3421

The Pharmaceutical Journal

AND

Transactions.

57 Cuike

THIRD SERIES.

VOLUME VII.

1876-77.

LONDON:

J. & A. CHURCHILL, NEW BURLINGTON STREET;

MACLACHLAN & STEWART, EDINBURGH; FANNIN & Co., DUBLIN;

TWIETMEYER, LEIPZIG.

1877.

699

PRINTED BY STEVENS AND RICHARDSON,
5, GREAT QUEEN STREET, LINCOLN'S INN FIELDS, LONDON, W.C.

The Pharmaceutical Journal

AND

Transactions.

VOL. VII.—JULY 1, 1876.

A SOURCE OF DAMAGE TO LINEN, ETC., MARKED WITH INK CONTAINING SILVER.

BY B. H. PAUL.

When linen etc., has been marked with any of the ordinary varieties of marking ink containing silver, it sometimes happens that the fabric becomes so weak at the part where the letters are traced that the least exercise of force suffices to produce a rent; and if the material marked is of delicate texture it is especially liable to injury in this way.

A similar effect was sometimes produced when marking ink was used which required the application of heat to the linen after the mark had been written, and it was then ascribed to the overheating of the iron under which the marked linen was pressed. That this was, in some cases, the real cause of the injury is very probable, but no such explanation of the effect above mentioned is admissible as regards marking ink that does not require the application of a hot iron to bring out the mark.

Quite recently I had occasion to examine a quantity of linen which had been affected in the way described. It was a new supply of house linen to a public establishment, and each article had been marked with a well-known kind of marking ink by means of a box-wood stamp. The mark consisted of a monogram surrounded by a garter forming a circle about two inches in diameter. This was printed upon the linen in the centre of each article, and after the linen had been for some little time in use the fibres gave way exactly at the places where the ink marks were situated, so that eventually a piece came away altogether, leaving a hole corresponding in size to the device marked on the articles. This happened in so many instances and so soon after the linen had been taken into use that it became a very serious question who was responsible for the damage.

Several conjectures were started to account for the results observed, and among the first to be put forward was the idea that the marking ink, being a chemical preparation, must have contained something of an acid or corrosive nature which had burnt the linen. Others assumed that the fibre of the linen had been cut by the pressure exerted upon it when the marking was done with the box-wood stamp, or at least so much weakened in this way that it subsequently tore more readily than the adjoining portions upon which no pressure of the raised parts of the stamp had been exercised. Both of these suggestions were consistent with the appearance of the damaged linen, for on examination it was easily recognizable that the injury was very sharply limited to those parts of the fabric which bore the marks of the device, and that the parts immediately adjoining still retained their natural strength and capability of resisting strain. But though the injury which the fabric had undergone was thus obviously connected with the presence of the marking ink upon the linen, it was not difficult to arrive at the conclusion that however plausible the above mentioned attempts at explanation might appear at first sight they would not bear the test of minute examination. The marking ink on examination proved to be free from uncombined acid; it was in fact strongly alkaline, and like the majority of such preparations it was a silver salt that had been rendered ammoniacal, and there was nothing to support the idea that it could produce any corrosive effect. Still less probability attached to the idea that the fibres of the linen had been damaged by the mechanical pressure of the stamp used in marking the linen, for the force required for that purpose would be quite inadequate to cut the fibre.

In addition to the absence of any acid from the marking ink that had been used in this case, it was further observed that the linen which had not been washed at all was free from any injury: and since those articles would retain the whole of the ink printed upon them and be more fully exposed to the influence of any corrosive ingredient than the articles which had been washed, it became quite evident that the damage presented by the linen was not referable either to the presence of corrosive ingredients in the marking ink or to the weakening of the fibre by the direct action of the ink. At the same time there was an evident connection between the occurrence of the damage and the washing of the linen. Those articles which had been washed once or twice showed no sign of injury, or at least very slight injury, while in the case of others which had been washed a dozen times there were holes corresponding to the place where the mark had been, or the marked parts of the linen were so weakened that they tore asunder with the least strain.

However, it was ascertained that mere washing was not in itself sufficient to cause the damage which the linen had undergone, for two of the marked articles subjected to this operation with ordinary soap and water about a score times and in a rougher manner than usual, failed to show any signs of injury such as that complained of. Even after boiling one of these articles subsequently for an entire day in a strong solution of soda it remained quite sound at the parts marked as well as elsewhere. It appeared, therefore, clear that the injury was not the result of any influence necessarily appertaining to the washing operation, and further, that there was a probability of its being due to something abnormal in the way that operation had been carried out in this case.

The evident connection between the extent of injury and the number of times the linen had been washed showed that the action was gradually progressive, and the local connection of the injury in the linen with the marks of the ink likewise indicated that the substance of which those marks consisted had something to do with the action which resulted in damage to the linen. The inquiry was therefore narrowed to these limits, and as the ink mark probably consists of silver oxide, the question was, what combination of other conditions besides the presence of that substance would result in corrosion of the linen? Remembering the statement that bleaching powder is sometimes used to expedite the whitening of linen, and the fact that oxide of silver is converted into chloride of silver when brought into contact with a solution of a hypochlorite, it struck me that the conditions under which this reaction takes place were such as to be worth examining with the view of ascertaining whether they might not furnish an explanation of the damage done to the linen. The reaction which takes place is represented by the following equation, taking calcium hypochlorite as being represented by a solution of ordinary bleaching powder.

$$Ag_2O + CaCl_2O_2 = 2\,AgCl + CaO + 2\,O.$$

Parallel with the formation of chloride of silver and lime which takes place in this reaction, there is a liberation of oxygen, and the conditions under which the reaction takes place are precisely those which are favourable to the production of that allotropic form of oxygen known as ozone. The reaction takes place without the aid of heat by the mere contact of the silver oxide with the hypochlorite solution; it is not a sudden reaction, because the particles of silver oxide becoming coated with chloride are protected from further change until this coating is removed, and consequently the action is progressive and gradual. The other product of this reaction being ozone, the well-known characters of this form of oxygen would fully account for damage of the kind described being produced when hypochlorite solution is used by laundresses in washing linen marked with silver oxide, for in addition to the bleaching action of ozone it corrodes most organic substances, and by its action upon the fibre of linen would produce effects such as those above described. The progressive character of the damage and the connection between its extent and the number of times the linen has been washed, are also circumstances which favoured the conclusion that the damage was caused by the use of bleaching powder in washing the linen.

In order to test this conclusion some of the articles were dipped into a solution of bleaching powder, and it was found that when a sufficiently strong solution was used the linen presented the appearance of having had pieces corresponding to the ink marks cut out with a sharp steel punch. With a weak solution the results were not so marked, but when the action was continued long enough the fibre of the linen was rendered so weak at the marked places that with a very slight strain the articles treated in this way presented all the characters of damage shown by the linen after it had passed several times through the hands of the laundress.

Analytical Laboratory, 106, *Fenchurch Street, E.C.*

NOTE ON SO-CALLED WOOD OIL.

BY PROFESSOR F. A. FLÜCKIGER.

In a note communicated to the *Archiv der Pharmacie*, for May, the author states that he has found that the ethereal oil of Dipterocarpus balsam, known as Gurgun balsam or wood oil, when dissolved in about 20 parts carbon bisulphide, and a drop of a cooled mixture of equal parts of sulphuric and nitric acids added, takes a splendid violet colour. A single drop of the ethereal oil is sufficient to produce the reaction, and the colour lasts several hours. It is not prevented by the presence of resin or by copaiva balsam, so that the reaction takes place with the crude Gurgun balsam, or even when that is mixed with eight times its volume of copaiva balsam. The reaction can therefore be used to detect the presence of Gurgun balsam in copaiva balsam. Under the same conditions fish liver and oil of valerian are also coloured a beautiful violet, but only transiently so. In order to exclude fish oil from the test it is recommended to distil off the ethereal oil, although on account of its high boiling point (250° to 260° C.) this is not an agreeable task. Only a few drops are required, however, for the test.

Should a wood oil not correspond to this reaction the author thinks it might probably be due to the fact that some Dipterocarpus trees yield a varying balsam. The balsam is obtained in large quantities from the following species:—*Dipterocarpus turbinatus*, Gaertn. (syn. D. lævis, *Ham.*, D. indicus, *Bedd.*), *D. incanus*, Roxb., *D. zeylanicus*, Thw., *D. trinervis* Blume, *D. littoralis*, Bl., *D. alatus*, Roxb., *D. hispidus* Thw., *D. gracilis*, Bl., *D. retusus*, Bl. All these species occur in India and in the Archipelago, and the last even in the Philippines. Their resinous juice is used very generally as varnish, hence the name "wood oil." It is hardly probable that they all yield a resin chemically and physically identical. The author has found that the oil distilled by him from undoubtedly true dipterocarpus balsam is dextrogyre, whilst Werner, who first examined Gurgun balsam, in 1862, speaks of it as lævogyre. In all the specimens examined by the author to the present time, however, he has found the colour reaction constant.

Another possible ground for failure in obtaining the reaction is its confusion with other liquids used for similar purposes. The balsam obtained from *Hardwickia pinnata*, Roxb., a leguminaceous plant, is used in Southern India in the same medical cases as copaiva balsam; but an authentic specimen in the author's possession is not fluorescent like Dipterocarpus balsam, and dissolved in carbon bisulphide gives only a yellow colour with the acid mixture. The author does not know, however, that it is ever there called "wood oil."

A fat oil, used in enormous quantities in Eastern Asia for paint and varnish, and also as a drastic medicine, and very generally called "wood oil," is obtained from the seeds of *Aleurites cordata*, Muller (syn. Dryandra cordata, *Thunb.*, Elaeococca Vernicia, *Sprgl.*, E. verrucosa, *A. Juss.*), a euphorbiaceous tree. The tree is common in China and Japan, of very characteristic appearance, and is known in China as the "tung tree." The oils from the seeds of *Ricinus* and *Croton Tiglium* differ in chemical properties and physiological action from most known oils; how far such peculiarities occur principally in the Euphorbiaceæ is a question that yet requires answering. That the "wood oil" from the Tung tree is a fat worthy of notice is shown by the experiments of Cloez. This chemist obtained from the seeds of *Aleurites cordata*, by means of carbon bisulphide, 41 per cent. of a fixed oil, forming a solid crystalline mass below 32° C. When on the contrary the seeds were treated with ether an oil was obtained that did not solidify even at − 18° C. But what is most surprising is that when prepared either by pressure or by one of the solvents mentioned, and heated in the air to 200° C., it changes suddenly into a solid transparent jelly, which is no longer soluble in ether or carbon bisulphide.* This change takes place also after a few days, when excluded from the air, under the influence of light alone. The oil dries more rapidly than linseed oil. The principal acid in it was obtained in crystals that melted at 44°, but very rapidly resinified, and therefore did not consist of linoleic acid.

In many respects this Chinese wood oil recalls the singular "axin" or "age" of Mexico, examined by Hoppe-Seyler, in 1860.† The Nin fat of Yucatan, described by Dondé,‡ might also be mentioned here. All these oils appear to correspond in yielding a peculiar body, which Mulder described as linoxyn.

NOTES ON INDIAN DRUGS.

BY W. DYMOCK.

(*Continued from Vol. VI., page* 1003.)

EMBELIA RIBES.—*Local name*, WAIWARUNG,

Common in the neighbourhood of Bombay, has a nearly globular red fruit, rather smaller than a peppercorn, which grows in large bunches. The drug has the five partite calyx and stalk often attached; the outer shell is striated from the base to the apex, where there is a small beak; its colour is reddish-brown, marked with dark spots. Inside the outer shell is the seed, enveloped in a delicate membrane, on removing which a cup-like hollow is seen opposite the insertion of the stalk. The seed is horny, of a reddish colour, and its external surface appears to be covered with spots of white mildew; this appearance, however, with the aid of a lens, is seen to be due to a delicate crystalline efflorescence. If kept for any time the outer shell of the fruit becomes nearly black, hence the statements that two kinds are met with in the shops. From the rapidity with which this change takes place I should suppose the quality of the drug to be not affected by it. Waiwarung is held in high repute as an anthelmintic among the country people, especially in cases of tape-worm, a disorder not uncommon among the native Christians of the western coast. The dose is a teaspoonful of the powder twice a day for a child, and a dessert spoonful for an adult; it is not purgative; the taste is rather pleasant, slightly astringent, and not unlike that of tea leaves. The worm is expelled dead. A purgative should be given to prepare the patient for the drug.

ADANSONIA DIGITATA.—*Local name*, GOWIK CHENTZ, *or* CHUREE CHENTZ.

This remarkable tree is not uncommon upon this part of the western coast. The fruit varies much, both in shape and size; some specimens correspond to the description given by Adanson and others to that of Guibourt (confer. Guibourt, vol. iii., p. 644). The shell is hard, woody and light, clothed with a dull green, felt-like down, composed of simple hairs; it is made up of regularly arranged wood cells, intersected here and there by vascular bundles. The fruit is full of a subacid pulp, which is divided by fibrous bands into a number of compartments. The pulp dries up into a starch-like powder, which adheres together in polyhedral masses, a seed forming the centre of each. The seeds are enclosed in a horny shell, with a rusty red rough exterior; they are kidney shaped, and half an inch in length. The structure of the bark is very confused: it consists of a mixture of pitted and wood cells, without any regular arrangement; the epidermis is scabrous, and appears to consist of the desquamating cells of the bark. When fresh the bark is about five-eighths of an inch in thickness; a section shows a mottled yellowish green and reddish brown surface; internally it is intimately united with the woody fibre of the trunk; it does not taste bitter, but is said by Duchassaing to be a useful substitute for cinchona. The pulp is very mucilaginous, and has a pleasant cool subacid taste, which it retains when dry. It may probably be a useful demulcent acid refrigerant. No part of the tree appears to be used medicinally in Bombay. The fruit makes floats for fishing nets and bottles for holding water.

SALMALIA MALABARICA.—*Local name*, SAUR.

The astringent exudation Muchurrus, or Supari che phool. A red fungus like mass, changing to a dark mahogany colour when old; it is brittle and flaky. The larger tears are hollow in the centre, and the cavity is of a cinnamon colour, and has a cellular appearance. Muchurrus is not a simple juice but the product of a diseased action, being a proliferation of the cells of the suberous tissue of the bark. Upon making a section of the diseased part a number of small cavities are seen which contain a semitransparent jelly-like substance, consisting of oblong cells with botryoidal nuclei. At the margin of the cavity the columns of healthy cells are seen breaking up and the cells separating to join the jelly-like mass; this gradually increases in size, and finds its way to the surface to be extruded as muchurrus. Upon its first appearance it is of an opaque yellowish white colour, firm externally, but semi-fluid internally, and there is no central cavity. The dry exudation when soaked in water swells up and communicates a red colour and slight astringency to it; a section can then be made to show its cellular structure. I have not been able to satisfy myself as to the cause of the disease in the bark which produces this substance, but traces of insects are always to be seen at the site of exudation. Incisions in the healthy bark yield nothing. Muchurrus has a purely astringent taste like tannin, for which it probably is an efficient substitute. I have only met with one kind in the market.

ODINA WODIER.—*Local name*, SHIMPTEE, *or* MOOI.

The gum, Shimptee, or Mooi cha goud. This gum is partly in tears of a yellowish tinge, and partly in colourless angular fragments, which are full of fissures like gum arabic; it has a disagreeable taste, and is not astringent; about one half of it is com-

* *Comptes Rendus*, Sept. 1875, p. 469, and 1876, p. 501.
† Gmelin, vol. vii., p. 1471.
‡ *Pharm. Journ.* [3], iv., 836.

pletely soluble in water, the remaining portion forms a slimy mucilage, but is not gelatinous. The soluble portion, which is feebly acid, is precipitated by alcohol, and in a less degree by oxalate of ammonium—not at all by perchloride of iron or borax. Odina gum is mentioned in the Pharmacopœia of India, but is probably of no medicinal value; it might be of use in calico printing.

ZANTHOXYLON Sp.?

The bark, Tejbul. A soft, light, reddish bark about five-eighths of an inch thick, in pieces about as large as the palm of the hand, trimmed, the epidermis being removed and the inner surface scraped; sometimes it is deeply fissured. The structure is like that of cork, only much coarser, which gives it a glistening appearance. The cells are about six times the size of cork cells. This bark is slightly aromatic, and is in repute as a stimulant.

Bombay, May 29, 1876.

(*To be continued.*)

ERGOTINE.

The researches of Professor Salkowski and other German chemists on the active principle in the preparation of ergotine were recently referred to. Professor Buchheim now writes to the *Klinische Wochenschrift* confessing that he also has not succeeded in isolating completely that principle, though he worked on it for several months; and he states his reasons why he thinks that such isolation might be impossible, and that for practical medical purposes the infusion of ergot, or the freshly prepared extract, will alone remain available. The organization of the ergot fungus seems to him so low that its mycelium cannot build up organic matter, so as to constitute an alkaloid or glucoside substance from water, carbonic acid and ammonia, but feeds, so to speak, more directly on the vegetable material of the mother plant. He believes that less elementary compouds are taken up by it from the rye grain, and thinks the gluten the most likely material from which to form the gelatine-like substance which he isolated partly from ergotine. On this modified albuminous constituent of the rye, at a certain stage of its metamorphosis, he infers, depends the peculiar action of the fresh infusion or extract. Any further complex chemical processes and reactions for the isolation of the active substance must necessarily have changed it so much in its natural course of decomposition that it has lost its efficacy, in the same manner, for instance, as the decomposing albuminous substances of putrid blood lose their poisonous effects when decomposition has reached to a certain point.

The freshly prepared ergotine seems therefore to give alone a guarantee of success. For subcutaneous application it ought to be carefully neutralized by carbonate of soda, as it contains much acid, especially lactic acid, as Buchheim found, besides quantities of leucine.

MATÉ, OR PARAGUAYAN TEA.

Some interesting paragraphs respecting this substance are quoted in the *Revista Farmacéutica*, the organ of the Argentine Pharmaceutical Society, from an unpublished work by Dr. Bialet, entitled 'Compendio de Anatomia, Fiscologia é Higiene humana.' Of these the following is an abstract:—

The Maté or Paraguay Tea tree (*Ilex mate paraguayensis*), is a small tree belonging to the family of the Celastrineæ,* which reaches at the most a height of seven metres; ordinarily it does not exceed four or five. Its trunk is about twenty centimetres in circumference, and is covered by a whitish bark. The leaves are oblong, cuneiform, obtuse and finely dentate. It has axillary multipartite peduncles; calyx tetrasepalous; the corolla with four petals in the form of a crown; stile none; stigma 4-fid; fruit a 4-seeded berry. The plant grows very abundantly in Paraguay, North Corrientes, Chaco, and South Brazil, where it forms woods called "*yerbales*."

* Not to the Iliciea, as stated by some authors.

According to Dr. Mantegazza, maté is prepared in Paraguay in the following way:—The entire trees are cut down, and the small branches and shoots are taken with the leaves and placed in the tatacúa, a plot of earth about six feet square surrounded by a fire, where the plant undergoes its first roasting. From thence it is taken to the *barbacúa*, which is a grating supported by a strong arch, underneath which burns a large fire; here it is submitted to a particular torrefaction, determined by experience, which develops the aromatic principle. Then it is reduced to a coarse powder in mortars formed of pits dug in the earth and well rammed. It is next put into fresh bullock skins, well pressed and placed in the sun to dry. The packages (*tercois*) thus obtained, which weigh 90 to 100 kilograms, are very compact; and have an average value in commerce of one to two dollars the kilo, according to quality, those of Paraguay and Missiones being the better, or least hurtful, those of Oran and Paranaguá being much more prejudicial to health.

Of all the analyses of maté that have appeared in books, Dr. Bialet considers not one, up to the present time, deserves much credit. Senor Arata, however, who has devoted much time and skill to the subject has placed the following data at his service:—

Maté contains in 100 parts:

Organic combustible substances	91·685
Ash	8·315

The ash contains—

Calcium Oxide	12·344
Magnesium Oxide	11·395
Sodium Oxide	7·281
Potassium Oxide	2·984
Manganese Oxide	2·500
Ferric Oxide	3·410
Sulphuric Acid	0·926
Hydrochloric Acid	0·716
Phosphoric Acid	5·540
Carbonic Acid	8·150
Sand, Silica, Carbon, and Loss	44·754

It will be understood that the enormous relative quantities of sand found in the analysis is a result of the mode of preparation, in excavations made in the soil.

The plant contains—

Principles soluble in Ether	9·820
" " Alcohol	8·482
" " Water	26·208
" " Water Acidulated with Hydrochloric Acid	7·260
In Solution of Caustic Soda	16·830
Cellulose	13·280
Water	9·000
Sand	9·120
	100·000

Among the soluble principles is an average of 1·300 of caffeine. The quantity, however, was found to be very variable in different plants analysed; the Paraguay and Missiones plants contained the most and the Paranaguá and Argentine the least. Senor Arata has made a careful search for caffeic acid and the caffeates that some say they have found in maté, but hitherto always with negative results; the same remark applies to the examination for a volatile acid.

The tannin of maté is peculiar; it does not tan hides, and requires a special method for its estimation; the average amount obtained by the ordinary method is not more than 12 per cent.; but the whole quantity present amounts to about 16 per cent.

Maté contains also a large quantity of a peculiar fatty matter, not entirely saponifiable by potash, besides pectic matters.

Comparing maté with the other caffeic substances it ranks between coffee and tea for the proportion of caffeine it contains, and has the largest proportion of mineral salts.

The action of maté, like that of all other caffeic substances, is upon the nervous system; but though it contains a large quantity of caffeine it does not exalt the peripheric nerves like tea, nor the cerebric like coffee; but rather contributes in a high degree to the indolence and drowsiness of the ordinary drinkers of maté, whose mental faculties become at length disarranged and impoverished to a lamentable degree. It accelerates the cardiac contractions, producing many more affections of the heart than tea or coffee. Upon the digestive organs it acts variously; no other beverage disturbs them so much, though there are persons who can tolerate its use. It accelerates the peristaltic movements and produces an irritation of the organs generally. These effects are produced in whatever way the maté may be taken, but the most injurious effects are produced upon the mucous membrane when the maté is taken hot and is sucked through a "bombilla," as it then passes into the stomach uncooled by previous contact with the mouth.

When the use of maté is prolonged it becomes an imperious necessity, such a gloominess following abstention from it, that habitual drinkers would rather go without food than without maté. The moderate use of two or three doses a day during the summer heats or great fatigue is convenient, but it should be taken from a cup. It adds to the disadvantage of the "bombilla" that by indiscriminate use of the same bombilla by different persons it may become the vehicle of contagion for the most repulsive complaints.

A HITHERTO NEGLECTED SOURCE OF IODINE. IODINE AND BROMINE IN FRESH-WATER PLANTS.*

BY H. ZENGER, OF MUNICH.

As early as 1862, Mr. Retter† examined the ashes of *Cladophora glomerata* for iodine, and on heating in a closed tube the palladic iodide, which he had obtained by precipitating the solution of the ashes of the plant with palladious nitrate, he detected the violet vapour of the liberated iodine. Although only a very small quantity of the plant could be obtained, from a reservoir in the garden of Professor Dr. G. C. Wittstein, he was, nevertheless, quite able to complete a qualitative analysis of the ashes and to prove the presence of iodine.

My own efforts were chiefly directed, first, towards the quantitative determination of the bromine, whose presence, though not yet detected in fresh-water plants, was suspected by me as a companion of the iodine; secondly, to try some methods of precipitation for the iodine other than the palladium solution; and thirdly, to examine various fresh-water plants, not yet investigated, and to obtain the iodine and bromine from them in a pure state, even if in very small quantities.

The extensive peat-bogs, as well as the canals for irrigation and drainage of the estate "Zengermoos," placed me in a position to collect great quantities of fresh-water plants with which to begin my investigations.

As in the quantitative analysis of Mr. Jessler‡ to which I shall hereafter call attention, I had a sure basis for my operations, [illegible] an my work with *Cladophora glomerata.*

* Translated [illegible] the *American Chemist.*

† Vierteljahresschrift für pract. Pharm. von Wittstein, xi, 545.

‡ Vierteljahresschrift für pract. Pharm., xii, 279, 1863.

The plants, after being collected, were most thoroughly freed from all animal life, mud, and foreign organic and inorganic substances, and dried in an airy place (granary) on grain-sifters of split tubing. In cleansing the plants, innumerable water and swamp-animals were found, among which I will mention the following; Large numbers of four species of fresh-water Polyps (Hydra), chiefly *H. vulgaris* and *H. fusca*, *H. grisea* and *H. viridis* being less abundant. Also an innumerable quantity of water-snails (Limophila), often replaced by several species of *Limnæa*, such as *L. vulgaris*, *palustris*, *ovata*, *stagnalis*, *peregra*, *truncatula*, *auricularia*, and numbers of *Planorbis* (Ger. "Tellerschnecken"); e. g., *P. hispidis*, *vortex*, *spirorbis*, *marginatus*, *charteus*, *leucostoma*, *contortus*, *complanatus*, and *nitidus*.

Among the most prominent insects present, both in the larva and perfect state, were the large water beetle—*Dytiscus latissimus;* also, *Gyrinus natator*, *Nepa cinerea*, and *Notonecta glauca*; two specimens of Nepa and Notonecta making themselves felt by their penetrating stings. The larvæ of the *Sialidæ* were rarely to be found; those of the *Ephemerinæ* more frequently.

When we consider that the above named animals were present, not singly but in masses, and some of them in different varieties, we can get an idea of the population of these water plants, and understand why the water-fowl are so fond of them.

I will only add that, to cleanse a quantity of *C. glomerata*, which only weighed 18⅜ pounds, I was obliged to work five days, with but slight intermission, and my hands were covered with blisters, and remained swollen for a fortnight, from the attacks of the inhabitants.

In spite of all my pains, the tiny skeletons of *Limnæa* and *Planorbis*, which before had been invisible, could be discerned in the ashes.

In a botanical point of view, I will briefly remark that *Cladophora glomerata* was called in the older classifications of the fresh-water Algæ *Conferva glomerata*, L., also *Chautrausia glomerata*, Dec. In the newer classifications, "Conferva" (English), "Crow Silk"—French, "la conferve") forms a species of the family of the *Confervaceæ*. It consists of long, fine, dark-green threads, and, with its kindred, assists in the formation of peat. The green colour is due to chlorophyll, which is contained in the cells.

Examination of Cladophora glomerata.

To determine the amount of water contained in it 2000* of the air-dried plants were heated in an air-bath at 110° C., and lost thereby 8·950 per cent. For analysis, and for the various iodine and bromine reactions, 100·0 of the plant were carefully reduced to ashes in a porcelain dish, over a charcoal fire, with frequent stirring with an iron spatula. This required considerable time, owing to the large amount of lime that was present. These 100·0 gave 52·850 ash; *i.e.*, over half the weight of the dried plants. 2·0 of these ashes were treated with distilled water for an half an hour in a porcelain dish, at ordinary temperature, filtered; the residue washed, and dried in an air-bath at 110° C., and weighed; the weight being 1·899. The loss in weight is the amount of soluble salts found in the ashes:—

2·003
1·899

0·101—or in 100 parts = 5·050.

The further investigations were conducted exactly in accordance with the directions of the approved method of Dr. G. C. Wittstein, for the analysis of the ashes of plants or of organic substances in general, and gave the following result, calculated for 100 parts. I place the analysis of Jessler alongside of my own for the purpose of comparison:—

* All these weights are expressed in grammes and fractions of the same.

	Zenger.	Jessler.
Potash	1·729	0·256
Soda	3·837	4·028
Lime	48·937	43·655
Magnesia	1·047	1·365
Alumina	0·029	0·225
Ferric Oxide	1·148	0·388
Mangano-manganic Oxide	0·342	——
Chlorine	1·564	0·770
Iodine	0·043	——
Bromine	0·017	——
Carbonic Acid	31·450	25·229
Sulphuric Acid	2·555	10·832
Silicic Acid	5·555	7·822
Phosphoric Acid	7·711	3·054
Sodium		0·504
	100·00	99·124

The 0·504 sodium was combined, according to Jessler, with 0·770 chlorine to form 1·274 NaCl. Iodine having already been discovered, I began my investigation with the qualitative determination of bromine, whose presence I suspected along with the chlorine and iodine. For this purpose I chose the following way, which is, without doubt, the easiest: 10·0 ash were treated with cold water and filtered. As the filtrate gave a very slight alkaline reaction, in order to avoid the escape of iodine and bromine, I added a little sodic carbonate and concentrated the solution. In this way most of the salts separated out in crystals and could be removed by filtration, excepting the salts of the alkalies. The filtrate was then saturated with hydrochloric acid and chlorine water added, whereupon the iodine present was set free; though, nevertheless, converted into iodic acid by the excess of chlorine. At the same time the bromine was liberated, and on being caught by agitation with chloroform showed not only its characteristic colour, but also its reaction with organic substances, imparting an intense orange-yellow colour to starch. *The presence of bromine was thus clearly proved.* Before I speak of my method of determining the bromine quantitatively, or of my method of separating the chloride, iodide, and bromide of silver, I will mention one or two of the means I have used to precipitate the iodine. The basis of these is the precipitation of the iodine in a slightly acid solution, in the presence of chlorine and bromine, as *cuprous iodide.* It would, I admit, be possible to employ this method of precipitation quantitatively by using cupric sulphate alone; the result obtained would have to be doubled, however, as only half of the iodine would be precipitated as cuprous iodide, and the other half set free. By a simultaneous or previous addition of some reducing agent, such as SO_2 or $FeSO_4$, the whole of the iodine may be thrown down as Cu_2I_2. The precipitated Cu_2I_2 contains when dried at 40° C., 4 per cent. water, and is, therefore, Cu_2I_2Aq or Cu_2O,HI. On this account I dissolved in a porcelain dish, with the necessary amount of water, five parts by weight of cupric sulphate, and eight parts of ferrous sulphate, and, as a little ferric oxide had been deposited, I added hydrochloric acid until it disappeared. With this solution the precipitation of all the iodine was effected exactly as if I had treated a very dilute solution of potassium iodide with an equal volume of the above-mentioned solution of cupric and ferrous sulphate. Nevertheless with this reagent, I was, in one experiment, unable to obtain a precipitate in a solution from the ash, although through the use of another reagent, I had been convinced that iodine was present in minute quantity. I shall return to this fact again after I have mentioned another method of determining iodine suggested by Dr. F. Mohr.* Dr. Mohr proposes the following way: In 200 c. c. of a clear solution consisting of cuprous chloride, sal ammoniac, and water, the first drop of a potassium iodide solution, which contained 1 per cent. iodine (1·308 potassium iodide) to the litre, caused immediately a large precipitate. Thirty-two drops from the pipette used made 1 c. c., therefore each drop contained $\frac{0·01}{32} = 0·0002$ iodine, which reckoned for 200 c. c. $= \frac{3}{2,000,000}$ iodine, which were detected by this reagent. Therefore, for a complete precipitation of iodine from its soluble salts, we do not need either palladium or thallium. The palladious oxide test is less delicate than with cuprous chloride.

A very dilute solution of potassium iodide was still further diluted with water, and poured into two glasses, side by side. To one of them was added cuprous chloride which had been clarified by ammonic chloride; to the other palladium solution. After some time the former showed a milky cloudiness, but the palladium solution none at all. These are the facts presented by Mohr. I might with certainty consider that Mohr had not regarded the difficult solubility of cuprous chloride *per se* in water, and that owing to a too small addition of NH_4Cl the Cu_2Cl_2 came down and caused the cloudiness which he concluded was cuprous iodide.

Let us consider these points more closely. The basis and starting point of Mohr's method of proceeding is, strictly speaking, identical with that by means of cuprous oxide; for in both cases we have to do with the lower state of oxidation of the copper, whether suboxide or subchloride is immaterial, as the secondary reactions taking place at the same time are only important so far as they may act to dissolve or decompose the Cu_2I_2 after it is formed. That this is really the case, my own observations have shown. The resulting salts of the ferrous oxide dissolve the cuprous iodine in no small quantity, a fact which Dr. Fleischer* has also noticed. The latter proposes stannous chloride as a reducing agent. The precipitation, he says, is complete and the stannous chloride does not act in the least on the cuprous iodide to dissolve it. Both facts I have found to be entirely true.

From all these experiments, it follows, that the precipitation of iodine as Cu_2I_2, in the presence of chlorine and bromine, could be conducted on a large scale with success, where a comparatively small loss of iodine is of no great moment, and that this method more than answers the requirements of exactness, which chemical industry on a large scale demands. But for a quantitative determination of iodine in very dilute solutions, such as we meet with in the analysis of ashes and many mineral waters, none of these methods give perfectly satisfactory results, and we are always forced back to the palladious oxide method. Dr. Mohr declares that with cuprous chloride a milky cloudiness will occur even after the palladium solution shows no more reaction. As already remarked, in a very dilute solution I obtained no precipitate of cuprous iodide, even after long standing, while the addition of palladium solution caused an immediate precipitate. That this precipitate was really palladic iodide was shown by drying and heating it in a tube closed at one end, whereby the violet iodine vapours were distinctly to be seen. Hence: *In delicacy none of the hitherto discovered methods of precipitation can replace the palladious nitrate.*

In the investigation of other water-plants, in which I am at present engaged, I shall have opportunity to note more exactly the degree of dilution in which the palladium solution will still show a reaction.

The quantitative determination of the iodine and bromine I accomplished in the following way: The difference of the behaviour of the chloride, iodide, and bromide of silver to different degrees of concentration of ammonia, served as a basis for my work. For precipita-

* Mohr, Zeitschrift von Fresenius. XII. Jahrgang, 4 heft.

* Titrirmethode als selbstständige quan. analyse, § 33, Kupfer und Iodbestimmung, p. 73.

tion, a concentrated solution of argentic nitrate (1 : 4) was employed. The washed precipitate was treated with 5 per cent. ammonia water; it dissolved the argentic chloride; on the filter remained the argentic iodide and bromide. The argentic chloride was precipitated with nitric acid, and the iodide and bromide having been washed were treated with strong (15 per cent.) ammonia. Only the argentic bromide was dissolved, which having been filtered off was likewise re-precipitated by nitric acid.

In all the operations, such as digesting, precipitating, filtering, and washing, the light was excluded as much as possible. The endeavour to prepare a little iodine from the ashes of *C. glomerata* did not succeed, owing to the circumstance that I employed a too thin and soft glass tube, which melted on being heated, before the palladic iodide contained in it was decomposed. However, I removed the palladic iodide from the tube and heated it in a platinum crucible, whereupon the iodine escaped in a thick cloud. In this manner it could not be caught. I have therefore commenced work upon a still larger quantity of ash to obtain the iodine.

Palladic iodide certainly requires quite a high temperature to decompose it into its constituents.

Mr. Carl Petter remarks that in his experiments the loss in weight of *C. glomerata* dried at 110° C. was 8 per cent. Mr. Jessler calculated that 18¾ lb. of the dried algæ gave 0·23431 grm. iodine: *i.e.*, 23·431 grms. per cwt. According to my analysis, the amount of ash in the plant was 52·850 per cent., and in 1 cwt. of ash there were 21·50 grms. iodine, and 8·50 grms. bromine. This large amount of ash consisted chiefly of lime, and had its origin in the extremely "hard" waters of Zengermoos.

Without reference to an analysis by Prof. Kaisen, this fact would be proved alone by the tufa and the broad belt of that peculiar, white, calcareous earth, known as "alm," which stretches eastward towards Erding. Without doubt both the tufa and alm owe their origin to the Isar, which contained the calcic carbonate in solution and deposited it in Erdingermoos. A piece of sound wood which has lain for a short time in the Golbach, a stream which flows around Zengermoos, loses the power to float, owing to the impregnation with lime. The bed of this brook is formed, for the most part, of alm and tufa; from this fact comes the large percentage of lime in the soil and in the plants, as well as the semi-alpine flora of the district. The yellow, sweet smelling *Primula auricula*, with its flesh-coloured leaves and powdered stalk, flourishes here, as well as many varieties of Gentian, *e.g.*, *Gentiana lutea, purpurea, pannonica, acaulis, punctata*. It is readily to be seen that the lime in Cladophora glomerata existed previously as carbonate from the fact that the plants effervesce strongly with acid, which was long ago noticed.

How varying the composition of one and the same plant may be, according to its location, can be seen from the analysis of Mr. Jessler and my own. He obtained the plants out of pure spring water; I, out of very hard water. It would be impossible to detect iodine in this water, no matter how concentrated, *but the plants have the property of absorbing the iodine and bromine, and thus concentrating and storing them up.*

I think that after my experience with Cladophora and other water plants, I am justified in believing that iodine and bromine occur in water plants to an extent as yet hardly dreamed of, and that also in land plants these bodies can be recognized with certainty.

Karl Sprengel, whose worth has been wrongly undervalued, to whom with better right than to Liebig we should ascribe the foundation of the new scientific agriculture (for Liebig only built upon the foundation laid by Sprengel, and more than ignored him whose too great modesty and lack of self-conceit—faults no one ever accused Liebig of—were his only mistakes), says: "Very probably iodine is contained in all earths which are rich in sodic chloride. I have found it in small quantities in the subsoil of the marshes on the coast of the North Sea. *Whether or not the iodine belongs to the nourishing materials absorbed by the plant, which is probable, it is at any rate present,* and we will therefore, etc."*

That the manganese was present as manganous oxide in the ashes is proved by the evolution of chlorine on treating the ash with hydrochloric acid.

Alumina, almost completely ignored by Liebig, I found in every analysis of the ash. The same result has been very often obtained in Wittstein's laboratory, and by scientists such as Sprengel, Boussingault, and others, who have done so much for agriculture. All these have found alumina constantly present and often in comparatively large quantities in the ashes of plants, and hence we are obliged to set it down among the prominent constituents of plants.

On account of the great number of fresh-water plants existing everywhere, it is quite possible that the manufacture of iodine from them may grow to be a branch of chemical industry. I shall direct my attention to the examination for bromine and iodine, of as many land and water plants as possible. At present I am engaged upon another water plant, *Lemna minor*. This plant surpasses *Cladophora glomerata* in the large amount of salts soluble in water it contains. Iodine, in considerable quantity, and bromine are present. The exact quantitative results will be given later. Nevertheless we can already say with certainty that iodine and bromine occur much more extensively in the vegetable kingdom than has hitherto been supposed.

A METHOD OF ESTIMATING BISMUTH VOLUMETRICALLY.†

BY M. M. PATTINSON MUIR, F.R.S.E.,

Assistant Lecturer on Chemistry, The Owens College, Manchester.

Löwe (*J. prakt. Chemie*, lxvii., 288 and 463), has described two salts produced by the action of potassium chromate and potassium dichromate respectively upon warm, nearly neutral solutions of bismuth nitrate. To the first of these salts he assigns the formula $3Bi_2O_3.2CrO_3$, and to the second the formula $Bi_2O_3.2CrO_3$. The same author has described a process for estimating bismuth gravimetrically, based upon the formation of these salts (*ibid.*, 464). Pearson has described a process for the estimation of bismuth, nearly identical with that of Löwe, and in addition a process based upon the same reaction, for the volumetric examination of the same metal (*Phil. Mag.* [4], xi, 204). In Pearson's volumetric process potassium dichromate solution is run into the solution of bismuth until the whole of that metal is precipitated, the termination of the reaction being determined by noting the point at which the supernatant liquid acquires a permanent yellow tint.

The process described by the author of the present paper depends upon the facts concerning the formation of chromate of bismuth made known by Löwe and referred to above. Potassium chromate or potassium dichromate solution is run into a nearly neutral solution of bismuth nitrate until the whole of the metal is precipitated in the form of chromate. The final point of the reaction is determined by bringing a drop of the supernatant yellow liquid into contact with a drop of the silver nitrate solution upon a white slab, when red silver chromate is produced.

On account of the uncertainty which still exists in reference to the exact composition of the chromates of bismuth, and also on account of the fact that a slight excess of either of the potassium chromates appears

---

* Karl Sprengel. Chemie für Landwirthe, Forstmänner und Cameralisten. 1 Theil, p. 334. Gottingen, bei Vanderhœck und Ruprecht, 1831.

† From a paper read before the Chemical Society (*Journ. Chem. Soc.*, April, 1876.)

necessary in order to cause the complete precipitation of the bismuth salts, no attempt was made to calculate the exact quantity of chromate needed to precipitate a known weight of bismuth, and upon such a calculation to base the composition of a standard liquid; but the plan was adopted of titrating a dilute chromate solution against a standard bismuth solution, and from these results calculating the strength of the chromate in terms of bismuth precipitated.

The author first describes the results of the experiments made with a solution of potassium chromate. The chromate was purified by recrystallization from aqueous solution. About 10 grams were dissolved in 1000 c.c. of water. A solution of bismuth nitrate was prepared by dissolving a known weight of pure bismuthic trioxide (Bi_2O_3) in dilute nitric acid, and making up the liquid to one litre. The chromate solution was run into a measured quantity of the bismuth-containing liquid (made nearly neutral with ammonia and maintained at the boiling point) until a faint reddish colour was produced on bringing a drop of the supernatant liquid in contact with a drop of an aqueous solution of silver nitrate spotted upon a glass plate, which rested upon a sheet of white paper.

Partial neutralization of the acid liquid containing bismuth was effected by dropping in ammonia until a very faint precipitate was formed, then boiling the liquid, and continuing to add ammonia very carefully until the solution was but slightly acid. Before this point was reached a precipitate invariably formed, but it was found that this did not interfere with the results. If an excess of ammonia were inadvertently added it was found better to add nitric acid in quantity sufficient to dissolve the precipitate, and again to nearly neutralize with ammonia, rather than to add merely such a quantity of nitric acid as should cause but a faint acid reaction in the liquid. The chromate was run in from a burette graduated in tenths of a cubic centimeter and furnished with a glass stop-cock. After the addition of a few drops of chromate solution, the liquid was boiled for some minutes, and the precipitate was then allowed to settle, which it did very rapidly and completely. In order to bring a drop of silver nitrate solution on to the glass plate, and at the same time to prevent the continued exposure of this solution to the air of the laboratory—an exposure which always resulted sooner or later in the production of silver sulphide in the solution—a special apparatus was made use of, by which the formation of silver sulphide was reduced to a minimum. The formation of silver chromate only became apparent after a few moments, and when an excess of silver nitrate was used relatively to the quantity of potassium chromate in the drop of liquid. The following results were obtained:—

A. *Standardizing Chromate Solution.*

Bismuth taken.	c.c. of chromate used.
0·1623 gram.	27·6
„ „	27·2
„ „	27·2
Mean	= 27·33

1 c.c. = 0·005945 gram bismuth.

B. *Estimation of Bismuth by means of the Standard Chromate.*

Bismuth taken.	c.c. of chromate used.	Bismuth found.	Difference.
0·3246 gram.	55·0	0·3269 gram.	+ ·0023

A_1. *Standardizing Second Chromate Solution.*

Bismuth taken.	c.c. of chromate used.
0·3246 gram.	40·0
„ „	40·0
„ „	40·0
Mean	= 40·0

1 c.c. = 0·008115 gram bismuth.

B_1. *Estimation of Bismuth by means of Standard Chromate.*

Bismuth taken.	c.c. of chromate used.	Bismuth found.	Difference.
0·3246 gram.	40·8	0·3311 gram.	+ ·0065
0·3246 „	39·8	0·3229 „	− ·0017
0·6492 „	79·5	0·6452 „	+ ·0040
0·2494 „	30·5	0·2475 „	− ·0019

These results may be stated in another way. From the quantity of chromate used in each experiment the value of 1 c.c. of the liquid in terms of bismuth may be deduced. Thus, taking the second series of experiments, the following values are obtained:—

1. 1 c.c. of chromate liquid = 0·008115 gram bismuth.
2. 1 c.c. „ „ = 0·008115 „ „
3. 1 c.c. „ „ = 0·008115 „ „
4. 1 c.c. „ „ = 0·007956 „ „
5. 1 c.c. „ „ = 0·008156 „ „
6. 1 c.c. „ „ = 0·008166 „ „
7. 1 c.c. „ „ = 0·008177 „ „

The following results were obtained when working with a solution of potassium dichromate. The process was carried out in a manner similar to that already described. The dichromate was purified by recrystallization from aqueous solution:—

C. *Standardizing Dichromate Solution.*

Bismuth taken.	c.c. of dichromate used.
6·1623 gram	17·0
„ „	17·0
„ „	17·5
Mean	17·16

1 c.c. = 0·009458 gram bismuth.

D. *Estimation of Bismuth by means of Standard Dichromate.*

Bismuth taken.	c.c. of chromate used.	Bismuth found.	Difference.
0·1247 gram	13·0	0·1229 gram	—·0018
0·1247 „	13·0	0·1229 „	—·0018
0·2494 „	26·2	0·2478 „	—·0016
0·1247 „	13·1	0·1239 „	—·0008

If these results be stated so as to show the value of 1 c.c. of the dichromate liquid in terms of bismuth, as deduced from each experiment, the following numbers are obtained:—

1. 1 c.c. of chromate liquid = 0·009429 gram bismuth.
2. 1 c.c. „ „ = 0·009429 „ „
3. 1 c.c. „ „ = 0·009274 „ „
4. 1 c.c. „ „ = 0·009592 „ „
5. 1 c.c. „ „ = 0·009592 „ „
6. 1 c.c. „ „ = 0·009519 „ „
7. 1 c.c. „ „ = 0·009519 „ „

The dichromate method is, the author thinks, rather to be preferred to the chromate method. It is easy to crystallize potassium dichromate, and therefore easy to obtain a pure solution of this salt. The reaction with silver nitrate is more marked than in the case of the chromate, but a slight excess of silver nitrate should here also be added, and a little time should be allowed to elapse before a conclusion is drawn as to the completion of the process. The difference between the quantities of bismuth taken and the quantities found are smaller in the results obtained by the dichromate than in those obtained by the chromate method.

It is necessary to neutralize the greater part of the free nitric acid before running in the dichromate liquid.

The presence of a considerable quantity of chlorides also interferes with the estimation of bismuth by this method. The precipitate formed being totally unlike the chromate of bismuth usually obtained: it was white or light yellow, heavy, and granular, and probably consisted in large part of bismuth oxychloride.

Attempts were made to estimate bismuth by this method in the presence of nearly equal quantities of copper (as nitrate), of arsenic (as arsenious oxide), and of calcium as nitrate, but in no case were satisfactory results obtained. The metals which may exist in solution along with bismuth should therefore be removed before the estimation of the latter by means of potassium dichromate. Some experiments that were made showed that bismuth may be separated from other metals by the ordinary methods, and then estimated by the dichromate method.

The Pharmaceutical Journal.

SATURDAY, JULY 1, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

MILK OF SULPHUR.

THE discussion on the question "What is Milk of Sulphur," by the Society of Public Analysts has been useful not only in furnishing some members of that body with an opportunity of correcting their notions on this subject, but also as a means of eliciting an expression of opinion respecting it from two of the medical journals. It was indeed literally somewhat out of order that, on the occasion referred to, this question should have been raised by Dr. ALFRED HILL after he had so positively disposed of it at Birmingham but a few days before, and had succeeded in leading the magistrates to declare that the preparation known and in use, for more than a century and a half, by the familiar name of "milk of sulphur" cannot be lawfully sold now unless with a distinctive label stating that "it contains sulphate of lime."

But notwithstanding this inconsistency, suggestive of the old practice of hanging a man first and trying him afterwards, we trust some good may result from the discussion, especially since the President of the Society of Public Analysts took the trouble to expose the numerous fallacies into which the Public Analyst for Birmingham had fallen. The letter which appears in this number of the Journal from Mr. GROVES will also contribute to the same result. It is further satisfactory to find that the *Lancet*, in speaking of this subject and distinctly expressing objection to the sale of uncertain mixtures with titles capable of misconception, unreservedly admits that the title "milk of sulphur" can hardly be said to mean necessarily pure sulphur. Unfortunately, the misuse of this title by some persons as a designation of the precipitated sulphur of the Pharmacopœia has led to some confusion and difficulty. Whenever the term is used with that meaning the Pharmacopœia preparation should be supplied. But we are disposed to believe that in the majority of instances the title "milk of sulphur" is meant to indicate the old-fashioned preparation and that being so, as the *Lancet* observes, "there seems no reason why it should not be sold exclusively under that name."

The *Medical Times and Gazette* also admits that pharmacists have good reason to be dissatisfied with the decision of the Birmingham magistrates. Recognizing the fact that the old-fashioned preparation of sulphur, made—by authority of the old Pharmacopœia—in such a way as to contain a large proportion of sulphate of lime, has long been a popular remedy though it is no longer a Pharmacopœia article, it doubts the propriety of the demand that a druggist should be compelled to supply precipitated sulphur when asked by a customer for "milk of sulphur." Yet this is the position which Dr. HILL, of Birmingham, and certain other public analysts seek to maintain, and as it appears to us it was solely upon the assumption of this view as the correct one, that the decision of the Birmingham magistrates was based. That decision really begs the whole question and, instead of settling the matter, it adds to the necessity of bringing the case before a superior court.

METHYLATED SPIRIT, ETC.

JUDGING from some inquiries and communications that have reached us there seems to be still much uncertainty prevailing as to what is legal and what is not legal as regards the sale and use of methylated spirit and "finish." We doubt whether the permission of the Inland Revenue Commissioners to use methylated spirit would justify the application of it even for making Pharmacopœia preparations that are not intended for internal use, such as liniment of aconite or liniment of belladona. We are still more disposed to question the legality of selling these preparations when made with methylated spirit, inasmuch as the Pharmacopœia orders rectified spirit to be used and deviation from those directions would involve liability under the Sale of Food and Drugs Act, and under the 15th section of the Pharmacy Act, 1868.

Of course every one retailing methylated spirit requires to have a license, and in obtaining that license, as well as in renewing it from year to year, he is brought into communication with the Inland Revenue authorities in such a manner, that he can always obtain information as to the conditions that he must observe as a retailer of the spirit. The danger consists in failing to take out and renew the license.

As regards "finish" it is now five years since we pointed out to our readers the necessity of taking every possibly precaution to make sure that the "finish" they purchased was really prepared according to the requirements of the Inland Revenue authorities. By mixing a little of the "finish" with three times its volume of water, it should become milky, and after a short time a curdy precipitate should be deposited. If the mixture only becomes turbid there is reason to suspect that it does not contain the proper proportion of gum resin, and then a further test should be applied by evaporating a known quantity to complete dryness, and weighing the residue of gum so as to ascertain the exact amount contained in the "finish." These operations are sufficiently simple to be carried out with no great difficulty and the practice of testing every supply as received would furnish the dealer with some satisfactory assurance of the character of the article.

"LEADERS IN MEDICINE AND SURGERY."

MESSRS. BARRAUD and JERRARD, the photographers, who have published several very successful group pictures, have recently issued one which cannot fail to be of interest to many readers of this Journal, representing "Leaders in Medicine and Surgery." The picture comprises 183 portraits of leading physicians or surgeons who have sat for the purpose. The likenesses are exceedingly good, and the grouping affords a very satisfactory representation of individual characteristics.

At the late Conversazione of the Obstetrical Society, held in the rooms of the Royal College of Physicians, this picture was throughout the evening the centre of an admiring throng of spectators, and elicited warm commendation.

COUNTERFEIT COINS.

IN his Sixth Annual Report, just issued, the Deputy Master of the Mint refers to the subject of counterfeit coinage. It is satisfactory to note that, so far as the statistics given can be accepted as evidence, there appears to have been a decrease in the crime of counterfeit coining. The number of prosecutions during the year 1875 was only 180, against 256 in 1870, which was also a decrease on previous years. One of the greatest difficulties these offenders have to contend with is the imitation of the milling or lettering on the edges; another is the necessity for confederacy, shown by the fact that the average of prisoners is nearly two to each prosecution.

It is noted that half sovereigns among gold coins and florins and shillings among silver are the coins most frequently counterfeited, probably, it is thought, because coins of these denominations are found to attract the least attention from the public.

The only counterfeits that can be considered really successful imitations are coins of gilded platinum containing a small percentage of copper and sometimes provided with a rim of pure gold. These have a good ring and are of good weight, and may pass freely without being detected until the gold is worn off, disclosing the platinum beneath. One form of counterfeit, principally met with in America, consists of the shell of a genuine coin from which the interior has been removed and replaced by base metal. Counterfeiters of silver coin usually employ a fusible alloy of lead and tin, which is cast in a mould.

The Deputy Master of the Mint condemns the so-called "detector," used for bending coin, and points out that it affords no proof that a piece is not genuine, and moreover that its use is rendered illegal by the Act passed in 1853 to prevent the defacing of the current coin of the realm. Neither is "ringing" a coin more conclusive, as genuine coins may easily be rendered "dumb." As a rule, he considers the best test to be the weighing of the suspected coin against a piece of the same denomination that is evidently genuine.

THE CULTIVATION OF JABORANDI AND EUCALYPTUS.

AMONG the prizes instituted by the Société d'Acclimatation this year is one of 500 francs for the cultivation of Jaborandi (*Pilocarpus pinnatus*) in France or in Algeria. The prize is to remain open until the 1st of December, 1885, and the conditions of its award are that the plant shall have been successfully cultivated upwards of five years, and that at least during the latter years the cultivation shall have extended over a demi-hectare. The cultivation must also be a commercial success.

Another prize of 500 francs, to remain open until the same date, is offered for a "Practical and Theoretical Guide to the Culture of the Eucalyptus." The authors are especially to make an investigation, based on comparative experiments, as to the species of Eucalyptus that can be best cultivated under various climates, to indicate the nature of the soil that is most suitable and the special cares demanded in the cultivation of each species, the degree of cold which it can resist, and its relative value.

APPRENTICESHIP IN THE SOUTH OF FRANCE.

AN application for information respecting the conditions of pharmaceutical apprenticeship which ordinarily obtain in the city of Bordeaux, addressed to the Editor of the Bulletin of the Pharmaceutical Society of that city, has elicited a reply, which reveals a great diversity of practice, with no better result than that, "everybody complains, everybody accuses everybody else, and nobody thinks of doing anything but beat the breast." This unsatisfactory state of things is attributed to the imperfect training of the apprentices, and the following remedy is suggested. "Instead of complaining let us seek to do better; do not forget that it is upon the discipline of the first years that the worth of the pupil, and subsequently of the pharmacien depends. Require then, from your apprentice—not harshly, but with firmness—that he works without cessation, does not go out much, smokes as little as possible, rises early, studies the preparations made during the day, and that he does not recoil from a greasy bottle, a dirty pan, or a turn with the broom. If he does not submit with good grace to these exigencies, which are not yours, but those of the profession, show him the door, and if he should then go to a confrère who treats him in the same fashion, he will quit the calling or become a good pupil and a good pharmacien. Amen!"

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of the above Association will be held at 17, Bloomsbury Square, on Thursday evening, July 6th, at eight o'clock, when a paper on "Polarization of Light" will be read by Mr. CHARLES H. HUTCHINSON.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A lecture was delivered in the rooms of the above Association, Halford Street, on Tuesday evening, June 20, 1876, by Mr. W. B. Baron, President, subject "The Microscope." Mr. J. Garrett, Vice-President, presided.

The lecturer commenced his task by stating that his aim was to give his audience a scientific knowledge of that marvellous instrument the microscope, in place of the empirical knowledge that had perhaps heretofore been their sole possession. With this object in view he intended, as far as his ability would permit, to lay before them the laws of optics bearing more or less upon the construction and working of the microscope. After these and other preparatory remarks the lecturer commented on the linear propagation of the ethereal undulations. Next the reflection of light was touched upon, the law governing the course pursued by the incident and by the reflected rays being carefully explained and illustrated. The refraction of the luminous ray on passing from one optical medium to another was then adverted to at some length; the course of the ray before, during, and after refraction by bodies bounded by plane surfaces and by those whose surfaces are curves, together with the constant ratio existing between the sine of the angle of incidence and that of the angle of reflection, and also the varying refractive power possessed by different bodies, being minutely detailed. A lens was next defined as "a piece of glass or other transparent substance, having its surfaces so formed that rays of light passing through them have their direction changed and are made to converge or diverge from their original parallelism, or to become parallel after converging or diverging." The diversified kinds of lenses, both converging and diverging, were then alluded to, and their action upon the luminous rays particularly explained by means of diagrams, etc. The structure of the crystalline lens of the eye, the manner in which it brings light rays to a focus upon the retina, its inability to properly focus strongly divergent rays, and the necessity consequently existing for the use of convex lenses were all touched upon. Spherical aberration next claimed attention, its cause being explained; likewise its remedy—

1. By the use of lenses whose surfaces are portions of an ellipse or an hyperbola. An effective if it were not impracticable expedient.
2. The tolerably effective though undesirable method of cutting off the circumferential rays by means of a diaphragm or stop.
3. The usual method employed, viz., by continuing lenses in such manner that the aberration of one shall counteract that of the other, and magnifying power be gained at the same time.

The cause and cure of chromatic aberration was treated of in a similar manner. Finally, the application of the foregoing laws in the construction of the microscope, together with its mechanical details were explained. The section on the polarization of light was necessarily postponed owing to lack of time. The speaker concluded by expressing his opinion upon those persons who affected a contempt for the microscope simply because by it were viewed only what they were pleased to call little things, and by quoting Young's well known lines—

"Think nought a trifle though it small appears,
Small sands the mountain, moments make the years,
And trifles life."

The lecture, which was listened to attentively throughout, lasted one hour and fifteen minutes.

Mr. Raynor then very heartily proposed a vote of thanks to the lecturer, which was unanimously carried and appropriately replied to, after which the proceedings terminated.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

Prize Competition.

At the recent examinations in connection with the Botany and Tutorial Classes, held under the auspices of this society, the following prizes were awarded:—

BOTANY CLASS.

First prize, Mr. Peter Foa.
Second prize, Mr. John McNicol.

TUTORIAL CLASS.

First prize, Mr. C. McKirdy.
Second prize, Mr. James Rait.

Professor Kiddie and Mr. Fyfe, the teachers, report very favourably regarding the progress made by the various students, and the visiting committee of the Council also report as being highly gratified with the classes generally.

Proceedings of Scientific Societies.

ROYAL INSTITUTION OF GREAT BRITAIN.*

The Mechanical Action of Light.

BY W. CROOKES, F.R.S.

To generate motion has been found a characteristic common, with one exception, to all the phases of physical force. We hold the bulb of a thermometer in our hands, and the mercury expands in bulk, and, rising along the scale, indicates the increase of heat it has received. We heat water, and it is converted into steam, and moves our machinery, our carriages, and our ironclads. We bring a loadstone near a number of iron filings, and they move towards it, arranging themselves in peculiar and intricate lines; or we bring a piece of iron near a magnetic needle, and we find it turned away from its ordinary position. We rub a piece of glass with silk, thus throwing it into a state of electrical excitement, and we find that bits of paper or thread fly towards it, and are, in a few moments, repelled again. If we remove the supports from a mass of matter it falls, the influence of gravitation being here most plainly expressed in motion, as shown in clocks and water-mills. If we fix pieces of paper upon a stretched string, and then sound a musical note near it, we find certain of the papers projected from their places. Latterly, the so-called "sensitive flames," which are violently agitated by certain musical notes, have become well known as instances of the conversion of sound into motion. How readily chemical force undergoes the same transformation is manifested in such catastrophes as those of Bremerhaven, in the recent deplorable coal-mine explosions, and indeed in every discharge of a gun.

But light, in some respects the highest of the powers of nature, has not been hitherto found capable of direct conversion into motion, and such an exception cannot but be regarded as a singular anomaly.

This anomaly the researches which I am about to bring before you have now removed; and, like the other forms of force, light is found to be capable of direct conversion into motion, and of being—like heat, electricity, magnetism, sound, gravitation, and chemical action—most delicately and accurately measured by the amount of motion thus produced.

My research arose from the study of an anomaly.

It is well known to scientific men that bodies appear to weigh less when they are hot than when they are cold; the explanation given being, that the ascending currents of hot air buoy up the body, so to speak. Wishing to get rid of this and other interfering actions of the air

* Lecture delivered on Friday, February 11, 1876.

during a research on the atomic weight of thallium, I had a balance constructed in which I could weigh in a vacuum. I still, indeed, found my apparatus less heavy when hot than when cold. The obvious explanations were evidently not the true ones: *obvious* explanations seldom are true ones, for simplicity is not a characteristic of nature.

An unknown disturbing cause was interfering, and the endeavour to find the clue to the apparent anomaly has led to the discovery of the mechanical action of light.

I was long troubled by the apparent lawlessness of the actions I obtained. By gradually increasing the delicacy of my apparatus I could easily get certain results of motion when hot bodies were brought near them, but sometimes it was one of attraction, at others of repulsion, whilst occasionally no movement whatever was produced.

I will try to reproduce these phenomena in this apparatus. Here are two glass bulbs, each containing a bar of pith about three inches long and half an inch thick, suspended horizontally by a long fibre of cocoon silk. I bring a hot glass rod, or a candle, towards one of them, and you see that the pith is gradually attracted, following the candle as I move it round the bulb. That seems a very definite fact; but look at the action in the other bulb. I bring the candle, or a hot glass rod, near the other bar of pith, and it is strongly *repelled* by it—much more strongly than it was attracted in the first instance.

Here, again, is a third fact. I bring a piece of ice near the pith bar which has just been repelled by the hot rod, and it is attracted, and follows the rod round as a magnetic needle follows a piece of iron.

The repulsion by radiation is the key-note of these researches. The movement of a small bar of pith is not very distinct, except to those near, and I wish to make this repulsion evident to all. I have therefore arranged a piece of apparatus by which it can be seen by all present. I will, by means of the electric light, project an image of a pendulum suspended *in vacuo* on the screen. You see that the approach of a candle gives the bob a veritable push, and by alternately obscuring and uncovering the light, I can make the pendulum beat time to my movements.

What then is the cause of the contradictory action in these two bulbs—attraction in one, and repulsion in the other? It can be explained in a few words. Attraction takes place when air is present, and repulsion when air is absent.

Neutrality, or no movement, is produced when the vacuum is insufficient. A minute trace of air in the apparatus interferes most materially with the repulsion, and for a long time I was unaware of the powerful action produced by radiation in a "perfect" vacuum.

It is not at first sight obvious how ice or a cold body can produce the opposite effect to heat. The law of exchanges, however, explains this perfectly. The pith bar and the whole of the surrounding bodies are incessantly exchanging heat-rays; and under ordinary circumstances the income and expenditure of heat are in equilibrium. Let me draw your attention to the diagram illustrating what takes place when I bring a piece of ice near the apparatus. The centre circle represents my piece of pith; the arrows show the influx and efflux of heat. A piece of ice brought near cuts off the influx of heat from one side, and therefore allows an excess of heat to fall on the pith from the opposite side. Attraction by a cold body is therefore seen to be only repulsion by radiation from the opposite side of the room.

The later developments of this research have demanded the utmost refinement of apparatus. Everything has to be conducted in glass vessels, and these must be blown together till they make one piece, for none but fused joints are admissible. In an investigation depending for its successful prosecution on manipulative dexterity, I have been fortunate in having the assistance of my friend Mr. Charles Gillingham. All the apparatus you see before you are the fruits of his skilful manipulation, and I now want to draw your attention to what I think is a masterpiece of glass-working—the pump which enables me so readily to produce a vacuum unattainable by ordinary means.

The pump here at work is a modification of the Sprengel pump, but it contains two or three valuable improvements. I cannot attempt to describe the whole of the arrangements, but I will rapidly run over them as illuminated by the electric light. It has a triple fall tube in which the mercury is carried down, thus exhausting with threefold rapidity; it has Dr. McLeod's beautiful arrangement for measuring the residual gas; it has gauges in all directions, and a small radiometer attached to it to tell the amount of exhaustion that I get in my experiments; it has a contrivance for admitting oil of vitriol into the tubes without interfering with the progress of the exhaustion, and it is provided with a whole series of most ingenious vacuum taps devised by Mr. Gillingham. The exhaustion produced in this pump is such that a current of electricity from an induction coil will not pass across the vacuum. This pump is now exhausting a torsion balance, which will be described presently. Another pump, of a similar kind but less complicated, is exhausting an apparatus which has enabled me to pass from the mere exhibition of the phenomena to the obtaining of quantitative measurements.

A certain amount of force is exerted when a ray of light or heat falls on the suspended pith, and I wish to ascertain—

First. What were the actual rays—invisible heat, luminous, or ultra-violet—which caused this action?

Secondly. What influence had the colour of the surface on the action?

Thirdly. Was the amount of action in direct proportion to the amount of radiation?

Fourthly. What was the amount of force exerted by radiation?

I required an apparatus which would be easily moved by the impact of light on it, but which would readily return to zero, so that measurements might be obtained of the force exerted when different amounts of light acted on it. At first I made an apparatus on the Zöllner's horizontal pendulum. For a reason that will be explained presently, I am unable to show you the apparatus at work; but the principle of it is shown in the diagram. The pendulum represented by this horizontal line has a weight at the end. It is supported on two fibres of glass, one stretched upwards and the other stretched downwards, both firmly fastened at the ends, and also attached to the horizontal rod at points near together, but not quite opposite to one another.

It is evident that if there is a certain amount of pull upon each of these fibres, and that the pull can be so adjusted as to counteract the weight at the end and keep it horizontal, the nearer the beam approaches the horizontal line the slower its rate of oscillation. If I relax the tension, by throwing the horizontal beam downwards, I get a more rapid oscillation sideways. If I turn the levelling screw so as to raise the beam and weight, the nearer it approaches the horizontal position the slower the oscillation becomes, and the more delicate is the instrument. Here is the actual apparatus that I tried to work with. The weight at the end is a piece of pith; in the centre is a glass mirror, on which to throw a ray of light, so as to enable me to see the movements by a luminous index. The instrument, enclosed in glass and exhausted of air, was mounted on a stand with levelling screws, and with it I tried the action of a ray of light falling on the pith. I found that I could get any amount of sensitiveness that I liked; but it was not only sensitive to the impact of a ray of light, it was immeasurably more so to a change of horizontality. It was, in fact, too delicate for me to work with. The slightest elevation of one end of the instrument altered the sensitiveness, or the position of the zero-point, to such a degree that it was impossible to try any experiments with it in such a place as London. A person stepping from one room to another altered the position of the centre of gravity of the house. If I walked from one side of my own laboratory to the other, I tilted the house over sufficiently to upset the equilibrium of the apparatus. Children playing in the streets disturbed it. Professor Rood, who has worked with an apparatus of this kind in America, finds that an elevation of its side equal to $\frac{1}{360000000}$ part of an inch is sufficient to be shown on the instrument. It was therefore out of the question to use an instrument of this construction, so I tried another form in which a fine glass beam, having discs of pith at each end, is suspended horizontally by a fine glass fibre, the whole being sealed up in glass and perfectly exhausted. To the centre of oscillation a glass mirror is attached.

Now a glass fibre has the property of always coming back to zero when it is twisted out of its position. It is almost, if not quite, a perfectly elastic body. I will show this by a simple experiment. This is a long glass fibre hanging vertically, and having a horizontal bar suspended on it. I hold the bar, and turn it half round; it swings backwards and forwards for a few times, but it quickly comes back to its original position. However much twist, however much torsion, may be put on this, it always returns ultimately to the same position. I have twisted glass fibres round, and kept them in a permanent state of twist more than a hundred complete revolutions, and they always came back accurately to zero. The principle of an instrument that I shall describe farther on depends entirely on this property of glass.

Instead of using silk to suspend the torsion beam with, I employ a fibre of glass, drawn out very fine before the blow-pipe. A thread of glass of less than the thousandth of an inch in thickness is wonderfully strong, of great stiffness, and of perfect elasticity, so that however much it is twisted round short of the breaking point, it untwists itself perfectly when liberated. The advantage of using glass fibres for suspending my beam is, therefore, that it always returns accurately to zero, after having tried an experiment, whilst I can get any desired amount of sensitiveness by drawing out the glass fibre sufficiently fine.

Here, then, is the torsion apparatus sealed on to a Sprengel pump. It consists of a horizontal beam suspended by a glass fibre, and having discs of pith at each end coated with lampblack. The whole is enclosed in a glass case, made of tubes blown together, and by means of the pump the air is entirely removed. In the centre of the horizontal beam is a silvered mirror, and a ray from the electric light is reflected from it on to a scale in front, where it is visible as a small circular spot of light. It is evident that an angular movement of the torsion beam will cause the spot of light to move to the right or to the left along the scale. I will first show you the wonderful sensitiveness of the apparatus. I simply place my finger near the pith disc at one end, and the warmth is quite sufficient to drive the spot of light several inches along the scale. It has now returned to zero, and I place a candle near it. The spot of light flies off the scale. I now bring the candle near it alternately from one side to the other, and you see how perfectly it obeys the force of the candle. I think the movement is almost better seen without the screen than with it. The fog, which has been so great a detriment to every one else, is rather in my favour, for it shows the luminous index like a solid bar of light swaying to and fro across the room. The warmth of my finger or the radiation from a candle is therefore seen to drive the pith disc away. Here is a lump of ice, and on bringing it near one of the discs the luminous index promptly shows a movement of apparent attraction.

With this apparatus I have tried many experiments, and amongst others I have endeavoured to answer the question, "Is it light, or is it heat, that produces the movement?" for that is a question that is asked me by almost every one; and a good many appear to think that if the motion can be explained by an action of heat, all the novelty and the importance of the discovery vanishes. Now this question of light or heat is one I cannot answer, and I think that when I have explained the reason you will agree with me that it is unanswerable. There is no physical difference between light and heat. The spectrum, as scientific men understand it, extends from an indefinite distance beyond the red to an indefinite distance beyond the violet. We do not know how far it would extend one way or the other if no absorbing media were present; but, by what we may call a physiological accident, the human eye is sensitive to a portion of the spectrum situated between the line A in the red to about the line H in the violet. But this is not a physical difference between the luminous and non-luminous parts of the spectrum; it is only a physiological difference. Now, the part at the red end of the spectrum possesses, in the greatest degree, the property of causing the sensation of warmth, and of dilating the mercury in a thermometer, and of doing other things which are conveniently classed among the effects of *heat*; the centre part affects the eye, and is therefore called *light*; whilst the part at the other end of the spectrum has the greatest energy in producing *chemical action*. But it must not be forgotten that any ray of the spectrum, from whatever part it is selected, will produce all these physical actions in more or less degree. A ray here, at the letter C, for instance, in the orange, if concentrated on the bulb of a thermometer, will cause the mercury to dilate, and thus show the presence of *heat*; if concentrated on my hand I feel *warmth*; if I throw it on the face of a thermo-pile it will produce a current of *electricity*; if I throw it upon a sensitive photographic plate it will produce *chemical action*; and if I throw it upon the instrument I have just described, it will produce *motion*. What, then, am I to call that ray? Is it light, heat, electricity, chemical action, or motion? It is neither. All these actions are inseparable attributes of the ray of that particular wave-length, and are not evidences of separate identities. I can no more split that ray up into five or six different rays, each having different properties, than I can split up the element iron, for instance, into other elements, one possessing the specific gravity of iron, another its magnetic properties, a third its chemical properties, a fourth its conducting power for heat, and so on. A ray of light of a definite refrangibility is one and indivisible, just as an element is, and these different properties of the ray are mere functions of that refrangibility, and inseparable from it. Therefore when I tell you that a ray in the ultra-red pushes the instrument with a force of 100, and a ray in the most luminous part has a dynamic value of about half that, it must be understood that the latter action is not due to heat-rays, which accompany the luminous rays, but that the action is one purely due to the wave-length and the refrangibility of the ray employed. You now understand why it is that I cannot give a definite answer to the question, "Is it heat or is it light that produces these movements?" There is no physical difference between heat and light; so, to avoid confusion, I call the total bundle of rays which come from a candle or the sun, *radiation*.

I found, by throwing the pure rays of the spectrum one after the other upon this apparatus, that I could obtain a very definite answer to my first question, "What are the actual rays which cause this action?"

The apparatus was fitted up in a room specially devoted to it, and was protected on all sides, except where the rays of light had to pass, with cotton-wool and large bottles of water. A heliostat reflected a beam of sunlight in a constant direction, and it was received on an appropriate arrangement of slit, lenses, prisms, etc., for projecting a pure spectrum. Results were obtained in the months of July, August, and September; and they are represented graphically as a curve, the maximum being in the ultra-red and the minimum in the ultra-violet. Taking the maximum at 100, the following are the mechanical values of the different colours of the spectrum:—

Ultra-red	100
Extreme red	85
Red	73
Orange	66
Yellow	57
Green	41
Blue	22
Indigo	8½
Violet	6
Ultra-violet	5

A comparison of these figures is a sufficient proof that the mechanical action of radiation is as much a function of the luminous rays as it is of the dark heat-rays.

The second question, namely, "What influence has the colour of the surface on the action?" has also been solved by this apparatus.

In order to obtain comparative results between discs of pith coated with lampblack and with other substances, another torsion apparatus was constructed, in which six discs *in vacuo* could be exposed one after the other to a standard light. One disc always being lampblacked pith, the other discs could be changed so as to get comparisons of action. Calling the action of radiation from a candle on the lampblacked disc 100, the following are the proportions obtained:—

Lampblacked pith	100
Iodide of palladium	87·3
Precipitated silver	56
Amorphous phosphorus	40
Sulphate of baryta	37
Milk of sulphur	31
Red oxide of iron	28
Scarlet iodide of mercury and copper	22
Lampblacked silver	18
White pith	18
Carbonate of lead	13
Rock-salt	6·5
Glass	6.5

This table gives important information on many points; one more especially—the action of radiation on lampblacked pith is five and a half times what it is on plain pith. A bar like those used in my first experiment, having one half black and one half white, exposed to a broad beam of radiation, will be pushed with five and a half times more strength on the black than on the white half, and if freely suspended will set at an angle greater or less according to the intensity of the radiation falling on it.

This suggests the employment of such a bar as a photometer, and I have accordingly made an instrument on this principle. It consists of a flat bar of pith, half black and half white, suspended horizontally in a bulb by means of a long silk fibre. A reflecting mirror and small magnet are fastened to the pith, and a controlling magnet is fastened outside, so that it can slip up and down the tube, and thus increase or diminish sensitiveness. The whole is completely exhausted and then enclosed in a box lined with black velvet, with apertures for the rays of light to pass in and out. A ray of light from a lamp reflected from the mirror to a graduated scale shows the movements of the pith bar.

The instrument fitted up for a photometric experiment is in front of me on the table. A beam from the electric light falls on the little mirror, and is thence reflected back to the screen, where it forms a spot of light, the displacement of which to the right or the left shows the movement of the pith bar. One end of the bar is blacked on each side, the other end being left plain. I have two candles, each twelve inches off the pith bar, one on each side of it. When I remove the screens the candle on one side will give the pith a push in one direction, and the candle on the other side will give the pith a push in the opposite direction, and as they are the same distance off they will neutralize each other, and the spot of light will not move. I now take the two screens away; each candle is pushing the pith equally in opposite directions, and the luminous index remains at zero. When, however, I cut one candle off, the candle on the opposite side exerts its full influence, and the index flies to one end of the scale. I cut the other one off and obscure the first, and the spot of light flies to the other side. I obscure them both, and the index comes quickly to zero. I remove the screens simultaneously, and the index does not move.

I will retain one candle 12 inches off, and put two candles on the other side 17 inches off. On removing the screens you see the index does not move from zero. Now the square of 12 is 144, and the square of 17 is 289. Twice 144 is 288. The light of these candles, therefore, is as 288 to 289. They therefore balance each other as nearly as possible. Similarly I can balance a gas-light against a candle. I have a small gas-burner here, which I place 28 inches off on one side, and you see it balances the candle 12 inches off. These experiments show how conveniently and accurately this instrument can be used as a photometer. By balancing a standard candle on one side against any source of light on the other, the value of the latter in terms of a candle is readily shown; thus in the last experiment the standard candle 12 inches off is balanced by a gas-flame 28 inches off. The lights are therefore in the proportion of 12_2 to 28_2, or as 1 to 5·4. The gas-burner is therefore equal to about 5½ candles.

In practical work on photometry it is often required to ascertain the value of gas. Gas is spoken of commercially as of so many candle-power. There is a certain "standard" candle which is supposed to be made invariable by Act of Parliament. I have worked a great deal with these standard candles, and I find them to be among the most variable things in the world. They never burn with the same luminosity from one hour to the other, and no two candles are alike. I can now, however, easily get over this difficulty. I place a "standard" candle at such a distance from the apparatus that it gives a deflection of 100 degrees on the scale. If it is poorer than the standard I bring it nearer; if better, I put it farther off. Indeed, any candle may be taken; and if it be placed at such a distance from the apparatus that it will give a uniform deflection, say of 100 divisions, the standard can be reproduced at any subsequent time; and the burning of the candle may be tested during the photometric experiments by taking the deflection it causes from time to time, and altering its distance, if needed, to keep the deflection at 100 divisions. The gas-light to be tested is placed at such a distance on the opposite side of the pith bar that it exactly balances the candle. Then, by squaring the distances, I get the exact proportion between the gas and the candle.

Before this instrument can be used as a photometer or light measurer, means must be taken to cut off from it all those rays coming from the candle or gas which are not actually luminous. A reference to the spectrum diagram will show that at each end of the coloured rays there is a large space inactive, as far as the eye is concerned, but active in respect to the production of motion—strongly so at the red end, less strong at the violet end. Before the instrument can be used to measure luminosity, these rays must be cut off. We buy gas for the light that it gives, not for the heat it evolves on burning, and it would therefore never do to measure the heat and pay for it as light.

It has been found that a clear plate of alum, whilst letting all the light through, is almost, if not quite, opaque to the heating rays below the red. A solution of alum in water is almost as effective as a crystal of alum; if, therefore, I place in front of the instrument glass cells containing an aqueous solution of alum, the dark heat-rays are filtered off.

But the ultra-violet rays still pass through, and to cut these off I dissolve in the alum solution a quantity of sulphate of quinine. This body has the property of cutting off the ultra-violet rays from a point between the lines G and H. A combination of alum and sulphate of quinine, therefore, limits the action to those rays which affect the human eye, and the instrument, such as you see it before you, becomes a true photometer.

This instrument, when its sensitiveness is not deadened by the powerful control magnet I am obliged to keep near it for these experiments, is wonderfully sensible to light. In my own laboratory a candle 36 feet off produces a decided movement, and the motion of the index increases inversely with the square of the distance, thus answering the third question, "Is the amount of action in direct proportion to the amount of radiation?"

The experimental observations and the numbers which are required by the theoretical diminution of light with the square of the distance are sufficiently close, as the following figures show:

Candle	6 feet off	gives a	deflection of	218·0°
"	12	"	"	54·0°
"	18	"	"	24·0°
"	24	"	"	13·0°
"	10	"	"	77·0°
"	20	"	"	19·0°
"	30	"	"	8·5°

The effect of two candles side by side is practically double, and of three candles three times that of one candle.

In the instrument just described the candle acts on a pith bar, one end of which is blacked on each side. But suppose I black the bar on alternate halves and place a light near it sufficiently strong to drive the bar half round. The light will now have presented to it another black surface in the same position as the first, and the bar will be again driven in the same direction half round. This action will be again repeated, the differential action of the light on the black and white surfaces keeps the bar moving, and the result will be rotation.

Here is such a pith bar, blacked on alternate sides, and suspended in an exhausted glass bulb. I project its image on the screen, and the strong light which shines on it sets it rotating with considerable velocity. Now it is slackening speed, and now it has stopped altogether. The bar is supported on a fibre of silk, which has twisted round till the rotation is stopped by the accumulated torsion. I put a water screen between the bar and the electric light to cut off some of the active rays, and the silk untwists, turning the bar in the opposite direction. I now remove the water, and the bar revolves rapidly as at first.

From suspending the pith on a silk fibre to balancing it on a point the transition is slight; the interfering action of torsion is thereby removed, and the instrument rotates continuously under the influence of radiation. Many of these little pieces of apparatus, to which I have given the name of radiometers, are on the table, revolving with more or less speed. The construction is very simple. They are formed of four arms of very fine glass, supported in the centre by a needle-point, and having at the extremities thin discs of pith lamp-blacked on one side, the black surfaces all facing the same way. The needle stands in a glass cup, and the arms and discs are delicately balanced so as to revolve with the slighest impetus.

Here are some rotating by the light of a candle. This one now is rather an historical instrument, being the first one in which I saw rotation. It goes very slowly in comparison with the others, but it is not so bad for the first instrument of the sort that was ever made.

I will now, by means of a vertical lantern, throw on the screen the projection of one of these instruments, so as to show the movement rather better than you could see it on the table. The electric light falling vertically downwards on it, and much of the power being cut of by water and alum screens, the rotation is slow. I bring a candle near and the speed increases. I now lift the radiometer up, and place it full in the electric light, projecting its image direct on the screen, and it goes so rapidly that if I had not cut out the four pieces of pith of different shapes you would have been unable to follow the movement.

(To be continued.)

Parliamentary and Law Proceedings.

IMPORTANT TO DRUG GRINDERS. CONVICTION UNDER THE SALE OF FOOD AND DRUGS ACT.

A special petty session was held at Dunster on Friday, June 23rd, for the purpose of hearing an adjourned case, in which Mr. William Burnell, general shopkeeper, of Wootton Courtney, was summoned by Mr. Durham, inspector of weights and measures, for selling one ounce of adulterated pepper on the 25th of April. Mr. Cooper, wholesale druggist and chemist, of Exeter, by whom the article was supplied to the defendant, was in attendance and conducted the case for the defence.

Mr. Durham stated that on the 25th of April he purchased an ounce of pepper at the defendant's shop and took it, with other samples of various articles, to Mr. Stoddart, the county analyst, at Bristol, on the following day. He had received a certificate from Mr. Stoddart stating that the pepper was adulterated with ten per cent. of starch.

Mr. W. W. Stoddart said he analysed the pepper in question and found that it contained at least ten per cent. of starch from the flour of beans or peas. He produced in a glass the starch which he had extracted from thirty grains of the pepper. He had since received a sample of pepper direct from the defendant for analysis, and had found that it also contained the same proportion of starch. In answer to Mr. Cooper the witness said the glass produced also contained some pure pepper starch. If some beans had been ground in a mill and pepper corns had afterwards been ground with the same stones, particular care not having been taken to cleanse the stones, it was quite probable that some of the bean flour would become mixed with the pepper accidentally. It might not affect the whole of the bulk of the pepper in the same proportion, but the first portion would be most affected. He thought it would pay a manufacturer to adulterate pepper with ten per cent. of starch. He had known Mr. Cooper for a great number of years, and did not think him capable of practising adulteration.

For the defence Mr. Burnell stated that he added nothing whatever to the pepper and that he sent a sample of it, by Mr. Cooper's request, to Professor Attfield of London.

Walter Frost, assistant to Mr. Cooper, of Exeter, proved sending seven pounds of pepper to the defendant about the last week in February. He received it in a ground state from Mr. Tapscott, a wholesale grocer. He had been with Mr. Cooper for sixteen years, and had not during that time known of any article being adulterated by Mr. Cooper or by his instructions. Nothing could be adulterated in his master's place without his (witness's) knowledge.

James Keen, assistant to Mr. Tapscott, wholesale grocer, of Exeter, produced a receiving book which was used for checking goods inwards and outwards, and in it was an entry in the handwriting of a commercial traveller of Mr. Tapscott, implying that two bags of whole white pepper were sent to the Round Tree Mill, Exeter, to be ground, on February 25th. He (witness) received the pepper after it had been ground on March 4th, and one of the bags he sent to Mr. Cooper about two hours afterwards. Nothing was added to it, to his knowledge, while it was in his possession, and nothing could have been added without his being aware of it. He had not known Mr. Tapscott adulterate anything during the time he had been in his employ.

John Middlewick, miller, of Exeter, proved receiving two sacks of pepper corns from the previous witness. He ground them himself. There were no peas or beans with them. He did not add anything whatever to the pepper, but replaced it in the bags. The stones were kept for other uses. Before the pepper the last things ground were beans. A small quantity of the bean flour might have remained in the stones and so contaminated a slight portion of the pepper.

Dr. J. Attfield, professor of practical chemistry to the Pharmaceutical Society, stated that on the 30th of May last he received a sample of pepper by post from the defendant. He analysed it and found no pea meal, pea starch, or bean starch in it. He was well acquainted with the operation of drug grinding, and the previous witness's statement that some bean meal might get mixed with the pepper was correct. From the description which had been given by the miller of the process which he adopted in grinding, he was of opinion that a small portion of the ground pepper would contain bean meal. He explained the finding of starch by Mr. Stoddart and not by himself by the suggestion that the portion sold to the inspector was the portion containing the bean meal. The complete admixture of a little bean meal with the whole bulk of pepper ground would be extremely unlikely.

The Chairman remarked that this theory would no doubt account for the presence of the starch.

Professor Attfield said it was the custom of millers to use the residue of previous grindings for cleansing the stones, and in that way, if beans were used, a small portion of the flour would very likely be mixed with a portion of the pepper ground.

Mr. Cooper drew the attention of the Bench to the fifth section of the Adulteration Act, 1875, by which it was provided that no person should be liable to be convicted if he proved absence of knowledge of the article being adulterated.

The Clerk pointed out that the information was laid under the sixth section, and that this provisal could not apply. There was, however, a clause of the sixth section that a conviction should not take place when it should be proved that any article of food or drug was mixed with extraneous matter in the process of preparation or collection.

The Bench expressed an opinion that this clause could not shield the defendant, as they thought that although the pepper had not been wilfully adulterated, the presence of the starch could have been avoided. The fine would be a nominal one, 6*d*, and costs, and they wished to say that that the case had been conducted very straightforwardly, and that they believed that Mr. Cooper had not wilfully adulterated the pepper.

Mr. Cooper paid the fine and the costs £4 0*s*. 5*d*.—*West Somerset Free Press.*

Alleged Adulterated Arrowroot.

At the Wandsworth Police Court on Wednesday the 21st ult., John Bain, of the Balham Co-operative Stores, Cavendish Road, Clapham Park, was summoned for selling to the prejudice of the purchaser arrowroot which was adulterated with tapioca. A certificate was produced from Dr. Muter, the analyst of the local board of works, stating that the sample was adulterated with 50 per cent. of tapioca.

The Inspector appointed under the Act said that tapioca was sold at 4*d*. per pound. He paid 1*s*. for half a pound of arrowroot.

Mr. Ingham remarked that the defendant made 6*d*. profit upon every half pound of arrowroot.

An application was here made by the secretary of the society which sold the arrowroot to the Co-operative Stores for an adjournment, as he doubted the correctness of Dr. Muter's analysis. The arrowroot was sold in the same state as it was imported from St. Vincent, and there was not a case known of adulterated arrowroot having been sent.

The summons was then adjourned for the sample of arrowroot to be analysed at the laboratory in Somerset House, as directed by the act.—*Standard.*

The Sale of "Ginger Ale."

On Wednesday, at the Bradford Borough Police Court, Mr. Albert Hodgson, hair-dresser, Kirkgate, Bradford, was summoned on a charge of selling an article called ginger ale which was not of the quality demanded by the purchaser. The Town Clerk appeared in support of the summons and Mr. Berry for the defence. The defendant is the local agent for Messrs. Cantrell and Cochrane, Dublin and Belfast, manufacturers of ginger ale, potash water, etc.

The Town Clerk said that the complaint was that the defendant sold what he called "superior ginger ale," but which the prosecution said was not ale at all, and which was, therefore, a fraud upon the public. The analysis of Mr. Rimmington, the borough analyst, who had examined a sample of the "ale," was as follows:—"I am of opinion that the sample contained the parts as under:—12·2 parts of sugar in 100 parts of the liquid, 0·21 parts of tartaric acid, 87·59 parts of water, including very small quantity of capsicum and lemon flavour. This article is sold as ginger ale, but there is a total absence of everything constituting ale, save the water; neither has it undergone any fermentation. The capsicum renders it very irritating." Now ale and beer were described in McCulloch's 'Commercial Dictionary' to be fermented liquors, the principle of which is extracted from several sorts of grain, commonly from barley after it has undergone the process termed malting; and in this case there was neither ginger nor ale.

Mr. Booker, inspector of nuisances, stated that he purchased the ale at the defendant's shop on the 21st of April last. He asked for and obtained three bottles of the ale, and then told Mr. Hodgson that he was the inspector, and that he intended to have the ale analysed. He complied with the formalities of the act by offering to give Mr. Hodgson a sample of the article, but Mr. Hodgson would not take it. He then took the ale to the analyst, and it was divided in his presence, in accordance with the requirements of the act. The certificate which had been put in referred to the ale just purchased. He had made the purchase in consequence of a communication he received about a son of Mr. Manoah Rhodes becoming ill by drinking some of the ale. In cross-examination by Mr. Berry, Mr. Booker said he never had any intimation about ginger ale until this matter came up. It was in consequence of seeing Mr. Rimmington analysing some of the ale which had been sent to him by Mr. Rhodes that he was led to take this action.

Mr. Rimmington was cross-examined by Mr. Berry. He said he ascertained the presence of capsicum by the taste, and he also separated it. He did not detect the taste of ginger. He was prepared to say that there was no ginger perceptible in it. He had no idea of the quantity of capsicum in it. The quantity was small, but it was sufficient to produce the effect he had mentioned on the certificate. He had tested it in two or three ways—with ether and chloroform. He could venture to say that the entire pungency of the ale was to be ascribed to capsicum and not to ginger. Ginger would have made it muddy, and could not be introduced except in a very small quantity indeed. He did not think that the label, "Superior ginger ale, aromatic," properly described the contents of the bottles, because there was no ale in them.

For the defence, Mr. Berry said that a license was required in order to enable a person to sell fermented ale or beer, and on going into Mr. Hodgson's shop Mr. Booker knew that he had not a license, and that he did not sell fermented liquor. He contended that this was the only article known by the name of ginger ale, and that therefore no fraud was attempted by selling it under that name. He further argued that the name ginger ale was as correct as applied to this article as ginger beer was when applied to the article sold under that name. It was not sold to the prejudice of the purchaser, being of the substance, nature, and quality demanded by him, and there was nothing injurious to health in it.

Henry Cochrane, managing partner of the firm of Cantrell and Cochrane, said his firm had manufactured the ginger ale for the last twenty-five years along with other aërated waters, and it was sold very extensively. It was made from ginger, essence of lemon, capsicum, and other ingredients.

Mr. Hodgson, the defendant, said that the bottles sold by him to Mr. Booker were taken from his general stock. He had had other bottles analysed.

Dr. Terry, Bradford, gave evidence as to the wholesomeness of the ginger ale which he kept in his house. He sometimes used it medicinally, the capsicum having a good effect in neutralizing the results of ale drinking.

Mr. Thos. Fairley, public analyst, of Leeds, said he had analysed a sample of the ginger ale, and found nothing injurious to health in it. He found a trace of capsicum and ginger in it.

Dr. C. A. Burghardt, lecturer in mineralogy, and mineralogical chemistry at Owens College, Manchester, corroborated.

The Bench, after a short consultation, dismissed the case.—*Bradford Chronicle.*

DEATH FROM CHLORAL HYDRATE.

Dr. Hardwicke, coroner for Central Middlesex, held an inquiry on the 13th ult. at the Queen's Arms, Haverstock Hill, concerning the death of Adrian Byron Ashford, aged 45, a gentleman of independent means. The evidence of the widow, showed that deceased had suffered from liver complaint for some years. He had been in the habit of taking almost every evening a night-draught, which was supplied by a local chemist from a special prescription, in order to procure sleep. Mr. John West, residing in the same house, said he was called to deceased's bedroom at three o'clock on Friday morning where he found deceased lying on the floor, snoring very loudly. He soon after died. Mr. William Kerr, M.R.C.S., said chloral hydrate would greatly increase the narcotic effects of the stimulants deceased had been accustomed to take on retiring to bed. The cause of death was syncope, or failure of the heart's action whilst under the influence of an overdose of chloral hydrate. The jury unanimously agreed to a verdict of death from misadventure.—*Echo.*

ALLEGED ADULTERATION OF SOLUBLE COCOA LABELLED AS AN "ADMIXTURE."

The following important correspondence has taken place with reference to summonses which were heard before the Southampton County Bench of magistrates on the 26th May last:—

The National Chamber of Trade, 446, Strand, W.C.
8th June, 1876.

SIR,—I am requested by the Committee of the National Chamber of Trade to most respectfully direct your attention to the following extract from the *Grocer* of the 3rd inst., which appears to them to be of an extraordinary character, as the report states "that the cocoa was labelled as a compound."

"Mr. Samuel Read, of Millbrook, and Mr. David Herley, of West End, grocers, were summoned before the magistrates, on Friday, the 26th ult., for selling cocoa containing cocoa-butter, cane-sugar, and sago-starch. The fact was proved that the cocoa was labelled as a compound. The Bench, notwithstanding, decided that the defendants had made themselves liable for not stating this to the purchaser when the sale was effected. Fined 10*s.* 6*d.* each, and costs.

"Mr. Read said he thought they must give up selling cocoa should the conviction be confirmed. The magistrates intimated that it was a matter for the defendants to fight out with Messrs. Taylor Brothers, the manufacturers. The cocoa was one of the cheapest kind."

They have been favoured by the manufacturers with a copy of the label which is used upon the article for which the defendants in the above cases were convicted, a sample of which is appended.

SOLUBLE
COCOA.
Manufactured by
TAYLOR BROTHERS,
LONDON.

This admixture contains no injurious ingredient.
38 & 39 Vic., c. 63.

I am also desired to add that the Committee will much esteem your consideration if you will acquaint them, for the information of the trade, whether the above label is a sufficient notice to the purchaser that the article is a compound, and upon what grounds a penalty was inflicted by the bench of magistrates before whom the cases in question were heard.

I have, etc.,
FRED. MORRISON, Secretary.

To the Right Hon. George Sclater-Booth, M.P.,
President of the Local Government Board, &c.

(COPY OF REPLY FROM THE GOVERNMENT.)

No. 380236.
1876.

Local Government Board, Whitehall, S.W.
19th June, 1876.

SIR,—I am directed by the Local Government Board to acknowledge the receipt of your letter of the 8th instant, in which, at the request of the National Chamber of Trade, you call the Board's attention to a decision recently given by a bench of magistrates under the Sale of Food and Drugs Act, 1875.

The Board desire me to state that they have no authority to review the decision of the magistrates to which you refer, nor can any opinion of theirs settle the law in the case. This can only be done by a decision of the High Court of Justice.

The Board has no information as to the grounds on which the decision of the magistrates was based, but they think that the label, of which you have forwarded a copy, might be framed in more distinct terms.

The Statute 38 and 39 Vic. cap. 63, sec. 8, requires that the vendor of any compound article of food shall supply to the person receiving it a notice "by a label distinctly and legibly written or printed on, or with the article, to the effect that the same is mixed.

In this particular case, for example, such words as the following might be used on the label: "This is an admixture, but contains no ingredient injurious to health."

I am, Sir,
Your obedient servant,
(Signed) DANBY C. FRY,
Assistant Secretary.

To F. Morrison, Esq., Secretary of the National Chamber of Trade, 446, Strand, W.C.

BOOKS, PAMPHLETS, ETC., RECEIVED.

THE ANALYST'S ANNUAL NOTE BOOK. 1875. Edited by SIDNEY RICH. London. 1876. From the Editor.

AMICUS CANIS.—A Concise Description of the Various Diseases in Dogs with their Several Remedies. By ARTHUR J. HEALD. 1876. From the Author.

THE BOOK OF PRESCRIPTIONS. By HENRY BEASLEY. Fifth Edition. London: J. and A. Churchill. 1876. From the Publishers.

BRITISH HOMŒOPATHIC PHARMACOPŒIA. Second Edition. London: British Homœopathic Society. 1876. From the Publishers.

AN INTRODUCTION TO THE ELEMENTS OF PHARMACY. By F. HARWOOD LESCHER. Fifth Edition. London: J. and A. Churchill. 1876. From the Publishers.

THE APPOINTMENT DIAL. Designed by Dr. DOBELL London: Maw, Son and Thompson. 1876. From the Author.

SUR LA RECHERCHE DES SUBSTANCES AMERES DANS LA BIERE. Par le docteur DRAGENDORFF. Traduit de l'Allemand par le docteur JUL. MOREL. Ghent: E. Todt. 1876. From the Translator.

Notes and Queries.

QUININE FOR HYPODERMIC USE. — Mr. Wood states (*Amer. Journ. Pharm.*, April, p. 187) that a solution of arabinate of quinine, three minims containing one grain of the salt, has been used for hypodermic injection, giving satisfactory results in its action, and without unpleasant local effects.

[513]. MOTH DESTROYER.—Can any one tell me how to get rid of moths in walls? They are in the walls of a coach house. The place has been stoved with sulphur, lime-washed with lime and carbolic acid, and nothing seems to kill them.—M.P.S.

Obituary.

Notice has been received of the death of the following:—

On the 24th of June, 1876, rather suddenly, Mr. John Elsey, Pharmaceutical Chemist, of Horncastle. Mr. Elsey was 59 years of age, and had been in business 32 years in Horncastle, where his removal by death will be regretted not only by a large circle of friends, but by the town generally. He became a Member of the Pharmaceutical Society in 1845 and for several years had acted as Local Secretary.

On the 22nd of June, 1876, of disease of the brain, Mr. Henry Ellis, Pharmaceutical Chemist, of Mildmay Grove, Islington. Aged 23 years. Mr. Ellis was a student in the School of Pharmacy, Bloomsbury Square, during last session, and was awarded the Silver Medal for Botany and Materia Medica and the first certificate of Honour for Chemistry and Pharmacy; also the Bronze Medal for the first course of Chemistry and Pharmacy.

On the 1st of June, 1876, Mr. George Fawcett, Chemist and Druggist, of Dewsbury. Aged 41 years.

On the 18th of June, 1876, Mr. Andrew McLean, Chemist and Druggist, of Leyton, Essex. Aged 43 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE GREAT MILK OF SULPHUR CASE.

Sir,—Every one ought I am sure to rejoice at the prospect of a final settlement by the Court of Queen's Bench of a question which as much by its littleness as by its frequency has long harassed the drug dealers of this country.

If I might be allowed to occupy your columns with so trite a subject I should like to point out why in my opinion the main line of defence should be the present *popular* use of the term milk of sulphur, and the *bonâ fide* nature of the demand for it.

The contention that the new name sulphur præcipitatum was invented to designate a new and improved preparation is not borne out by the facts, as I will endeavour to show.

The Pharmacopœia of 1724, a copy of which I have before me, gives the following directions for preparing "Lac Sulphuris."—℞ Sulphuris partem unam; Calcis vivæ *vel* Salis Tartari, partes tres. Coque in Aquæ Fontanæ q.s. ad solutionem Sulphuris. Filtra calide; præcipita cum Spiritu Vitrioli; edulcora et sicca.

The fact that the alternative use of either lime or salt of tartar influenced materially the result of the operation, in the one case yielding pure sulphur, in the other sulphur plus twice its weight or thereabouts of sulphate of lime, seems to have been entirely lost sight of, leaving one to infer that to the minds of the then Royal College of Physicians the term lac sulphuris was as applicable to one preparation as to the other.

In the Pharmacopœia of 1746 the alternative use of salt of tartar is not mentioned, the formula remaining in other respects the same. The name of the product has however undergone a notable alteration, it is now "Sulphur Præcipitatum," notwithstanding that it contains the unavoidable addition of sulphate of lime.

In the one pharmacopœia therefore we have the term lac sulphuris applied to pure precipitated sulphur; in the other the term sulphur præcipitatum applied to the mixture of precipitated sulphur with twice its weight of sulphate of lime. From this I conclude that the change of appellation was simply the substitution of what was intended for a scientific name for one that was trivial or popular.

Pemberton's English translation of the 'Dispensatory of the Royal College of Physicians, London, 1748' (second edition), is preceded by a most valuable and interesting chapter entitled "A Narrative of the Proceedings of the Committee appointed by the College of Physicians to review their Pharmacopœia." From page 2 *et seq.* I extract the following:—"It is needless to repeat that the first care of the committee was to expunge the medicines no longer made use of in general practice and to insert such as have come into esteem since the last revisal of the Pharmacopœia; but the principal part of their labour has been to examine the articles they have retained or given admission to, both in regard to their pharmaceutic composition, and upon the genuine principles of medicine."

The result of the examination of the preparation formerly called lac sulphuris was the exclusion of the alternative use of salt of tartar and the conferring the name sulphur præcipitatum on the mixed substance resulting from the precipitation of a sulphur-lime solution with dilute vitriolic acid. So much for the then current ideas on "pharmaceutic composition," and "the genuine principles of medicine."

Farther on (page 58), in a paragraph where changes of name are discoursed of we find the following:—"Here lac sulphuris, which is a powder, is now more properly called sulphur præcipitatum." The triviality of the name was, therefore, not its main offence, but the absurdity involved in applying to a solid a term appropriate only to a fluid.

In the 'New Dispensatory,' etc. (third ed.), printed for J. Nourse, etc., 1780, but without the editor's name, it is stated with reference to this "that the name lac sulphuris or milk of sulphur, applied among us to the precipitate, is by the French writers confined to the white liquor before the precipitate has fallen from it." In comparing the two preparations the editor says that "quick lime gives the preparation a more saleable whiteness." "The medicine is nearly the same in both cases." The Pharmacopœia of 1788, directs the use of sulphurated kali and diluted vitriolic acid. The editor of the translation appends to the formula the following remark, "This preparation is not so white as that of the last Dispensatory, which was made with quick lime; but it is more purgative."

It seems, then, that throwing aside the discordant opinions of pharmaceutic authorities of various degrees of dignity, we must, in order to establish a valid distinction between the terms "milk of sulphur" and "precipitated sulphur," fall back upon *popular usage*, which will probably vary in different localities. Here no such distinction is, as far as my experience goes, recognized. I supply the pure article to all customers and get no complaints of either price or quality. It might be, and possibly is, otherwise elsewhere; that, however, will have to be proved. A *bonâ fide* demand for an article not possessing injurious qualities, and it is idle to question the wholesomeness the old milk of sulphur, that off and on ever since the time of the alchemists has been in use in almost every household, ought surely to be attended to, and to apply the penal clauses of an Act of Parliament to such supply is not only cruel to the tradesman but contrary to the liberty of the subject.

That sulphate of lime in the dose usually taken is not injurious is a proved fact; that the quantity of sulphur taken with it is amply sufficient has also been established by centuries of experience. Considering the complete insolubility of sulphur in water, its alterative, viewed as distinct from its purgative, quality would doubtless be as fully marked if milk of sulphur contained not 33 but 5 per cent. only of the element—probably 99 per cent. of what is swallowed passes through the system unchanged.

In common with the great bulk of pharmacists, I can look forward to the contemplated decision with equanimity, desiring only a settlement of the "quæstio vexata."

THOS. B. GROVES.

THE EXAMINATIONS.

Sir,—I take this opportunity to express my entire satisfaction with the recent decision of the Council of the Pharmaceutical Society in reference to the manner in which the result of the examinations is announced, as being more strictly in accordance with the Act of Parliament in which the powers committed to them are set forth. The examinations are not to be considered as competitive in their character, but rather as proofs and guarantees of certain qualifications on the part of those who pass them, deemed necessary for the proper discharge of duties connected with our business. I trust great numbers of our young men will not rest satisfied with the lower position but will go in for the higher grade and thus prove themselves worthy not only of the honour attaching to it, but also prepare themselves to take part in carrying forward the great educational work which the founders and members of the Society, supported by the Legislature, deem so highly important.

I quite approve of competitive examinations at the proper time, and have had great pleasure on several occasions in being present at Bloomsbury Square when prizes were distributed to those students who had attained the highest positions in the examinations conducted by the Professors at the close of each session. If, in addition, arrangements on a satisfactory basis could be made for a written examination, and prizes awarded, open to country students generally whose names are on the register, I think it would prove a most excellent stimulus to study.

W. V. RADLEY.

Sheffield, June 21, 1876.

METHYLATED FINISH.

Sir,—The recent excise prosecutions render it very necessary that the druggist should satisfy himself that the "Finish" he sells contains the quantity of resin required by law. If on examining the finish newly received into stock he discovers it deficient in this respect, he will probably find the missing resin as an undissolved but slowly dissolving mass at the bottom of the cask. For it appears that some makers do not keep finish, as finish, in stock at all. When, therefore, an order is received for the latter, they fill a cask with methylated spirit, add thereto the proper quantity of resin in the solid state and straightway dispatch to their customer. Now we can very well understand that if the cask be not well shaken in transit, or on arrival, or if the resin added be a somewhat difficultly soluble one, the first portions will be deficient in resin and the last portion overcharged therewith. I will now refer to two cases which have come under my own observation. A hogshead of finish was found on arrival from the makers to contain only 370 grains of resin to the gallon. After eighteen hours, during which time it had been twice shaken, it contained 414 grains to the gallon. It was again shaken and tested and this was continued until at last, on the nineteenth day after being taken into stock all the resin in the cask was found to have dissolved, and the finish to have reached the excise standard. Just afterwards I had the opportunity afforded me of examining the contents of a nearly empty cask of finish, and was now not very surprised to find the latter containing 5¾ oz. of resin to the gallon. The first portions of finish drawn out of this cask must have contained very little resin indeed, and would, if they had come within the ken of the excise, have brought down on the luckless druggist I know not what pains and penalties.

The foregoing observations may perhaps throw some light on the cause of that deficiency of resin in methylated finish which has of late brought so many druggists into the police courts.

ALFRED N. PALMER.

Manchester.

Sir,—I had the misfortune to be fined, on Monday last, the sum of £12 10*s*. for selling half a pint of finish that did not contain the proper quantity of gum. The wholesale house from whom I purchased it say that it did contain the proper quantity. The analytical chemist connected with the Inland Revenue Department, at Somerset House, stated that it contained 497 grs. instead of 1312. Will you kindly inform me in your next issue of the Journal, whether in the event of the chemist's report being proved correct I can legally recover the amount of the penalty from the firm who supplied me with the finish?

I should perhaps say that the summons was for selling methylated spirit, but I presume the excise authorities consider all finish that is not properly prepared to be methylated spirit.

GEO. K. GOSSOP.

88, *Church Street, Grimsby,*
June 21, 1876.

[*** This is so purely a legal question that we are unable to answer it; but it is evident that the best way for our correspondent to have protected himself would have been to have examined the finish and satisfied himself that it contained the proper quantity of gum before selling any.—ED. PH. J.]

THE SPECTROSCOPICAL EXAMINATION OF FIXED OILS.

Sir,—Will you kindly allow me to gratify Mr. Gilmour's wish to know how far he and I have carried on our investigation "in precisely the same manner" by stating that I believe we have worked on the same lines so far as Mr. Gilmour has gone at present, but that my work has apparently been more extensive than his and therefore, probably, had a different ending. The microspectroscope was used throughout the investigation, but each observation of many hundreds was confirmed by, or at least compared with, the readings of two, and sometimes three, other instruments of different dispersive power, including a stand single prism instrument of considerable power. The only reason why I practically set aside the stand spectroscope was that, in common with all other absorption spectroscopists (or nearly all), I found very early in my work that the direct vision instrument of moderate power was so vastly superior to the other that it was practically the only one fit for the work. There were, and always are, certain cases in which the stand spectroscope was better fitted for the work, and one such case is referred to in the *English Mechanic*, I think a week later, when I took occasion to point out that an unusually pure specimen of linseed oil gave a spectrum differing materially from that figured by me the previous week.

Mr. Gilmour will find when the new work I have done sees the light that the spectroscopical investigation of oils is a much more difficult matter than at present he has any idea of.

So far as the question of priority is concerned I have nothing to say; I have not thought for a moment other than that Mr. Gilmour sincerely believed he had lighted on a new field of research and that he was entirely in ignorance of what had previously been done. We are neither of us the first to examine oils spectroscopically, for I have found only very recently—this week in fact—that Dr. Thudichum worked at them prior to 1867, as witness the following in the tenth report of the Medical Officer of the Privy Council, page 211, appendix:—"Some solutions prolong the red part of the spectrum in the direction of the heat spectrum. This peculiarity belongs to a particular variety of pure yellow olive oil . . . These fluids also exhibit a black absorption band in red; in less pure and very impure olive oil two more feeble absorption bands in green appear. All these absorptions are probably due to the admixture of xanthophylline. Animal fats including human have never yet been found to possess absorptive qualites although they are frequently very powerfully phosphorescent." It is, in fact, extremely difficult to students in absorption spectroscopy to find out what has been and what has not been done in the subject. Many persons have taken it up, made a few observations, published them in the handiest journal, and then let it drop, the result bring that isolated papers are scattered over nearly the whole of our scientific literature.

HENRY POCKLINGTON.

Leeds, June 24, 1876.

THE SALE OF PATENT MEDICINES.

Sir,—For some time past I have been under the impression that the sale of patent medicines by grocers, cobblers, barbers, etc., was caused to a great extent by men who are sent about the country to ornament or disfigure, whichever it may be called, our windows and glass doors. I have lately a case in point: a man called on me a short time since and asked if he should affix to my window and door gold letters referring to the preparations of —— and ——. I made the remark to the man that I supposed he did not introduce these things to other trades; to which he replied, "Oh, no." But, behold, the next day I discovered that Mr. Shaver had the letters "———Pills sold here" on the most prominent part of the window, and to day I have received an enclosure for the same person consisting of books and counter bills for ———'s medicines. I am very much surprised that proprietors of respectable patent medicines should allow themselves to be mixed up with such a lot. If they want to advertise them why don't they send a man purposely, and not join with a mixed medley lot to the injury of their brother chemists. I would recommend all chemists to refuse to have anything whatever to do with the men sent round. If the chemist knows nothing about the particular quack medicine his customer asks for, except that he keeps it, then it will soon be seen how long the sale will stand, however much it is advertised.

MIDLAND.

NOTE ON COCA.

Sir,—The therapeutic value of this drug, and its position in our Materia Medica, are still vexed questions amongst physiologists. From an experience extending over some years in a country subject to the extremes of both frigid and torrid zones, I am inclined to think coca has numerous virtues attributed to it it does not possess, and that travellers when speaking so glowingly of its wonderful sustaining powers are more apt to rely upon information supplied by natives than by direct experiments upon themselves. I have never found any benefit from chewing the leaves during long and tedious tramps over a rough country, the desire of food was just as great, and the muscular system incapable of more prolonged exertion. As a substitute for cinchona, in the form of wine and fluid extract, it has signally disappointed its introducers, both as a "builder up" after long illness and as a restorative to combat the enervating effects of a tropical summer. Dr. Ashburton Thompson, who has made a series of experiments with coca, informed me that the most notable result of a day's chewing of the leaves was a sore tongue and mouth.

THOMAS H. BATEMAN.

June 23, 1876.

THE COLLECTION OF HENBANE.

Sir,—As the time is drawing near for the collection of henbane, I am anxious of educing an opinion from the trade whether in collecting *Fol. Hyoscyami* for the preparation of the tincture the flowering heads should be collected along with the leaves and mixed up with them. The last lot that I had nearly one-half of it was flowering tops.

The instructions in the B.P. are, "that the leaves should be separated from the branches." Squire's 'Companion' says, that "the leaves only" should be collected.

JNO. HALLAWAY.

52, *Castle Street, Carlisle.*

G. C. Druce.—(1) *Carex disticha;* (2) *C. riparia;* (3, 4, 5) Send better specimens; (6) *Festuca ovina.*

"*Quæro.*"—From your description it would appear possible that the calico had been steeped in solution of strontium chlorate; but you are recommended to examine the substance yourself as you have some in your possession.

"*Alpha.*"—The pepsine wine of the Pharmacopœia Germanica is made by mixing 100 parts of the mucus from the stomach of an ox, with 50 parts of glycerine and 50 parts of water, adding 1000 parts of good white wine and 5 parts of hydrochloric acid, stirring well, allowing the whole to macerate at 20° C. for three days, with occasional stirring, and afterwards filtering.

"*Odor.*"—Cassia and almonds, probably.

H. Collins.—Various preparations for the purpose are advertised in the horticultural journals.

E. P.—"Brou" is a name applied in France to the outer envelope of the walnut; it is reported to possess antisyphilitic properties, and an injection is sometimes prepared from it.

A. J. Heald.—Your pamphlet has been received and will have due attention.

J. Richards.—There is no pocket edition of the work referred to.

Theta.—(1) The Board of Examiners cannot admit a person to the Major examination who has not passed the Minor. (2) The words of the regulation are—"That in the event of the failure of a candidate to pass the examination for which he presented himself, the fee shall not be returned, but he shall be permitted to present himself for examination at any subsequent meeting of the Board on payment of Two Guineas for the Major or Minor examination, or One Guinea for the Preliminary or Modified examination, provided he present himself within one year from the date of his failure." (3) The regulation will come into force on January 1, 1877. (4) No. (5) Seeds of *Dorema Ammoniacum:* see 'Pharmacographia,' p. 290.

E. T.—See an article on Pancreatin, in the *Pharm. Journ.* of April 22 last, p. 844.

G. R. Newton.—For a figure and description of true Pareira root, see vol. iv., p. 102, of the present series of this Journal.

"*Syrupus, B.P.*"—*Orchis maculata.*

"*Student.*"—Try 'Lessons in Elementary Physics,' by Balfour Stewart (Macmillan).

J. Onion.—Several recipes for "Lime Juice and Glycerine" have appeared; probably the one you want will be found in the Journal for Oct. 11, 1873, p. 298.

F. J.—It is not possible to dispense the prescription so that the camphor will not separate.

"*A Country Member.*"—Goold's 'Receipts and Instructions for the Preparation of Aërated Waters,' published by Barrett, Seething Lane. The quantity is simply a matter of calculation.

J. H.—Apply to Mr. Martindale, 10, New Cavendish Street, W.

"*Enitar.*"—(1) *Stellaria uliginosa;* (2) *Scandix Pecten-Veneris;* (3) *Lotus major:* (4) *Spergula arvensis.*

"*Minor Associate.*"—We are obliged to you for your communication.

L. M. Miller.—See the article on p. 9.

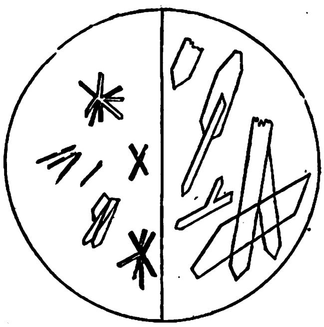
COMMUNICATIONS, LETTERS, ETC., have been received from Mr. Swain, Mr. Thresh, Mr. Shaw, Mr. Gilmour, Mr. Boyd, G. A., "Chemicus," "Omega," "Country Chemist," "Saled," "Brightonian."

CAPSAICIN, THE ACTIVE PRINCIPLE OF CAPSICUM FRUITS.

BY J. C. THRESH, F.C.S.

As stated in a note added to my paper on the supposed alkaloid "Capsicine,"* I have succeeded in isolating an unmixed organic principle possessing in the highest degree the acrid pungent property so characteristic of cayenne. After the conclusion of my investigation as to the existence of an alkaloid in this fruit possessing the above mentioned properties, I attempted to verify the statement of Buchheim, viz., that the source of the active property is an oily fluid which he called "capsicol." This is obtained by exhausting the powdered fruit with ether, removing the ether by distillation, dissolving the residual extract in boiling caustic alcoholic ley, diluting with water, and precipitating with barium chloride. This precipitate is washed, dried, and treated with ether, and upon evaporation an oily fluid is obtained which is the impure "capsicol." It is purified by a repetition of this same process.

I felt convinced that this red fluid was not the active principle, but as much a mixture as the fat from which it was obtained. I therefore attempted by other means to isolate the substance of which I was in search. Reflecting on the behaviour of the capsicine fat with alcohol,† I thought it probable that as castor oil renders some other oils to a certain extent soluble in alcohol, so this fat might be a mixture of two substances, the presence of the one increasing the solubility of the other. I therefore dissolved a portion of the red oil in twice its volume of almond oil, and agitated the mixture with three successive portions of proof spirit. By these means the whole of the active principle was removed by the alcohol, leaving the oil of a deep red colour, but quite devoid of pungency. The alcoholic solution when evaporated left a red brown fatty residue of the consistency of resin ointment, and of course intensely pungent in taste. This substance dissolved in dilute solution of potash forming a clear solution, but when treated with dilute ammonia a very imperfect soapy solution resulted. This was put aside for some time, and upon again examining it I found the liquid full of well defined pearly white crystals, Fig. 2, which I separated by filtration, washed, and dried.

(Fig. 1)  (Fig. 2)

This substance was most powerfully pungent, a most minute portion volatilized caused severe fits of coughing. It dissolved slightly in cold water, more readily in boiling water, a portion at that temperature being volatilized and causing long continued fits of sneezing. The excess of what is taken up by the water, melted and floated on the surface of the fluid as a colourless oil. The hot solution precipitated on addition of a strong acid, and after a few days the solution was found to have deposited crystals, Fig. 1.

The curious behaviour of this substance at first led me to suppose that it was a fatty acid, forming a soluble salt or soap with potash, and an insoluble one with ammonia. This supposition, however, is not confirmed by further experiments with the perfectly pure capsaicin, obtained by dissolving the first crop of crystals in solution of potash, and adding solution of ammonium chloride in excess. The milky fluid thus formed in a few hours deposits crystals of the pure principle. These (fig. 1), when thoroughly well washed, give no trace of ammonia. When dissolved in absolute alcohol and boiled with sodium carbonate, the filtered solution upon evaporation leaves an oily residue, which does not contain a trace of sodium, and which only begins to crystallize after many days. This residue appears to be totally insoluble in water, consequently the slight solubility of the capsaicin first obtained must be due to a trace of alkali existing in it as an impurity; and the crystals obtained by addition of acid would of course result from the neutralization of the alkali. The pure capsaicin dissolves readily in proof spirit, and the solution, when not too dilute, gives white precipitates with barium and calcium chlorides, both soluble in ether. Silver nitrate gives a precipitate which dissolves in dilute ammonia, and the solution when boiled darkens in colour and deposits a curdy brown-black precipitate. Neutral ferric chloride does not affect it in the cold, but when the solution is boiled a reddish precipitate falls. Boiled with dilute sulphuric acid and bichromate the pungent taste is almost instantly destroyed; dilute nitric acid and potassium permanganate also oxidize it. These reagents, therefore, similarly affect any preparation of cayenne, and this reaction might probably be utilized for determining in certain cases the presence of this substance.

With care capsaicin can be volatilized without decomposition, the sublimate being in the form of fatty globules. It volatilizes slowly at 212° F., and if mixed with water and distilled the distillate has a distinctly pungent taste.

I find this capsaicin can be isolated also by dissolving the capsicum oil in dilute potash, adding a sufficient quantity of solution of ammonium chloride, collecting the coloured precipitate, redissolving in potash solution, and at a temperature of 120° F. adding ammonium chloride in excess. In a few days an abundant crop of crystals will have formed which can be further purified if necessary by a repetition of the process by which they are obtained. I have also obtained it by dialysis, as follows:—A few ounces of strong tincture were placed in a parchment dialyser, and floated in proof spirit. The spirit rapidly acquired a pungent taste, and upon evaporation deposited after a time crystals identical in appearance with Fig. 1. The dialysed solution had a distinctly acid reaction.

I am now preparing a larger quantity of this substance, so as to admit of its elementary analysis (which Professor Flückiger has kindly offered to undertake) and further research as to its chemical and powerful physiological properties. The results I hope to have ready for communication at the ensuing Conference.

Buxton.

* *Pharm. Journ.*, May 27, 1876, p. 941.

† Braconnot, *Ann. Chem. Phys.* [2], vi., 1.

THE SPECTROSCOPE APPLIED TO THE DETECTION OF ADULTERATIONS, ETC., OF FIXED OILS.

BY W. GILMOUR.

Olive Oils.

A few weeks ago (June 10th), a communication appeared in the pages of the *Pharmaceutical Journal* in which I suggested in general terms the value of the spectroscope in detecting adulterations in fixed oils. The paper referred to was not intended to do more than call attention to the subject, and indicate the probable value as a detecting agent of the spectroscope. Whether it will become an agent in detecting adulterations under every circumstance, remains yet to be seen, and will probably only be determined after a long and exhaustive series of experiments. That it is an invaluable agent in detecting some (band giving oils, for example, such as rape in non-band-giving such as sperm), I have in many cases already proved, and hold beyond dispute.

Its utility in this respect taken in conjunction with the distinctive character of the spectrum of each oil, and the delicacy of the action of the spectroscope in detecting the slightest variation in the spectra of the same oils, are all features which cause us to hope that it may yet prove of great value in determining their quality, whilst they also demand for it I think the fullest investigation.

I have, therefore, in continuation of my previous experiments made some further and much more minute investigations this time, principally into the spectra of olive oils, which I venture to hope may not be without interest, and probably may be of some little use in the present state of our knowledge regarding them. All the experiments were performed under the same conditions so that I think the results may be taken at least as relatively correct. As far as the samples were concerned they were all marked "Sublime," "Extra Sublime," or "Super Extra," but of their further history I am entirely ignorant. By their taste, smell, colour, etc., I take it they would have all been esteemed commercially good samples, with the exceptions probably, of samples 2, 7, 16, which were rather marked, both in their smell and taste. The appearance of the various samples as

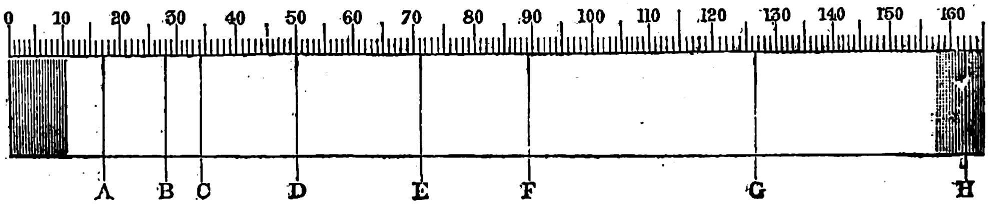


Fig. 1.

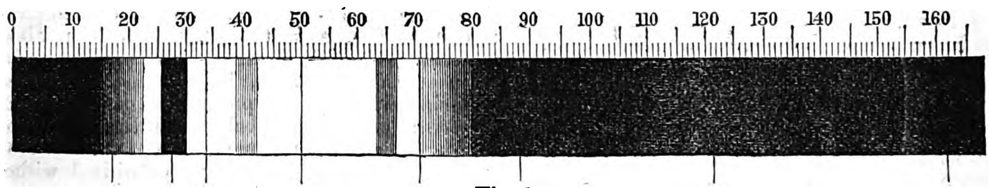


Fig. 2.

Spectra of Olive Oils.

Sample.	General Appearance of Sample.	Extreme red of Spectrum absorbed.	Dark Shading extended.	Breadth of 1st Dark Band.	Breadth of 2nd Dark Band.	Breadth of 3rd Dark Band.	Dark shading. Violet end began.	Spectrum all absorbed.
		Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.	Degrees.
1	Bright yellow	13	19½	1¼ F.*	faint trace.	trace.	72½	81
2	Bright yellow	14	23½	trace only.	no trace.	no trace.	73½	82½
3	Dark green	15½	22½	5 V. D.	3½	4	71	79
4	Dark green	11	17½	4½ V. D.	faint trace.	3	71¼	79½
5	Dark green	14	20	5 V. D.	3	3	70	77½
6	Bright yellow.....	12½	20	2½ F.	faint trace.	faint trace.	74	85
7	Bright green......	14	20	4 D.	distinct trace.	distinct trace.	70	90
8	Yellowish green .	14	22	5½ D.	3½	4	65	78
9	Pure green	15	20	6 V. D.	4	4	70	75
10	Bright green	15	20	6 V. D.	3½	4	69	75
11	Greenish yellow..	11	19	5 D.	trace.	1½	72	80
12	Bright yellow	13	20	5 D.	trace.	3½	72½	77½
13	Greenish yellow..	11	21	3 F.	no trace.	no trace.	72	85
14	Greenish yellow..	12	19	5 D.	trace.	4½	70	78½
15	Dark yelsh. green	11	20	3 F.	no trace.	faint trace.	72½	82½
16	Pale green	12	20	3 F.	no trace.	faint trace.	70	80
17	Yellowish green..	12	20	3½ V. D.	trace.	3½	70	78
18	Dark green	12	19	4 D.	trace.	trace.	71	79½

* F, faint; V D, very dark; D, dark; indicating the appearance of the band.

shortly stated in the first column of the accompanying table is therefore not in any way intended to indicate the quality of the oil, but rather simply to give an approximate idea of the relation betwixt the colour of the oil and the nature of the corresponding spectrum. To understand the table itself it is necessary that I should explain that my investigations have mainly been directed to determining the variations (and the amount) that exist in the spectra of different samples of olive oil, and for this purpose I have laid hold of every feature existing in the individual spectrum on which I possibly could, such as the amount of absorption at the extremes of the spectrum, the amount of shading previous to the absorption, the breadth of the several dark bands, and so on. The relative position of these several characteristics, as well as their breadth, or space which they occupy, will at once be understood by referring to the diagram accompanying the table, in which the degrees of the spectroscope are made to coincide with the dark bands of the solar spectrum, Fig I. This is a method of mapping spectra probably not the best, although correct enough for our present purpose, and much more simple and therefore much more readily understood than any other. Fig 2 represents literally the spectrum of sample No. 3, and from it the appearance of the spectrum of the other samples can readily be imagined by referring to the positions and breadths of the bands and shadings contained in the table.

At first sight it may be thought that the variations brought out in the above table are sufficiently unsatisfactory and discouraging. In some respects they would be, did they not at the same time so thoroughly establish the delicacy of the reaction of the spectroscope in thus detecting and disclosing them, however fine or insignificant. In several cases it was quite impossible to detect by any ordinary means the difference existing betwixt some of the foregoing samples; and yet, no sooner were they placed in the spectroscope than the most marked characteristics frequently were brought out. This being the case it is surely not too much to expect that having the delicate appliance at command for detecting the smallest variation in the character of a given oil, the ultimate cause of these variations may also be discovered without any great effort. The principal difficulty to me seems to lie in the almost impossibility of obtaining an oil on which sufficient reliance can be placed, to act not only as a standard oil, but one also on which experiments might be performed for the purpose of discovering how much these variations are dependent on causes inherent in the oil itself, and how much from extraneous sources. Age, exposure, and other similar causes may doubtless exert a modifying influence on the spectrum of an oil, as they do on its character generally; but the discovery of these would not be unimportant in themselves, whilst they would more than probably assist us very materially in the discovery of other and worse agencies, which it is to be feared too often find their way into this and other oils.

NOTE ON CASSAVA STARCH IN ARROWROOT.

BY H. WILLIAMS JONES.

A considerable quantity of arrowroot adulterated with cassava starch, amylum mandiocæ or Brazilian arrowroot, from which tapioca is made, is in the market at the present time; and during the past few months I have seen several samples selected from the bulk offered to wholesale buyers, so adulterated.

Pereira does not appear to have met with it as an adulterant in this country; but on the authority of Guibourt, he mentions its being imported into France and sold there for arrowroot.* Hanbury and Flückiger in their 'Pharmacographia' make no mention of it, though they state that "other starches than that of *Maranta* are occasionally sold."

The cassava granules found in the samples alluded to, agreed perfectly, as to form and size, with an authentic specimen kindly furnished me by Mr. J. R. Jackson, A.L.S., of the Museum, Royal Botanic Gardens, Kew.

17, *Bull Street, Birmingham.*

CRYSTALLIZED HYDROBROMATE OF CONIA.†

BY M. MOURRUT.

In a paper recently read before the Société de Thérapeutique the author described some attempts to obtain crystalline salts of conia. His first experiments were made with various acids upon the ordinary brown conia, from which crystals were obtained, but they were contaminated by a brown matter that could not be removed without great loss. The German conia, which is nearly white, was therefore substituted and this readily gave crystals. The salt obtained most easily was the hydrobromate, by simply treating the alkaloid with the acid. When brown conia was operated on, there was a rise of temperature, an evolution of white vapours and the characteristic odour of conia became manifest; the mixture then became green and finally black with a reddish tinge. After a short time crystals commenced to form; they were contaminated by the brown black substances that coloured the liquid, but by repeated crystallizations they were obtained colourless. There was, however, much loss with the impure alkaloid.

In operating upon the white conia the author places it in a crystallizing vessel with a fragment of blue litmus paper, and dilute hydrobromic acid is added drop by drop, until the litmus paper commenced to turn red, the liquid which was at first yellow has then a rose tint. The crystallization quickly commences, and the evaporation may be expedited by a gentle heat; there will no longer be any smell of conia.

The hydrobromate of conia crystallizes in colourless prismatic needles that are very soluble in water and alcohol, but less so in ether and chloroform. The crystals are not deliquescent; they are odourless and have only a slight taste; but when crushed between the fingers they give off a strong odour of conia. When exposed to the air the salt is coloured red, like many other hydrobromates, but does not decompose, in the dark it remains white. It supports a tolerably high temperature, melts at about 100° C., and above that point volatilizes, giving off an odour of conia. It contains about one-third its weight of bromine, but the author has not yet made an exact analysis.

The salt is reported to have been administered in hourly doses of 2 milligrams to infants one year old suffering from whooping cough, with good results, and in 5 milligram doses to a child three years old. Dr. Regnault has also injected equal to 5 milligrams in the case of an adult suffering from sciatic pains, repeating the dose at an interval of three days, after which the pains ceased.

* Mat. Med., vol. ii. pt. 1, 1297.

† *Répertoire de Pharmacie*, June 25, p. 369.

DRAGENDORFF'S ALKALOID PROCESSES.*

THE STRYCHNINE AND BRUCINE PROCESS.

The substance to be analysed should be first cut into small pieces and treated with water and a little sulphuric acid, enough to give a decidedly acid reaction to the mixture. To about 100 c.c. of the mixture of finely cut substance and water, add 10 c.c. of diluted sulphuric acid (1·5). Digest at 50° C. for several hours and then filter. Treat the undissolved material again with 100 c.c. of water and 10 c.c. of the dilute sulphuric acid, in the same manner, and filter.

Put both filtrates together and add sufficient calcined magnesia to neutralize most of the free acid, but the solution must still retain a decidedly acid reaction. Evaporate on the water-bath to the consistency of thin syrup, but not to dryness.

Mix this concentrated solution with three or four times its volume of alcohol, of from ninety to ninety-five per cent., add a few drops of dilute sulphuric acid, digest at from 30° to 40° for twenty-four hours, and then filter off the insoluble matters. Evaporate the filtrate until all the alcohol has passed off, dilute the remaining solution to 50 c.c. in a flask, and shake it thoroughly with from 20 to 30 c.c. of pure benzol. Remove this benzol and shake again with a fresh portion.

After the second portion of benzol has been removed, the watery solution is to be made decidedly alkaline with ammonia, warmed to 40° or 50°, when the alkaloid set free is taken up by shaking again thoroughly, with from 20 to 30 c.c. of benzol. This is then removed and the shaking is repeated with another portion of benzol.

The benzol solutions obtained in this way are generally colourless, and contain the alkaloids so nearly pure that, after shaking with distilled water and clearing by immersion in warm water, filtering and evaporating, a residue is obtained in which the alkaloids may be proved directly. But it is better, after the washing with distilled water, to take up the alkaloids again, by shaking with water acidulated by sulphuric acid; treating twice with 20 or 30 c.c. of the acidulated water and removing the benzol, then saturate the watery solution obtained in this way with ammonia, and make a new solution of the alkaloids in benzol. Wash with pure water, filter and evaporate, and if all the watery solution has been removed from the benzol, the alkaloids remain, in most cases, so pure and colourless that the identifying reactions may be obtained directly. It is best to divide the benzol solution among several watch-glasses, and evaporate at about 40° C.

THE COMPLETE ALKALOID PROCESS.

I. The substance is digested as above, with water containing sulphuric acid, at a temperature between 40° and 50°, two or three times, and the filtrates are put together after all the liquid has been pressed out of the solid matter. Most of the alkaloids are not injured by this treatment, even when too much acid has been used. Solanine, colchicine, and digitalin, are the only ones that might be injured by a large excess of acid. If there is abundance of time, the macerations may be made at common temperatures.

Berberine is less soluble in acidulated water than in pure water, but it is completely dissolved by the large quantity of liquid used. Piperine also dissolves with difficulty in acidulated water, and part of this alkaloid may remain in the undissolved residuum, where it should be sought for afterwards.

II. Evaporate the filtrates, after the free acid has been partially neutralized with magnesia, until the liquid reaches the consistency of syrup; mix this with three or four times its volume of alcohol and a little dilute sulphuric acid, allow it to digest for twenty-four hours at about 30°, let it become quite cold, and filter from the solid matters that have been separated by the alcohol. Wash the solid residue with spirits of wine, of about seventy per cent. The remarks made at I concerning solanine, colchicine and digitalin, apply equally to this digestion.

III. The alcohol must be separated from the filtrate by distillation (evaporation), and the watery residue, after the addition of a little more water, if necessary, is filtered into a flask, and in its acid condition is treated with freshly rectified petroleum naphtha (see note at the end of this translation), by continued and repeated shaking together, at a temperature of about 40°. After the liquids have separated, the naphtha, sometimes containing colouring matter and such impurities as may be removed by this treatment, is drawn off from the aqueous solution. The naphtha may also take up piperine, and if a considerable quantity has been used, and there is not too much impurity present, the alkaloid will be left upon evaporating the naphtha, in well defined crystals belonging to the rhombic system. Concentrated sulphuric acid dissolves it gradually, with the production of a handsome brown colour.

IV. Shake the aqueous solution with benzol, in the same way, at from 40° to 50°, and evaporate the benzol after removing it. If there are traces of any alkaloid in the residue from this evaporation, it indicates caffeine. In this case, neutralize the greater part of the acid in the aqueous solution with magnesia or ammonia, but still leave it decidedly acid, and treat it again with fresh portions of benzol, until the latter leaves no residue upon evaporation. Wash the benzol solution by shaking it with distilled water, separate from the water, and filter it. Distill off the greater part of the benzol from this filtrate, and evaporate the remainder upon several watch-glasses. Care must be exercised, that in case a drop of the aqueous fluid passes through the filter, it is not evaporated with the benzol.

The residue from this evaporation may contain caffeine, delphine, colchicine, cubebine, digitalin, and traces of veratrine, physostigmine, and berberine. Caffeine forms definite crystals, as colourless, glossy needles; it is known by its reaction with chlorine water and ammonia. Sulphuric acid does not colour it. Cubebine also forms small crystals, which may be known by their behaviour with sulphuric acid, and the same may be said of colocynthe, elaterine, and syringine. A yellow-colored residue indicates colchicine and berberine. Sulphuric acid dissolves and colours colchicine an intense and durable dark yellow; berberine, olive green, becoming clear afterwards. Berberine may be distinguished from colchicine, by the behaviour of its alcoholic solution with tincture of iodine. Delphine, digitalin, veratrine, and physostigmine are left as amorphous, nearly colourless residues. Delphine is coloured light brown by sulphuric acid; digitalin yields with it, in less than fifteen hours, a number of colours changing from amber, through red and brown, to dark cherry-red, and its presence may be confirmed by the sulphuric acid and bromine reaction. Veratrine, with pure sulphuric acid, becomes yellow-orange, and in less than half an hour beautiful orange-red, and this test may be confirmed by boiling with fuming hydrochloric acid. Physostigmine is not coloured by sulphuric acid. It may be known by its action on the eyes of cats.

V. The acid watery liquid is shaken with amylic alcohol, in the same way as in III. and IV. if the presence of theobromine is suspected.

There are also taken up by the amylic alcohol, some of the above-named alkaloids remaining from III. and IV.—namely, veratrine, and berberine, and traces of narcotine, aconitine and atropine, and they are left in crystals after the evaporation of the solution.

Theobromine is recognized by its reaction with chlorine water and ammonia, and also as it dissolves without colour in concentrated sulphuric acid.

Narcotine is not readily soluble in acetic acid, and may be recognized by its reaction when warmed with concentrated sulphuric acid.

* Translated in the *American Chemist*, April, 1876.

VI. The acid watery liquid is shaken with chloroform, only when the presence of the alkaloids of opium is suspected.

Chloroform takes up papaverine, thebaine (slowly) together with small quantities of narceine, brucine, physostigmine, berberine, and, when the treatment given at V. is omitted, veratrine and narcotine.

Crystals of papaverine and brucine are left after the evaporation of the chloroform solution. Papaverine may be readily distinguished by testing with sulphuric acid (beautiful blue violet colour), and brucine by the red colour imparted to it by Erdmann's reagent. Most of the narcotine, thebaine, narceine, veratrine, physostigmine, and berberine, are left as amorphous substances.

Narcotine may be separated from the other alkaloids by dilute acetic acid, in which it is not readily soluble, and it may be proved as in V. Thebaine is characterized by its behaviour with cold sulphuric acid. Veratrine and physostigmine as above.

VII. The watery liquid, at about 40°, is then covered with a layer of petroleum naphtha, made distinctly alkaline with ammonia, and immediately well shaken. After the first naphtha solution has been drawn off, other extractions should be made at the same temperature with fresh portions of petroleum naphtha. The warm naphtha solutions should be washed with distilled water, and afterwards filtered and evaporated. If the solution is too highly coloured by foreign matter, it may be purified by taking up the alkaloids in acidulated water, adding ammonia and shaking with pure naphtha again.

The petroleum naphtha takes up strychnine, brucine, quinine, emetine, veratrine, conine, nicotine, and papaverine.

A. Of these, conine and nicotine are fluids, and have characteristic odours. They may be brought into solution in distilled water, and nicotine is precipitated in minute crystals by potash-cadmium-iodide from the diluted solution after neutralizing with sulphuric acid, while conine is precipitated in amorphous form.

B. Upon cooling the warm naphtha solution, quinine separates, and traces of strychnine and papaverine also crystallize out.

C. After evaporation, the remainder of the quinine, strychnine, and papaverine are left in crystals, and brucine, emetine, and veratrine, in amorphous form.

The dry alkaloids are treated with anhydrous ether, which dissolves quinine, emetine, papaverine, and veratrine, and also conine and nicotine, if they have not been removed by water.

Strychnine and brucine may be separated by absolute alcohol, in which strychnine is nearly insoluble. Brucine is recognized, after the evaporation of its solution, by its behaviour with Erdmann's reagent. Strychnine may be determined by means of sulphuric acid and bichromate of potash.

After evaporating the ether solution, quinine, emetine, veratrine, and papaverine are dissolved in the smallest possible quantity of very dilute sulphuric acid, and the cold solution, which should not contain less than one per cent. of the alkaloids, is treated with carbonate of soda, when quinine, emetine, and papaverine are precipitated.

Quinine may be determined by its behaviour with chlorine-water and ammonia. Emetine by producing an emetic effect, and by the absence of the veratrine reaction with hydrochloric acid. Papaverine by its behaviour with sulphuric acid. Veratrine, after its watery filtrate has been treated with chloroform and the latter evaporated by boiling with hydrochloric acid.

VIII. The alkaline watery liquid is shaken with benzol, at 40° or 50°, purifying as in VII. This removes quinidine, cinchonine, atropine, hyoscyamine, aconitine, physostigmine, and codeine.

Crystals of cinchonine, sometimes accompanied by a little atropine and quinidine, separate from the solution on cooling.

After evaporating the solution, there remain with those just named, crystallized codeine (very distinct), aconitia, hyoscyamine and physostigmine (mostly amorphous).

A. The residue left by evaporation is treated with ether, which dissolves all the above-named alkaloids, excepting cinchonine.

B. The residue from the evaporation of this ether solution must be dissolved in the smallest possible quantity of water containing sulphuric acid, and treated with ammonia slightly in excess, which separates quinidine and aconitine, leaving atropine, hyoscyamine, and codeine in solution.

The precipitate, which may contain quinidine and aconitine, is collected on a very small filter and dissolved in the least quantity of hydrochloric acid. Upon the addition of chloride of platinum the whole of the quinidine is precipitated.

The solution of aconitine is freed from platinum by a current of sulphuretted hydrogen, then it is made alkaline and shaken with chloroform. In the residue left by evaporating this chloroform solution the aconitine may be recognized by means of sulphuric or phosphoric acid.

C. Atropine dissolves with difficulty in cold benzol, and codeine dissolves readily. The former is not coloured by concentrated sulphuric acid, the latter is gradually coloured blue. Atropine, when warmed with concentrated sulphuric acid, gives the characteristic odour previously described; codeine does not. Atropine (and hyoscyamine) distend the pupil of the eye; codeine does not. For physostigmine, see IV.

IX. The watery liquid is now acidulated with sulphuric acid, and heated to 50° or 60°, covered with amylic alcohol, and, after it has been made alkaline again with ammonia, it is shaken with the amylic alcohol, purifying as in VII. and VIII. By shaking with amylic alcohol at the temperature just given, the morphine, solanine, and part of the narceine are obtained. The latter should be dissolved in lukewarm water, and put with the watery liquid at X.

The solution of solanine in amylic alcohol gelatinizes upon cooling, that of morphine forms the best of alkaloid crystals. Morphine is proved by Fröhde's reaction (with molybdate of soda), and by Hersemann's test (concentrated sulphuric acid solution and nitric acid).

Solanine is characterized by its decomposition in hydrochloric acid, and the retention of the products of this decomposition by ether; and also by its behaviour with iodine water and sulphuric acid.

X. The watery liquid may still contain curarine and traces of berberine, narceine (and digitalin).

Evaporate it to dryness with powdered glass; digest the pulverized residue for a day in alcohol, filter, and evaporate the filtrate. If the residue is very impure, it may be repeatedly recrystallized from water and alcohol.

Berberine remains as a yellow-coloured residue, and is known by the behaviour of its alcoholic solution with iodine water.

Narceine is left in colourless crystals. It is recognized by its reaction with sulphuric acid, or by the behaviour of its aqueous solution with iodine water.

Curarine is left mostly amorphous and is distinguished by its reaction with sulphuric acid alone, and with sulphuric acid and chromate of potash.

NOTE.—Petroleum naphtha has a boiling point between 30° and 80°. It should be purified by shaking with an ammoniacal solution of acetate of lead and distilling. That which is sold in Russia as an illuminating fluid under the name of "Chandorine" may be rectified for use in this way.

Petroleum naphtha does not dissolve asphalt, which is soluble in benzol. Benzol boils at 80° or 81°. Petroleum naphtha begins to boil at a much lower temperature.

SANTONIN.*

MM. Cannizzaro and Sestini, having been engaged in an investigation of santonin, have observed that in combining with the elements of water, it yields numerous bodies; one unstable and decomposing in the presence of acids, the other presenting acid characters and decomposing carbonates. To obtain the latter compound, satonin is boiled for twelve hours in a saturated solution of baryta; a salt of baryta is formed, the acid of which has been named by M. Cannizzaro, santonic acid. This can be isolated by treating the baryta salt with hydrochloric acid and shaking with ether which dissolves the santonic acid.

Santonic acid ($C_{15}H_{20}O_4$) forms orthorhombic prisms, which are not, like santonin ($C_{15}H_{18}O_3$), coloured violet by caustic potash, or yellow by the action of light. It melts at 161° to 163° C., and is very soluble in boiling water, alcohol, ether and chloroform. It forms with soda and baryta two salts, $C_{15}H_{19}O_4Na$ and $(C_{15}H_{19}O_4)_2Ba$, which are very soluble and difficult to crystallize.

The authors have attempted to discover the relations of this acid with other compounds containing C_{15}, such as the essential oils of cubebs and of patchouli. They have obtained with santonic acid and hydriodic acid an iodide, $C_{15}H_{25}I$, and a hydrocarbide, $C_{15}H_{25}$, having the same composition as the hydrocarbide prepared with the camphor of patchouli. They have not been able to effect the conversion of santonic acid into santonin, but they have obtained an isomer of santonin, metasantonin, by submitting santonic acid to a prolonged boiling with hydriodic acid and phosphorus. This new body forms white crystals, does not give santonic acid with baryta water, and distils without alteration in a vacuum.

If bromine be added to a solution of santonin in acetic acid, there is formed after a contact of some hours, a new compound, $C_{15}H_{18}O_3Br_2$, which crystallizes in red needles and appears to be a product of addition.

According to M. Hesse a solution of santonate of soda treated with an acid in excess, gives a deposit of santonin, that could only be a product of decomposition of santonic acid.

A HYDRATED DERIVATIVE OF CELLULOSE.†

BY A. GIRARD.

Between the normal cellulose as it is separated from the organs of growth and the modified gelatinous form of the same mentioned by Béchamp in 1856, another peculiar condition has been observed, which has not yet been exactly described; its formation, however, frequently takes place in industrial operations. The cellulose in this condition loses its firmness and becomes friable. The author has undertaken a closer study of this substance, and found that it represents the first modification that cellulose undergoes under the action of acids. In preparing it the conditions requisite for its production must be closely maintained; and the strength of the acid, the time it is allowed to act upon the cellulose, and the temperature very carefully regulated. According to the author the best method of preparing this modification is first to moisten cellulose with, and then dip it into, cold sulphuric acid, sp. gr. 1·42, and allow the duration of the action to be dependent upon the permeability of the cellulose. With pure carded cotton wool it should last twelve hours. At the end of that time the cellulose appears to be unaltered, and under the microscope it only seems to be somewhat puffed and stretched, and to have acquired very adhesive properties; but if pressed between two glass plates it breaks up at once into a multitude of small irregular pieces. Notwithstanding its friability the substance can be well washed and dried at a low temperature without losing its shape. But in the dried condition upon the slightest rubbing between the fingers it crumbles immediately to a fine snow-like powder. An elementary analysis gave results answering to the formula $C_{12}H_{11}O_{11}$, which corresponds to the formula of cellulose plus one molecule of water. This molecule of water is not driven off by drying. The author has given to the substance the name of hydrocellulose.

Hydrocellulose possesses definite characteristic properties. It oxidizes with extraordinary readiness. Heated for several days to 50° C. it gradually turns yellow; its proportion of carbon diminishes, and that of hydrogen increases. If now it be washed with water, it gives up a yellow substance that reduces cupric solution and silver nitrate; but the residue is unaltered hydrocellulose, answering to the formula $C_{12}H_{11}O_{11}$. When heated with a weak (1 per cent.) solution of potash the hydrocellulose is oxidized and dissolves gradually with the formation of a strongly coloured reducing liquid.

Another method of preparation mentioned by the author is that used by Payen to limit the action of acid in the conversion of starch into dextrin; it consists in moistening the substance with a very weakly acid solution, and then exposing it to a temperature of 100° C. Under these conditions the cellulose passes rapidly into hydrocellulose, but is completely carbonized by a longer action of the acid. The production of the friable hydrocellulose through the hydration of cellulose, and the conversion of this into sugar, permits, the author believes, a better explanation of certain manufacturing accidents than has hitherto been given. For instance, the production of paper parchment may be counteracted by the superficial conversion of the paper fibre into hydrocellulose. Also, when a paper is imperfectly freed from the bleaching agent, its pliability and tissue may be destroyed through the formation of hydrocellulose; the bleaching lime being decomposed by carbonic acid in the air and yielding hypochlorous and hydrochloric acids, which then act upon the cellulose.

RESOURCES OF THE PROVINCE OF SHANTUNG.

The following interesting details are quoted in the *Journal of the Society of Arts*, from a report on the geography and natural history of the province of Shantung that has recently been published in Hong-Kong:—

"The province, in the plains and valleys, is very fertile: the hills are cultivated to the extreme limit of available soil, but they are generally barren, with the exception of a dwarf kind of pine, very seldom reaching more than 10 feet in height. Some of the mountains bear names indicating that at a certain period there must have been some trees upon them. For instance, in the high range of the Saw Teetto Mountains on the road from Chefoo to Lay Yung, there is a summit called the Elm Peak, upon which, however, no such tree as an Elm exists; a few dwarf oaks, the leaves of which are eaten by silkworms, is apparently the only vegetation there. In the ravines or stony valleys there is a larger kind of pine, flat-headed and resembling the Italian pine when the Chinese allow it to grow to its full size. Large trees in the plains are not very common, but on the high road to Chi-nan Fu, and near Lay Yung, are some poplars remarkable for their large size, silver-white bark, and contorted branches. There are two kinds, one with large, and the other with small leaves; both furnish a light and excellent timber for carving and junk building.

"A kind of Catalpa, bearing the name of the great naturalist Bunge, is very common in Shantung, and decorates the gardens of Chefoo; its wood is used for making musical instruments, chess-men, chess-tables, and weighing-rods. The ailanthus, or Chinese varnish-tree, is not only useful for feeding silkworms, but its roots furnish an exceedingly useful drug, for use in dysentery; this remedy, long known to the Chinese,

* *L'Union Pharmaceutique*, xvii, 136.

† *Schweizerische Wochenschrift für Pharmacie*, June 2, p. 180

has been experimented with successfully on Europeans during the last two years, and has proved to be one of the most powerful astringents known. The *Cedrela odorata*, a tree closely allied to the mahogany, also grows in Shantung; the wood is of a reddish colour; the fruit is astringent, and is used in cases of ophthalmia. The young shoots are described as having an onion-like taste, and they are boiled and eaten by the Chinese.

"The huai shu (*Sophora japonica*) is a very common tree, and is often found of great size and age, when they take the fantastical shapes the Chinese love so much. The veneration they have for old trees is a great incitement to preserving them from destruction. They support the long branches with poles or pillars, carefully patching the holes of the trunk with bricks and mortar, and often building a little chapel or niche at the foot of the tree, generally dedicated to the Tu-lao-ye, or god of agriculture, when not dedicated to the tree itself, which they call lao-ye. The flowers of this tree are used in China as a yellow dye, for dyeing the silk of which the garments of the mandarins are made. Very large quantities of these flowers are thus consumed, and the tree is largely cultivated for the purpose, not only in Shantung, but also in Tokien and Honan, from whence they are sent in sacks to other parts of China. Small quantities occasionally reach this country, but they have never yet become an established article of commerce.

"The Chinese persimmon (*Diospyros Kaki*) is very common in Shantung. The fruit is sometimes known as the Chinese date-plum; it is of a bright red colour, about the size of an ordinary apple, and the pulp, which somewhat resembles that of a plum, is yellowish transparent. These fruits are sometimes dried and candied; but both in their fresh and preserved states they are very delicious. Considering the ease with which they might be sent, preserved in tins or earthenware jars, it is surprising we do not often see them in the European markets. It seems, however, they are largely exported to Chili. The only uses to which the fruits of the elegant Gingko, or maidenhair tree (*Salisburia adiantifolia*) are put, are for making soups and as an astringent medicine. A large article of export, known as red and black dates, are the fruits of two very common shrubs, one of which is *Rhamnus utilis*, and the other probably *R. chlorophorus*. The former grows extensively on the mountains, and furnishes the well-known dye known as Chinese green indigo, and by the Chinese as lu-ko. It is prepared by chopping the twigs in small pieces and boiling them in water, to which a certain quantity of alum is added for fixing the colour. This dye has been imported in considerable quantities into France, chiefly to the silk weaving districts about Lyons, for dyeing some of the more beautiful shades of green. The fruit-bearing trees of Shantung are somewhat limited. The vines are plentiful and give two or three kinds of grapes, which are not so sweet as the cultivated grapes of Europe. Good wine is nevertheless made from them in Pekin by the French missionaries. A celebrated fruit of the province is the Shantung pear, which is largely exported.

"From the seeds of the millet (*Setaria* species) the Chinese make a fermented beverage in the following manner:—The seeds are boiled till they burst; they are then spread out on a table and mixed with a small quantity of leaves from wheat; the whole is then put into a large leather jar, where it is left to ferment from one to four weeks. It is then placed in linen and pressed with stones, and the liquid so extracted forms huang chin, or yellow wine. Besides this, a kind of brandy or spirit is prepared from viro, sweet potatoes, persimmon fruits, etc. The bean cheese or bean curd, so common in many parts of China, is made from white and yellow beans (*Soia hispida*) steeped in cold water till they are soft, when they are deprived of their skin by pressing them between the fingers, after which they are reduced to pulp by pounding them in a mortar or pressing them under a millstone; the pulp is passed through a sieve and then some *lu-shui*—the residuum of sea salt or nitre, or a gypsum solution is added, which coagulates the albumen; the water is taken off by pressure in a linen cloth loaded with stones; this liquid is carefully thrown away, being said to be poisonous. The cake so obtained is salted, and sold fresh in the streets, or dried to the consistency of a hard cheese. Flour for food is also made from these beans, as well as a sauce or soy. This sauce, now extensively used in this country and in America, is prepared by steeping the beans in water for one hour; they are then half-dried in the sun and mixed with wheat flour and allowed to ferment, being placed for that purpose in a hot damp place. The mould which develops itself in abundance on the beans is scraped off, the beans are then dried and put in salted water, which has been properly boiled and cooled (to expel the air). The brown and black colour of the sauce so obtained is supposed to be produced by a microscopic fungus resembling the ergot of rye, whose properties the soy is said to possess. These kinds of beans are very extensively used in the manufacture of the now famous bean cake. The Customs returns give but a small idea of the enormous export of these cakes; for, if thousands are sent to the southern ports in foreign bottoms, the many millions which have found their way in junks it is impossible even to guess at. The beans being thoroughly crushed under heavy stone wheels turned by mules, are heated under water and the cakes compressed between iron hoops. The pressure is slowly and gradually increased by driving the wedges with an enormous stone suspended as a pendulum and acting as a ram. The oil, which runs from them into a kind of well, is black and very dense; it has a disagreeable smell, and is used for illuminating purposes, and for caulking boats, and being mixed with lime it makes a kind of putty. A foreign firm in Nenchavang, some time ago, tried to extract oil from the beans by the more powerful and expeditious means of a hydraulic press, but the resistance to a sudden pressure was so great that hardly any oil could be obtained.

"The other oil-producing plants of Shantung are *Sesamum orientale*, *Arachis hypogæa*, *Cannabis sativa*, *Ricinus communis*. Some of these oils are exported to Canton to be purified and clarified there, and come back to Chefoo under the pompous but false name of tea-oil. The castor-oil plant is often cultivated in the form of hedges, being considered an effective barrier against the intrusion of animals.

"The Shantung province is also very rich in medicinal plants. A kind of native ginseng found in sandy plains, and accordingly called sha-sen, is exported in quantities. The roots of the *Libanotis* and the fruit of the *Aristolochia* are famous drugs, while the leaves of the *Artemisia* are used as Moxa.

"The products here mentioned are only a few of those constituting the natural resources of the province of Shantung."

THE CULTURE OF TOBACCO IN OHIO.*

BY BENJAMIN T. CREIGHTON PH.G.

The eastern and south-eastern part of the State affords the best soil for tobacco growing, and in these districts this product has become a staple article, affording the main crop of the farmer, and, as a rule, rarely failing pecuniarily, for even in seasons when the yield is small, the price of the article is proportionately large.

In growing this much-used vegetable, the first step is the preparing of the ground for sowing the seed, by burning logs of wood or brush on the section of land chosen for tobacco beds. This is done to warm the soil, as well as to supply the ashes needed in nourishing the young plants. The burning takes place either in the fall or spring previous to sowing. If in the fall, the ground is slightly reburnt in the following spring. The time re-

* *American Journal of Pharmacy* for June.

quired for burning the beds, if logs of wood are used, is generally from two to three days. If brush be used, a much less time. The earth is then dug up and raked to a proper consistency. After the seeds have been deposited, the bed is thoroughly tramped or walked over, in order that it may retain sufficient moisture. In about three weeks the young plant makes it appearance, but it remains quite small for a considerable length of time, and, in fact, the growth is scarcely noticeable from the time of its appearance above ground (about the first of April,) until shortly before transplanting, which is generally about the latter part of June. It then grows with astonishing rapidity, as, when transplanted, it may have been but from 1 to 2 inches in height; when ready to collect (latter part of August) it generally measures from 3 to 6 feet and not unfrequently 10 feet in height. The transplanting of tobacco is not unfrequently attended with much difficulty, dry weather being very detrimental to the plant, and too much moisture equally as injurious. In the former case, the young plants wither and die, and in the latter instance, the earth becomes hardened and baked around the roots of the vegetable, thus killing it. The ground is considered to be of the proper consistency for transplanting after it has been thoroughly moistened by rain.

Tobacco is collected from the last of August until the last of October, until frost, and, if planted late, this unwelcome visitor often finds a large crop not matured, which is consequently worthless after the first touch of its icy breath. In collecting tobacco the first leaves gathered are called "bottom leaves," being from five to seven of the lower leaves of the plant, after which the plant is *topped*, thus producing larger leaves, and causing maturity in a much quicker time. This topping process strengthens the plant materially, as, after its performance, new shoots or branches will almost always spring from the axils of the leaves nearest to where the tops were broken off, and often afford leaves large enough to be gathered. The next in order are the middle leaves, which are collected in about two weeks after taking the bottom leaves; they consist of from ten to twelve leaves from the central part of the plant, and are the largest as well as the most valuable ones of the plant. Finally, the top leaves are collected, in from three to four weeks after taking the middle ones, providing there is no frost to injure them. These are smaller than the middle leaves, and resemble very much those taken from the bottom part of the plant, but are much cleaner than these latter, which often become very much soiled from their close proximity to the soil.

Among other points in cultivating tobacco, we mention the worming process, which, to most persons, is an exceedingly unpleasant task. The worm which is found on the plant is not very attractive in appearance, nor agreeable to handle. It is of a green colour, and, when full size, measures about an inch in circumference and from two to three inches in length. They are very destructive, a single worm often consuming an entire plant in a few days, if unmolested. They are also found to be quite numerous, inasmuch as the tobacco has to be thoroughly cleaned of them several times during a season. To kill them, the worms are grasped with the thumb and finger by the head, and thrown, with considerable force, on the ground, which has the effect of mashing them; when agitated, while taking them from the plant, they will often eject a greenish liquid from the mouth, which is very offensive to the sight, and reminds one somewhat of the tobacco chewers of a higher order.

After collecting the tobacco, it is taken to the tobacco house, and strung upon sticks (by means of a large needle and twine), called "tobacco sticks." Women are employed for this work, who string from one hundred to one hundred and twenty-five sticks per day. It is then placed on the tobacco scaffold, in the open air, until wilted, when it is placed in the "tobacco house," where a gradual heat is applied until it assumes a yellow colour. A higher degree of heat is then immediately applied, for twenty-four hours, to "kill it," as the farmer terms it, meaning the expulsion of all moisture from the leaves. The doors of the house are then thrown open, and the floor often sprinkled with water, in order that the leaves may again become sufficiently moistened to permit manipulation. It is now rolled in bundles ready for market.

The main object sought for by tobacco growers is the colour, which is influenced by various causes, among the leading ones are the modes of drying and the soil upon which it was raised, as the first crop of tobacco on any soil is invariably the finest. The "yellow spangle" is considered the finest colour, and, consequently, brings the highest price. The "light red" also stands high in the list, and is deemed a valuable colour. There are several other colours beside the two named which go to make up the tobacco seen in commerce.

Ashes.—After careful experiments with an extra fine quality of tobacco, furnished by an Ohio grower, the following results have been obtained, being the relative per cent. yielded by bottom, middle, and top leaves:—

Bottom leaves 18·4, middle leaves 14·2, top leaves 14·8 per cent.

In obtaining these results, the tobacco was dried by means of heat until it ceased to lose weight, one thousand grains were then weighed out and subjected to smothered combustion, until charred, after which they were completely incinerated, and the product again weighed, yielding, respectively, 184, 142, and 148 grains of ashes.

These amounts are much smaller than obtained by other experimenters, and I can only attribute the different results to the following, namely:—The bottom leaves of tobacco invariably grow on or near the ground, and tobacco being of a very glutinous nature becomes strongly impregnated with the soil. This foreign matter adheres so tenaciously to the leaves that it cannot all be removed, nor can it be recognized with the naked eye. In view of this fact, it is but fair to suppose that the large amount of ashes which some have obtained may have been due, in part, at least, to the bottom leaves having been used in their experiments.

COD LIVER OIL AND FERROUS IODIDE.

The following formula for this preparation has been published in the *Nieu Tydschrift voor de Pharmacie in Nederland*, by a Commission which the Netherlands Pharmaceutical Society has appointed to examine secret remedies and specialties:—

Iodine	1 part.
Pulverized Iron	1 part.
Pale Cod Liver Oil	80 parts.

Triturate the pulverized iron in a mortar with the iodine and one-fourth of the oil, and heat the mixture in a water-bath with continual stirring, until the brown colour of the iodine has entirely disappeared and given place to a deep purple colour, showing that the ferrous iodide has been formed and dissolved. Then add the remainder of the oil, mix carefully, and after standing decant into dry bottles, which are to be completely filled, closed immediately and kept sheltered from the light.

This oil is of a purple colour and differs in taste but little from the ordinary medicinal cod liver oil. Exposed to the light it changes after a few days to a red brown colour. Although the taste is but little altered it is important to prevent this change of colour which always indicates the liberation of iodine. In well stoppered bottles the oil remains unaltered, but it is as well not to prepare too much in advance. The taste and colour furnish good criteria for its condition.

The Pharmaceutical Journal.

SATURDAY, JULY 8, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

CONCENTRATED MEDICINES.

FORTUNATELY it is but seldom that we have occasion to record cases of accidental poisoning that are referable to negligence in the dispensing of prescriptions by pharmacists, or to the want of due care in the keeping of dangerous drugs, and considering how frequently potent substances such as alkaloids, etc., are now employed in medicine this circumstance furnishes evidence of the attention given by pharmacists to the dispensing of medicines.

But notwithstanding this appropriate exercise of carefulness on the part of the pharmacist there are still some possibilities of disaster such as the accidental substitution of a poisonous liniment for a mixture, either in the hands of a nurse or of patients themselves, and it would perhaps be difficult to do away with such possibilities altogether. There are, however, others which are entirely preventible; among them there is one involving very serious risk in some cases. We refer to the practice of prescribing concentrated medicines, which has been on various occasions treated of in this Journal with the object of demonstrating by argument the danger with which it is attended, and sometimes by recording the consequences to which it has given rise.

A letter which appeared in the *Lancet* on the 24th of last month under the heading of "Prescribers and Dispensers," too plainly shows that the dangerous practice to which we refer has not been wholly abandoned by medical men, and as its continuance would be no less a source of danger to patients than of perplexity to dispensers, we think it fitting to take advantage of this opportunity to urge upon medical men the desirability of its discontinuance.

In the case now referred to, two prescriptions were taken to a pharmacist in the West of London to be dispensed, which were literally as follows:

"℞ Liq. Strychniæ ℥ j. Fiat gutt.

"A teaspoonful to be added to six ounces of water. A tablespoonful to be taken twice daily before meals."

"℞ Liq. Sodæ Arseniatis ℥ j. Fiat gutt.

"A teaspoonful to be added to six ounces of water, and a tablespoonful to be taken twice daily after meals."

The pharmacist who was required to dispense these medicines felt a reluctance to do so for reasons that will readily be understood by our readers, and he adopted what we think was the proper course of calling upon the physician to express his reasons for disliking to dispense such potent remedies in that form; but, as he states, his visit was considered to be an excessive overstepping of his province.

Having thus failed to obtain consideration from the prescriber, Mr. TUPHOLME wrote to the editor of the *Lancet*, stating the difficulty he experienced as to whether he should dispense the prescription or incur the risk of offending both patient and physician, at the same time putting the questions, Whether he would be justified in refusing to dispense the medicines? Whether he would be justified in putting upon them a label with the word "Poison"? Whether his conduct in dispensing the medicines would be considered reprehensible by the public or the profession should any accident arise? And, lastly, Whether such prescribing is in accordance with professional medical ethics?

It is scarcely to be wondered at that the *Lancet* abstains from giving a specific answer to these questions, though it is admitted that an important question is raised which should be settled amicably between physicians who have to prescribe poisonous drugs and chemists who have to dispense them.

We are glad, however, to find that our medical contemporary does not hesitate to declare its opinion that the prescription of such quantities of strong solutions of the strongest poisons is most objectionable, and then proceeds to give reasons for this opinion which are so much to the point that we trust they will be duly appreciated by medical men, and have the effect of deterring them in future from the practice of prescribing concentrated medicines.

In the first place, the want of accordance in this particular instance with the instruction of the Pharmacopœia, under the head of Arseniate of Soda, that it is "to be used cautiously," is pointed out and it is held that this instruction applies even more forcibly to strychnia. A further reason for objecting to this kind of prescription is that an important part of the dispensing is left to be done by the patient or by his friends, and while the accuracy with which this is done is so important, he is directed to measure this strong solution of strychnine by the rough and variable means of a teaspoon. Equal liability to error attaches to the directions given for diluting this quantity so that the tablespoonful may contain the intended dose of strychnine. Another objection, of a more purely medical nature, consists in the length of time for which such a supply of medicine would last, nearly seven weeks, and that in the case of a medicine which acts very irregularly on different persons and requires that the patient should be frequently seen while he is taking it.

Our contemporary also urges that it is the due of chemists that dangerous medicines should be compounded by them ready for the patients' use and that for doing so they should receive a reasonable recompense, which could scarcely be the case when they supply a wholesale stock of uncompounded preparations as in this instance.

We are glad to acknowledge the spirit of fairness and consideration evinced by the foregoing remarks, and we trust they will not fail to influence medical men in such a way as to remove a fruitful source of difficulty to dispensers.

THE COUNCIL EXAMINATION PRIZES.

WE wish to call the attention of Pharmaceutical Chemists who have passed the Major examination during the present session, and who were at the time Associates of the Society, to the official notice that the examination for the above prizes (the first under the new regulations) is to be held in London and Edinburgh on Wednesday, the 26th inst. The first prize includes the PEREIRA Medal in silver, the second the Pharmaceutical Society's Medal in silver, and the third the Society's Medal in bronze. The medals are to be accompanied by presents of books of the value of about £5, £3, and £2 respectively, the gift of Mr. THOMAS HYDE HILLS. Persons intending to compete must give notice to the SECRETARY AND REGISTRAR on or before Saturday, the 15th inst.

LECTURES ON CHEMISTRY AND PHARMACY.

IT will be seen by the Report on another page that the Council, on the recommendation of the Library, Museum, and Laboratory Committee, has authorized the Professor of Chemistry and Pharmacy to raise the fees for attendance at his lectures to three guineas for a single course, four guineas for the sessional two courses, and five guineas for perpetual admission. The ground on which this alteration is made is that each course of sixty lectures has been practically increased by extending the time from an hour to an hour and a half, so that each course now comprises the matter of ninety lectures. We understand, also, that under the new arrangement of fees the Professor contemplates supplementing each course with a few evening lectures, at which he will be able to illustrate some of the subjects, such as those of polarized light, the spectroscope, etc., with experiments, for which a darkened room is required.

THE GOVERNMENT AND SCIENTIFIC RESEARCH.

THE recommendation contained in the Eighth Report of the Commission on Scientific Instruction and the Advancement of Science,* to the effect that competent investigators should sometimes receive grants in money enabling them to provide themselves with means for conducting their researches, appears to have received a practical endorsement from the Government. Some correspondence has just been published in which an offer is made by the Government on the one hand and accepted by the Royal Society on the other, of a grant of £4000 annually as an addition to the £1000 already voted annually to enable the Royal Society to defray the expenses of scientific investigations considered by a committee of the Society to be worthy of such aid. The conditions of the £1000 grant—that it should be expended in aiding investigators to provide themselves with apparatus and assistants, but never in personal payments to the investigators themselves—are to remain unaltered. But with respect to the £4000 it is intended that permission should be accorded to the Government Grant Committee of the Royal Society—which is to be enlarged so as to include the Presidents of the principal scientific bodies—to recommend in certain cases the payment of personal allowances to gentlemen during the time they are engaged in their investigations. The experiment is to be tried for five years, the Royal Society reporting annually to the Lords of the Committee of Council on Education, the department responsible to Parliament for the proper administration of the grant, on the progress made, and as to the desirability of renewing the grant. All instruments purchased for investigations with money out of this fund are to be left in the charge of the Education Department when no longer required.

* See vol. vi., p. 150.

THE REGISTRATION OF TRADE MARKS.

ACCORDING to the Act passed last session, regulating the registration of trade marks, it was provided that on and after Saturday last no person should be entitled to institute any proceeding to prevent the infringement of any trade mark until and unless such trade mark is registered pursuant to the Act. In consequence of the number of existing trade marks, and the difficulties attending their registration, it has been found impossible to complete their registration within the time specified; a Bill has therefore been introduced into Parliament to extend the time to the 1st of January, 1877, with power of still further extension by an Order in Council. The Bill has passed the Lords, and was considered in Committee in the Commons on Thursday last, when the date was again altered to the 1st of July 1877. The amendment Bill as introduced also contained a provision that the powers vested in the "Court" by the principal Act might be exercised by the Commissioners of Patents, but this was removed from the Bill in Committee.

A SUCCESSFUL PATENT MEDICINE.

THE *Temps* of the 17th ult. contains a curious report of the hearing, in a French correctional court, of a charge of swindling against a German named BAER, who had become naturalized in France, and whose name is associated with the sale of "Eau antineuralgique." This compound is alleged to cure neuralgia, prevent apoplexy, and combat epilepsy. According to the report of Dr. BERGERON, it consists of bad eau-de-vie in which tobacco previously exhausted with boiling water has been macerated; to this a little indigo is added. The remedy is sold in 4*s.* bottles, but sample bottles are considerately provided at 2*s.* 6*d.* each. In the course of his explanation the accused asserted that the water had produced "des résultats très-grands," a remark which met with the concurrence of the prosecution on the ground that the proceeds of its sale amounted to 1,800,000 francs yearly! The charge of swindling was established and the accused was sentenced to one month's imprisonment.

Transactions of the Pharmaceutical Society

MEETING OF THE COUNCIL.

Wednesday, July 5th, 1876.

MR. JOHN WILLIAMS, PRESIDENT, IN THE CHAIR.

MR. WILLIAM DAWSON SAVAGE, VICE-PRESIDENT.

Present,—Messrs. Atherton, Atkins, Betty, Bottle, Cracknell, Frazer, Greenish, Hampson, Hanbury, Hills, Owen, Rimmington, Robbins, Sandford, Schacht, Shaw, and Stacey.

The minutes of the previous meeting were read and confirmed.

The SECRETARY read a letter from Mrs. Brew, of Brighton, acknowledging the letter of condolence sent to the family on the occasion of the death of Mr. Brew.

The SECRETARY also read a letter from Mr. Barnard S. Proctor, undertaking to deliver the sessional address in October next.

The SECRETARY also stated that in consequence of the acceptance of office by Mr. Stacey as a member of the Council, it would be necessary to appoint an auditor next month.

The PRESIDENT took this occasion to say a few words of welcome to Mr. Stacey on his taking his seat at the Council table, to which that gentleman briefly replied.

THE HANBURY MEMORIAL FUND.

The PRESIDENT said there was a letter from the Pharmaceutical Society of Prague, which he might read, although it did not strictly relate to the business of the Society, but to the Hanbury Memorial Fund.

Mr. GREENISH moved that the letter be entered on the minutes and published in the Journal, which was agreed to.

The following is the letter :—

"Prague, 11th June, 1876.

"To the Honourable Council of the
Pharmaceutical Society of Great Britain,
London.

"I am charged by the President of our 'Society of Bohemian Pharmacists' to notify that this Society has changed its name last time and is now called '*Pharmaceutische Gesellschaft in Prag*' (Pharmaceutical Society of Prague).

"Your Honourable Council please at once to accept my best thanks for the most honouring election of my person as one of the Vice-Presidents of the Executive Committee of the 'Hanbury Memorial Fund,' which I will endeavour to promote as much as possible. Mr. Thomas Greenish will pay for this fund to one of the Honorary Secretaries £1 1*s*. from myself (Josef Dittrich) and £1 1*s*. from the Pharmaceutical Society of Prague.

"The Pharm. Society of Prague,
In order of the President,
JOSEF DITTRICH,
Pharmacist at Prague,
No. 219, III. Bohemia.
Member of the Council."

THE MATERIA MEDICA COLLECTION OF THE LATE DANIEL HANBURY.

The PRESIDENT also read the following letter from Mr. Thomas Hanbury, relating to the botanical collection of the late Mr. Hanbury, and suggested that the offer should be gratefully accepted, on the conditions named.

"Ashburton House,
"Croydon, 29 June, 1876.

"To the President of the Pharmaceutical Society
of Great Britain.

"SIR,—My late dear brother Daniel Hanbury when near his end, gave me verbal instructions that he wished 'his herbarium to be divided between Kew, the Pharmaceutical Society, the British Museum and Professor Flückiger.'

"In taking steps to carry out this wish, I have heard many regrets expressed by the scientific friends of my late brother, that there should be any division of his Pharmaceutical collection, which being unique and *sui generis*, would it is considered greatly lose in interest by being divided and scattered. I share this opinion, and believe that had my late brother calmly considered the matter in time of health, he would have come to the same conclusion.

"With the approval of my co-executor and my other relatives, I have decided to offer the entire Pharmaceutical collection to your society, on the simple condition that it shall be kept apart, and labelled in a suitable manner to show it was formed by my late brother, and that access to the specimens and herbarium be allowed only under most careful regulations to prevent injury or loss.

"I am,
"Yours faithfully,
THOMAS HANBURY."

Mr. SANDFORD moved, and Mr. Hills seconded the following, which was carried unanimously :

"That the offer of the collection of the late Daniel Hanbury to the Pharmaceutical Society be accepted, with the best thanks of this Council to his executors, and that the letter from Mr. Thomas Hanbury be referred to the Library, Museum, and Laboratory Committee, for the purpose of making the necessary arrangements for keeping the specimens according to the wishes of the late Daniel Hanbury's representatives."

ELECTIONS.

The following being duly registered as Pharmaceutical Chemists were respectively granted a Diploma stamped with the Seal of the Society :—

Appleby, Edward Joseph.
Pain, Arthur.
Sheppard, Ebenezer.
Thomas, Henry Alma.
West, John Leaver.
Wheatly, Arthur William.
Woodland, John.

On the list of names being submitted for election to membership,

The SECRETARY drew attention to the fact that the name of a lady was included.

Mr. SANDFORD thought it was understood that when a lady applied her name should be put separately.

Mr. HAMPSON was not aware of any rule of that kind.

The VICE-PRESIDENT said the resolution was submitted in the usual form, and it was open to any one to move an amendment.

Mr. SANDFORD said he was prepared to move as on a former occasion, that the name of the lady be omitted.

Mr. BOTTLE suggested that the names be taken *seriatim*.

Mr. HAMPSON said he felt something very much akin to a sense of shame in speaking on this subject, and to find that it was necessary to re-discuss a question of this kind. He believed that the lady in question had as much right to membership as any man at the board. She was eligible according to the Act of Parliament, having passed the highest examination that the Society imposed on the candidates, and he considered that in refusing her election the Council would be acting illegally, and that probably in the future a *mandamus* from the Court of Queen's Bench would be the result. It had come to this that the Council selfishly excluded those who had a right to membership, and he believed that by so doing it was neglecting a simple duty, and acting unjustly as well as illegally. He should like to read a short passage bearing on this point from a report of a Conference held in 1867 between the Society and the United Society of Chemists and Druggists. Mr. Sandford was then president and in speaking of the word "eligibility" quoted the opinion of the solicitor that if a man were "eligible" under the Act of Parliament "they were bound to elect him, and to proceed according to the spirit of the Act." Now he contended that the spirit of the Act was decidedly in favour of the election of this lady. She had done everything which was requisite, and he felt that the Council had no right to deprive her of the privilege of membership. It was a matter of common courtesy and justice, and he hoped the election would take place.

Mr. ROBBINS contended that it was not competent for the Council to elect a lady as a member after the decision of the annual general meeting some years ago without first annulling that decision by a resolution deciding that ladies can be admitted to membership; the present mode of attempt to admit a certain lady was out of order and irregular.

Mr. OWEN did not think the Council was altogether bound by the decision of the annual meeting.

Mr. SANDFORD here formally moved an amendment that the lady be not elected. He said he was quite prepared to stand by what Mr. Hampson had read, and agreed with the definition of "eligibility" there given. It was well known that the power of election was discretionary, and cases occurred from time to time, when the discretion was exercised by refusing to elect persons whom they did not think would be fit and proper members. It was a hard thing to speak against ladies in this way, but he did not consider they would be proper members of the Society; they could not become members of the Council, or take the Presidential chair, and therefore he thought it a pity that the question had been opened again. The proper way would be to bring it before a general meeting and let the sense of the Society be taken upon it.

Mr. ATHERTON seconded the amendment. He said that ever since the Council had had the advantage of Mr. Hampson's presence this matter had been brought forward annually; and considering that year after year the Council had come to so decided a negative he rather wondered at Mr. Hampson bringing it up again.

Mr. HAMPSON protested against this being considered as his particular question.

Mr. SANDFORD: I thought you moved it.

Mr. HAMPSON: So I do. But you will please to understand that I do not bring the matter forward. It comes as it ought to come, in the usual way; the applicant has obeyed the statute, passed the examination, and seeks election in the ordinary way.

Mr. ATKINS said he should like to have the question raised by Mr. Robbins settled, whether the Council could properly elect this lady.

Mr. FRAZER asked if the President could say whether the Council would be acting illegally in electing this lady.

The PRESIDENT said he should be sorry to say it would be illegal, but he thought it would be very injudicious in the Council to do so after so strong an expression of opinion by a general meeting, without submitting the question to the members again.

Mr. FRAZER thought if the Council were entitled by law to elect this lady it was bound to do so. Her fees had been taken and she had been allowed to enter the trade, and it was now too late to stop.

Mr. BETTY pointed out that the decision of the general meeting was arrived at, not haphazard, but in consequence of the question being formally remitted to it by the Council. Therefore, although the Council might legally elect this lady, he contended most strongly that representing their constituents, morally they could not do so.

Mr. HAMPSON demurred to the statement that the question was specially referred to the general meeting, but acknowledged that he was mistaken on Mr. Bottle stating that he himself had moved a resolution for the purpose.

Mr. BETTY repeated that consistently the Council could not advance in this matter, and he should like a vote taken on this preliminary point, and afterwards, if necessary, he would give his opinion on the main question.

Mr. ATKINS agreed with Mr. Betty that the Council could not introduce such an organic change without consulting the members generally, especially after the decision which had been already come to.

Mr. SCHACHT said that although he had on former occasions voted for the admission of ladies, and still hoped that the time would shortly come when at a public meeting a vote would reverse the former decision, yet he felt that until such a vote had been given it would not be right to elect a lady as a member, and therefore he must vote for the amendment.

A vote was then taken when twelve voted for the amendment; four against it. The amendment was therefore carried. The list was then submitted with the exception of the lady's name, and the following elections took place:—

MEMBERS.

Pharmaceutical Chemists.

Appleby, Edward Joseph ......Devonport.
Pain, Arthur ....Ipswich.
Sheppard, Ebenezer ....Walsall.
West, John Leaver ....London.
Wheatly, Arthur William ......London.
Woodland, John ....Deal.

Chemist and Druggist.

Abram, Frederick William ......East Dereham.

ASSOCIATES IN BUSINESS.

The following having passed their respective examinations, and being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Fiddick Thomas ....Camborne.
Hugo, Richard ....Kensington.

Modified.

Martin, Richard ....Bolton.
Saunders, Charles J. H. ....Exeter.

ASSOCIATES.

The following having passed their respective examinations, and having severally paid or tendered the subscription for the current year, were elected "Associates" of the Society:—

Adams, Charles.....................Birmingham.
Barcham, Henry ... .Hackford.
Daniel, John ....Ceibach.
Fosse, Alexander Fare............Ilfracombe.
Gregory, Walter ....Taunton.
Helmore, William Holloway ...Stratford-on-Avon.
Prebble, John George ....Folkestone.
Roberts, Edmund..................Cambridge.

Modified.

Llewelyn, Ynyr.....................Stourbridge.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Baker, Joseph Palmer............Bulwell.
Callander, William Wright......Exeter.
Cave, John Maud Perry ....Leominster.
Killick, Charles R. ....London.
Nathan, Louis Bernard ....Jersey.
Rowe, Walter ....Leicester.
Williams, Alfred Joseph ....London.

A former member was restored to his former status in the Society upon payment of the current year's subscription and a fine.

Reports of Committees.

Finance.

The report of this Committee was read and adopted, and sundry accounts ordered to be paid.

Benevolent Fund.

The report of this Committee was read, including recommendations of the following grants:—

£10 to a registered chemist and druggist in distressed circumstances. Applicant has received a former grant of like amount.

£10 to a former member, aged 55, who has had two former grants.

One application had been rejected, the person seeking assistance being in receipt of parochial relief; and another application had been ordered to stand over.

The following regulation of the Royal Agricultural Benevolent Institution had been laid before the Committee by the Secretary, who suggested that a similar regulation might with advantage be adopted:—

> "Should any subscriber, being duly qualified, hereafter become a candidate for the benefits of the Institution such number of votes should be placed to his or her credit at the first succeeding election, as should be represented by the whole amount of subscription he or she may have paid during the period of his or her enrolment as a subscriber."

The consideration of this matter had been deferred to the next meeting of the Committee.

The report and recommendations were received and adopted.

Library, Museum, and Laboratory.

The report of this Committee included the following information:—

Professor Redwood had reported that he had 51 students now attending his class; 15 perpetual, and 12 for the entire session.

Professor Bentley had reported 74 students in his class.

Professor Attfield had reported that he had had 119 entries since the commencement of the session, 56 now working.

The Librarian reported that the average attendance in the Library during the day had been 27; in the evening 9. The circulation of books had been 174 in town; country, to 28 places, 47.

The Committeee recommended the purchase of the following books from the general fund:—

Fresenius' 'Quantitative Analysis,' 7th ed., vol. 1.
Fresenius' 'Qualitative Analysis,' 9th ed.
Clowes' 'Practical and Analytical Chemistry.'
Valentin's 'Inorganic Chemistry,' 3rd ed.
Jeannel's 'Formulaire Officinal et Magistral,' 2me éd.

The Curator had reported the attendance in the Museum as being on the average 19 in the day, 5 in the evening. The stag's horns presented by the late Sir Edwin Landseer were now mounted and placed in the Museum. The Materia Medica portion of the catalogue was finally revised. The following donations to the Museum had been received:—

A series of specimens illustrating a paper on Ergot, by Professor Dragendorff of Dorpat.

A fine specimen of Bryony root, from Mr. Sturton, of Cambridge.

A number of specimens of Indian drugs, from Professor Dymock, of Bombay.

Specimen of the root of Garuleum bipinnatum, from the Cape of Good Hope, from Mr. Hyman.

With regard to the question recently raised as to the obtaining for the library certain foreign pharmaceutical journals, Mr. Greenish had reported that he had made inquiries of a firm of booksellers in Berlin who had furnished an estimate. The Committee decided to defer the consideration of this question until next month, further inquiries to be made in the meantime.

In response to the letter of Professor Redwood the Committee recommended that the fees for the Chemistry and Pharmacy course be increased to the following amounts:—

One Course	£3 3s.
An Entire Session	£4 4s.
Perpetual Admission . . .	£5 5s.

The report and recommendations of the Committee were received and adopted.

The Philadelphia Exhibition.

The President read a letter received from the American Pharmaceutical Association expressing a hope that many English pharmacists visiting the Philadelphia Exhibition would make arrangements for being present at the annual meeting of the Association in September.

Appointment of Professors and Curator for the ensuing Year.

Professor Redwood was re-appointed Professor of Chemistry and Pharmacy for the ensuing year.

Professor Bentley was re-appointed Professor of Botany and Materia Medica for the ensuing year.

Professor Attfield was re-appointed Professor of Practical Chemistry for the ensuing year.

Mr. Holmes was re-appointed Curator of the Society's Museum for the ensuing year.

House.

The report of this Committee was read and adopted. It only referred to matters of detail with regard to the house arrangements.

Law and Parliamentary.

The report of this Committee contained letters from the Solicitor detailing the steps taken in various legal proceedings. The Secretary also reported steps taken in several cases of alleged infringement of the Pharmacy Act. The Committee recommended prosecution in four cases of infringement of the provisions of the Pharmacy Act, 1868.

The report of the Committee was received and adopted.

Preliminary Examinations.

The following Superintendents and Deputy-Superintendents of written examinations at the various local centres, were appointed for the ensuing year:—

Superintendents of Examinations.

Aberdeen	Davidson, Charles.
Aberystwith	Wynne, E. P.
Barnstaple	Goss, Samuel.
Berwick-on-Tweed	Carr, William Graham.
Birmingham	Southall, William.
Boston	Pilley, Henry T.
Brighton	Gwatkin, James Thomas.
Bristol	Stoddart, W. W.
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Cross, William.
Cardigan	Jones, J. E.
Carlisle	Thompson, Andrew.
Carmarthen	Davies, R. M.
Carnarvon	Jones, John.
Cheltenham	Smith, N.
Chester	Grindley, W.
Colchester	Shenstone, J. B. B.
Darlington	Robinson, A. F.
Doncaster	Dunhill, W. W.
Dorchester	Evans, A. J.
Dumfries	Allan, William.
Dundee	Hardie, James.
Edinburgh	Mackay, John.
Exeter	Delves, George.
Glasgow	Kinninmont, A.
Guernsey	Arnold, A.
Hereford	Jennings, R.
Hull	Bell, C. B.
Inverness	Galloway, G. R.
Jersey	Ereaut, J. jun.

Leamington	Jones, S. U.
Leeds	Reynolds, R.
Leicester	Cooper, Thomas.
Lincoln	Maltby, Joseph.
Liverpool	Abraham, J.
London	Taylor, Geo. Spratt.
Lynn	Atmore, George.
Macclesfield	Bates, W. I.
Manchester	Wilkinson, W.
Newcastle	Gooderham, Rev. A.
Northampton	Bingley, J.
Norwich	Sutton, Francis.
Nottingham	Atherton, J. H.
Oxford	Prior, G. T.
Perth	Dandie, David.
Peterborough	Heanley, M.
Plymouth	Balkwill, A. P.
Portsmouth	Rastrick, R. J.
Preston	Barnes, J.
Reading	Hayward, W. G.
Salisbury	Atkins, S. R.
Scarborough	Whitfield, J.
Sheffield	Wilson, Edward.
Shrewsbury	Cross, W. G.
Southampton	Dawson, O. R.
Stafford	Averill, J.
Swansea	Brend, Thomas.
Taunton	Prince, Henry.
Truro	Serpell, S.
Worcester	Virgo, Charles.
York	Davison, R.

DEPUTY-SUPERINTENDENTS OF EXAMINATIONS.

Aberdeen	Kay, James Petrie.
Aberystwith	Vaughan, W. G.
Barnstaple	Symons, William.
Berwick-on-Tweed	Carr, Robert.
Birmingham	Churchill, Walter J.
Boston	Haller, Frederick William.
Brighton	Savage, William Wallace.
Bristol	Schacht, G. F.
Cambridge	Church, H. J.
Canterbury	Amos, D.
Cardiff	Bartleet, John.
Cardigan	Evans, C.
Carlisle	Halloway, John.
Carmarthen	Davies, R. M., jun.
Carnarvon	Hughes, Richard.
Cheltenham	Barron, William.
Chester	Hodges, W.
Colchester	Prosser, E. T.
Darlington	Hutchinson, E.
Doncaster	Shaw, H. W.
Dorchester	Durden, Henry.
Dumfries	Carruthers, R. B.
Dundee	Laird, William.
Edinburgh	Ainslie, William.
Exeter	Lake, J. H.
Glasgow	Davison, T.
Guernsey	Collenette, A.
Hereford	Parkin, T.
Hull	Baynes, J.
Inverness	Galloway, G.
Jersey	Ereaut, J.
Leamington	Davies, H.
Leeds	Smeeton, W.
Leicester	Cooper, Henry.
Lincoln	Battle, J. S.
Liverpool	Shaw, John.
London	Bremridge, Richard.
"	Knapman, J. W.
"	Holmes, E. M.
Lynn	Willis, C.
Macclesfield	Wood, R.
Manchester	Wilkinson, G.
Newcastle	Usher, J.
Northampton	Mayger, W. D.
Norwich	Corder, O.
Nottingham	Fitzhugh, R.
Oxford	Thurland, T. H.
Perth	Dandie, Robert.
Peterborough	Buckle, F. G.
Plymouth	Hearder, H. P.
Portsmouth	Rastrick, J. L.
Preston	Barnes, L. R.
Reading	Bradley, Charles.
Salisbury	Orchard, E. J.
Scarborough	Fryer, C.
Sheffield	Ward, William.
Shrewsbury	Cross, W. G. jun.
Southampton	Spearing, James.
Stafford	Averill, H. A.
Swansea	Layng, T. B.
Taunton	Gregory, G. H.
Truro	Richards, J. E.
Worcester	Lunn, Thomas.
York	Cooper, Thomas.

The VICE-PRESIDENT said the first three months of 1876, as compared with 1875, showed an increase of 195 in England in the number coming up for the Preliminary examination.

REPORT OF EXAMINATIONS.

June, 1876.

ENGLAND AND WALES.

		Candidates.		
		Examined.	Passed.	Failed.
Major	21st	9	7	2
Minor	21st	15	7	8
"	22nd	20	9	11
		— 35	— 16	— 19
Modified	22nd	2	1	1
		46	24	22

THE COUNCIL EXAMINATION PRIZES.

Messrs. Carteighe and Linford were appointed to conduct the examination for the Council Examination Prizes to be held on Wednesday, the 26th instant.

The SECRETARY read a letter from Mr. Mackay, saying that the Council of the North British Branch had received an application from Dr. Gillespie on behalf of the Edinburgh Medical and Chirurgical Society, for the use of the Society's Rooms once a month, paying a fee of one guinea. The Council of the North British Branch had acceded to the application subject to the approval of the London Council.

A resolution was passed sanctioning the proposed arrangement.

A letter was read from a gentleman who prepares pupils for the examinations of the Society, asking that the list of successful candidates might be made known to him on the evening of the day of examination, instead of the next morning, in order to save young men from a night of suspense, and allow some of them to return to their homes a day earlier.

The SECRETARY said the list used to be exhibited in the hall on the night of the examination, but the practice had given rise to much confusion and obstruction in the hall, and it became absolutely necessary to discontinue it. The candidates were now communicated with direct from the office, and that system has been found to work satisfactorily.

The Secretary was directed to inform the gentleman referred to that the Council could not accede to his request.

THE PRELIMINARY EXAMINATIONS.

The SECRETARY submitted the following list of attendances at the different centres since the establishment of the present system :—

PRELIMINARY EXAMINATION.

List of Centres and Table of Attendances of Candidates at each Centre.

	1874. July.	1874. Oct.	1875. Jan.	1875. April.	1875. July.	1875. Oct.	1876. Jan.	1876. April.	1876. July.	Total number of attendances at each Centre.
England and Wales.										
Aberystwith	3	...	1	3	2	3	2	2	2	18
Barnstaple	...	1	...	1	...	...	...	1	3	6
Berwick-on-Tweed	2	1	...	...	...	1	...	1	...	5
Birmingham	22	9	14	11	6	8	13	12	15	110
Boston	4	2	6	5	3	4	5	5	2	36
Brighton	1	4	3	2	2	1	2	6	3	24
Bristol	5	6	6	11	6	6	2	9	7	58
Cambridge	7	5	4	2	3	6	2	8	6	43
Canterbury	3	2	2	2	3	4	7	5	2	30
Cardiff	7	1	2	1	7	...	4	4	8	34
Cardigan	5	...	...	1	...	3	1	4	4	18
Carlisle	3	...	2	1	3	3	4	2	3	21
Carmarthen	5	8	3	4	6	4	1	4	3	38
Carnarvon	2	3	2	2	1	3	2	...	1	16
Cheltenham	2	3	1	5	3	1	1	2	2	20
Chester	5	4	3	4	1	3	3	5	1	29
Colchester	2	...	1	...	1	1	4	3	3	15
Darlington	7	7	4	2	1	2	2	3	6	34
Doncaster	1	2	1	1	2	...	6	1	3	17
Dorchester	...	...	...	...	1	...	...	...	...	1
Exeter	3	2	1	...	1	1	1	5	...	14
Guernsey	...	1	1	...	...	...	...	...	1	3
Hereford	...	...	...	...	...	1	3	...	2	6
Hull	12	8	3	5	10	4	9	4	9	64
Jersey	...	...	...	...	...	...	1	...	...	1
Leamington	2	4	2	2	...	4	1	2	1	18
Leeds	14	8	7	7	4	11	15	12	14	92
Leicester	4	6	4	1	3	4	2	3	4	31
Lincoln	5	3	...	3	1	1	6	2	3	24
Liverpool	16	10	5	7	13	7	8	11	9	86
London	58	49	23	38	40	22	28	50	40	343
Lynn	1	1	...	...	6	3	...	4	3	18
Macclesfield	3	1	...	...	...	...	...	1	2	7
Manchester	22	21	8	14	5	9	13	11	18	121
Newcastle-on-Tyne	6	4	5	5	5	3	10	10	8	56
Northampton	4	2	4	2	7	1	1	2	2	25
Norwich	7	1	3	6	6	6	3	3	4	39
Nottingham	11	6	6	3	7	6	4	9	8	60
Oxford	1	1	1	2	3	2	3	5	2	20
Peterborough	4	1	...	2	5	2	...	1	4	19
Plymouth	7	3	4	1	2	4	...	2	10	33
Portsmouth	2	5	2	3	2	1	1	5	4	25
Preston	7	4	2	4	1	4	4	7	3	36
Reading	2	...	1	1	4	2	1	1	5	17
Salisbury	...	2	...	2	4	2	2	3	...	15
Scarborough	2	1	1	2	2	2	...	3	3	16
Sheffield	6	2	6	3	2	3	5	4	6	37
Shrewsbury	3	3	...	2	1	3	4	5	2	23
Southampton	1	...	1	...	3	4	1	1	4	15
Stafford	6	3	..	..	1	3	1	2	3	19
Swansea	6	4	...	4	...	2	7	4	5	32
Taunton	2	...	1	1	2	1	2	1	2	12
Truro	2	...	1	4	2	3	2	3	2	19
Worcester	5	4	...	4	6	2	2	...	3	26
York	2	4	3	7	3	1	4	2	6	32
Scotland.										
Aberdeen	10	5	9	10	11	10	5	4	5	69
Dumfries	5	...	...	2	1	2	1	3	7	21
Dundee	3	7	2	1	1	1	1	2	5	23
Edinburgh	11	7	9	10	9	9	13	9	8	85
Glasgow	11	2	1	9	3	3	4	12	6	51
Inverness	2	...	1	1	...	...	1	2	4	11
Perth	1	...	...	1	1	...	...	...	1	4

Proceedings of Scientific Societies.

ROYAL INSTITUTION OF GREAT BRITAIN.*

THE MECHANICAL ACTION OF LIGHT.

BY W. CROOKES, F.R.S.

(Concluded from page 15.)

The speed with which a sensitive radiometer will revolve in the sun is almost incredible; and the electric light such as I have in this lantern cannot be far short of full sunshine. Here is the most sensitive instrument I have yet made, and I project its image on the screen, letting the full blaze of the electric light shine upon it. Nothing is seen but an undefined nebulous ring, which becomes at times almost invisible. The number of revolutions per second cannot be counted, but they must be several hundreds, for one candle has made it spin round forty times a second.

I have called the instrument the radiometer, because it will enable me to measure the intensity of radiation falling on it by counting the revolutions in a given time; the law being that the rapidity of revolution is inversely as the square of the distance between the light and the instrument.

When exposed to different numbers of candles at the same distance off, the speed of revolution in a given time is in proportion to the number of candles; two candles giving twice the rapidity of one candle, and three, three times, etc.

The position of the light in the horizontal plane of the instrument is of no consequence, provided the distance is not altered; thus, two candles, 1 foot off, give the same number of revolutions per second, whether they are side by side or opposite to each other. From this it follows that if the radiometer is brought into a uniformly lighted space it will continue to revolve.

It is easy to get rotation in a radiometer without having the surfaces of the discs differently coloured. Here is one having the pith discs blacked on both sides. I project its image on the screen, and there is no movement. I bring a candle near it, and shade the light from one side, when rapid rotation is produced, which is at once altered in direction by moving the shade to the other side.

I have arranged here a radiometer so that it can be made to move by a very faint light, and at the same time its rotation is easily followed by all present. In this bulb is a large six-armed radiometer carrying a mirror in its centre. The mirror is almost horizontal, but not quite so, and therefore when I throw a beam of electric light vertically downwards on to the central mirror, the light is reflected off at a slight angle, and as the instrument rotates its movement is shown by the spot of light travelling round the ceiling in a circle. Here again the fog helps us, for it gives us an imponderable beam of light moving round the room like a solid body, and saving you the trouble of looking up to the ceiling. I now set the radiometer moving round by the light of a candle, and I want to show you that coloured light does not very much interfere with the movement. I place a yellow glass in front, and the movement is scarcely diminished at all. Very deep coloured glass, you see, diminishes it a little more. Blue and green glass make it go a little slower, but still do not diminish the speed one half. I now place a screen of water in front: the instrument moves with diminished velocity, rotating with about one-fourth its original speed.

Taking the action produced by a candle flame as 100

Yellow glass reduces it to	89
Red ,, ,, ,,	71
Blue ,, ,, ,,	56
Green ,, ,, ,,	56
Water ,, ,, ,,	26
Alum ,, ,, ,,	15

* Lecture delivered on Friday, February 11, 1876.

I now move the candle a little distance off, so as to make the instrument move slower, and bring a flask of boiling water close to it. See what happens. The luminous index no longer moves steadily, but in jerks. Each disc appears to come up to the boiling water with difficulty, and to hurry past it. More and more sluggishly do they move past, until now one has failed to get by, and the luminous beam, after oscillating to and fro a few times, comes to rest. I now gradually bring the candle near. The index shows no movement. Nearer still. There is now a commencement of motion, as if the radiometer was trying to push past the resistance offered by the hot water; but it is not until I have brought the candle to within a few inches of the glass globe that rotation is recommenced. On these pith radiometers the action of dark heat is to repel the black and white surfaces almost equally, and this repulsion is so energetic as to overcome the rotation caused by the candle, and to stop the instrument.

With a radiometer constructed of a good conductor of heat, such as metal, the action of dark heat is different. Here is one of silvered copper, polished on one side and lampblacked on the other. I have set it moving with a candle slightly the normal way. Here is a glass shade heated so that it feels decidedly warm to the hand. I cover the radiometer with it, and the rotation first stops, and then recommences the reverse way. On removing the hot shade the reverse movement ceases, and normal rotation recommences.

If, however, I place a hot glass shade over a pith radiometer the arms at once revolve the normal way, as if I had exposed the instrument to light. The diametrically opposite behaviour of a pith and a metal instrument when exposed to dark heat radiated from a hot glass shade is very striking. The explanation of the action is not easy, but it depends on the fact that the metal is one of the best conductors of heat, whilst pith is one of the worst.

One more experiment with this metallic radiometer. I heat it strongly with a spirit lamp, and the arms spin round rapidly. Now the whole bulb is hot, and I remove the lamp: see what happens. The rotation quickly diminishes. Now it is at rest; and now it is spinning round just as fast the reverse way. I can procure this reverse movement only with difficulty with a pith instrument. The action is due to the metal being a good conductor of heat. As it absorbs heat it moves one way; as it radiates heat it moves the opposite way.

At first I made these instruments of the very lightest material possible, some of them not weighing more than half a grain; and where extreme sensitiveness is required lightness is essential. But the force that carries them round is quite strong enough to move a much greater weight. Thus the metallic instrument I have just experimented with weighs over 13 grains, and here is one still heavier, made of four pieces of looking-glass blacked on the silvered side, which are quickly sent round by the impact of this imponderable agent, and flash the rays of light all round the room when the electric lamp is turned on the instrument.

Before dismissing this instrument, let me show one more experiment. I place the looking-glass and the metal radiometer side by side, and, screening the light from them, they come almost to rest. Their temperature is the same as that of the room. What will happen if I suddenly chill them? I pour a few drops of ether on each of the bulbs. Both instruments begin to revolve. But notice the difference. Whilst the movement in the case of the metal radiometer is direct, that of the looking-glass instrument is reverse. And yet to a candle they both rotate the same way, the black being repelled.

Now, having found that this force would carry round a comparatively heavy weight, another useful application suggested itself. If I can carry round heavy mirrors or plates of copper, I can carry round a magnet. Here then is an instrument carrying a magnet and outside is a smaller magnet, delicately balanced in a vertical position, having the south pole at the top and the north pole at the bottom. As the inside magnet comes round, the outside magnet being delicately suspended on its centre, bows backwards and forwards, and, making contact at the bottom, carries an electric current from a battery to a Morse instrument. A ribbon of paper is drawn through the "Morse" by clockwork, and at each contact—at each revolution of the radiometer—a record is printed on the strip of paper by dots; close together if the radiometer revolves quickly, farther apart if it goes slower.

Here the inner magnet is too strong to allow the radiometer to start with a faint light without some initial impetus. Imagine the instrument to be on the top of a mountain away from everybody, and I wish to start it in the morning. Outside the bulb are a few coils of insulated copper wire, and by depressing the key for an instant I pass an electric current from the battery through them. The interior magnet is immediately deflected from its north-south position, and the impetus thus gained enables the light to keep up the rotation. In a proper meteorological instrument I should have an astatic combination inside the bulb, so that a very faint light would be sufficient to start it, but in this case I am obliged to set it going by an electric current. I have placed a candle near the magnetic radiometer. I now touch the key; the instrument immediately responds; the paper unwinds from the Morse instrument, and on it you will see dots in regular order. I put the candle 8 inches off, and the dots come wide apart. I place it 5⅝ inches off, and two dots come where one did before. I bring the candle 4 inches from the instrument, and the dots become four times as numerous, thus recording automatically the intensity of the light falling on the instrument, and proving that in this case also the radiometer obeys the law of inverse squares.

This instrument, the principle of which I have illustrated to-night, is not a mere toy or scientific curiosity, but is capable of giving much useful information in climatology. You are well aware that the temperature, the rainfall, the atmospheric pressure, the direction and force of the wind, are now carefully studied in most countries, in order to elucidate their sanitary condition, their animal and vegetable productions, and their agricultural capabilities. But one most important element, the amount of light received at any given place, has been hitherto but very crudely and approximately estimated, or rather guessed at. Yet it cannot be denied that sunlight has its effect upon life and health, vegetable, animal, and human, and that its relative amount at any place is hence a point of no small moment. The difficulty is now overcome by such an instrument as this. The radiometer may be permanently placed on some tall building, or high mountain, and, by connecting it by telegraphic wires to a central observatory, an exact account can be kept of the proportion of sunlight received in different latitudes, and at various heights above the sea level. Furthermore, our records of the comparative temperature of different places have been hitherto deficient. The temperature of a country depends partly on the amount of rays which it receives direct from the sun, and partly on the atmospheric and oceanic currents, warm or cold, which sweep over or near it. The thermometer does not discriminate between these influences; but the radiometer will enable us now to distinguish how much of the annual temperature of a place is due to the direct influence of the sun alone, and how much to the other factors above referred to.

I now come to the last question which I stated at the beginning of this discourse, "What is the amount of force exerted by radiation?" Well, I can calculate out the force in a certain way, from data supplied by this torsion apparatus. Knowing the weight of the beam, the power of the torsion fibre of glass, its time of oscillation, and the size of the surface acted on, it is not difficult to calculate the amount of force required to deflect the beam through a given angle; but I want to get a more direct measure of the force. I throw a ray of light upon one of these instruments, and it gives a push; surely it is possible to measure the amount of this push in parts of a grain. This I have succeeded in doing in the instrument behind me; but before showing the experiment I want to illustrate the principle upon which it depends. Here is a very fine glass fibre suspended from a horizontal bar, and I wish to show you the strength of it. The fibre is only a few thousandths of an inch thick; it is about 3 feet long, and at the lower end is hanging a scale-pan, weighing 100 grains. So I start with a pull of 100 grains on it. I now add little lead weights, 50 grains each, till it breaks. It bears a pull of 750 grains, but gives way when additional weight is added. You see then the great strength of a fibre of glass, so fine as to be invisible to all who are not close to it, to resist a tensile strain.

Now I will illustrate another equally important property of a glass thread, viz., its power to resist torsion. Here is a still finer glass thread, stretched horizontally between two supports: and in order to show its position I have put little jockeys of paper on it. One end is cemented firmly to a wooden block, and the other end is attached to a little instrument called a counter—a little machine for registering the number of revolutions. I now turn this handle till the fibre breaks, and the counter will tell me how many twists I have given this fibre of glass. You see it breaks at twenty revolutions. This is rather a thicker fibre than usual. I have had them bear more than 200 turns without breaking, and some that I have worked with are so fine that if I hold one of them by the end it curls itself up and floats about the room like a piece of spider's thread.

Having now illustrated these properties of glass fibres I will try to show a very delicate experiment. I want to ascertain the amount of pressure which radiation exerts on a blackened surface. I will put a ray of light on the pan of a balance, and give you its weight in grains; for I think in this Institution and before this audience I may be allowed a scientific use of the imagination, and may speak of weighing that which is not affected by gravitation.

The principle of the instrument is that of W. Ritchie's torsion balance, described by him in the 'Philosophical Transactions,' for 1830. The construction is somewhat complicated. A light beam, AB, having 2 square inches of pith, C, at one end, is balanced on a very fine fibre of glass, DD, stretched horizontally in a tube; one end of the fibre being connected with a torsion handle, E, passing through the tube, and indicating angular movements on a graduated circle. The beam is cemented to the torsion fibre, and the whole is enclosed in glass and connected with the mercury pump by a spiral tube, F, and exhausted as perfectly as possible. G is a spiral spring, to keep the fibre in a uniform state of tension. H is a piece of cocoon silk. I is a glass stopper, which is ground into the tube as perfectly as possible, and then highly polished and lubricated with melted indiarubber, which is the only substance I know that allows perfect lubrication and will still hold a vacuum. The pith, C, represents the scale-pan of the balance. The cross-beam, A B, which carries it, is cemented firmly to the thin glass fibre, D, and in the centre is a piece of mirror, K. Now the cross-beam A B, and the fibre, D, being rigidly connected together, any twist which I give to the torsion handle, E, will throw the beam out of adjustment. If, on the other hand, I place a weight on the piece of pith C, that end of the beam will fall down, and I shall have to turn the handle, E, round and round a certain number of times, until I have put sufficient torsion on the fibre, D, to lift up the beam. Now, according to the law of torsion, the force with which a perfectly elastic body like glass tends to untwist itself is directly proportional to the number of degrees through which it has been twisted; therefore, knowing how many degrees of torsion I must put on the fibre to lift up the $\frac{1}{100}$th of a grain weight, I can tell how many degrees of torsion are required to lift up any other weight; and conversely, putting an unknown weight or pressure on the pith, I can find its equivalent in grains by seeing how much torsion it is equal to. Thus, if $\frac{1}{100}$th of a grain requires 10,000 degrees of torsion, $\frac{1}{50}$th of a grain would require 20,000 degrees; and conversely, a weight which required 5000 degrees torsion would weigh $\frac{1}{200}$th of a grain. Once knowing the torsion equivalent of $\frac{1}{100}$th of a grain, the ratio of the known to the unknown weights is given by the degrees of torsion.

Having thus explained the working of the torsion balance I will proceed to the actual experiment. On the central mirror I throw a ray from the electric light, and the beam reflected on a particular spot of the ceiling will represent zero. The graduated circle, J, of the instrument also stands at zero, and the counter which I fasten on at the end, L, stands at O. The position of the spot of light reflected from the little concave mirror being noted, the torsion balance enables me to estimate the pressure or weight of a beam of light to a surprising degree of exactness. I lift up my little iron weight by means of a magnet (for working in a vacuum I am restricted in the means of manipulating), and drop it in the centre of the pith; it knocks the scale-pan down, as if I had placed a pound weight upon an ordinary balance, and the index-ray of light has flown far from the zero-point on the ceiling. I now put torsion on the fibre to bring the beam again into equilibrium. The index-ray is moving slowly back again. At last it is at zero, and on looking at the circle and counter I see that I have had to make 27 complete revolutions and 301 degrees, or $27 \times 360° + 301° = 10,021°$, before the force of torsion would balance the $\frac{1}{100}$th of a grain.

I now remove the weight from the pith-pan of my balance, and liberate the glass thread from torsion by twisting it back again. Now the spot of light on the ceiling is at zero, and the counter and index are again at O.

Having thus obtained the value of the $\frac{1}{100}$th of a grain in torsion degrees, I will get the same for the radiation from a candle. I place a lighted candle exactly six inches from the blackened surface, and on removing the screen the pith scale-pan falls down, and the index-ray again flies across the ceiling. I now turn the torsion handle, and in much less time than in the former case the ray is brought back to zero. On looking at the counter I find it registers four revolutions, and the index points to 188 degrees, making altogether $360° \times 4 + 188 = 1628°$, through which the torsion fibre has to be twisted to balance the light of the candle.

It is an easy calculation to convert this into parts of a grain weight; 10,021 torsion degrees representing 0·01 grain, 1628 torsion degrees represent 0·001624 grain.

$$10{,}021° : 0{\cdot}01 \text{ grain} :: 1628° : 0{\cdot}001624 \text{ grain}.$$

The radiation of a candle six inches off, therefore, weighs or presses the two square inches of blackened pith with a weight of 0·001624 grain. In my own laboratory, working with this torsion balance, I found that a candle six inches off gave a pressure of 0·001772 grain. The difference is only 0·000148 grain, and is fairly within the allowable limits of a discourse experiment. But this balance is capable of weighing to far greater accuracy than that. You have seen that a torsion of 10,021° balanced the hundredth of a grain. If I give the fibre one degree more twist the weight is over-balanced, as shown by the movement of the index-ray on the ceiling. Now one degree of torsion is about the $\frac{1}{10000}$th part of the whole torsion required by the $\frac{1}{100}$th grain. It represents therefore the $\frac{1}{10000}$th part of the $\frac{1}{100}$th, or the millionth part of a grain.

Divide a grain weight into a million parts, place one of them on the pan of the balance, and the beam will be instantly depressed.

Weighed in this balance the mechanical force of a candle twelve inches off was found to be 0·000444 grain; of a candle six inches off, 0·001772 grain. At half the distance the weight of radiation should be four times, or 0·001776 grain; the difference between theory and experiment being only four millionths of a grain is a sufficient proof that the indications of this instrument, like those of the apparatus previously described, follow the law of inverse squares. An examination of the differences between the separate observations and the mean shows that my estimate of the sensitiveness of this balance is not excessive, and that in practice it will safely indicate the millionth of a grain.

I have only had one opportunity of getting an observation of the weight of sunlight: it was taken on December 13th, but the sun was so obscured by thin clouds and haze that it was only equal to 10·2 candles six inches off. Calculating from this datum, it is seen that the pressure of sunshine is 2·3 tons per square mile.

But, however fair an equivalent ten candles may be for a London sun in December, a midsummer sun in a cloudless sky has a very different value. Authorities differ as to its exact equivalent, but I under-estimate it at one thousand candles twelve inches off.

Let us see what pressure this will give:—A candle twelve inches off, acting on two square inches of surface, was found equal to 0·000444 grain; the sun, equalling 1000 candles, therefore gives a pressure of 0·444000 grain; that is, equal to about 32 grains per square foot, to 2 cwt. per acre, 57 tons per square mile, or nearly three thousand million tons on the exposed surface of the globe—sufficient to knock the earth out of its orbit if it came upon it suddenly.

It may be said that a force like this must alter our ordinary ideas of gravitation; but it must be remembered that we only know the force of gravity as between bodies such as they actually exist, and we do not know what this force would be if the temperatures of the gravitating masses were to undergo a change. If the sun is gradually cooling, possibly its attractive force is increasing, but the rate will be so slow that it will probably not be detected by our present means of research.

Whilst showing this experiment I wish to have it distinctly understood that I do not attach the least importance to the actual numerical results. I simply wish to show you the marvellous sensitiveness of the apparatus with which I am accustomed to work. I may, indeed, say that I know these rough estimates to be incorrect. It must be remembered that our earth is not a lamp-blacked body enclosed in a glass case, nor is its shape such as to give the maximum of surface with the minimum of weight. The solar forces which perpetually pour on it are not simply absorbed and degraded into radiant heat, but are transformed into the various forms of motion we see around us, and into the countless forms of vegetable, animal, and human activity. The earth, it is true, is poised in vacuous space, but it is surrounded by a cushion of air; and, knowing how strongly a little air stops the movement of repulsion, it is easy to conceive that the sun's radiation through this atmospheric layer may not produce any important amount of repulsion. It is true the upper surface of our atmosphere must present a very cold front, and this might suffer repulsion by the sun; but I have said enough to show how utterly in the dark we are as to the cosmical bearings of this action of radiation, and further speculation would be but waste of time.

It may be of interest to compare these experimental results with a calculation made in 1873, before any knowledge of these facts had been made public.

Professor Clerk Maxwell, in his 'Electricity and Magnetism,' vol. ii. p. 391, writes as follows:—"The mean energy in one cubic foot of sunlight is about 0·0000000882 of a foot-pound, and the mean pressure on a square foot is 0·0000000882 of pound weight. A flat body exposed to sunlight would experience this pressure on its illuminated side only, and would therefore be repelled from the side on which the light falls."

Calculated out, this gives the pressure of sunlight equal to about $2\frac{1}{2}$ lb. per square mile. Between the $2\frac{1}{2}$ lb. deduced from calculation and the 57 tons obtained from experiment the difference is great; but not greater than is often the case between theory and experiment.

In conclusion. I beg to call especial attention to one not unimportant lesson which may be gathered from this discovery. It will be at once seen that the whole springs from the investigation of an anomaly. Such a result is by no means singular. Anomalies may be regarded as the finger-posts along the high road of research, pointing to the bye-ways which lead to further discoveries. As scientific men are well aware, our way of accounting for any given phenomenon is not always perfect. Some point is perhaps taken for granted, some peculiar circumstance is overlooked. Or else our explanation agrees with the facts not perfectly, but merely in an approximate manner, leaving a something still to be accounted for. Now these residual phenomena, these very anomalies, may become the guides to new and important revelations.

In the course of my research anomalies have sprung up in every direction. I have felt like a traveller navigating some mighty river in an unexplored continent. I have seen to the right and the left other channels opening out, all claiming investigation, and promising rich rewards of discovery for the explorer who shall trace them to their source. Time has not allowed me to undertake the whole of a task so vast and so manifold. I have felt compelled to follow out, as far as lay in my power, my original idea, passing over reluctantly the collateral questions springing up on either hand. To these I must now invite the attention of my fellow-workers in science. There is ample room for many inquirers.

Nor must we forget that the more rigidly we scrutinize our received theories, our routine explanations and interpretations of nature, and the more frankly we admit their shortcomings, the greater will be our ultimate reward. In the practical world, fortunes have been realized from the careful examination of what has been ignorantly thrown aside as refuse; no less, in the sphere of science, are reputations to be made by the patient investigation of anomalies.

Parliamentary and Law Proceedings.

Chemists' Shops and late Refreshments.

Emil Guenin and Louis Hermann were on Thursday summoned before Mr. Vaughan, at the Bow Street Police Court for keeping a refreshment-house without a licence.

Mr. Pitt, who prosecuted on behalf of the Excise, said that the defendants were conducting a chemist's shop, at No. 7, Tichborne Street, at the top of the Haymarket. The police had complained that this shop was kept open till a very late hour at night, for the sale of drinks, known under the name of American ice cream sodas; that women of bad repute frequented this place, and that disturbances had ensued. The Excise officers had, of course, no suspicion that a chemist's shop would be used as a refreshment-house; but upon these complaints they made the inquiries which resulted in this charge.

Mr. Pitt then called two Excise officers, who proved that on the 20th of December, between twelve and one at night, they had been served with these American drinks, for which they payed 6*d*. each.

For the defence, it was not denied that the drinks were sold, but they stated this was a *bonâ fide* chemist's business. If the drinks were not sold the shop would be kept open as now until two o'clock for the sale of drugs.

Mr. Vaughan, in giving judgment, said that although the shop was a chemist's shop, still, undoubtedly, it was kept open at least two or three hours every night for the purpose of supplying all comers with these American drinks. And the evidence went to prove that these comers were very numerous. Mr. Vaughan then went on to read part of Lord Justice Mellish's judgment in the case of Howes. In conclusion, he said that by that judgment he was bound to convict the defendants.

In mitigation of the full penalty of £20, Mr. Reid, for the defendants, urged that the judgment in the case of Howes was very recent, and had not yet been published, so that the defendants had not had the means of making themselves acquainted with it.

Mr. Vaughan mitigated the penalty to one-fourth —namely, £5 and costs.—*Standard.*

[*** If reference had been made to the Register of Chemists and Druggists for 1876, a copy of which has, we presume, been supplied by the Home Office for the use of the Bow Street Police Court, it would have been found that no persons bearing the names of the defendants have a right to represent themselves as being chemists and druggists.—Ed. Pharm. Journ.]

Poisoning by Carbolic Acid.

On Wednesday, June 28, an inquest was held at St. Thomas's Hospital, before Mr. Hull, in view of the body of Francis Fraser Morris, 21.

Mrs. Julia Sophia Morris said she last saw her son alive in her own house at Walworth, on Sunday evening. He came suddenly into the drawing-room looking very strange and ill. Being asked what was the matter, he said, "I have taken carbolic acid, I shall die." He did not say why he had taken the acid. She persuaded him to take some hot mustard and water, but he got rapidly worse, vomited blood, and became too ill to speak. Mr. Martin, a neighbour, summoned Dr. Simmon, the family physician, under whose advice the deceased was sent to St. Thomas's Hospital, where he died shortly afterwards.

The Rev. Eli Morris was then called, and in answer to the Coroner, said his son had for years past been subject to fits of depression. He had discharged himself from his last situation six weeks ago, but had not told any one of it, and had gone out at his usual time every morning, returned every night as usual. Carbolic acid was never used in the house.

The house surgeon having given evidence as to the effects of the poison upon the deceased, the jury returned a verdict of "Suicide while of unsound mind.—*Times.*

Poisoning by a Liniment.

A case of accidental poisoning has occurred at Heywood, near Manchester, by which an extensive ironmonger, named Robert Porter, aged 40 years, has lost his life. Deceased had been suffering from an acute attack of rheumatism. Dr. Jameson visited him, and told him he would prepare him a liniment for external application, and the deceased must send to his surgery for it. Deceased has also been taking medicine for his ailments, and it would appear that his wife was not notified of the doctor's intention to send a liniment. At half-past ten in the morning she sent to the doctor's as usual for the medicine. Her husband was then in bed, and engaged in conversation with a friend. He asked for his medicine. The wife got the bottle containing the liniment, which was labelled, "for external use only," and gave her husband a tablespoonful of the mixture, which contained belladonna. Before taking the medicine deceased remarked that it was very bad. In a few minutes afterwards deceased fell asleep. Having left the two men by themselves, about half-past eleven Mrs. Porter went to look at deceased, and noticed that he breathed heavily. She immediately went to the doctor's house, and said that her husband had been worse since he had taken the medicine. The doctor, taken aback, replied, "The bottle which I gave your boy was for external use only." Medical aid was procured as soon as possible, but deceased expired at a quarter to one o'clock.—*Manchester Courier.*

Sale of Adulterated Starch.

At the Wandsworth Police Court, on Friday, June 30, Mr. John Bain, of the Balham Co-operative Stores, appeared to answer an adjourned summons for selling to the prejudice of Mr. Samuel Smith, the inspector appointed by the Wandsworth Board of Works, a quantity of arrowroot adulterated with tapioca. In this case the analysis of the Board's analyst was disputed, and the summons was adjourned to allow of another analysis to be made in the laboratory at Somerset House.

Mr. Corsellis, clerk of the Wandsworth Board of Works, said the certificate which he produced stated that the sample was adulterated to the extent of 50 per cent. The certificate sent from Somerset House stated that it was adulterated not less than 25 per cent. He had other certificates stating that the arrowroot was adulterated.

The defendant offered no defence. He wished to absolve the stores from all blame. He sold the article under a guarantee, and it was bought under a guarantee.

Mr. Ingham said he had no doubt the defendant believed he had got a genuine article. He fined him 5*s*. and 23*s*. costs, which he could recover from the person who supplied him with it.—*Times*.

Charge of Selling Adulterated Whisky.

William Brown, spirit merchant, was charged in the Greenock Sheriff Court, on June 30, with having sold a bottle of whisky which was not of the nature, substance, or quality demanded by the purchaser.

The inspector under the Sale of Food and Drugs Act, deposed that he had received complaints regarding the quality of whisky sold in the town. Captain Grant, of H.M.S. Aurora, complained of the whisky sold to the sailors and marines of that vessel; and certain whisky taken on board was sent for analysis. It was found to be bad whisky, but as the purchaser had not intimated, when he bought the whisky, that he intended to have it analysed, a prosecution could not be instituted. In consequence of that, he took samples from shops in the habit of supplying the men of the Aurora. The shop of the defendant was one of these. The case was before the court some time ago, when it was continued for a report of analysis at Somerset House. The report from Somerset House, now read, confirmed the analysis of Mr. M'Cowan, the local analyst, and stated that the sample of whisky had been adulterated with 427 grains of hydrated sulphuric acid in the imperial gallon.

The defendant stated that he never had vitriol in his shop. Never had anything called sulphuric acid. Was well aware that neither of these was put into the whisky that was in his shop. When a cask of whisky was broached witness was in the habit of tasting it. Never observed anything peculiar about the whisky in question.

The Sheriff, in giving judgment, remarked that the defendant was not charged with having adulterated the whisky, but he was charged with having sold it in an adulterated state, and there was little doubt that the prosecution had succeeded in proving that he had done what he was charged with. He considered it a case of gross carelessness, and would pass sentence of £5 with £5 expenses.—*Greenock Telegraph*.

Notes and Queries.

[514]. GREEN OILS.—Will any reader oblige me with a formula for Lockhart's Green Oils? It is much used amongst cattle. Have tried the old white oils with subacetate of copper, but the result is not satisfactory.—F. G. Holmes.

[515]. CISTERNS FOR STORING TURPENTINE.—Mr. John Porter would be glad to receive information as to the best material for the construction of cisterns for the storing of spirit of turpentine without its becoming coloured.

[516]. BRONZE LIQUID.—W. H. L. will be glad of a recipe for making "Bronze Liquid." It contains acid. sulph., acid. mur., etc., and is used for immersing brass goods in, after which they are blackleaded and then lacquered.

[517]. GOLD LABELLING.—"Omega" will be obliged if any one can give him the *modus operandi* of Gold Labelling, also the best means of affixing Gold Paper Labels.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Suggestions.

Sir,—I wish to suggest a new measuring glass which, I think, would be of service to chemists,—that is, a tubular glass, graduated on the same principle as Mohr's burette, and holding, say 20 c.c., with lip and bottom like an ordinary measuring glass, for use when the burette is engaged with standard solution. Also, if some of our makers of evaporating dishes would adopt the plan of graduating them as well, I think they would meet with demand.

E. H. Cole.

Lichfield, July 1, 1876.

Methylated Spirit.

Sir,—In reading the letters published by you on the above subject, it seems to me that druggists, as a rule, are not aware that the licence for methylated spirit is only 10*s*. 6*d*. per annum, by taking which they, of course, can protect themselves from prosecution on account of badly made "finish," and also give greater satisfaction to the public. Besides this, by once getting fined they sink as much money at five per cent. interest as will bring in the amount of the annual licence.

Richard Sturton.

Cambridge, July 3, 1876.

[*** We have reason to believe that the case is as you suspect, but are at a loss to understand how it can be so, since the necessity for a licence is stated in the appendix to the Calendar of the Pharmaceutical Society, and the sum to be paid annually for such license is specified.—Ed. Pharm. Journ.]

"*Umbel*."—(1) *Poa compressa*; (2) *Brachypodium sylvaticum*; (3) *Triticum junceum*; (4) *Carum Carvi*; (5) *Lepturus filiformis*; (6) *Alopecurus pratensis*.

J. E. Sawyer.—*Specularia hybrida*,

J. Boyd.—We are unable to furnish any information further than what is contained in the advertisement.

"*A Country Chemist*."—To obtain a "legal view" of the cases you are recommended to consult your solicitor.

"*Chemicus*."—If the medicine were dispensed according to the prescription the charge should be about 5*s*.

"*Syrupus, P.B.*"—Try the formula given in last week's Journal, p. 20.

L. Thompson.—A specimen of the plant could be obtained probably from Messrs. Veitch, of King's Road, Chelsea.

S. F. Nottingham.—See a formula in the Journal for Jan. 22 last, p. 598.

H. W. B. Baker.—If you are a "Student of the Society" you ought to receive the Journal regularly as published without further payment than your annual subscription. We do not see your name in the list of Registered Apprentices and Students of the Society in the Society's Calendar.

Communications, Letters, etc., have been received from Mr. Saunders (Montreal), Dr. Morel (Ghent), Mr. Wilkinson (Manchester), Mr. Corner (Paris), Mr. Fairlie (Glasgow), Veritas, A. W. P., G. O. S.

THE DIFFERENT SYRUPS OF THE PHOSPHATES IN GENERAL USE.

BY ERNEST C. SAUNDERS.

The difference in the quality and strength of different samples of the preparation known as Parrish's chemical food, as found in the market at the present time, has been the subject of considerable discussion during the past few months, but as, with the exception of Mr. W. L. Howie in his useful and practical paper, all seem to have devoted their energies more to finding out faults in ordinary samples of the preparation than to remedying them, I venture to submit the following remarks on this article, and the somewhat similar one of Easton's syrup, which is also difficult to make and to keep in good condition. I begin with Parrish's syrup as perhaps the most difficult to make according to the ordinary formula.

The chief reason for the difference met with in the various makes of this preparation is to be found in the fact that the principal published formula, that in Parrish's 'Pharmacy,' is an utterly unpractical one. It is well known that glacial phosphoric acid uncontaminated with phosphate of soda is hardly to be found in the market at present; but even if it were, it is next to impossible to obtain a good preparation with it, as it is a monobasic acid, while the direction to add "quantum sufficit" of hydrochloric acid is exceedingly vague. But apart from this, it is evident that the formula cannot be strictly followed, as if the quantity of ferrous phosphate directed to be present in each fluid drachm of the completed syrup is attended to, 32 troy ounces of sugar will have to be made into 36 fluid ounces of syrup—a manifest impossibility; while if the quantity given as the amount of solution to be formed for the sugar to be dissolved in is adhered to, the result will be about 46 fluid ounces of syrup, which will not contain the requisite amount per drachm of iron and lime. All the formulæ at present in use seem merely modifications of that given by Parrish. In the following form the author has only followed Parrish as far as the result to be obtained is concerned, viz.—that the finished syrup shall contain in each fluid drachm 1 grain ferrous phosphate $Fe_3P_2O_8$, $2\frac{1}{2}$ grains calcic phosphate $Ca_3P_2O_8$, and traces of sodic and potassic phosphates, with free phosphoric acid.

Take of—

Iron Wire, clean, No. 20 . . .	240 grains.
Syrupy Phosphoric Acid (Spec. Grav. 1·75)	3 oz. by weight.
Water, Distilled	4 fluid ounces.

Mix the acid and water, and dissolve the wire in the mixture in a flask, loosely stopped with tow; the hydrogen evolved then protects the solution from oxidation. When all action has ceased, heat to boiling point, and filter through paper in a funnel with a long neck reaching to the bottom of a beaker containing a little syrup, which floating on the iron solution will effectually prevent any oxidation.

Slaked Lime, Fresh	923 grains.
Phosphoric Acid (Spec. Grav. 1·75)	$9\frac{1}{2}$ oz. by weight.
Water, Distilled	14 fluid ounces.

Mix the acid and water, and dissolve the lime in the mixture. Filter the solution.

Crystallized Sodic Carbonate .	54 grains.
Potassic Carbonate	72 grains.
Phosphoric Acid (Spec. Grav. 1·75)	$\frac{1}{2}$ oz. by weight.
Distilled Water	1 fluid ounce.

Dissolve and filter. Then mix all the solutions, and having added distilled water to make the solution measure 28 fluid ounces, dissolve in it with heat, sugar, $3\frac{1}{4}$; powdered cochineal, 85 grains; and strain while hot. When cold add orange flower water, 2 fluid ounces, and sufficient distilled water to make the whole measure 64 fluid ounces. The product is a nice clear syrup, entirely free from sulphate of soda, or ammonic chloride, both of which are by no means uncommon impurities, from the difficulty of washing the precipitates, when the syrup is made in the old way, while the whole process will be found very much less troublesome and tedious. Calcic hydrate is generally sufficiently pure as commonly obtained, though where the chemist has the facilities for doing it, it is best for him to make the lime himself, by igniting precipitated chalk in a crucible at a full red heat for an hour.

I may remark here, though it does not exactly bear on the subject, that the last edition (1872) of Pereira's 'Materia Medica' contains the astonishing information, on page 213, that "Hypophosphite of lime is an important constituent in Parrish's chemical food;" a statement that is liable to mislead physicians in a serious manner.

Easton's syrup, is another preparation that is frequently badly made, and very often deficient in iron. The precipitate so frequently met with, in the form of phosphate of quinine, is, I think, always owing to the use of an acid containing metaphosphoric acid. I have never been troubled with a precipitate since I have taken pains to use only orthophosphoric acid, H_3PO_4. The change in colour is due to exposure to the air, chiefly from oxidation of the iron salt, but partly to the quinine changing colour. It may be entirely avoided, as has been often remarked, by completely filling the bottles in which the syrup is kept, and corking so as to have as little air left in the bottle as possible.

No trouble will be found in making a satisfactory preparation if the following form be strictly followed, and care taken to avoid exposure to the air of the iron solution.

Take of—

Iron Wire (No. 20)	240 grains.
Phosphoric Acid (Spec. Grav. 1·75)	3 oz. by weight.
Water	4 fluid ounces.

Dissolve with the precautions directed above in the formula for Parrish's syrup.

Quinine Sulph	625 grains.
Liq. Ammon.	
Distilled Water,	
Dilute Sulphuric Acid . . .	āā q. s.

Precipitate the quinine, secundum artem, and wash on a filter with a pint of very cold distilled water, press strongly, and dissolve in half an ounce by weight of phosphoric acid, diluted with an ounce of water in which 16 grains of strychnine have been dissolved. Mix with the solution of iron, add enough distilled water to make the whole measure 10 fluid ounces, and mix thoroughly with 54 fluid ounces of simple syrup. The resulting syrup will contain in each fluid drachm 1 grain ferrous phosphate $Fe_3P_2O_8$; 1 grain quinic phosphate $(C_{20}H_{24}N_2O_2)_3 2H_3PO_4$, and $\frac{1}{32}$ grain of strychnine.

These two syrups afford good examples of two classes of syrups that present considerable difficulties in manipulation with the formulæ in general use, which, I think, are quite removed in the two just submitted. Both have now been tested on a large scale, for some time, and found very satisfactory in their products. No originality is claimed in the use of metallic iron in place of precipitated ferrous phosphate; it was, I believe, first suggested by Mr. H. W. Jones, in the columns of the *Pharmaceutical Journal*. The chief point that I would press is the importance of using tribasic (ortho) phosphoric acid, H_3PO_4; both metaphosphoric acid HPO_3, and pyrophosphoric acid $H_4P_2O_7$, if present in the acid to even a small extent, are certain to cause trouble. The precaution given as to filtering the solution of ferrous phosphate will be found useful in many other cases; a beaker full of solution of ferrous iodide filtered in a similar manner, with a layer of syrup the eighth of an inch thick floating on the surface, can be left exposed for twenty-four hours without injury to the solution. It is, of course necessary that the solution should have the greatest specific gravity.

COLOURLESS TINCTURE OF IODINE.

BY WM. H. DARLING, F.C.S.

This preparation has from time to time attracted the attention of pharmacists, and various formulæ have been offered for its preparation, which differ widely as to the results they give.

Curtmann* made a series of experiments to determine the quantity of ammonia necessary to decolorize a fixed quantity of iodine with varying quantities of alcohol, and from these experiments he proposes the following formula:—

Iodine	10 drams.
Rectified Spirit	13 fluid ounces.
Strong Solution of Ammonia	3 „

He states the result of the reaction in such a mixture to be ammonium iodide and iodate, ethyl iodide, and iodide of an ethyl substituted ammonia.

Macmillan† objects to the use of ammonia because iodide of nitrogen or some iodine substituted ammonia is formed, which he appears to think simply dissolves as a whole, and therefore the greater portion of the iodine is rendered inactive. To avoid this he proposes the replacement of the ammonia by fixed alkalies.

In the supposition that the brown precipitate dissolves as a whole he is mistaken, for it is decomposed with effervescence, more rapidly in direct sunlight, shortly after its formation.

Hager,‡ referring to the experiments of Curtmann, proposes a modification of his formula by which a colourless solution may be obtained in a short time. The decolorizing agent he uses is sodium hyposulphite. The iodine, sodium hyposulphite, and water are gently heated until colourless, when ammonia and alcohol are added. A solution so prepared, he says, contains iodide of triethyl ammonium, which decomposes in course of time into triethylamine and ethyl iodide, with sodium iodide. There is no mention of iodate, which Curtmann states is present.

By neither Curtmann nor Hager is iodoform mentioned as a constituent of a solution of decolorized iodine. Indeed, Hager's formula does not admit of its formation.

Some time ago, when preparing a quantity of the colourless tincture of iodine, and before all the alcohol was added, a few spangles or crystals were observed in the almost colourless solution. As these had not been previously noticed, curiosity was excited as to the cause and what they were. When collected upon a filter, washed with distilled water, and allowed to dry, their colour was pale yellow and their odour recalled that of iodoform.

The quantity being too small (under half-a-gram) to admit of two combustions, one for the carbon and hydrogen, and a second for the iodine, the latter alone was made by burning a known weight in a tube filled with pure lime. The iodine being precipitated by silver, the following numbers were obtained:—

Weight of substance used—0·3946 grms.
Weight of AgI obtained—0·5990 = 0·32371 of I.
„ Ag 0·0482 = 0·05668 of I.
0·38039

$$\frac{0{\cdot}38039 \times 100}{0{\cdot}3946} = 96{\cdot}39 \text{ per cent. of iodine.}$$

The molecular weight of iodoform CHI_3 is 394.

$$\frac{3 \times 127 \times 100}{394} = 96{\cdot}70 \text{ per cent. of iodine.}$$

The physical character of the substance, its odour, and finally the close agreement, a difference of 0·31 per cent. between the calculated percentage of iodine in iodoform and that found, leave little doubt that the substance in question was iodoform.

If the reaction of ammonia with iodine in the presence of alcohol, omitting the formation of iodide of nitrogen from consideration, be viewed as analogous to that of fixed alkalies, the formation of iodoform is to be expected, and if this view be correct there should be little, if any, iodate present. Its formation must be preceded by that of ammonium hypoiodite, which would react with the alcohol, of which there is an excess, producing iodoform in the same manner as calcium hypochlorite reacts with the same alcohol forming chloroform. The formation of such a compound as ammonium hypoiodite is not a matter of conjecture, for Schönbein* states that it is formed when iodine acts upon an excess of ammonia.

The efficacy of the decolorized iodine must be attributed for the most part to the iodoform it contains. This iodated compound is an almost colourless substance, which contains more than nine tenths of its weight of iodine, but how far a solution of it alone will replace the ordinary decolorized iodine must remain to be ascertained.

* 'Year-Book,' 1870, p. 22.
† *Pharm. Journ.*, 3rd series, vol. i., p. 987.
‡ 'Year-Book,' 1873, p. 326.

* Watt's 'Dictionary,' vol. iii., p. 297.

The Pharmaceutical Journal.

SATURDAY, JULY 15, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE TRADE CONFERENCE AT BIRMINGHAM.

THE Conference at Birmingham has been in every respect as successful as could be expected. The programme which appeared in our advertisement columns last week comprised a number of subjects which have a special interest for the trade, and the consideration of those subjects in the shape of papers had been undertaken by men whose ability was sufficiently well known to add an additional attraction to the opportunity of discussing them under such circumstances. The announcement that Mr. REYNOLDS was to occupy the position of Chairman of the Conference also furnished assurance that the proceedings would be conducted with strict regard to order and practical requirements. Punctually at the hour fixed for the commencement of the proceedings the spacious lecture hall in Needless Alley began to fill, and before midday arrived the meeting numbered one hundred and forty persons.

Altogether there were nine papers to be read and eight subjects to be discussed, besides the introductory remarks of the Chairman and the statement by Mr. WILLIAM SOUTHALL as to the origin of the Conference and its relations to the Pharmaceutical Society. These papers are published in full in our report, and the discussion of them was so skilfully managed that the whole proceedings of the Conference were concluded within ten minutes after the time that had been fixed.

As the establishment of an ample fund for defraying ordinary expenses of management as well as extraordinary outlay in carrying on special work is one of the points most essential for the existence of such an association, this formed an important feature of the proceedings, and a sum of between £200 and £300 was subscribed, partly by those present, and partly by others who were unable to attend, the amounts ranging from a few shillings up to ten guineas. In addition to this it was decided that the annual subscription of members should be fixed at the small sum of five shillings a year, in order to offer the utmost facility for becoming a member; and to prevent inequality among the members any support given to the Association beyond this annual subscription is to be given in the form of donations, and Mr. HOLDSWORTH, who acted in the capacity of Honorary Secretary of the Conference, will receive donations to the Fund, as well as subscriptions, and will enrol members until the appointment of Secretary to the Association has been filled up.

This adoption of an extremely moderate annual subscription is we think a wise step, for it will remove any possible grounds for not joining the Association, and as we have already remarked in speaking of this project, it is essential that the Association should have the active support of the great mass of the trade. Without this it will be impossible to take any such action in regard to matters affecting trade interests as would command the approval and satisfaction of the trade at large.

The number of members already enrolled amounts to about 400, and though this may not be unsatisfactory as a commencement it is at the utmost only one twentieth of the actual numerical strength that such an association should have in order to be able to do the work contemplated. The development of the nucleus that has thus been formed, to an association which shall be capable of representing the trade and protecting its interests, because it has the general support of those engaged in the business, will be an arduous task, and it will require the most strenuous efforts of those already enrolled to bring their brethren into active co-operation with them.

We dwell upon this point not with any motive of discouraging the enterprise that has been put in motion by the Birmingham Conference, but solely because we are deeply convinced of the indispensable need for a foundation co-extensive with the trade itself in order to ensure the power of defence and guardianship which it is desired the Association shall possess and exercise. If this power should eventually be acquired, and the entire body of chemists and druggists united in the effort, as well as the desire to promote their common welfare and protect their mutual interest, another important step will have been taken in the advancement of pharmacy, and chemists and druggists will be indebted to Messrs. SOUTHALL BROS. and BARCLAY for having instigated the realization of that object of the founders of the Pharmaceutical Society which concerns the material well being of the trade in like manner as they are indebted to JACOB BELL for the services he rendered in the formation of the Society, and to the founders of the Pharmaceutical Conference for having established a means of scientific cultivation and genial intercourse which has been productive of vast improvement, both intellectually and socially.

We fully agree with the opinion that it is doubtful whether the educational and examining body which governs the practice of Pharmacy ought to run the risk of rebuff and failure that a trade association will be sure to incur. But in the same way that the formation of the Pharmaceutical Conference has served to supplement the work of the Society and make it stronger than before it seems probable that a thoroughly well supported Association for dealing with purely trade objects may also be useful in itself and in promoting the general good of pharmacy.

TRADE CONFERENCE AT BIRMINGHAM.

On Tuesday last, the 11th inst., a Trade Conference of Chemists and Druggists was held at Birmingham, in the Hall of the Young Men's Christian Association, Needless Alley, New Street. The proceedings commenced at 10 A.M.

Mr. BARCLAY (Birmingham) said: On behalf of the Provisional Committee, I have much pleasure in proposing that our friend Mr. Reynolds, of Leeds, take the chair at this meeting. I am sure we shall all agree that he is the right man in the right place. He has been already the author of one successful conference—the Pharmaceutical Conference—and I am sure that his presence here to day will add very much to the prospect of success of this Conference. Mr. Reynolds's wide experience both in trade matters and also in scientific matters entitles him to our heartiest respect and confidence; and I am sure we shall all very readily agree with any decisions he may come to in guiding the business of the meeting.

Mr. HOLDSWORTH (Birmingham) seconded the motion and it was carried unanimously.

Mr. RICHARD REYNOLDS, F.C.S., then took the chair.

Mr. JONES (Leamington): I have great pleasure in proposing the next resolution, which is that Mr. Barclay be appointed Vice-Chairman, and that Mr. Holdsworth be appointed Secretary to the Conference.

Mr. RIMMINGTON (Bradford) seconded the resolution and it was carried.

The CHAIRMAN: On the programme of this day's business you will notice a paragraph on the subject of reporting. It is stated there that as soon as the Chairman is appointed the provisional committee will recommend that the proceedings be only reported so far as the Conference deems desirable. Now, gentlemen, in a meeting of this sort—a gathering of the trade for purposes which are strictly confined to that trade, it is essential and it is for the interests of the trade that we should retain such a power in our own hands. This is not a public meeting and therefore we cannot be asking anything unreasonable to retain such a power. I am quite sure it will be with your permission that the editors and representatives of the two trade journals, the *Pharmaceutical Journal* and the *Chemist and Druggist* are admitted to these proceedings. We know that we can rely upon the discretion of the conductors of those journals. We see here their representatives and I ask you to express your approval of their being permitted to attend.

The Chairman's suggestion was unanimously approved.

The CHAIRMAN then made the following opening remarks:—

I accept the appointment to act as your chairman today as a duty owed to the common cause in which we are interested, and I offer you my grateful thanks for the personal good-will you have shown me. I would that you had placed the trust in stronger hands, so that in surveying and mapping out the features of the new subject before us you might have had the experience of some one of our leaders, entitled to be termed *facile princeps* from a combination of veteran sagacity with intimate knowledge of the steps of past legislation affecting us. The circumstances under which we meet for a day only will impress upon us the value of time, and no speaker must waste its ever-falling golden sands. I shall endeavour to fulfil this obligation to brevity. Upon the origin of the Conference we shall immediately have the pleasure of hearing a statement by Mr. William Southall, one of the gentlemen to whose energetic determination we owe this gathering. I am aware that in some quarters the initial difficulty of the movement has been the manner in which it was suggested. I need not conceal the opinion that support has been withheld in certain directions because of this mode of initiatory procedure. But, from the moment of the organization of a Provisional Committee, and even more emphatically from the time of the assembly of this Conference, the movement has been an open one, conducted on the ordinary principles of English associations. The degree of success achieved in bringing together this meeting entitles the prime movers of the Conference to our heartiest thanks. The responsibility is now ours. Let us not separate without founding an association which shall bring to a focus the latent powers of chemists and druggists in defence of their legitimate interests. Your Provisional Committee has done well in reprinting the opinions of our trade journals on the subject. We are glad to have their cordial support so far, and recognize the great power which their conductors wield in promoting agreement of opinion amongst us upon any line of policy. You will have read the remarks of the editor of the *Chemist and Druggist* upon the various reasons alleged by those who see no necessity for either a Trade Conference or a Defence Association. This criticism upon the critics has more piquancy than any phrases in which I could hope to clothe similar ideas, and I trust it will be considered by those concerned. Objectors have told us to stay our hands because already two associations exist capable of doing the work, viz. the Pharmaceutical Society and the British Pharmaceutical Conference. Gentlemen, I ought to know something about both these institutions, and the first idea recalled from the depths of my memory is that the same objection, in the same words,—aye and by the same objectors in some cases,—was brought against us when we founded the British Pharmaceutical Conference. Many a moral might be drawn from the short life history of that Conference. Do you doubt the power of chemists for effective combination? Look at that Conference, and its successful results, including its highly profitable (in two senses) 'Year-Book of Pharmacy.' It has done for the trade throughout Britain what our local associations can do for our larger towns only, in making chemists know and respect each other, and work together for their common good. But for its influence, I will venture to say that to-day's meeting would never have been held. Let me finish the subject of the British Pharmaceutical Conference before dealing with its elder sister. Its constitution is not a very rigid one, and it may assume considerable variety in aspect, according to the wish of its members. I hold that it would be an absurd position, if, when a trade question united us in feeling, we should fail to exercise some opportunity of using our influence effectively. I remember the action of the Conference at its meeting at Norwich, when it memorialized the Board of Inland Revenue on some of the abuses existing in relation to methylated spirit. But, whilst commending to members of that association the policy of not allowing this right to be lost by abeyance, I am sure that it is not feasible that the British Pharmaceutical Conference should charge itself with the general duties of a trade association. Such functions would involve a dual staff of honorary officers, for what Presidents could it find who would be "always good alike," whether recounting the advances of pharmacy, or guiding defective movements of trade policy? and for what compensatory success would the Conference part with its senior Honorary Secretary, Professor Attfield? The Pharmaceutical Society stands on a very different footing. Mr. William Southall will undertake the consideration of this subject, and I have no wish to anticipate him. Let me say, however, that so far as the Charter and the various Acts of Parliament confer power on the Society, the policy of its Council should reflect the judgment of its members. Gentlemen, I believe firmly in the representative principle of government, more especially as the intelligence of the constituents is of the higher order. Until the Society forfeits the recognition of its reasonableness, any representations which it may make upon state policy in relation to pharmacy, will, if supported in an earnest manner, be likely to receive attention from the authorities. Therefore, in the prevention of new abuses, and perhaps in the reformation of some old ones, we must recognize the power of the Pharmaceutical Society as the most potent within our command. The onus of showing cause against the exercise of this power must usually rest with the objectors to its employment. The chance of our motives being misunderstood must count for little. A body of men who have complied with the educational requirements of the state so far as have the chemists and druggists, with a very slender compensation *per contra*, have the right to be heard on any case of injustice to their order. The conclusion which I draw from these opinions is that when we have fixed upon a line of trade policy, we must take care to send to Bloomsbury Square representatives who share them, and who can give them effect. I rejoice to see amongst us to day many of our present representatives, who most fully answer this description. In relation to the duties of the Pharmaceutical Society, I should be glad if some practical suggestions come before us upon the late conviction for the sale of milk of sulphur. This case must have great interest in this district, and a miscarriage of justice will have happened if legal technicalities should prevent its being carried to a higher court. In Leeds, we had the same question raised more than a a year since, and the judgment of our stipendiary, I am happy to say, was exactly the reverse of that just given at Birmingham. The infatuation of certain public analysts is almost beyond belief. *Quis Deus vult perdere, prius dementat* is suggested by the indiscretions of some of them. That they have supplied one important reason for this Conference is beyond doubt. The subject of patent medicines will be brought before us, and this is quite justified by the various changes that have taken place in this branch of business, during the past few years; changes not only in the cost of the patent medicine licence, but in the circumstances of their distribution by retailers. Many of us would be glad of more light upon the question and I think that the exchange of information will be at present a wiser course than any very dogmatic expression of opinions. As to the recent fashion amongst fashionable people and others to take part in keeping retail shops without becoming shopkeepers there must be many here who desire to relieve their minds. I am not of the class who will offer them Job's comfort and ask *cui bono?* Freedom of trade is all very well, and it may form a general basis of our arrangements of social economy, but any precious idea of co-operation that is incorporated in the scheme of the stores would be a very poor safeguard against monopolies, as compared with the fair and equal competition from which we do not shrink. That the Government, whether liberal or conservative, should blink the question of its paid servants combining to undersell the ratepayers, shows that we live in a very free country, but the question to come forward some time must be, How long will the ratepayers submit to this? The chest of tea bought *en bloc* by the post-office clerks, and divided by them, has some historic significance, even if less important than those earlier chests that found their end in Boston Harbour. The taxgatherers of some ancient nations were noted for rapacity and unscrupulousness, but they are not recorded to have had the audacity to give their name to shops or stores. Mr. Hampson will lay before us his views upon the legal action which may be possible in relation to the stores, and I will not anticipate them. In the provinces there are social influences which may check the extension, and probably terminate the existence of many such bodies. But a general consent to put these influences into operation is needed. For the position of the question in London, I will not presume to speak, but Sir Thomas Chambers' motion on Civil Service Trading would not have been cynically counted out of the House of Commons if both London and the country had first taken counsel. The programme now in your hands details the other papers to be read by gentlemen who have been good enough to undertake this duty. The outcome of our deliberations to-day ought to be a trade association, but I will ask you to look for a moment at some of the difficulties that will surround this. They will arise, firstly, in the different views which members may take as to its functions. As age creeps slowly but surely over societies, the active becomes changed for the passive mood, but the danger of indifference is not that which I foresee as the earliest. Too much zeal is a still more mischievous quality, and it will be well that no false hopes should be raised in the minds of those who are disposed to this error. Let no one suppose that we want an association which will receive five shillings as a subscription, and will proceed forthwith to harry the subscriber's enemies and guarantee him a snug preserve. Funds will be needful, but the money need not burn our pockets until it gets transferred to those of the lawyers. If defence and not defiance be a leading principle, there will be considerable irregularity in the work to be done in different years. External circumstances will determine this to a great extent. In conclusion, gentlemen, let our discussions to day be business-like and kept to the point, each of us disposed to concession if needful for the common good, for that we wish it well we have all pledged ourselves by coming here to-day.

Mr. Barclay announced the receipt of letters of apology from some of the Liverpool delegates, Messrs. J. A. Turner, A. Redford, A. E. Tanner, J. Abraham, and D. Wharrie; from Messrs. J. R. Robinson (Dewsbury), A. W. Postans (London), J. A. Jeffrey (Cheltenham), T. Cooper (Leicester), J. M. Fairlie (Glasgow), and others. Those gentlemen expressed strong sympathy and their regret that from various reasons they were unable to be present. The circular, which was sent out to 298 local secretaries and secretaries of Chemists' Associations, was answered in the following way:—No returns as to whether a Conference was desirable or not were sent from 9 places. There were unfavourable replies from 6; indifferent 38; favourable 145. In answer to the question, Would a deputation attend from your district?—there were no returns from 7; 22 districts promised to send delegates; doubtful 30. The names of towns which were either represented at the Conference to-day, or had promised to be represented, were Liverpool, Birmingham, Leeds, Halifax, Sheffield, Leicester, York, Wolverhampton, Dewsbury, Sunderland, Taunton, Bridgewater, Hull, Exeter, Shrewsbury, Leamington, Cheltenham, Henley-on-Thames, Coventry, Rochester, Cradley, Hinckley, Riddings, Chesterfield, Derby, Bradford, Hampton-in-Arden, Clay Cross, Hay, Ruabon, Rhos-y-medre, Longton, Birkenhead, Lye, Shipley, Buxton, Oldbury, Banbury, and Bloxwich. In answer to the questions, Are there any unregistered persons practising as chemists and druggists in your district? and if so, how many?—the replies were, unregistered persons, in 21 places; none in 127 places; and no returns from 50. The various suggestions which had been made from the chemists throughout the country had been embodied in the programme which the provisional committee had already put before the Conference. The provisional committee having met, and having all the data before it decided upon the programme which had been sent to every chemist in Great Britain. A circular had also been sent to the members of the Council in London some of whom were present while others had sent letters of apology.

In the absence of Mr. William Southall, the Secretary read the following paper by that gentleman:—

The Origin of the Conference and its Relations to the Pharmaceutical Society.

If any apology be required from me as a member of the firm which has been instrumental in bringing about this Conference, I should like to say that as Local Secretary of the Pharmaceutical Society, and also as connected in business relations with a large number of druggists up and down the country, it has been my lot from time to time to hear a good deal of the troubles and grievances of our brethren. Some of these may be imaginary but others are very real, and it seemed to our firm that the time was ripe for a Conference on trade matters in general, if some one would only take the initiative. This we have done, and by way of explanation I have strung together a few notes on the general condition of the trade that may serve to explain the position we have taken. Although not very old I am old enough to remember the profession of pharmacy in a very different position from what it now is. The druggist of my early days was an old-fashioned character altogether compared with the pharmacist of the present; and although we hope the process of selection, natural or artificial, may extend a little further, we had even then advanced beyond the condition in which a first class chemist, like the preceptor of John Bell, was in the habit of subduing the too powerful properties of powdered nitre before it was fit for sale. Druggists in my early days were just taking the alarm. Mr. Hawes by his bill in Parliament had startled them out of a reposeful state, and they must either do the requisite work for themselves or it might be rather roughly done for them. At that time there were, as at present, men who were excellent pharmacists and in the quiet recessses of whose back shops important discoveries had been made and light cast upon chemistry and pharmacy, but the rank and file were but an ill-educated body, and there was a good deal that wanted rooting out as well as fresh planting. Nor was this to be wondered at, for the school at Bloomsbury Square did not yet exist, and the tutorship was confined to the back counter; Anthony Todd Thompson was the great light of materia medica, for as yet Pereira's fame had hardly reached us. The old edition of Gray's 'Supplement,' Turner's 'Chemistry,' and a few medical books, together with the Pharmacopœia, constituted the druggist's library. As yet there was no "Journal," or *Chemist and Druggist*, to diffuse, weekly or monthly, pharmaceutical "sweetness and light" through the land. The times needed a master mind, and one arose equal to the occasion. Jacob Bell, enlisting under his banner the intelligence of the trade, contended nobly against opposition from within and from without, and his efforts were ultimately crowned by the establishment of the Pharmaceutical Society and the passing of the first Pharmacy Act. Now it is not my business to trace the history of the Pharmaceutical Society, or of the chemist and druggist under the Pharmacy Act, and its various modifications; it is known more or less to most present, and it is certain that a most important change has been effected. The various Presidents of the Society may well refer in their annual addresses with pride to the results which a comparatively few years have seen effected; whilst the rising chemist of the present day may thank the Society that, through its efforts, his position is exalted from that of a mere trader to a member of an educated and scientific profession.

It is true the title is not accorded to us, but that is not of much moment. We owe more than many are perhaps willing to admit to the Pharmaceutical Society, and it is our bounden duty to support and strengthen it by all the means in our power.

Now let us refer for a moment to the chemist of thirty or thirty-five years back, and we find him very differently circumstanced from his successor. In these earlier days he was a worthy or of course sometimes an unworthy man according to his lights, but things went on very easily as far as interference from outside. He took it easily at home too, for new preparations and new "patents" did not spring up in the mushroom crop they do at present, and if people wanted new things they must wait for them.

London was then as far off from Birmingham as Paris is now, and as for small country places, they might as well have been at Timbuctoo. Then, by way of preparation for business, a shop boy could pick up a little Latin behind the counter, and in due time he acquired knowledge enough to enter business on his own account. At present responsibilities begin with his apron. He must read Cæsar and have a fair general knowledge to begin with. But I do not stay over studies, examinations etc., they are merely matters of money and brains; the money is well spent and ought to be an excellent investment in whatever way you look at it, whether by having gained ability for trade, or increased intellectual powers for the usefulness and enjoyment of life. There are, however, now-a-days responsibilities which were never thought of in old times. Let us consider a few of them. First come certain laws, which whether or no they be terrors to evil men, are certainly terrors to good ones. A conscientious pharmacist is afraid of infringing the provisions of the Sale of Poisons Act; he perhaps wakes up at night after a doubtful twopence-worth of laudanum has passed over his counter, assured that somebody has been poisoned. Then again the more careful he is to avoid the claws of the Adulteration Act, the more fearful is he lest some article should unfortunately have escaped his careful revision and be pounced upon to his eternal self-condemnation. And now, according to a recent number of the Journal, we hear of a new terror. The inspector of weights and measures sends to a druggist for a test prescription, so called, to be made up, and it is forthwith handed to the analyst, who pronounces that one article is in excess, and the unfortunate dispenser is fined 50*s.*; the case cited, however, seems to need further explanation. Now correctness is the very backbone of our position, and as honest men we are willing to have our work examined, but the analysis of a complicated mixture is not unlikely to be attended with error, and how is the ordinary chemist to defend himself unassisted? The confidence of the public is destroyed and the fine of 50*s.* may become one of £50, and it is questionable whether this accords with the intention of the legislature.

Next comes Lord Campbell's Act, which makes a man responsible in damages for the errors of his assistants as well as of himself, a most grave responsibility to the druggist. All these new responsibilities are additions by law to the serious and always increasing responsibility that naturally attaches to the proper carrying out of our business.

Let us now turn to the *quid pro quo*. Have we got it? As far as a return for our improved education goes, and in most of our internal relations which have been subjected to change, we either have it, or it is in a fair way of realization, though some may think the good time rather long in coming. Apprentices it is true are scarce, and assistants' salaries are higher, but the rise in remuneration will probably increase the supply, whilst the tendency of the examination will certainly be to restrict the number of men entering into business and at the same time the number of those in business before 1868 will continue to fall off. So far the benefits in return for our internal legislation! But how do we stand in the general way of our trade? Surely every one here will say that the pharmacist being so heavily handicapped with laws and regulations ought to be fully protected in the legitimate exercise of his calling. We find, however, that he is hustled and interfered with. The character of a chemist's business varies very much in different places; but it is impossible that he can, as a rule, make a living by dispensing and the sale of drugs alone without the addition of sundries. Here he finds that he is interfered with by the grocer, who, in addition to many articles that may be free warren, has robbed him of the sale of many—such as extract of meat—which were his own introduction. Then the haberdasher sells perfumes, a very old adjunct of a chemist's business. This, however, is all legitimate, though it may be painful in our struggle for existence; we find, however, that the grocer and others sell patent medicines containing drugs subject to the provisions of the Poisons Act. This certainly requires looking into. Then there is the Co-operative grievance, which presses heavily upon many of our brethren. For my part I always consider co-operation a mild sort of communism, and communism, whether in Paris or Westminster, means getting what you want without paying full value for it. If there must be a community of goods it should not be confined to a few shopkeeper's articles, but should be the whole thing—the red flag and common property in land above all. The aristocrats of the Haymarket might then find they had burnt their fingers. Nay, some advanced philosopher might judiciously hint at social community also, and recall the happy days when, if I recollect, Cæsar said of our ancestors, "*Uxores habent inter se communes, fratres cum fratribus.*" But you will hear presently about cooperation. Next, we have the altogether unlawful carrying on of the business by people whose names are not upon the Register. This seems to be a growing evil, and I regret to say that the efforts of the Society to put a stop to it appear to fall far short of the requirements. As local secretary I have been found fault with for inefficiency when the blame did not lie at my door. It is not, moreover, the place of any chemist, local secretary or not, to take upon himself the office of detective and virtual prosecutor; a society may do it, and upon an officer of that society, and not upon the aggrieved neighbours, should fall the duty of getting up the evidence. In connection with this arises the further question, are the laws that govern our trade such, that whilst fully protecting the public interests, they are also the best we may justly claim for our own protection? There are other matters of material import, also, well worthy of consideration, but I have said enough to show that the Conference does not come together without reason. Some will doubtless say, "The Pharmaceutical Society is the proper body to look after our interests." Well this may be so, but we require a fulcrum to move the Society; for any powerful institution that has done a great work is apt in the course of years to settle down in a comfortable state, and to inhale the pleasant aroma of finality. Therefore a little ventilation of these matters in the free air outside the walls of the city may do no harm. For my part I am most desirous that the Pharmaceutical Society should take up the work that the Conference desires to see accomplished, but I am somewhat doubtful if the great educational and examining body of our profession ought to run the risk of rebuff and failure that a trade association will certainly incur. The Pharmaceutical Conference has not only safely floated off an immense amount of scientific work from the elder society, but has left it stronger than before. Why should not a Conference that deals with trade objects purely be also successful?

To ensure success, a trade conference must not clash with the Society, but it must be largely and thoroughly supported to be of any use. At all events there is a good deal wants talking over at the present time; and to those who would say, "Better keep quiet and let these things alone," I would observe that to my mind there is a great deal of quiet wisdom and wit in the words of Dr. John Richie, at the time of the Scotch disruption. "Agitation!" said John "what good in the world was ever done without agitation? You cannot even make butter without it."

The Chairman: I think our thanks to the readers o the papers had better be made to each, and although Mr Southall has been unable to be present I am sure you will all feel much indebted to him for his paper. The arrangements made for discussion are, that the reading of a paper is not to exceed twenty minutes, and no speaker is to exceed ten minutes without the permission of the Chairman.

A Delegate suggested that discussion on Mr. Southall's paper should be deferred until some of the other papers had been read.

The Chairman approved of the suggestion, and said that unless any one desired to make any remarks he would call upon the reader of the next paper.

Mr. J. C. Thresh, F.C.S. (Buxton), read the following paper:—

The Condition of Chemists and Druggists under the Pharmacy Act.

The object of this necessarily brief and hastily compiled paper is to indicate the restrictions, responsibilities, etc., imposed upon us as a class by the Pharmacy Act of 1868; to inquire how far this Act is responsible for our grievances; to ascertain what benefits we are at present deriving from it; and to offer for discussion certain suggestions, whereby to attempt the removal of most of the grievances of which we now complain. It is notorious and certainly to be lamented that ever since the Pharmacy Act became law it has formed the subject of continual complaints, since it imposes upon our shoulders numerous burdens, for which it gives us but little in return.

When the Pharmaceutical Society first introduced the Bill it encountered a great amount of determined opposition; many real and imaginary objections were raised against it; some denied the necessity of any interference from the State, and others foresaw the results most likely to accrue from the enforcement of such a law; but the majority listened to the voice of the charmer, and believed in the brilliant future and in the immediate and prospective advantages which the Society and the advocates of the Bill predicted would accrue to the chemist and druggist should it become law.

It will materially assist us afterwards if I now briefly state the chief results which we were so confidently assured would flow from the Pharmacy Act, as we shall then the more readily discover how lamentably up to the present time it has failed to fulfil the objects for which it was promoted. The Bill was intended to secure the greater safety of the public by confining the sale of poisons and dispensing of medicines to properly qualified persons, and in return for the restrictions to be placed on the sale of these certain poisons, and in compensation for the study, for the time and money, which in future would have to be expended before any one could qualify himself to carry on the business of a chemist and druggist, we were promised—

(1) A monopoly in the sale of poisons and in the dispensing of prescriptions.

(2) That in the course of time the grocers and petty dealers who would have to be and were placed on the register, would diminish in number from death and other causes, and that thus ultimately the whole, or nearly the whole, of the dealing in drugs would be in the hands of the legitimate chemists and druggists.

(3) That in consequence of the examinations the number of young men entering the trade would decrease, and the number of chemists in proportion to the population would consequently decrease.

(4) That our ranks would in future be filled from a better class of men, and that this, together with the examinations, would confer upon the chemist a much higher status in society than he had hitherto enjoyed.

In return for these advantages, the only burden or restriction on the chemists then in business was to be the labelling certain articles after the manner specified by the Act, and the registration, etc., of the sale of certain other poisons, under pain of incurring a heavy penalty in case of neglect or wanton infringement.

It is now eight years since the Act came in force, and we have had ample time, therefore, to judge of its working, to ascertain our present condition under it, and to arrive at positive conclusions as to whether it has answered the expectations of its introducers, and the purpose for which it was passed. I think there are very few who will venture to affirm that as yet it has either secured the greater safety of the public or conferred upon us any real advantages for what we have found to be the irksome restrictions placed upon us.

First, then, is the safety of the public greater than it was before? Now the answer to this question involves answers also to the following:—

Can poisons now only be obtained of duly registered chemists and druggists?

Are prescriptions dispensed solely by competent and qualified persons?

Now the answer to both these questions is most emphatically, No. The obtaining of poison by any person and for any purpose is scarcely more difficult than it was previous to the enforcement of this Poison Bill, and the dispensing of prescriptions is not the monopoly of the chemist; and both these assertions can easily be verified. Let any one carefully examine the cases of accidental poisoning, and of suicide, and murder by means of poison, and such an one cannot fail instantly to be impressed not only with the ease with which these things can be obtained but with the almost impossibility in many cases of ascertaining when and where they were obtained. We do not wonder that this is so, for it is notorious and forms just ground for complaint that in every town and village in the kingdom we are being openly defrauded by the sale of poison or of preparations containing poisons by unregistered chemists, grocers, hucksters, and others. Instead of the number of these petty dabblers in drugs having decreased they have considerably increased, for everywhere may be found dealers in sand, blacking, and physic, who if they do not openly sell laudanum, chloroform and other poisons in the pure state, yet vend in enormous quantities mother's friend, infant's cordial, cough syrups, ointments, etc., which contain these poisons. I know certain densely populated localities in which every fifth or sixth house is a kind of shop, in almost every one of which there is sold articles of this kind. How does this state of thing affect us? It may possibly be thought convenient by some classes of the public, but it certainly is not to their benefit, and the amount of legitimate trade of which we are defrauded by these shops is almost incredible.

Again the number of men who without passing any examination or possessing any qualifications whatever are openly or covertly carrying on the trade of chemist and druggist, appears to be on the increase. Medical botanists, wholesale chemists, medical halls, drug stores, etc., are being opened out in all directions, and either the Act is unable to cope with them or, as I am inclined to think and the majority of others with me, those upon whom up to the present the duty of enforcing the Act has fallen have failed properly to enforce the Act. The Pharmaceutical Society has exhibited a truly laudable zeal in raising the standard of qualification as high as possible, and thus decreasing the number and shall I say increasing the quality of those entering our trade (or profession as many would like to call it), but I fear it is far from being generally credited with showing the same amount of zeal in protecting their interests when they have entered the trade. This, however, is a question which it would at present be useless discussing.

Many of these stores not only deal in poison but dispense prescriptions, and to obtain a trade generally begin by cutting down the prices, and thus not only compete illegally but unfairly with the legitimate chemist. There is not time to go into the various devices which these men adopt to keep as they think beyond the arm of the law; they can be considered when we are ready to vindicate our rights and eradicate the parasites. The various trade organs have frequently of late contained letters from correspondents complaining of this unfair competition and illegal trading, but they have chiefly dealt with unregistered retailers, the petty wholesale chemists rarely being mentioned, and yet in many localities these do considerably more harm that the former class. These wholesale chemists are generally assistants who have got a smattering of the so-called wholesale trade from being with some chemist who cultivated the suicidical business of supplying grocers with drugs. Many of this class keep open shop, and their wholesale dealings are made a cover for as much retailing as they can possibly do, whether it be in the sale of pickle, blacking or poison. I know instances of this kind, and I know the result it has upon the trade. People knowing that they can purchase small quantities of anything they require from these wholesale druggists, conclude they can do so at wholesale price, and to keep up this profitable delusion, the dealer reduces his prices and also his quality below that of the legitimate chemists. But this is not the only way in which we are openly defrauded by wanton infringement of the Acts designed to protect us. There are the men who, unable to compete with the established chemists who cultivate a grocers' connection, induce every little shopkeeper and huckster to deal in drugs, with ruinous result to the chemists in such localities. Towns which should support a dozen chemists in comfort afford only a bare existence to two or three. One may ask how is it that people, and working people I now more especially refer to, prefer purchasing drugs from the small shopkeepers rather than from the legitimate chemists. There are many reasons for this, one of which is that they cannot get physic from the chemist on credit, whereas by getting it where they purchase their weekly supply of food or sundries they obtain it with the same credit; but the chief reason is that it is cheaper. How is it that these small dealers can buy their few shillings worth of drugs from small wholesale druggists and yet afford to sell them for less than the chemist? These people will have a good profit upon them or they would not deal in them. The fact is the drugs sold at these shops are of the very worst description, bought at a much less price in small quantities than we can really buy genuine drugs at in large quantities. I do not make this accusation rashly, but deliberately, from an intimate knowledge of the trade and from the examination of drugs purchased from these wholesale druggists and sold by their customers. To find sweet nitre having a sp. gr. of 900 and upwards is the rule, and all the tinctures contain about half the official proportion of spirit; light carbonate of magnesia is sold as calcined, and syrup of lime blue for syrup of violets, and so on through the whole category of drugs. This question may seem at first foreign to the subject with which I am dealing, but I contend that it is not, since it is the result chiefly of the maladministration of the Pharmacy and Adulteration Acts, and I hope shortly to show how, by the proper enforcement of these Acts, nine-tenths of this infamous traffic may be stopped. But this class of so-called chemists are the source of still greater and more urgent cause of grievance by inducing the shopkeepers for the sake of increased profit to themselves to take up the sale of cough mixtures, cholera mixtures, rubbing bottles, infants' cordials, ointments, etc., so on *ad nauseam*, nearly all of which contain one or more of the poisons mentioned by the Pharmacy Act, and the exclusive sale of which is supposed to compensate the chemist and druggist for the restrictions placed upon him in his business. I have known dozens of gallons of cough mixture containing large quantities of chlorodyne or laudanum sold under the names of raspberry cough syrup, balsam of honey, and the like. Cholera mixtures invariably contain opium; so also does the infant's friend or cordial. Family ointment is usually a preparation containing white precipitate, and golden ointment a preparation with red precipitate. It must not be supposed that these cases are rare, for although flourishing more in certain localities than in others, yet there is probably not a town or village throughout the kingdom in which the rights of the chemist are not being infringed by the sale of these poisonous preparations. It is only occasionally that the attention of the public is drawn to the danger of using these medicines, as when a child is given an overdose of infant's friend, and does not recover, and then even the chemist has to stand by without defending his rights, and has to see the illegal sale of these things continued simply from the lack of some power to move the law to put an end to it.

The registration of the sale of poisons by chemists and the distinctive labelling as poison of such preparations as have not hitherto been considered such, is in itself a source often of much annoyance.

The signing of his name by the purchaser appears to be very little trouble either to him or to the retailer, but somehow or other the British public has a decided objection to signing its name, or to informing others of its intentions, consequently people look out for other places for purchasing poison where they will not be asked to sign their names or to enter into details as to the purpose for which they require them. As a consequence we find grocers and others dealing in rat and mice poisons, arsenical sheep dips, etc.; and as familiarity breeds contempt, so the evasion of the law, which at first is done surreptitiously, ultimately is done openly, to the serious loss of the chemist, who is thus again partially deprived of one of the few advantages the Pharmacy Act can confer upon him.

The subject of co-operative and civil service retailing and dispensing, I need not touch upon, as it is to be dealt with by an abler hand than mine. It is a subject worthy of serious consideration, for it more or less affects us all, since in the smaller towns many of the inhabitants are joining these societies and obtaining their drugs and medicines with their groceries.

Now let us return to the other advantages which we were to derive from this Act, namely that of the decrease in the number of chemists, and of the higher status of the trade. It is true that for some time there has been an increasing difficulty in obtaining intelligent, well educated apprentices, and one would infer that this argued a future decrease in the number of chemists. The parents of boys who can afford to give them an education fitting them to pass our Preliminary examination and thus to prosecute their future studies with a surety of success, find that for a trifling extra outlay they can place them in the medical profession; and since in the first case the result is only a chemist and druggist, whose status as yet is regarded as but little or nothing above that of his neighbours the grocers and drapers, and who if he has all his rights enjoys only the poor monopoly of the sale of a few poisons and the dispensing of medicines, in the second, the result is the enrolling of his son's name in that of an honourable profession with position and prospects far above that of a chemist. The worst result of this scarcity of respectable youths is that the poorer class of chemists are, to carry on their businesses, compelled to take as apprentices youths of whom there is not the slightest probability of their passing the examination; subsequently these are thrown upon the world as unqualified assistants, to ultimately become unqualified dealers in drugs, infringers of the law, and increasers of the illegal competition to which we are already subject. The opinion of many chemists is that the examinations are too stringent, more so than was contemplated when the Act was first framed. I hold, however, that the examinations are not a whit too stringent to prove the competency of a man to dispense and retail drugs, but I do contend that for the time and money requisite to be expended, before one can become a qualified chemist, we obtain but most disproportionately small advantages, even if the Act was fully enforced. What proportion of the average chemist's turnover is due to the sale of poisons and dispensing? Really in most cases very little. There are numerous towns, and very large towns too, where all the dispensing would not more than support a single chemist. But the further treatment of this subject would lead to a consideration of the relations of the chemist and the medical profession, which I willingly leave to some one else.

The last growl I shall utter is one upon a subject which we shall not all view in the same light. I refer to that portion of the 16th clause of the Pharmacy Act which says "nothing hereinbefore contained shall extend to or interfere with the making or dealing in patent medicines." Why, is it not equally due for the sake of the public safety and for the rights of our trade, that the sale of all patent medicines containing poisons should be subject to the same law as the sale of poisons not protected with a medicine stamp? What virtue or power is there in the government label to prevent accidental or wilful poisoning? Is it not true that a large proportion of these cases are due to the administration of these remedies? Why therefore should not their sale be restricted to the chemist, and take place exactly in the same way as the sale of any other poisonous mixture? But again this clause affords a loophole for evading the Acts, and advantage is already being taken of it to sell laudanum, paregoric and other poisons under the protection of a threehalfpenny stamp.

To the best of my ability I have now pointed out the results of the Pharmacy Act both as affecting ourselves and the public, and it is evident that a many of the grievances which we now suffer are due as much or more to the maladministration and non-enforcement of the Act as to the enforcement of it, and it is therefore necessary for us to consider (first) What means can be adapted to properly enforce the Act and protect our rights? and (second) how we can secure some more adequate recompense for own responsibilities and the restrictions placed upon us?

Now one would naturally suppose from a perusal of the Pharmacy Act, that the Pharmaceutical Society of Great Britain was the legally constituted guardian and champion of our rights, and responsible for the proper enforcements of the provisions of the Act. I am sorry to say we all know only too well that to look for help in that direction is utterly vain; for it either cannot or it will not assist us. It may be that both the chemists themselves and the Society are to blame. The latter is not supported sufficiently by the former, and as a consequence we are deserted, our distinctive title of pharmaceutical chemist is lost to us, and we are delivered over to the spoliator. Had the chemist evinced greater sympathy with the Society, and taken a more active interest in the election of its council, that council and that Society might have been made to represent every class and branch of the drug trade and have been composed of men pledged to do their utmost to protect our interests and vindicate our rights. But there is no immediate prospect of such a consummation, however devoutly it may be wished, and our only hope lies in the issue of the Conference now assembled.

The only means that I consider feasible and likely to be successful in its efforts to assist us is the formation of a trade society, which shall not be antagonistic to the Pharmaceutical Society, but which shall rather if possible act as an auxiliary to it; but if this is not possible it must be prepared to act independently of it. This society should have for its object, the defence of our rights by the enforcement of the Pharmacy Acts against all unregistered chemists, and against all shopkeepers and others who are found dealing in medicines containing poisons; to try by process of law the rights of co-operative societies to dispense and deal in poisons; to point out to the public analysts another and better field for the exercise of their abilities, namely that of investigating the quality of the drugs not sold by druggists; and to attempt to obtain such alteration of the Pharmacy Act as shall secure us increased advantages. I do not think there will be a person present who will deny the urgent necessity of some such steps being taken, and it is sincerely to be hoped that the chemists throughout the country may be roused from their lethargic state, to unite together for the common weal. There are many who would go even further than this and restrict entirely the sale of drugs to the chemist and druggist, but any one who calmly reflects on the subject will at once see that this is an object which it would be folly at present to attempt. Neither do I think it would benefit us aiming at too much, we must prove our demands to be just and moderate, and there is little doubt but that ultimately our demands would be complied with.

In conclusion let me just point out what I think would be the result of a short period of vigorous action undertaken by such a society by simply enforcing the present Pharmacy and Adulteration Acts. First by a thorough enforcement of the Pharmacy Act the sale of poisons and dispensing by unregistered men would soon be stopped. The drug stores, medical halls, etc., would have to put up their shutters or their owners make an effort, and pass the requisite examinations, and thus a large portion of our trade of which we are at present defrauded by these men would accrue to us.

The legality of co-operative dispensing could be put to the test; if illegal there would soon be an end of this grievance, and if it should prove to be legal, we should then know the worst, and could at least attempt by an alteration of the law to make it illegal.

The proper enforcement of the Adulteration Act would speedily rid us of three-fourths of that wretched competition with petty shopkeepers to which all chemists except in better class neighbourhoods are subject. It has often struck me that the inspectors would much more effectually cope with this subject if instead of always purchasing goods from the recognized dealers, as drugs of chemists, groceries of grocers, etc., they would take samples of those things not properly belonging to the business of the traders from whom they are purchased. They would thus not only be more likely to meet with cases of adulteration, but would also protect the different classes of tradesmen from unfair competition with each other.

Again, I think it would be quite possible to obtain some modification of the Pharmacy Act, so as to render it somewhat more just. This might be done by confining the sale of all patents containing poisons to the chemist, and by either extending the number of poisons in part 2 of Schedule A, or by creation of a part 3, which should contain a number of powerful remedies, such as carbolic acid, sugar of lead, nux vomica, phosphorus, lobelia, caustic, digitalis, and chloral hydrate, and all their preparations. These should only be sold by the qualified chemist, but it should be left to his discretion whether they should be labelled poison or no. These, however, are all subjects which would be taken up by the society it is proposed to form.

Let the proposal be considered as dispassionately as possible, and then whatever action we decide to take, let us unitedly strive to accomplish the purpose for which we undertake it. No local grievances, no spirit of petty jealousy or personal animosity, no trifling differences of opinion must be allowed to turn us from our purpose; we must determine to gain the favour of the gods by doing all we can for ourselves, we must keep the goal before our eyes, and swerve neither to the right nor to the left until we reach it. Let us strive to do this, and the consciousness that our efforts are not prompted by defiance, but by defence, and that our demands are just and right, will materially assist us in our endeavours, and ultimately lead us on to victory.

The Chairman: I am sure you will feel very much indebted to Mr. Thresh for his vigorous paper. We have had the pleasure of knowing Mr. Thresh for some years; I won't say a number of years, for we must speak of Mr. Thresh as one of our young able investigators. You will see how often his name occurs in the pharmaceutical and other prints, in connection with pharmaceutical science, and I am glad he has given us his clear judgment on such a question as this also. The suggestion which was made concerning Mr. Southall's paper, that it ought to be considered with some other matters yet to be brought before the Conference will apply also to this. The allusion especially to the subject of patent medicines may very properly be considered when Mr. Shaw and Mr. Arblaster give us their views on the same subjects. Some of Mr. Thresh's statements, particularly as to the abuses by small wholesale druggists acting as retailers, and also as to the quality of drugs sold by unauthorized persons, I am quite sure, are the result of his own experience, and his experience would indicate to us, even if we had not made up our minds as to what should be done or how to do it, that the collection of information is a worthy object for an association like this. I hope that we shall always bear in mind that the charter of the Pharmaceutical Society, after referring to the purpose of its education, has a definite statement that it is to be also for the protection of those who carry on the business of chemists and druggists. Let us not think that we are asking something unreasonable in asking for reasonable protection.

Mr. Edwin Yewdall (Leeds) then read the following paper:—

The Difficulties of Chemists under the Adulteration Act.

The practical working of the "Sale of Food and Drugs Act, 1875," having resulted in the prosecution of several respectable tradesmen whose previous honourable dealings lead to the supposition that they are the innocent victims of a stringent law, it has been thought that a consideration of its various sections may be interesting and productive of mutual advantage. With the object of obtaining the opinions of others I have undertaken to bring the subject before you to-day, though well aware that there are many here present who could have treated it in a much more able manner had they been invited to do so. The preamble of this Act states that it is desirable all Acts relating to the Adulteration of Food and Drugs in force at the date when this Bill became law shall be repealed, and the 1st section gives a list of these Acts, amongst which will be found the 24th section of the Pharmacy Act, the repeal of which seems to very much modify the provisions of that Act. You will remember that according to the section referred to any registered chemist and druggist selling an adulterated drug would, unless the contrary was proved, be deemed to have knowledge of such adulteration, and whilst thus rendering himself liable to the penalties of the Acts then in force for the purpose of preventing adulteration he was liable under the 26th section of the same Act to have his name erased from the Register had the Privy Council, in whom was vested the power, considered his offence deserved such further punishment. The repeal of the 24th section relieves the retail chemist of any charge of adulteration under the Pharmacy Act. Referring to the "Sale of Food and Drugs Act, 1875," the 2nd section interprets the word "Food" to mean every article used for food or drink by man other than drugs or water; also, that the term "drugs" shall include medicines for internal and external use, but it does not say for man, consequently, I presume that this term applies also to medicines for cattle. The 3rd section refers to the penalties which can be imposed for mixing any injurious ingredient with food and selling it in that condition. By the 4th section any person selling a drug to which any article has been added calculated to affect injuriously its quality or potency is liable to a penalty for the first offence of a fine for a sum not exceeding fifty pounds, and for a second or any subsequent offence of imprisonment with hard labour for a term not exceeding six months. With these heavy penalties hanging over us it is of the greatest importance that we should, if possible avoid a first conviction, especially as the success of a retail chemist depends very much indeed upon his character for supplying genuine articles. There is a provision in the next section that no person shall be liable to these penalties if he proves to the satisfaction of the Court that he did not know of the articles being mixed or adulterated and could not with reasonable diligence have obtained the knowledge. It will be observed that it is incumbent upon the retailer to be in a position to assert either from his own knowledge or from information obtained from the person of whom he purchased the article that it is genuine. To be able to speak from his own knowledge requires that he should have examined the article thoroughly, which to some chemists and druggists who have little knowledge of the use of the microscope or the process of chemical analysis, and to others who are fully employed in the usual routine work of a retail business, would be almost an impossibility; they will therefore adopt the alternative of relying upon those from whom they have purchased it, but in order to make themselves safe will probably require a warranty. How can they obtain this warranty? As the provisions of the Act apply to the wholesale dealer, it follows that if an order is given for an article and it is supplied, with it will be sent an invoice giving the quantity and name. That invoice I consider is a warranty. It is well known, however, that the sale of drugs is very slow with some retail dealers and it might happen that a drug obtained some time ago is the one respecting which action is being taken; and those who are familiar with the usual retail chemist's business are aware that when new stock is received it is often put into the store bottle in which there is perhaps some old stock obtained from another house, or if from the same source it has been so long upon the shelves, subject to the varying temperature and humid atmosphere of the shop, perhaps also exposed to direct sunlight, that it is almost inert; and yet on the ground of economy this will be mixed with that just received, thus seriously affecting its quality. Again, there are many articles which are constantly deteriorating. Under all these circumstances would it not be unfair to expect that the wholesale dealer should be held responsible for an unlimited period or even until the stock was sold,—as by improper storage the quality of a drug may be quickly altered. How long should the wholesale dealer be held responsible? To meet this difficulty, it is very probable that the wholesale dealer will, by a notice upon his invoice, intimate that he will not hold himself responsible for the genuineness of the article if it is removed from the bottle or wrapper in which it is forwarded. I have little doubt there are, in many retail shops, parcels of old drugs which have lain for years; it will be apparent to the owners of such, that for their own safety it is absolutely necessary to go through the stock, throwing out all articles of questionable character, including all powders, extracts, or similar preparations, which have become altered in their colour, smell, or taste; and if any costly article is found, respecting which there is a doubt, it will be more satisfactory to send a fair sample either to the Laboratory of the Pharmaceutical Society or to some competent analyst, of which there are many to be found in our ranks, whose practical knowledge of the various articles used as food, and also of drugs, renders them well qualified to fill the position of public analyst, providing they considered such an appointment a *quid pro quo* for relinquishing the business of a chemist and druggist. There are several articles of every-day demand, respecting which a doubt exists whether they can be sold without danger; amongst these will be found cera flav. and cera alb., which, being used in the preparation of medicines for external use, come under the definition of the term drug and therefore ought to be sold genuine, though it is a well-known fact that both are liable to sophistication. When asked for carbonate of iron, we usually supply the sesquioxide. Sapo mollis is frequently used in the preparation of linimentum saponis.

Flavouring fruit essences are artificial, and prepared in the chemists' laboratory instead of from the fruit.

Crocus in placentâ (cake saffron) is sold in large quantities in some towns, and used for similar purposes as crocus in fæno; yet it is questionable whether there is a vestige of saffron in it.

Is the retailer liable to a conviction for the sale of any of these articles under the names mentioned?

Lac sulphuris is another preparation which has already resulted in several vexatious proceedings. Respecting the last prosecution in your town, I wish to call your attention to the report in the *Pharmaceutical Journal*, which I presume is correct, and in which I observe that Mr Herbert, who appeared for the town clerk, stated that in this case it could not be pleaded that the article has been unavoidably mixed, because it was purchased in a pure state and was extensively adulterated with sulphate of lime; this adulteration having, I presume, by this statement been carried out by the defendant after he had bought it pure. If this is a correct report you will fail to see any way by which the defendant could evade the penalty, but if Mr. Herbert is wrong and the article sold was the one usually known as milk of suphur, then we are brought to a consideration of the question, What is milk of sulphur? Was the imposition of a fine in this case the proper administration of the law? I am not prepared to bring before you the whole of the correspondence which has taken place with regard to this preparation; several very eminent pharmacists have expressed an opinion that it should be considered as a separate and distinct preparation from the precipitated sulphur of the Pharmacopœia, in which opinion Dr. Redwood agrees, and there are also several most intelligent chemists, amongst whom is Dr. Attfield, who assert that the term milk of sulphur applies only to precipitated sulphur; they further argue that if an imperfect process was originally introduced for its manufacture, that process has been superseded by another in which pure sulphur only is obtained. With such a diversity of opinion we can scarcely wonder at the difficulty the learned stipendiary of this town, Mr. Kynnersley, felt in giving judgment in this case, or fail to admire his candour in expressing a hope that the question would be taken to a higher court. At the same time inasmuch as there was a doubt whether it should be considered an adulterated article or not, the English law gives the defendant the advantage of the doubt. I am disposed to think it ought to have been dismissed, yet the opportunity now afforded ought not to be allowed to pass, and as the question is one which affects the whole trade you will no doubt concur with me in thinking that the expenses attending such an appeal ought to be borne by the Pharmaceutical Society, though I must admit this Society has not received that encouragement from the trade which should have been given to it, especially by those who when danger threatens are the first to apply for assistance. If the Society refuse to take up this case, then the necessity for some trade organiza tion for obtaining a proper settlement of this and othe questions which will no doubt arise is undeniable, and it is for the purpose of considering the desirability of such a course that we are met to-day. Pending the settlement of the question, I think a label "Milk of Sulphur, prepared according to the Pharmacopœia 1724," would probably prevent any further actions, as showing that it was manufactured by a process according to which the presence of sulphate of lime was unavoidable, and therefore might be considered exempt according to the 4th clause of the 6th section. The omission of any standard of comparison up to which the pharmacist may work or by which the analyst may judge of the quality of the article submitted to him is to be regretted, from the fact that preparations bearing the same name are prepared of many different strengths; for instance, tincture of camphor, which if prepared according to the British Pharmacopœia is frequently taken with benefit. Cases are upon record in which the homœopathic tincture has produced alarming poisonous effects. Although all preparations of the British Pharmacopœia used for the dispensing or compounding of medicines according to prescriptions written since its publication must be of the strength ordered in that work, yet large quantities of drugs are sold daily by shopkeepers which are of inferior quality and in the case of preparations bearing the pharmacopœial name prepared with very weak spirit, or if of the nature of spirit of nitre mixed with water, nevertheless the want of a legal standard to judge of the qualities of these drugs and preparations is a serious obstacle in the way of any attempt to enforce the provisions of this Act against such dealers. Instead, therefore, of appointing an inspector to search for the articles we know are to be met with, would it not be better to appoint some energetic chemist as analyst, we can all obtain from our own neighbourhood specimens of the article sold, but it is not every one who has the time to examine them; if such an appointment was made, or arrangements entered into with Dr. Attfield for the same purpose, such specimens could be forwarded, and if the report showed the presence of any article restricted by the Pharmacy Act to the registered chemist and druggist, information could be given to the local inspector, and the case would be carried on by him in the usual way and without the appearance of any animosity or ill feeling on our part. It would be uncharitable to suppose that the object of the legislature was to harass the well meaning tradesman, but unfortunately if any person who, from pique or vicious disposition, or supposed injury, seeks to do a tradesman harm, this Act appears to lend a means by which he may carry out his design, unless great care is exercised. In the *Pharmaceutical Journal*, April 1, 1876, is the report of a case where a milk dealer was summoned for selling adulterated milk. Although it is not stated under which section the information was laid, I presume from the remarks of the stipendary that it was under the 6th section. Mr. Arnold pointed out that to ensure a conviction under this section it must be proved that the sale was to the prejudice of the purchaser, and as the inspector could not affirm that such was the case, he—the magistrate—would take time to consider the point. I have carefully searched in the Journal for the final decision, but have not yet met with it.

Having briefly laid before you some of the points requiring your attention, I hope due consideration will be given to them, as well as to those which may be adduced by the papers which are to follow, that some well digested scheme whereby we may avoid the penalties of this Act may be the outcoming of our meeting.

The CHAIRMAN: Our thanks are due to Mr. Yewdall for his very excellent paper on this subject, and a most important one it is. Those of us who live in the same town as Mr. Yewdall, know how important his services have been towards the organization of associations for promoting the common advantage. There can be no objection to the paper being discussed now, as I do not see any subsequent proceedings which can be taken with it. If we are to be practical, I suppose the first matter would be the consideration of the Birmingham milk of sulphur case. I should be glad if some local member would give us a little information. We have read what has been published, but it is not probably known to the meeting generally whether the person who sold this milk of sulphur was a registered chemist and druggist, or not. I should be glad to have this information, and also whether the legal technicalities which would be needful for the case to be carried to a higher court have been complied with, or whether it is now too late for such a step to be taken.

Mr. ALFRED BIRD (Birmingham) said: There have been two milk of sulphur cases, the one against Mr. J. Sumner, chemist and druggist, of Coleshill, and the other against a drysalter. As I conducted the scientific defence of Mr. Sumner, and to a successful issue, at Coleshill, we thought the same arguments and the same reasoning as was employed in the Coleshill case would suffice before our learned stipendiary. The argument which we brought forward at Coleshill was very simple. We showed distinctly that there were two preparations, and that milk of sulphur was separately quoted on the drug trade lists. I told the magistrates that I had sold milk of sulphur in my shop nearly forty years, and I should continue to sell it. The magistrates were so convinced that there were two preparations that they dismissed the summons. One of the reasons why the prosecution was resisted, was that there was a foul word in the summons, charging Mr. Sumner with fraud. I do not know, gentlemen, how you would feel, but I know how I should feel if I were charged with fraud, and I was determined in this case, regardless of expense, to hurl back the charge. We were successful, for the magistrates dismissed the case and coupled with it that Mr. Sumner did not sell a fraudulent article, but a legitimate one and was perfectly justified in so doing. When the second milk of sulphur case came on at our public office we thought that the same arguments temperately stated to our magistrate would settle the case, in fact we thought it would convince Dr. Hill. However, the result was different, and Mr. Kynnersley distinctly enunciated that the term milk of sulphur is only applicable to the precipitated sulphur of the last Pharmacopœia; that the terms are synonymous, and that if you sell the old milk of sulphur you must be good enough to put a label that there is sulphate of lime in it. I beg to say that though this unfortunate fellow who was summoned was fined a shilling he has not been able to carry on the case, for he is a very poor man and anything in the way of a reference to a higher court is a most costly proceeding. This man did not feel in a position to find money to fight the cause of the chemists and druggists, therefore the case has dropped without any appeal to the Court of Queen's Bench whatever on the point. Mr. Bird suggested that those who supplied these preparations should take particular care under what name the article is purchased. If the customer asks you for milk of sulphur, give him milk of sulphur; if he asks for precipitated sulphur, give him precipitated sulphur; then you are safe. The effect of Mr. Kynnersley's judgment has been to carry alarm and dismay into the chemists' shops throughout the whole town, and last night I had a most curious and comical instance of it. An old woman came into my shop with a tumbler glass and a spoon, and she said, "Just look here, what's this?" She was stirring away at something in the glass, and she said, "I went into a certain shop for two ounces of milk of sulphur, and this is what they gave me." She got it on Saturday night and she was still stirring at it. I asked her to give me a small portion which I tested in a spoon, and in a few moments I saw that the chemist had given her some of this unmanageable preparation. I said—"This is not milk of sulphur, you have been sold the wrong article. You look like a woman who knows how to defend yourself." I said—"Go down to the magistrates to-morrow morning and ask for Mr. Kynnersley, and just tell him your grievance, and tell him also I sent you." I do not know whether she has gone down, but I had reason to think she would. I told her first to go back to the chemist's shop and tell them she had not got the right article, when she replied, "Its no good doing that, as they would just take it away and give me something else." She said—"This is an abominable adulteration, and I don't see why a poor creature like me should be served so." I hope we shall not refuse to sell milk of sulphur when it is asked for, and that we shall not put anything on about sulphate of lime.

Mr. R. HAMPSON (London): I fully agree with what has been said about calling things by their own names. A reference has been made to the Pharmacopœia that it will be taken as the standard, and must be upheld and obeyed by chemists. Now, I hope in the future, when a time comes for another Pharmacopœia, we shall have some voice in the making of it. It is not a pressing subject now, but I feel sure it will be our interest, as well as simply just, that we should have a voice in the making of that Pharmacopœia, that we shall stand in the same position in England as upon the continent, and that the work shall be that of the pharmacists as well as of medical men. Another thought strikes me in reference to the Adulteration Act, and that is, that we have analysts appointed with very imperfect credentials. We have gentlemen no doubt very worthy, but not having the requisite skill and knowledge for their position; and it does seem exceedingly hard that examined men—chemists—should be tackled by incompetent men, and should have their reputations damaged by them. A case may come forward of adulteration, or presumed adulteration, of some article sold by a chemist, and the chemist may not have the resolution and the pluck to face it out, but may think it the best policy to abide by the analyst's statement. But what I most desire is, that in future we should bear in mind that the analyst should be a qualified analyst—an unadulterated analyst in fact—and that we should have men thoroughly qualified to undertake the responsible duties attaching to their post.

Mr. CHURCHILL (Birmingham): I think it would be well to bear in mind that our Birmingham milk of sulphur case was not directed against a chemist and druggist. The reader of the paper on the Adulteration Act suggested that in the event of such a case being brought against a chemist and druggist the defence should be undertaken by the Pharmaceutical Society. That idea has been held by many chemists, and I may state that I myself wrote to the Secretary of the Pharmaceutical Society suggesting such a view, but I received a reply that the Society was not a trade union. That seemed to point very clearly to the necessity for the formation of such an association as is now proposed.

Mr. G. ELLINOR (Sheffield): I have looked into the Pharmacopœias, especially the one of 1721, when lac sulphuris was officially named and the process given. We next find that the name was changed from lac sulphuris to sulphur præcipitatum. The present process was not adopted till 1809, therefore the name milk of sulphur applies to the present Pharmacopœia article sulphur præcipitatum. The name applies, because the name was changed before the process. I think, if you take the London Pharmacopœias as they are in the London Society's Library, and examine them, you will find there is no ground whereby you can stand with the adulterated milk of sulphur. I believe that is the only official regulation we can have, and that convictions can be obtained and will be obtained if contaminated milk of sulphur is sold either as milk of sulphur or sulphur præcipitatum. We cannot get away from the Pharmacopœias; they are the legal standards.

MR. ANDREWS (Bayswater): I am going to suggest a manner in which you may give the public what they ask for, for undoubtedly there is a demand for this adulterated —as it is termed—article. I would simply suggest that you should have a label "Milk of Sulphur—not the Precipitated Sulphur of the Pharmacopœia." Do not say adulterated with anything. Then have another label, "Precipitated Sulphur, British Pharmacopœia—such a date." I think that by this means you will escape all difficulty.

MR. G. WARD (Sheffield): I should like first of all to demur to the term "adulterated milk of sulphur." I hold it is not adulterated. I should like also to say, that the solicitor engaged in our case at Leeds, advised a label exactly such as has been recommended by the last speaker—of "Milk of Sulphur, not the Precipitated Sulphur of the British Pharmacopœia." Such a label is becoming somewhat common in our neighbourhood. There have been a great many instances in which this pure precipitated sulphur has been sold as milk of sulphur and has been returned as not being the article desired by the purchaser. A good deal of force undoubtedly rests in the remarks about the names in the Pharmacopœia but, I think, there is also some force in the custom of the trade. If I have been accustomed to buy for twenty years an article which I have known by a certain name, and which most people know by a certain name, I hold that if I go and ask for the article by the same name, the seller has a right to supply me with the article I want. That is simply what has taken place in this milk of sulphur case. Precipitated sulphur certainly is not milk of sulphur, and milk of sulphur certainly is not precipitated sulphur, according to the present Pharmacopœia, and I think the case would be established if it were taken up. I trust that it will be one of the objects of this Trade Defence Association. I am sorry to see that in some cases the advocacy of the contrary view was sought to be strengthened by the imputation of impure motives.

Mr. ELLINOR: I hope my remarks did not lead to the conclusion that I thought milk of sulphur was an adulterated article. It is a different article, and I think if the distinction is observed on our labels we shall avoid future difficulties.

Mr. WALKER (Longton): Allow me to say that some people have a very strong opinion about this milk of sulphur. On two occasions, within twenty years, I have been persuaded by friends, against my own opinion, to give up selling milk of sulphur and to sell only sulphur præcipitatum, but with very unsatisfactory results. I may say that on scores of occasions people have brought it back and have complained bitterly of being supplied with an article they did not want. It was not what they wanted; and this has been the case with other chemists who have sold pure precipitated sulphur. Where people ask for milk of sulphur they want a different article altogether, and I think all will agree they ought to be satisfied with what is known as milk of sulphur. If they ask for precipitated sulphur, let them have it; but if you supply it to them under the name of milk of sulphur they are dissatisfied, and they have not got what they want. I may mention that in my own neighbourhood certain chemists were summoned for selling milk of sulphur when precipitated sulphur was asked for. Eight or nine such cases occurred, and the defence in the case upon which the whole were decided was that they were synonmyous terms, and that when asked for precipitated sulphur we were quite justified in supplying milk of sulphur, because they were the same thing. The magistrate at once decided against that. He decided that the terms were not synonymous, that the two articles were entirely different, and that if when asked for precipitated sulphur the dealers supplied an article in which sulphate of lime was an ingredient, they broke the law, and in each case a conviction followed.

Mr. THONGER (Birmingham): I am perfectly satisfied that if the opinion of the trade was canvassed as to whether it would be wise to turn our backs on what I have no fear to call a very nasty article—the old fashioned lac sulphuris,—we should find the great majority in favour of doing so. I was told before I went into business to look at it as a nasty thing and a useless thing, and I have never had the slightest difficulty in selling the sulphur præcipitatum. I would propose that the subject should be one of the first that should be taken up by the association, and that a good plan of going to work would be first to consult some high medical authority as to whether such a society would be wise in doing its best to remove the thing altogether from the trade. If there is any value in it as a medicine it is for the medical authority to say so. That I cannot answer. If it be proved that there is some advantage in it which sulphur præcipitatum does not possess, the sale of it need not be followed with any great difficulty, I am sure.

Mr. COUNCILLOR STEAD (Leeds): Like some other gentlemen, I, after the milk of sulphur case at Leeds, sold in three instances sulphur præcipitatum, and in each case it came back.

Mr. MASON (President of the Liverpool Chemists' Association): It appears to me that the locality in which milk of sulphur is sold would in great measure decide what is to be sold for it. I agree entirely with Mr. Thonger, and I agree perhaps with the public analysts and medical men in thinking that there is not any virtue in lac sulphuris, and that one of the good re-versely, putting an unknown weight or pressure on the pith, I can find its equivalent in grains by seeing how much torsion it is equal to. Thus, if $\frac{1}{100}$th of a grain requires 10,000 degrees of torsion, $\frac{1}{50}$th of a grain would require 20,000 degrees; and conversely, a weight which required 5000 degrees torsion would weigh $\frac{1}{200}$th of a grain. Once knowing the torsion equivalent of $\frac{1}{100}$th of a grain, the ratio of the known to the unknown weights is given by the degrees of torsion.

Having thus explained the working of the torsion balance I will proceed to the actual experiment. On the central mirror I throw a ray from the electric light, and the beam reflected on a particular spot of the ceiling will represent zero. The graduated circle, J, of the instrument also stands at zero, and the counter which I fasten on at the end, L, stands at O. The position of the spot of light reflected from the little concave mirror being noted, the torsion balance enables me to estimate the pressure or weight of a beam of light to a surprising degree of exactness. I lift up my little iron weight by means of a magnet (for working in a vacuum I am restricted in the means of manipulating), and drop it in the centre of the pith; it knocks the scale-pan down, as if I had placed a pound weight upon an ordinary balance, and the index-ray of light has flown far from the zero-point on the ceiling. I now put torsion on the fibre to bring the beam again into equilibrium. The index-ray is moving slowly back again. At last it is at zero, and on looking at the circle and counter I see that I have had to make 27 complete revolutions and 301 degrees, or $27 \times 360° + 301° = 10{,}021°$, before the force of torsion would balance the $\frac{1}{100}$th of a grain.

I now remove the weight from the pith-pan of my balance, and liberate the glass thread from torsion by twisting it back again. Now the spot of light on the ceiling is at zero, and the counter and index are again at O.

Having thus obtained the value of the $\frac{1}{100}$th of a grain in torsion degrees, I will get the same for the radiation from a candle. I place a lighted candle exactly six inches from the blackened surface, and on removing the screen the pith scale-pan falls down, and the index-ray again flies across the ceiling. I now turn the torsion handle, and in much less time than in the former case the ray is brought back to zero. On looking at the counter I find it registers four revolutions, and the index points to 188 degrees, making altogether $360° \times 4 + 188 = 1628°$, through which the torsion fibre has to be twisted to balance the light of the candle.

It is an easy calculation to convert this into parts of a grain weight; 10,021 torsion degrees representing 0·01 grain, 1628 torsion degrees represent 0·001624 grain.

$$10{,}021° : 0·01 \text{ grain} :: 1628° : 0·001624 \text{ grain}.$$

The radiation of a candle six inches off, therefore, weighs or presses the two square inches of blackened pith with a weight of 0·001624 grain. In my own laboratory, working with this torsion balance, I found that a candle six inches off gave a pressure of 0·001772 grain. The difference is only 0·000148 grain, and is fairly within the allowable limits of a discourse experiment. But this balance is capable of weighing to far greater accuracy than that. You have seen that a torsion of 10,021° balanced the hundredth of a grain. If I give the fibre one degree more twist the weight is over-balanced, as shown by the movement of the index-ray on the ceiling. Now one degree of torsion is about the $\frac{1}{10000}$th part of the whole torsion required by the $\frac{1}{100}$th grain. It represents therefore the $\frac{1}{10000}$th part of the $\frac{1}{100}$th, or the millionth part of a grain.

Divide a grain weight into a million parts, place one of them on the pan of the balance, and the beam will be instantly depressed.

Weighed in this balance the mechanical force of a candle twelve inches off was found to be 0·000444 grain; of a candle six inches off, 0·001772 grain. At half the distance the weight of radiation should be four times, or 0·001776 grain; the difference between theory and experiment being only four millionths of a grain is a sufficient proof that the indications of this instrument, like those of the apparatus previously described, follow the law of inverse squares. An examination of the differences between the separate observations and the mean shows that my estimate of the sensitiveness of this balance is not excessive, and that in practice it will safely indicate the millionth of a grain.

I have only had one opportunity of getting an observation of the weight of sunlight: it was taken on December 13th, but the sun was so obscured by thin clouds and haze that it was only equal to 10·2 candles six inches off. Calculating from this datum, it is seen that the pressure of sunshine is 2·3 tons per square mile.

But, however fair an equivalent ten candles may be for a London sun in December, a midsummer sun in a cloudless sky has a very different value. Authorities differ as to its exact equivalent, but I under-estimate it at one thousand candles twelve inches off.

Let us see what pressure this will give:—A candle twelve inches off, acting on two square inches of surface, was found equal to 0·000444 grain; the sun, equalling 1000 candles, therefore gives a pressure of 0·444000 grain; that is, equal to about 32 grains per square foot, to 2 cwt. per acre, 57 tons per square mile, or nearly three thousand million tons on the exposed surface of the globe—sufficient to knock the earth out of its orbit if it came upon it suddenly.

It may be said that a force like this must alter our ordinary ideas of gravitation; but it must be remembered that we only know the force of gravity as between bodies such as they actually exist, and we do not know what this force would be if the temperatures of the gravitating masses were to undergo a change. If the sun is gradually cooling, possibly its attractive force is increasing, but the rate will be so slow that it will probably not be detected by our present means of research.

Whilst showing this experiment I wish to have it distinctly understood that I do not attach the least importance to the actual numerical results. I simply wish to show you the marvellous sensitiveness of the apparatus with which I am accustomed to work. I may, indeed, say that I know these rough estimates to be incorrect. It must be remembered that our earth is not a lamp-blacked body enclosed in a glass case, nor is its shape such as to give the maximum of surface with the minimum of weight. The solar forces which perpetually pour on it are not simply absorbed and degraded into radiant heat, but are transformed into the various forms of motion we see around us, and into the countless forms of vegetable, animal, and human activity. The earth, it is true, is poised in vacuous space, but it is surrounded by a cushion of air; and, knowing how strongly a little air stops the movement of repulsion, it is easy to conceive that the sun's radiation through this atmospheric layer may not produce any important amount of repulsion. It is true the upper surface of our atmosphere must present a very cold front, and this might suffer repulsion by the sun; but I have said enough to show how utterly in the dark we are as to the cosmical bearings of this action of radiation, and further speculation would be but waste of time.

It may be of interest to compare these experimental results with a calculation made in 1873, before any knowledge of these facts had been made public.

Professor Clerk Maxwell, in his 'Electricity and Magnetism,' vol. ii. p. 391, writes as follows:—"The mean energy in one cubic foot of sunlight is about 0·0000000882 of a foot-pound, and the mean pressure on a square foot is 0·0000000882 of pound weight. A flat body exposed to sunlight would experience this pressure on its illuminated side only, and would therefore be repelled from the side on which the light falls."

Calculated out, this gives the pressure of sunlight equal to about $2\frac{1}{2}$ lb. per square mile. Between the $2\frac{1}{2}$ lb. deduced from calculation and the 57 tons obtained from experiment the difference is great; but not greater than is often the case between theory and experiment.

In conclusion. I beg to call especial attention to one not unimportant lesson which may be gathered from this discovery. It will be at once seen that the whole springs from the investigation of an anomaly. Such a result is by no means singular. Anomalies may be regarded as the finger-posts along the high road of research, pointing to the bye-ways which lead to further discoveries. As scientific men are well aware, our way of accounting for any given phenomenon is not always perfect. Some point is perhaps taken for granted, some peculiar circumstance is overlooked. Or else our explanation agrees with the facts not perfectly, but merely in an approximate manner, leaving a something still to be accounted for. Now these residual phenomena, these very anomalies, may become the guides to new and important revelations.

In the course of my research anomalies have sprung up in every direction. I have felt like a traveller navigating some mighty river in an unexplored continent. I have seen to the right and the left other channels opening out, all claiming investigation, and promising rich rewards of discovery for the explorer who shall trace them to their source. Time has not allowed me to undertake the whole of a task so vast and so manifold. I have felt compelled to follow out, as far as lay in my power, my original idea, passing over reluctantly the collateral questions springing up on either hand. To these I must now invite the attention of my fellow-workers in science. There is ample room for many inquirers.

Nor must we forget that the more rigidly we scrutinize our received theories, our routine explanations and interpretations of nature, and the more frankly we admit their shortcomings, the greater will be our ultimate reward. In the practical world, fortunes have been realized from the careful examination of what has been ignorantly thrown aside as refuse; no less, in the sphere of science, are reputations to be made by the patient investigation of anomalies.

Parliamentary and Law Proceedings.

Chemists' Shops and late Refreshments.

Emil Guenin and Louis Hermann were on Thursday summoned before Mr. Vaughan, at the Bow Street Police Court for keeping a refreshment-house without a licence.

Mr. Pitt, who prosecuted on behalf of the Excise, said that the defendants were conducting a chemist's shop, at No. 7, Tichborne Street, at the top of the Haymarket. The police had complained that this shop was kept open till a very late hour at night, for the sale of drinks, known under the name of American ice cream sodas; that women of bad repute frequented this place, and that disturbances had ensued. The Excise officers had, of course, no suspicion that a chemist's shop would be used as a refreshment-house; but upon these complaints they made the inquiries which resulted in this charge.

Mr. Pitt then called two Excise officers, who proved that on the 20th of December, between twelve and one at night, they had been served with these American drinks, for which they payed 6*d.* each.

For the defence, it was not denied that the drinks were sold, but they stated this was a *bonâ fide* chemist's business. If the drinks were not sold the shop would be kept open as now until two o'clock for the sale of drugs.

Mr. Vaughan, in giving judgment, said that although the shop was a chemist's shop, still, undoubtedly, it was kept open at least two or three hours every night for the purpose of supplying all comers with these American drinks. And the evidence went to prove that these comers were very numerous. Mr. Vaughan then went on to read part of Lord Justice Mellish's judgment in the case of Howes. In conclusion, he said that by that judgment he was bound to convict the defendants.

In mitigation of the full penalty of £20, Mr. Reid, for the defendants, urged that the judgment in the case of Howes was very recent, and had not yet been published, so that the defendants had not had the means of making themselves acquainted with it.

Mr. Vaughan mitigated the penalty to one-fourth—namely, £5 and costs.—*Standard.*

[*** If reference had been made to the Register of Chemists and Druggists for 1876, a copy of which has, we presume, been supplied by the Home Office for the use of the Bow Street Police Court, it would have been found that no persons bearing the names of the defendants have a right to represent themselves as being chemists and druggists.—Ed. Pharm. Journ.]

Poisoning by Carbolic Acid.

On Wednesday, June 28, an inquest was held at St. Thomas's Hospital, before Mr. Hull, in view of the body of Francis Fraser Morris, 21.

Mrs. Julia Sophia Morris said she last saw her son alive in her own house at Walworth, on Sunday evening. He came suddenly into the drawing-room looking very strange and ill. Being asked what was the matter, he said, "I have taken carbolic acid, I shall die." He did not say why he had taken the acid. She persuaded him to take some hot mustard and water, but he got rapidly worse, vomited blood, and became too ill to speak. Mr. Martin, a neighbour, summoned Dr. Simmon, the family physician, under whose advice the deceased was sent to St. Thomas's Hospital, where he died shortly afterwards.

The Rev. Eli Morris was then called, and in answer to the Coroner, said his son had for years past been subject to fits of depression. He had discharged himself from his last situation six weeks ago, but had not told any one of it, and had gone out at his usual time every morning, returned every night as usual. Carbolic acid was never used in the house.

The house surgeon having given evidence as to the effects of the poison upon the deceased, the jury returned a verdict of "Suicide while of unsound mind."—*Times.*

Poisoning by a Liniment.

A case of accidental poisoning has occurred at Heywood, near Manchester, by which an extensive ironmonger, named Robert Porter, aged 40 years, has lost his life. Deceased had been suffering from an acute attack of rheumatism. Dr. Jameson visited him, and told him he would prepare him a liniment for external application, and the deceased must send to his surgery for it. Deceased has also been taking medicine for his ailments, and it would appear that his wife was not notified of the doctor's intention to send a liniment. At half-past ten in the morning she sent to the doctor's as usual for the medicine. Her husband was then in bed, and engaged in conversation with a friend. He asked for his medicine. The wife got the bottle containing the liniment, which was labelled, "for external use only," and gave her husband a tablespoonful of the mixture, which contained belladonna. Before taking the medicine deceased remarked that it was very bad. In a few minutes afterwards deceased fell asleep. Having left the two men by themselves, about half-past eleven Mrs. Porter went to look at deceased, and noticed that he breathed heavily. She immediately went to the doctor's house, and said that her husband had been worse since he had taken the medicine. The doctor, taken aback, replied, "The bottle which I gave your boy was for external use only." Medical aid was procured as soon as possible, but deceased expired at a quarter to one o'clock.—*Manchester Courier.*

SALE OF ADULTERATED STARCH.

At the Wandsworth Police Court, on Friday, June 30, Mr. John Bain, of the Balham Co-operative Stores, appeared to answer an adjourned summons for selling to the prejudice of Mr. Samuel Smith, the inspector appointed by the Wandsworth Board of Works, a quantity of arrowroot adulterated with tapioca. In this case the analysis of the Board's analyst was disputed, and the summons was adjourned to allow of another analysis to be made in the laboratory at Somerset House.

Mr. Corsellis, clerk of the Wandsworth Board of Works, said the certificate which he produced stated that the sample was adulterated to the extent of 50 per cent. The certificate sent from Somerset House stated that it was adulterated not less than 25 per cent. He had other certificates stating that the arrowroot was adulterated.

The defendant offered no defence. He wished to absolve the stores from all blame. He sold the article under a guarantee, and it was bought under a guarantee.

Mr. Ingham said he had no doubt the defendant believed he had got a genuine article. He fined him 5s. and 23s. costs, which he could recover from the person who supplied him with it.—*Times.*

CHARGE OF SELLING ADULTERATED WHISKY.

William Brown, spirit merchant, was charged in the Greenock Sheriff Court, on June 30, with having sold a bottle of whisky which was not of the nature, substance, or quality demanded by the purchaser.

The inspector under the Sale of Food and Drugs Act, deposed that he had received complaints regarding the quality of whisky sold in the town. Captain Grant, of H.M.S. Aurora, complained of the whisky sold to the sailors and marines of that vessel; and certain whisky taken on board was sent for analysis. It was found to be bad whisky, but as the purchaser had not intimated, when he bought the whisky, that he intended to have it analysed, a prosecution could not be instituted. In consequence of that, he took samples from shops in the habit of supplying the men of the Aurora. The shop of the defendant was one of these. The case was before the court some time ago, when it was continued for a report of analysis at Somerset House. The report from Somerset House, now read, confirmed the analysis of Mr. M'Cowan, the local analyst, and stated that the sample of whisky had been adulterated with 427 grains of hydrated sulphuric acid in the imperial gallon.

The defendant stated that he never had vitriol in his shop. Never had anything called sulphuric acid. Was well aware that neither of these was put into the whisky that was in his shop. When a cask of whisky was broached witness was in the habit of tasting it. Never observed anything peculiar about the whisky in question.

The Sheriff, in giving judgment, remarked that the defendant was not charged with having adulterated the whisky, but he was charged with having sold it in an adulterated state, and there was little doubt that the prosecution had succeeded in proving that he had done what he was charged with. He considered it a case of gross carelessness, and would pass sentence of £5 with £5 expenses.—*Greenock Telegraph.*

Notes and Queries.

[514]. GREEN OILS.—Will any reader oblige me with a formula for Lockhart's Green Oils? It is much used amongst cattle. Have tried the old white oils with subacetate of copper, but the result is not satisfactory.—F. G. HOLMES.

[515]. CISTERNS FOR STORING TURPENTINE.—Mr. JOHN PORTER would be glad to receive information as to the best material for the construction of cisterns for the storing of spirit of turpentine without its becoming coloured.

[516]. BRONZE LIQUID.—W. H. L. will be glad of a recipe for making "Bronze Liquid." It contains acid. sulph., acid. mur., etc., and is used for immersing brass goods in, after which they are blackleaded and then lacquered.

[517]. GOLD LABELLING.—"OMEGA" will be obliged if any one can give him the *modus operandi* of Gold Labelling, also the best means of affixing Gold Paper Labels.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

SUGGESTIONS.

Sir,—I wish to suggest a new measuring glass which, I think, would be of service to chemists,—that is, a tubular glass, graduated on the same principle as Mohr's burette, and holding, say 20 c.c., with lip and bottom like an ordinary measuring glass, for use when the burette is engaged with standard solution. Also, if some of our makers of evaporating dishes would adopt the plan of graduating them as well, I think they would meet with demand.

E. H. COLE.

Lichfield, July 1, 1876.

METHYLATED SPIRIT.

Sir,—In reading the letters published by you on the above subject, it seems to me that druggists, as a rule, are not aware that the licence for methylated spirit is only 10s. 6d. per annum, by taking which they, of course, can protect themselves from prosecution on account of badly made "finish," and also give greater satisfaction to the public. Besides this, by once getting fined they sink as much money at five per cent. interest as will bring in the amount of the annual licence.

RICHARD STURTON.

Cambridge, July 3, 1876.

[*** We have reason to believe that the case is as you suspect, but are at a loss to understand how it can be so, since the necessity for a licence is stated in the appendix to the Calendar of the Pharmaceutical Society, and the sum to be paid annually for such license is specified.—ED. PHARM. JOURN.]

"*Umbel.*"—(1) *Poa compressa;* (2) *Brachypodium sylvaticum;* (3) *Triticum junceum;* (4) *Carum Carvi;* (5) *Lepturus filiformis;* (6) *Alopecurus pratensis.*

J. E. Sawyer.—*Specularia hybrida.*

J. Boyd.—We are unable to furnish any information further than what is contained in the advertisement.

"*A Country Chemist.*"—To obtain a "legal view" of the cases you are recommended to consult your solicitor.

"*Chemicus.*"—If the medicine were dispensed according to the prescription the charge should be about 5s.

"*Syrupus, P.B.*"—Try the formula given in last week's Journal, p. 20.

L. Thompson.—A specimen of the plant could be obtained probably from Messrs. Veitch, of King's Road, Chelsea.

S. F. Nottingham.—See a formula in the Journal for Jan. 22 last, p. 598.

H. W. B. Baker.—If you are a "Student of the Society" you ought to receive the Journal regularly as published without further payment than your annual subscription. We do not see your name in the list of Registered Apprentices and Students of the Society in the Society's Calendar.

COMMUNICATIONS, LETTERS, ETC., have been received from Mr. Saunders (Montreal), Dr. Morel (Ghent), Mr. Wilkinson (Manchester), Mr. Corner (Paris), Mr. Fairlie (Glasgow), Veritas, A. W. P., G. O. S.

THE DIFFERENT SYRUPS OF THE PHOSPHATES IN GENERAL USE.

BY ERNEST C. SAUNDERS.

The difference in the quality and strength of different samples of the preparation known as Parrish's chemical food, as found in the market at the present time, has been the subject of considerable discussion during the past few months, but as, with the exception of Mr. W. L. Howie in his useful and practical paper, all seem to have devoted their energies more to finding out faults in ordinary samples of the preparation than to remedying them, I venture to submit the following remarks on this article, and the somewhat similar one of Easton's syrup, which is also difficult to make and to keep in good condition. I begin with Parrish's syrup as perhaps the most difficult to make according to the ordinary formula.

The chief reason for the difference met with in the various makes of this preparation is to be found in the fact that the principal published formula, that in Parrish's 'Pharmacy,' is an utterly unpractical one. It is well known that glacial phosphoric acid uncontaminated with phosphate of soda is hardly to be found in the market at present; but even if it were, it is next to impossible to obtain a good preparation with it, as it is a monobasic acid, while the direction to add "quantum sufficit" of hydrochloric acid is exceedingly vague. But apart from this, it is evident that the formula cannot be strictly followed, as if the quantity of ferrous phosphate directed to be present in each fluid drachm of the completed syrup is attended to, 32 troy ounces of sugar will have to be made into 36 fluid ounces of syrup—a manifest impossibility; while if the quantity given as the amount of solution to be formed for the sugar to be dissolved in is adhered to, the result will be about 46 fluid ounces of syrup, which will not contain the requisite amount per drachm of iron and lime. All the formulæ at present in use seem merely modifications of that given by Parrish. In the following form the author has only followed Parrish as far as the result to be obtained is concerned, viz.—that the finished syrup shall contain in each fluid drachm 1 grain ferrous phosphate $Fe_3P_2O_8$, $2\frac{1}{2}$ grains calcic phosphate $Ca_3P_2O_8$, and traces of sodic and potassic phosphates, with free phosphoric acid.

Take of—

Iron Wire, clean, No. 20 . . .	240 grains.
Syrupy Phosphoric Acid (Spec. Grav. 1·75)	3 oz. by weight.
Water, Distilled	4 fluid ounces.

Mix the acid and water, and dissolve the wire in the mixture in a flask, loosely stopped with tow; the hydrogen evolved then protects the solution from oxidation. When all action has ceased, heat to boiling point, and filter through paper in a funnel with a long neck reaching to the bottom of a beaker containing a little syrup, which floating on the iron solution will effectually prevent any oxidation.

Slaked Lime, Fresh	923 grains.
Phosphoric Acid (Spec. Grav. 1·75)	$9\frac{1}{2}$ oz. by weight.
Water, Distilled	14 fluid ounces.

Mix the acid and water, and dissolve the lime in the mixture. Filter the solution.

Crystallized Sodic Carbonate .	54 grains.
Potassic Carbonate	72 grains.
Phosphoric Acid (Spec. Grav. 1·75)	½ oz. by weight.
Distilled Water	1 fluid ounce.

Dissolve and filter. Then mix all the solutions, and having added distilled water to make the solution measure 28 fluid ounces, dissolve in it with heat, sugar, $3\frac{1}{4}$; powdered cochineal, 85 grains; and strain while hot. When cold add orange flower water, 2 fluid ounces, and sufficient distilled water to make the whole measure 64 fluid ounces. The product is a nice clear syrup, entirely free from sulphate of soda, or ammonic chloride, both of which are by no means uncommon impurities, from the difficulty of washing the precipitates, when the syrup is made in the old way, while the whole process will be found very much less troublesome and tedious. Calcic hydrate is generally sufficiently pure as commonly obtained, though where the chemist has the facilities for doing it, it is best for him to make the lime himself, by igniting precipitated chalk in a crucible at a full red heat for an hour.

I may remark here, though it does not exactly bear on the subject, that the last edition (1872) of Pereira's 'Materia Medica' contains the astonishing information, on page 213, that "Hypophosphite of lime is an important constituent in Parrish's chemical food;" a statement that is liable to mislead physicians in a serious manner.

Easton's syrup, is another preparation that is frequently badly made, and very often deficient in iron. The precipitate so frequently met with, in the form of phosphate of quinine, is, I think, always owing to the use of an acid containing metaphosphoric acid. I have never been troubled with a precipitate since I have taken pains to use only orthophosphoric acid, H_3PO_4. The change in colour is due to exposure to the air, chiefly from oxidation of the iron salt, but partly to the quinine changing colour. It may be entirely avoided, as has been often remarked, by completely filling the bottles in which the syrup is kept, and corking so as to have as little air left in the bottle as possible.

No trouble will be found in making a satisfactory preparation if the following form be strictly followed, and care taken to avoid exposure to the air of the iron solution.

Take of—

Iron Wire (No. 20)	240 grains.
Phosphoric Acid (Spec. Grav. 1·75)	3 oz. by weight.
Water	4 fluid ounces.

Dissolve with the precautions directed above in the formula for Parrish's syrup.

Quinine Sulph	625 grains.
Liq. Ammon.	
Distilled Water,	
Dilute Sulphuric Acid . . .	āā q. s.

Precipitate the quinine, secundum artem, and wash on a filter with a pint of very cold distilled water, press strongly, and dissolve in half an ounce by weight of phosphoric acid, diluted with an ounce of water in which 16 grains of strychnine have been dissolved. Mix with the solution of iron, add enough distilled water to make the whole measure 10 fluid ounces, and mix thoroughly with 54 fluid ounces of simple syrup. The resulting syrup will contain in each fluid drachm 1 grain ferrous phosphate $Fe_3P_2O_8$; 1 grain quinic phosphate $(C_{20}H_{24}N_2O_2)_3 2H_3PO_4$, and $\frac{1}{32}$ grain of strychnine.

These two syrups afford good examples of two classes of syrups that present considerable difficulties in manipulation with the formulæ in general use, which, I think, are quite removed in the two just submitted. Both have now been tested on a large scale, for some time, and found very satisfactory in their products. No originality is claimed in the use of metallic iron in place of precipitated ferrous phosphate; it was, I believe, first suggested by Mr. H. W. Jones, in the columns of the *Pharmaceutical Journal*. The chief point that I would press is the importance of using tribasic (ortho) phosphoric acid, H_3PO_4; both metaphosphoric acid HPO_3, and pyrophosphoric acid $H_4P_2O_7$, if present in the acid to even a small extent, are certain to cause trouble. The precaution given as to filtering the solution of ferrous phosphate will be found useful in many other cases; a beaker full of solution of ferrous iodide filtered in a similar manner, with a layer of syrup the eighth of an inch thick floating on the surface, can be left exposed for twenty-four hours without injury to the solution. It is, of course necessary that the solution should have the greatest specific gravity.

COLOURLESS TINCTURE OF IODINE.

BY WM. H. DARLING, F.C.S.

This preparation has from time to time attracted the attention of pharmacists, and various formulæ have been offered for its preparation, which differ widely as to the results they give.

Curtmann* made a series of experiments to determine the quantity of ammonia necessary to decolorize a fixed quantity of iodine with varying quantities of alcohol, and from these experiments he proposes the following formula:—

Iodine	10 drams.
Rectified Spirit	13 fluid ounces.
Strong Solution of Ammonia	3 „

He states the result of the reaction in such a mixture to be ammonium iodide and iodate, ethyl iodide, and iodide of an ethyl substituted ammonia.

Macmillan† objects to the use of ammonia because iodide of nitrogen or some iodine substituted ammonia is formed, which he appears to think simply dissolves as a whole, and therefore the greater portion of the iodine is rendered inactive. To avoid this he proposes the replacement of the ammonia by fixed alkalies.

In the supposition that the brown precipitate dissolves as a whole he is mistaken, for it is decomposed with effervescence, more rapidly in direct sunlight, shortly after its formation.

Hager,‡ referring to the experiments of Curtmann, proposes a modification of his formula by which a colourless solution may be obtained in a short time. The decolorizing agent he uses is sodium hyposulphite. The iodine, sodium hyposulphite, and water are gently heated until colourless, when ammonia and alcohol are added. A solution so prepared, he says, contains iodide of triethyl ammonium, which decomposes in course of time into triethylamine and ethyl iodide, with sodium iodide. There is no mention of iodate, which Curtmann states is present.

By neither Curtmann nor Hager is iodoform mentioned as a constituent of a solution of decolorized iodine. Indeed, Hager's formula does not admit of its formation.

Some time ago, when preparing a quantity of the colourless tincture of iodine, and before all the alcohol was added, a few spangles or crystals were observed in the almost colourless solution. As these had not been previously noticed, curiosity was excited as to the cause and what they were. When collected upon a filter, washed with distilled water, and allowed to dry, their colour was pale yellow and their odour recalled that of iodoform.

The quantity being too small (under half-a-gram) to admit of two combustions, one for the carbon and hydrogen, and a second for the iodine, the latter alone was made by burning a known weight in a tube filled with pure lime. The iodine being precipitated by silver, the following numbers were obtained:—

Weight of substance used—0·3946 grms.
Weight of AgI obtained—0·5990 = 0·32371 of I.
„ Ag 0·0482 = 0·05668 of I.

0·38039

$$\frac{0{\cdot}38039 \times 100}{0{\cdot}3946} = 96{\cdot}39 \text{ per cent. of iodine.}$$

The molecular weight of iodoform CHI_3 is 394.

$$\frac{3 \times 127 \times 100}{394} = 96{\cdot}70 \text{ per cent. of iodine.}$$

The physical character of the substance, its odour, and finally the close agreement, a difference of 0·31 per cent. between the calculated percentage of iodine in iodoform and that found, leave little doubt that the substance in question was iodoform.

If the reaction of ammonia with iodine in the presence of alcohol, omitting the formation of iodide of nitrogen from consideration, be viewed as analogous to that of fixed alkalies, the formation of iodoform is to be expected, and if this view be correct there should be little, if any, iodate present. Its formation must be preceded by that of ammonium hypoiodite, which would react with the alcohol, of which there is an excess, producing iodoform in the same manner as calcium hypochlorite reacts with the same alcohol forming chloroform. The formation of such a compound as ammonium hypoiodite is not a matter of conjecture, for Schönbein* states that it is formed when iodine acts upon an excess of ammonia.

The efficacy of the decolorized iodine must be attributed for the most part to the iodoform it contains. This iodated compound is an almost colourless substance, which contains more than nine tenths of its weight of iodine, but how far a solution of it alone will replace the ordinary decolorized iodine must remain to be ascertained.

* 'Year-Book,' 1870, p. 22.
† *Pharm. Journ.*, 3rd series, vol. i., p. 987.
‡ 'Year-Book,' 1873, p. 326.

* Watt's 'Dictionary,' vol. iii., p. 297.

The Pharmaceutical Journal.

SATURDAY, JULY 15, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE TRADE CONFERENCE AT BIRMINGHAM.

THE Conference at Birmingham has been in every respect as successful as could be expected. The programme which appeared in our advertisement columns last week comprised a number of subjects which have a special interest for the trade, and the consideration of those subjects in the shape of papers had been undertaken by men whose ability was sufficiently well known to add an additional attraction to the opportunity of discussing them under such circumstances. The announcement that Mr. REYNOLDS was to occupy the position of Chairman of the Conference also furnished assurance that the proceedings would be conducted with strict regard to order and practical requirements. Punctually at the hour fixed for the commencement of the proceedings the spacious lecture hall in Needless Alley began to fill, and before midday arrived the meeting numbered one hundred and forty persons.

Altogether there were nine papers to be read and eight subjects to be discussed, besides the introductory remarks of the Chairman and the statement by Mr. WILLIAM SOUTHALL as to the origin of the Conference and its relations to the Pharmaceutical Society. These papers are published in full in our report, and the discussion of them was so skilfully managed that the whole proceedings of the Conference were concluded within ten minutes after the time that had been fixed.

As the establishment of an ample fund for defraying ordinary expenses of management as well as extraordinary outlay in carrying on special work is one of the points most essential for the existence of such an association, this formed an important feature of the proceedings, and a sum of between £200 and £300 was subscribed, partly by those present, and partly by others who were unable to attend, the amounts ranging from a few shillings up to ten guineas. In addition to this it was decided that the annual subscription of members should be fixed at the small sum of five shillings a year, in order to offer the utmost facility for becoming a member; and to prevent inequality among the members any support given to the Association beyond this annual subscription is to be given in the form of donations, and Mr. HOLDSWORTH, who acted in the capacity of Honorary Secretary of the Conference, will receive donations to the Fund, as well as subscriptions, and will enrol members until the appointment of Secretary to the Association has been filled up.

This adoption of an extremely moderate annual subscription is we think a wise step, for it will remove any possible grounds for not joining the Association, and as we have already remarked in speaking of this project, it is essential that the Association should have the active support of the great mass of the trade. Without this it will be impossible to take any such action in regard to matters affecting trade interests as would command the approval and satisfaction of the trade at large.

The number of members already enrolled amounts to about 400, and though this may not be unsatisfactory as a commencement it is at the utmost only one twentieth of the actual numerical strength that such an association should have in order to be able to do the work contemplated. The development of the nucleus that has thus been formed, to an association which shall be capable of representing the trade and protecting its interests, because it has the general support of those engaged in the business, will be an arduous task, and it will require the most strenuous efforts of those already enrolled to bring their brethren into active co-operation with them.

We dwell upon this point not with any motive of discouraging the enterprise that has been put in motion by the Birmingham Conference, but solely because we are deeply convinced of the indispensable need for a foundation co-extensive with the trade itself in order to ensure the power of defence and guardianship which it is desired the Association shall possess and exercise. If this power should eventually be acquired, and the entire body of chemists and druggists united in the effort, as well as the desire to promote their common welfare and protect their mutual interest, another important step will have been taken in the advancement of pharmacy, and chemists and druggists will be indebted to Messrs. SOUTHALL BROS. and BARCLAY for having instigated the realization of that object of the founders of the Pharmaceutical Society which concerns the material well being of the trade in like manner as they are indebted to JACOB BELL for the services he rendered in the formation of the Society, and to the founders of the Pharmaceutical Conference for having established a means of scientific cultivation and genial intercourse which has been productive of vast improvement, both intellectually and socially.

We fully agree with the opinion that it is doubtful whether the educational and examining body which governs the practice of Pharmacy ought to run the risk of rebuff and failure that a trade association will be sure to incur. But in the same way that the formation of the Pharmaceutical Conference has served to supplement the work of the Society and make it stronger than before it seems probable that a thoroughly well supported Association for dealing with purely trade objects may also be useful in itself and in promoting the general good of pharmacy.

TRADE CONFERENCE AT BIRMINGHAM.

On Tuesday last, the 11th inst., a Trade Conference of Chemists and Druggists was held at Birmingham, in the Hall of the Young Men's Christian Association, Needless Alley, New Street. The proceedings commenced at 10 A.M.

Mr. BARCLAY (Birmingham) said: On behalf of the Provisional Committee, I have much pleasure in proposing that our friend Mr. Reynolds, of Leeds, take the chair at this meeting. I am sure we shall all agree that he is the right man in the right place. He has been already the author of one successful conference—the Pharmaceutical Conference—and I am sure that his presence here to day will add very much to the prospect of success of this Conference. Mr. Reynolds's wide experience both in trade matters and also in scientific matters entitles him to our heartiest respect and confidence; and I am sure we shall all very readily agree with any decisions he may come to in guiding the business of the meeting.

Mr. HOLDSWORTH (Birmingham) seconded the motion and it was carried unanimously.

Mr. RICHARD REYNOLDS, F.C.S., then took the chair.

Mr. JONES (Leamington): I have great pleasure in proposing the next resolution, which is that Mr. Barclay be appointed Vice-Chairman, and that Mr. Holdsworth be appointed Secretary to the Conference.

Mr. RIMMINGTON (Bradford) seconded the resolution and it was carried.

The CHAIRMAN: On the programme of this day's business you will notice a paragraph on the subject of reporting. It is stated there that as soon as the Chairman is appointed the provisional committee will recommend that the proceedings be only reported so far as the Conference deems desirable. Now, gentlemen, in a meeting of this sort—a gathering of the trade for purposes which are strictly confined to that trade, it is essential and it is for the interests of the trade that we should retain such a power in our own hands. This is not a public meeting and therefore we cannot be asking anything unreasonable to retain such a power. I am quite sure it will be with your permission that the editors and representatives of the two trade journals, the *Pharmaceutical Journal* and the *Chemist and Druggist* are admitted to these proceedings. We know that we can rely upon the discretion of the conductors of those journals. We see here their representatives and I ask you to express your approval of their being permitted to attend.

The Chairman's suggestion was unanimously approved.

The CHAIRMAN then made the following opening remarks:—

I accept the appointment to act as your chairman today as a duty owed to the common cause in which we are interested, and I offer you my grateful thanks for the personal good-will you have shown me. I would that you had placed the trust in stronger hands, so that in surveying and mapping out the features of the new subject before us you might have had the experience of some one of our leaders, entitled to be termed *facile princeps* from a combination of veteran sagacity with intimate knowledge of the steps of past legislation affecting us. The circumstances under which we meet for a day only will impress upon us the value of time, and no speaker must waste its ever-falling golden sands. I shall endeavour to fulfil this obligation to brevity. Upon the origin of the Conference we shall immediately have the pleasure of hearing a statement by Mr. William Southall, one of the gentlemen to whose energetic determination we owe this gathering. I am aware that in some quarters the initial difficulty of the movement has been the manner in which it was suggested. I need not conceal the opinion that support has been withheld in certain directions because of this mode of initiatory procedure. But, from the moment of the organization of a Provisional Committee, and even more emphatically from the time of the assembly of this Conference, the movement has been an open one, conducted on the ordinary principles of English associations. The degree of success achieved in bringing together this meeting entitles the prime movers of the Conference to our heartiest thanks. The responsibility is now ours. Let us not separate without founding an association which shall bring to a focus the latent powers of chemists and druggists in defence of their legitimate interests. Your Provisional Committee has done well in reprinting the opinions of our trade journals on the subject. We are glad to have their cordial support so far, and recognize the great power which their conductors wield in promoting agreement of opinion amongst us upon any line of policy. You will have read the remarks of the editor of the *Chemist and Druggist* upon the various reasons alleged by those who see no necessity for either a Trade Conference or a Defence Association. This criticism upon the critics has more piquancy than any phrases in which I could hope to clothe similar ideas, and I trust it will be considered by those concerned. Objectors have told us to stay our hands because already two associations exist capable of doing the work, viz. the Pharmaceutical Society and the British Pharmaceutical Conference. Gentlemen, I ought to know something about both these institutions, and the first idea recalled from the depths of my memory is that the same objection, in the same words,—aye and by the same objectors in some cases,—was brought against us when we founded the British Pharmaceutical Conference. Many a moral might be drawn from the short life history of that Conference. Do you doubt the power of chemists for effective combination? Look at that Conference, and its successful results, including its highly profitable (in two senses) 'Year-Book of Pharmacy.' It has done for the trade throughout Britain what our local associations can do for our larger towns only, in making chemists know and respect each other, and work together for their common good. But for its influence, I will venture to say that to-day's meeting would never have been held. Let me finish the subject of the British Pharmaceutical Conference before dealing with its elder sister. Its constitution is not a very rigid one, and it may assume considerable variety in aspect, according to the wish of its members. I hold that it would be an absurd position, if, when a trade question united us in feeling, we should fail to exercise some opportunity of using our influence effectively. I remember the action of the Conference at its meeting at Norwich, when it memorialized the Board of Inland Revenue on some of the abuses existing in relation to methylated spirit. But, whilst commending to members of that association the policy of not allowing this right to be lost by abeyance, I am sure that it is not feasible that the British Pharmaceutical Conference should charge itself with the general duties of a trade association. Such functions would involve a dual staff of honorary officers, for what Presidents could it find who would be "always good alike," whether recounting the advances of pharmacy, or guiding defective movements of trade policy? and for what compensatory success would the Conference part with its senior Honorary Secretary, Professor Attfield? The Pharmaceutical Society stands on a very different footing. Mr. William Southall will undertake the consideration of this subject, and I have no wish to anticipate him. Let me say, however, that so far as the Charter and the various Acts of Parliament confer power on the Society, the policy of its Council should reflect the judgment of its members. Gentlemen, I believe firmly in the representative principle of government, more especially as the intelligence of the constituents is of the higher order. Until the Society forfeits the recognition of its reasonableness, any representations which it may make upon state policy in relation to pharmacy, will, if supported in an earnest manner, be likely to receive attention from the authorities. Therefore, in the prevention of new abuses, and perhaps in the reformation of some old ones, we must recognize the power of the Pharmaceutical Society as the most potent within our command. The onus of showing cause against the exercise of this power must usually rest with the objectors to its employment. The chance of our motives being misunderstood must count for little. A body of men who have complied with the educational requirements of the state so far as have the chemists and druggists, with a very slender compensation *per contra*, have the right to be heard on any case of injustice to their order. The conclusion which I draw from these opinions is that when we have fixed upon a line of trade policy, we must take care to send to Bloomsbury Square representatives who share them, and who can give them effect. I rejoice to see amongst us to day many of our present representatives, who most fully answer this description. In relation to the duties of the Pharmaceutical Society, I should be glad if some practical suggestions come before us upon the late conviction for the sale of milk of sulphur. This case must have great interest in this district, and a miscarriage of justice will have happened if legal technicalities should prevent its being carried to a higher court. In Leeds, we had the same question raised more than a a year since, and the judgment of our stipendiary, I am happy to say, was exactly the reverse of that just given at Birmingham. The infatuation of certain public analysts is almost beyond belief. *Quis Deus vult perdere, prius dementat* is suggested by the indiscretions of some of them. That they have supplied one important reason for this Conference is beyond doubt. The subject of patent medicines will be brought before us, and this is quite justified by the various changes that have taken place in this branch of business, during the past few years; changes not only in the cost of the patent medicine licence, but in the circumstances of their distribution by retailers. Many of us would be glad of more light upon the question and I think that the exchange of information will be at present a wiser course than any very dogmatic expression of opinions. As to the recent fashion amongst fashionable people and others to take part in keeping retail shops without becoming shopkeepers there must be many here who desire to relieve their minds. I am not of the class who will offer them Job's comfort and ask *cui bono?* Freedom of trade is all very well, and it may form a general basis of our arrangements of social economy, but any precious idea of co-operation that is incorporated in the scheme of the stores would be a very poor safeguard against monopolies, as compared with the fair and equal competition from which we do not shrink. That the Government, whether liberal or conservative, should blink the question of its paid servants combining to undersell the ratepayers, shows that we live in a very free country, but the question to come forward some time must be, How long will the ratepayers submit to this? The chest of tea bought *en bloc* by the post-office clerks, and divided by them, has some historic significance, even if less important than those earlier chests that found their end in Boston Harbour. The taxgatherers of some ancient nations were noted for rapacity and unscrupulousness, but they are not recorded to have had the audacity to give their name to shops or stores. Mr. Hampson will lay before us his views upon the legal action which may be possible in relation to the stores, and I will not anticipate them. In the provinces there are social influences which may check the extension, and probably terminate the existence of many such bodies. But a general consent to put these influences into operation is needed. For the position of the question in London, I will not presume to speak, but Sir Thomas Chambers' motion on Civil Service Trading would not have been cynically counted out of the House of Commons if both London and the country had first taken counsel. The programme now in your hands details the other papers to be read by gentlemen who have been good enough to undertake this duty. The outcome of our deliberations to-day ought to be a trade association, but I will ask you to look for a moment at some of the difficulties that will surround this. They will arise, firstly, in the different views which members may take as to its functions. As age creeps slowly but surely over societies, the active becomes changed for the passive mood, but the danger of indifference is not that which I foresee as the earliest. Too much zeal is a still more mischievous quality, and it will be well that no false hopes should be raised in the minds of those who are disposed to this error. Let no one suppose that we want an association which will receive five shillings as a subscription, and will proceed forthwith to harry the subscriber's enemies and guarantee him a snug preserve. Funds will be needful, but the money need not burn our pockets until it gets transferred to those of the lawyers. If defence and not defiance be a leading principle, there will be considerable irregularity in the work to be done in different years. External circumstances will determine this to a great extent. In conclusion, gentlemen, let our discussions to day be business-like and kept to the point, each of us disposed to concession if needful for the common good, for that we wish it well we have all pledged ourselves by coming here to-day.

Mr. Barclay announced the receipt of letters of apology from some of the Liverpool delegates, Messrs. J. A. Turner, A. Redford, A. E. Tanner, J. Abraham, and D. Wharrie; from Messrs. J. R. Robinson (Dewsbury), A. W. Postans (London), J. A. Jeffrey (Cheltenham), T. Cooper (Leicester), J. M. Fairlie (Glasgow), and others. Those gentlemen expressed strong sympathy and their regret that from various reasons they were unable to be present. The circular, which was sent out to 298 local secretaries and secretaries of Chemists' Associations, was answered in the following way:—No returns as to whether a Conference was desirable or not were sent from 9 places. There were unfavourable replies from 6; indifferent 38; favourable 145. In answer to the question, Would a deputation attend from your district?—there were no returns from 7; 22 districts promised to send delegates; doubtful 30. The names of towns which were either represented at the Conference to-day, or had promised to be represented, were Liverpool, Birmingham, Leeds, Halifax, Sheffield, Leicester, York, Wolverhampton, Dewsbury, Sunderland, Taunton, Bridgewater, Hull, Exeter, Shrewsbury, Leamington, Cheltenham, Henley-on-Thames, Coventry, Rochester, Cradley, Hinckley, Riddings, Chesterfield, Derby, Bradford, Hampton-in-Arden, Clay Cross, Hay, Ruabon, Rhos-y-medre, Longton, Birkenhead, Lye, Shipley, Buxton, Oldbury, Banbury, and Bloxwich. In answer to the questions, Are there any unregistered persons practising as chemists and druggists in your district? and if so, how many?—the replies were, unregistered persons, in 21 places; none in 127 places; and no returns from 50. The various suggestions which had been made from the chemists throughout the country had been embodied in the programme which the provisional committee had already put before the Conference. The provisional committee having met and having all the data before it decided upon the programme which had been sent to every chemist in Great Britain. A circular had also been sent to the members of the Council in London some of whom were present while others had sent letters of apology.

In the absence of Mr. William Southall, the Secretary read the following paper by that gentleman:—

The Origin of the Conference and its Relations to the Pharmaceutical Society.

If any apology be required from me as a member of the firm which has been instrumental in bringing about this Conference, I should like to say that as Local Secretary of the Pharmaceutical Society, and also as connected in business relations with a large number of druggists up and down the country, it has been my lot from time to time to hear a good deal of the troubles and grievances of our brethren. Some of these may be imaginary but others are very real, and it seemed to our firm that the time was ripe for a Conference on trade matters in general, if some one would only take the initiative. This we have done, and by way of explanation I have strung together a few notes on the general condition of the trade that may serve to explain the position we have taken. Although not very old I am old enough to remember the profession of pharmacy in a very different position from what it now is. The druggist of my early days was an old-fashioned character altogether compared with the pharmacist of the present; and although we hope the process of selection, natural or artificial, may extend a little further, we had even then advanced beyond the condition in which a first class chemist, like the preceptor of John Bell, was in the habit of subduing the too powerful properties of powdered nitre before it was fit for sale. Druggists in my early days were just taking the alarm. Mr. Hawes by his bill in Parliament had startled them out of a reposeful state, and they must either do the requisite work for themselves or it might be rather roughly done for them. At that time there were, as at present, men who were excellent pharmacists and in the quiet recessses of whose back shops important discoveries had been made and light cast upon chemistry and pharmacy, but the rank and file were but an ill-educated body, and there was a good deal that wanted rooting out as well as fresh planting. Nor was this to be wondered at, for the school at Bloomsbury Square did not yet exist, and the tutorship was confined to the back counter; Anthony Todd Thompson was the great light of materia medica, for as yet Pereira's fame had hardly reached us. The old edition of Gray's 'Supplement,' Turner's 'Chemistry,' and a few medical books, together with the Pharmacopœia, constituted the druggist's library. As yet there was no "Journal," or *Chemist and Druggist*, to diffuse, weekly or monthly, pharmaceutical "sweetness and light" through the land. The times needed a master mind, and one arose equal to the occasion. Jacob Bell, enlisting under his banner the intelligence of the trade, contended nobly against opposition from within and from without, and his efforts were ultimately crowned by the establishment of the Pharmaceutical Society and the passing of the first Pharmacy Act. Now it is not my business to trace the history of the Pharmaceutical Society, or of the chemist and druggist under the Pharmacy Act, and its various modifications; it is known more or less to most present, and it is certain that a most important change has been effected. The various Presidents of the Society may well refer in their annual addresses with pride to the results which a comparatively few years have seen effected; whilst the rising chemist of the present day may thank the Society that, through its efforts, his position is exalted from that of a mere trader to a member of an educated and scientific profession.

It is true the title is not accorded to us, but that is not of much moment. We owe more than many are perhaps willing to admit to the Pharmaceutical Society, and it is our bounden duty to support and strengthen it by all the means in our power.

Now let us refer for a moment to the chemist of thirty or thirty-five years back, and we find him very differently circumstanced from his successor. In these earlier days he was a worthy or of course sometimes an unworthy man according to his lights, but things went on very easily as far as interference from outside. He took it easily at home too, for new preparations and new "patents" did not spring up in the mushroom crop they do at present, and if people wanted new things they must wait for them.

London was then as far off from Birmingham as Paris is now, and as for small country places, they might as well have been at Timbuctoo. Then, by way of preparation for business, a shop boy could pick up a little Latin behind the counter, and in due time he acquired knowledge enough to enter business on his own account. At present responsibilities begin with his apron. He must read Cæsar and have a fair general knowledge to begin with. But I do not stay over studies, examinations, etc., they are merely matters of money and brains; the money is well spent and ought to be an excellent investment in whatever way you look at it, whether by having gained ability for trade, or increased intellectual powers for the usefulness and enjoyment of life. There are, however, now-a-days responsibilities which were never thought of in old times. Let us consider a few of them. First come certain laws, which whether or no they be terrors to evil men, are certainly terrors to good ones. A conscientious pharmacist is afraid of infringing the provisions of the Sale of Poisons Act; he perhaps wakes up at night after a doubtful twopence-worth of laudanum has passed over his counter, assured that somebody has been poisoned. Then again the more careful he is to avoid the claws of the Adulteration Act, the more fearful is he lest some article should unfortunately have escaped his careful revision and be pounced upon to his eternal self-condemnation. And now, according to a recent number of the Journal, we hear of a new terror. The inspector of weights and measures sends to a druggist for a test prescription, so called, to be made up, and it is forthwith handed to the analyst, who pronounces that one article is in excess, and the unfortunate dispenser is fined 50*s.*; the case cited, however, seems to need further explanation. Now correctness is the very backbone of our position, and as honest men we are willing to have our work examined, but the analysis of a complicated mixture is not unlikely to be attended with error, and how is the ordinary chemist to defend himself unassisted? The confidence of the public is destroyed and the fine of 50*s.* may become one of £50, and it is questionable whether this accords with the intention of the legislature.

Next comes Lord Campbell's Act, which makes a man responsible in damages for the errors of his assistants as well as of himself, a most grave responsibility to the druggist. All these new responsibilities are additions by law to the serious and always increasing responsibility that naturally attaches to the proper carrying out of our business.

Let us now turn to the *quid pro quo*. Have we got it? As far as a return for our improved education goes, and in most of our internal relations which have been subjected to change, we either have it, or it is in a fair way of realization, though some may think the good time rather long in coming. Apprentices it is true are scarce, and assistants' salaries are higher, but the rise in remuneration will probably increase the supply, whilst the tendency of the examination will certainly be to restrict the number of men entering into business and at the same time the number of those in business before 1868 will continue to fall off. So far the benefits in return for our internal legislation! But how do we stand in the general way of our trade? Surely every one here will say that the pharmacist being so heavily handicapped with laws and regulations ought to be fully protected in the legitimate exercise of his calling. We find, however, that he is hustled and interfered with. The character of a chemist's business varies very much in different places, but it is impossible that he can, as a rule, make a living by dispensing and the sale of drugs alone without the addition of sundries. Here he finds that he is interfered with by the grocer, who, in addition to many articles that may be free warren, has robbed him of the sale of many—such as extract of meat—which were his own introduction. Then the haberdasher sells perfumes, a very old adjunct of a chemist's business. This, however, is all legitimate, though it may be painful in our struggle for existence; we find, however, that the grocer and others sell patent medicines containing drugs subject to the provisions of the Poisons Act. This certainly requires looking into. Then there is the Co-operative grievance, which presses heavily upon many of our brethren. For my part I always consider co-operation a mild sort of communism, and communism, whether in Paris or Westminster, means getting what you want without paying full value for it. If there must be a community of goods it should not be confined to a few shopkeeper's articles, but should be the whole thing—the red flag and common property in land above all. The aristocrats of the Haymarket might then find they had burnt their fingers. Nay, some advanced philosopher might judiciously hint at social community also, and recall the happy days when, if I recollect, Cæsar said of our ancestors, "*Uxores habent inter se communes, fratres cum fratribus.*" But you will hear presently about cooperation. Next, we have the altogether unlawful carrying on of the business by people whose names are not upon the Register. This seems to be a growing evil, and I regret to say that the efforts of the Society to put a stop to it appear to fall far short of the requirements. As local secretary I have been found fault with for inefficiency when the blame did not lie at my door. It is not, moreover, the place of any chemist, local secretary or not, to take upon himself the office of detective and virtual prosecutor; a society may do it, and upon an officer of that society, and not upon the aggrieved neighbours, should fall the duty of getting up the evidence. In connection with this arises the further question, are the laws that govern our trade such, that whilst fully protecting the public interests, they are also the best we may justly claim for our own protection? There are other matters of material import, also, well worthy of consideration, but I have said enough to show that the Conference does not come together without reason. Some will doubtless say, "The Pharmaceutical Society is the proper body to look after our interests." Well this may be so, but we require a fulcrum to move the Society; for any powerful institution that has done a great work is apt in the course of years to settle down in a comfortable state, and to inhale the pleasant aroma of finality. Therefore a little ventilation of these matters in the free air outside the walls of the city may do no harm. For my part I am most desirous that the Pharmaceutical Society should take up the work that the Conference desires to see accomplished, but I am somewhat doubtful if the great educational and examining body of our profession ought to run the risk of rebuff and failure that a trade association will certainly incur. The Pharmaceutical Conference has not only safely floated off an immense amount of scientific work from the elder society, but has left it stronger than before. Why should not a Conference that deals with trade objects purely be also successful?

To ensure success, a trade conference must not clash with the Society, but it must be largely and thoroughly supported to be of any use. At all events there is a good deal wants talking over at the present time; and to those who would say, "Better keep quiet and let these things alone," I would observe that to my mind there is a great deal of quiet wisdom and wit in the words of Dr. John Richie, at the time of the Scotch disruption. "Agitation!" said John "what good in the world was ever done without agitation? You cannot even make butter without it."

The CHAIRMAN: I think our thanks to the readers o the papers had better be made to each, and although Mr Southall has been unable to be present I am sure you will all feel much indebted to him for his paper. The arrangements made for discussion are, that the reading of a paper is not to exceed twenty minutes, and no speaker is to exceed ten minutes without the permission of the Chairman.

A DELEGATE suggested that discussion on Mr. Southall's paper should be deferred until some of the other papers had been read.

The CHAIRMAN approved of the suggestion, and said that unless any one desired to make any remarks he would call upon the reader of the next paper.

Mr. J. C. THRESH, F.C.S. (Buxton), read the following paper:—

THE CONDITION OF CHEMISTS AND DRUGGISTS UNDER THE PHARMACY ACT.

The object of this necessarily brief and hastily compiled paper is to indicate the restrictions, responsibilities, etc., imposed upon us as a class by the Pharmacy Act of 1868; to inquire how far this Act is responsible for our grievances; to ascertain what benefits we are at present deriving from it; and to offer for discussion certain suggestions, whereby to attempt the removal of most of the grievances of which we now complain. It is notorious and certainly to be lamented that ever since the Pharmacy Act became law it has formed the subject of continual complaints, since it imposes upon our shoulders numerous burdens, for which it gives us but little in return.

When the Pharmaceutical Society first introduced the Bill it encountered a great amount of determined opposition; many real and imaginary objections were raised against it; some denied the necessity of any interference from the State, and others foresaw the results most likely to accrue from the enforcement of such a law; but the majority listened to the voice of the charmer, and believed in the brilliant future and in the immediate and prospective advantages which the Society and the advocates of the Bill predicted would accrue to the chemist and druggist should it become law.

It will materially assist us afterwards if I now briefly state the chief results which we were so confidently assured would flow from the Pharmacy Act, as we shall then the more readily discover how lamentably up to the present time it has failed to fulfil the objects for which it was promoted. The Bill was intended to secure the greater safety of the public by confining the sale of poisons and dispensing of medicines to properly qualified persons, and in return for the restrictions to be placed on the sale of these certain poisons, and in compensation for the study, for the time and money, which in future would have to be expended before any one could qualify himself to carry on the business of a chemist and druggist, we were promised—

(1) A monopoly in the sale of poisons and in the dispensing of prescriptions.

(2) That in the course of time the grocers and petty dealers who would have to be and were placed on the register, would diminish in number from death and other causes, and that thus ultimately the whole, or nearly the whole, of the dealing in drugs would be in the hands of the legitimate chemists and druggists.

(3) That in consequence of the examinations the number of young men entering the trade would decrease, and the number of chemists in proportion to the population would consequently decrease.

(4) That our ranks would in future be filled from a better class of men, and that this, together with the examinations, would confer upon the chemist a much higher status in society than he had hitherto enjoyed.

In return for these advantages, the only burden or restriction on the chemists then in business was to be the labelling certain articles after the manner specified by the Act, and the registration, etc., of the sale of certain other poisons, under pain of incurring a heavy penalty in case of neglect or wanton infringement.

It is now eight years since the Act came in force, and we have had ample time, therefore, to judge of its working, to ascertain our present condition under it, and to arrive at positive conclusions as to whether it has answered the expectations of its introducers, and the purpose for which it was passed. I think there are very few who will venture to affirm that as yet it has either secured the greater safety of the public or conferred upon us any real advantages for what we have found to be the irksome restrictions placed upon us.

First, then, is the safety of the public greater than it was before? Now the answer to this question involves answers also to the following:—

Can poisons now only be obtained of duly registered chemists and druggists?

Are prescriptions dispensed solely by competent and qualified persons?

Now the answer to both these questions is most emphatically, No. The obtaining of poison by any person and for any purpose is scarcely more difficult than it was previous to the enforcement of this Poison Bill, and the dispensing of prescriptions is not the monopoly of the chemist; and both these assertions can easily be verified. Let any one carefully examine the cases of accidental poisoning, and of suicide, and murder by means of poison, and such an one cannot fail instantly to be impressed not only with the ease with which these things can be obtained but with the almost impossibility in many cases of ascertaining when and where they were obtained. We do not wonder that this is so, for it is notorious and forms just ground for complaint that in every town and village in the kingdom we are being openly defrauded by the sale of poison or of preparations containing poisons by unregistered chemists, grocers, hucksters, and others. Instead of the number of these petty dabblers in drugs having decreased they have considerably increased, for everywhere may be found dealers in sand, blacking, and physic, who if they do not openly sell laudanum, chloroform and other poisons in the pure state, yet vend in enormous quantities mother's friend, infant's cordial, cough syrups, ointments, etc., which contain these poisons. I know certain densely populated localities in which every fifth or sixth house is a kind of shop, in almost every one of which there is sold articles of this kind. How does this state of thing affect us? It may possibly be thought convenient by some classes of the public, but it certainly is not to their benefit, and the amount of legitimate trade of which we are defrauded by these shops is almost incredible.

Again the number of men who without passing any examination or possessing any qualifications whatever are openly or covertly carrying on the trade of chemist and druggist, appears to be on the increase. Medical botanists, wholesale chemists, medical halls, drug stores, etc., are being opened out in all directions, and either the Act is unable to cope with them or, as I am inclined to think and the majority of others with me, those upon whom up to the present the duty of enforcing the Act has fallen have failed properly to enforce the Act. The Pharmaceutical Society has exhibited a truly laudable zeal in raising the standard of qualification as high as possible, and thus decreasing the number and shall I say increasing the quality of those entering our trade (or profession as many would like to call it), but I fear it is far from being generally credited with showing the same amount of zeal in protecting their interests when they have entered the trade. This, however, is a question which it would at present be useless discussing.

Many of these stores not only deal in poison but dispense prescriptions, and to obtain a trade generally begin by cutting down the prices, and thus not only compete illegally but unfairly with the legitimate chemist. There is not time to go into the various devices which these men adopt to keep as they think beyond the arm of the law; they can be considered when we are ready to vindicate our rights and eradicate the parasites. The various trade organs have frequently of late contained letters from correspondents complaining of this unfair competition and illegal trading, but they have chiefly dealt with unregistered retailers, the petty wholesale chemists rarely being mentioned, and yet in many localities these do considerably more harm that the former class. These wholesale chemists are generally assistants who have got a smattering of the so-called wholesale trade from being with some chemist who cultivated the suicidical business of supplying grocers with drugs. Many of this class keep open shop, and their wholesale dealings are made a cover for as much retailing as they can possibly do, whether it be in the sale of pickle, blacking or poison. I know instances of this kind, and I know the result it has upon the trade. People knowing that they can purchase small quantities of anything they require from these wholesale druggists, conclude they can do so at wholesale price, and to keep up this profitable delusion, the dealer reduces his prices and also his quality below that of the legitimate chemists. But this is not the only way in which we are openly defrauded by wanton infringement of the Acts designed to protect us. There are the men who, unable to compete with the established chemists who cultivate a grocers' connection, induce every little shopkeeper and huckster to deal in drugs, with ruinous result to the chemists in such localities. Towns which should support a dozen chemists in comfort afford only a bare existence to two or three. One may ask how is it that people, and working people I now more especially refer to, prefer purchasing drugs from the small shopkeepers rather than from the legitimate chemists. There are many reasons for this, one of which is that they cannot get physic from the chemist on credit, whereas by getting it where they purchase their weekly supply of food or sundries they obtain it with the same credit; but the chief reason is that it is cheaper. How is it that these small dealers can buy their few shillings worth of drugs from small wholesale druggists and yet afford to sell them for less than the chemist? These people will have a good profit upon them or they would not deal in them. The fact is the drugs sold at these shops are of the very worst description, bought at a much less price in small quantities than we can really buy genuine drugs at in large quantities. I do not make this accusation rashly, but deliberately, from an intimate knowledge of the trade and from the examination of drugs purchased from these wholesale druggists and sold by their customers. To find sweet nitre having a sp. gr. of 900 and upwards is the rule, and all the tinctures contain about half the official proportion of spirit; light carbonate of magnesia is sold as calcined, and syrup of lime blue for syrup of violets, and so on through the whole category of drugs. This question may seem at first foreign to the subject with which I am dealing, but I contend that it is not, since it is the result chiefly of the maladministration of the Pharmacy and Adulteration Acts, and I hope shortly to show how, by the proper enforcement of these Acts, nine-tenths of this infamous traffic may be stopped. But this class of so-called chemists are the source of still greater and more urgent cause of grievance by inducing the shopkeepers for the sake of increased profit to themselves to take up the sale of cough mixtures, cholera mixtures, rubbing bottles, infants' cordials, ointments, etc., so on *ad nauseam*, nearly all of which contain one or more of the poisons mentioned by the Pharmacy Act, and the exclusive sale of which is supposed to compensate the chemist and druggist for the restrictions placed upon him in his business. I have known dozens of gallons of cough mixture containing large quantities of chlorodyne or laudanum sold under the names of raspberry cough syrup, balsam of honey, and the like. Cholera mixtures invariably contain opium; so also does the infant's friend or cordial. Family ointment is usually a preparation containing white precipitate, and golden ointment a preparation with red precipitate. It must not be supposed that these cases are rare, for although flourishing more in certain localities than in others, yet there is probably not a town or village throughout the kingdom in which the rights of the chemist are not being infringed by the sale of these poisonous preparations. It is only occasionally that the attention of the public is drawn to the danger of using these medicines, as when a child is given an overdose of infant's friend, and does not recover, and then even the chemist has to stand by without defending his rights, and has to see the illegal sale of these things continued simply from the lack of some power to move the law to put an end to it.

The registration of the sale of poisons by chemists and the distinctive labelling as poison of such preparations as have not hitherto been considered such, is in itself a source often of much annoyance.

The signing of his name by the purchaser appears to be very little trouble either to him or to the retailer, but somehow or other the British public has a decided objection to signing its name, or to informing others of its intentions, consequently people look out for other places for purchasing poison where they will not be asked to sign their names or to enter into details as to the purpose for which they require them. As a consequence we find grocers and others dealing in rat and mice poisons, arsenical sheep dips, etc.; and as familiarity breeds contempt, so the evasion of the law, which at first is done surreptitiously, ultimately is done openly, to the serious loss of the chemist, who is thus again partially deprived of one of the few advantages the Pharmacy Act can confer upon him.

The subject of co-operative and civil service retailing and dispensing, I need not touch upon, as it is to be dealt with by an abler hand than mine. It is a subject worthy of serious consideration, for it more or less affects us all, since in the smaller towns many of the inhabitants are joining these societies and obtaining their drugs and medicines with their groceries.

Now let us return to the other advantages which we were to derive from this Act, namely that of the decrease in the number of chemists, and of the higher status of the trade. It is true that for some time there has been an increasing difficulty in obtaining intelligent, well educated apprentices, and one would infer that this argued a future decrease in the number of chemists. The parents of boys who can afford to give them an education fitting them to pass our Preliminary examination and thus to prosecute their future studies with a surety of success, find that for a trifling extra outlay they can place them in the medical profession; and since in the first case the result is only a chemist and druggist, whose status as yet is regarded as but little or nothing above that of his neighbours the grocers and drapers, and who if he has all his rights enjoys only the poor monopoly of the sale of a few poisons and the dispensing of medicines, in the second, the result is the enrolling of his son's name in that of an honourable profession with position and prospects far above that of a chemist. The worst result of this scarcity of respectable youths is that the poorer class of chemists are, to carry on their businesses, compelled to take as apprentices youths of whom there is not the slightest probability of their passing the examination; subsequently these are thrown upon the world as unqualified assistants, to ultimately become unqualified dealers in drugs, infringers of the law, and increasers of the illegal competition to which we are already subject. The opinion of many chemists is that the examinations are too stringent, more so than was contemplated when the Act was first framed. I hold, however, that the examinations are not a whit too stringent to prove the competency of a man to dispense and retail drugs, but I do contend that for the time and money requisite to be expended, before one can become a qualified chemist, we obtain but most disproportionately small advantages, even if the Act was fully enforced. What proportion of the average chemist's turnover is due to the sale of poisons and dispensing? Really in most cases very little. There are numerous towns, and very large towns too, where all the dispensing would not more than support a single chemist. But the further treatment of this subject would lead to a consideration of the relations of the chemist and the medical profession, which I willingly leave to some one else.

The last growl I shall utter is one upon a subject which we shall not all view in the same light. I refer to that portion of the 16th clause of the Pharmacy Act which says "nothing hereinbefore contained shall extend to or interfere with the making or dealing in patent medicines." Why, is it not equally due for the sake of the public safety and for the rights of our trade, that the sale of all patent medicines containing poisons should be subject to the same law as the sale of poisons not protected with a medicine stamp? What virtue or power is there in the government label to prevent accidental or wilful poisoning? Is it not true that a large proportion of these cases are due to the administration of these remedies? Why therefore should not their sale be restricted to the chemist, and take place exactly in the same way as the sale of any other poisonous mixture? But again this clause affords a loophole for evading the Acts, and advantage is already being taken of it to sell laudanum, paregoric and other poisons under the protection of a threehalfpenny stamp.

To the best of my ability I have now pointed out the results of the Pharmacy Act both as affecting ourselves and the public, and it is evident that a many of the grievances which we now suffer are due as much or more to the maladministration and non-enforcement of the Act as to the enforcement of it, and it is therefore necessary for us to consider (first) What means can be adapted to properly enforce the Act and protect our rights? and (second) how we can secure some more adequate recompense for own responsibilities and the restrictions placed upon us?

Now one would naturally suppose from a perusal of the Pharmacy Act, that the Pharmaceutical Society of Great Britain was the legally constituted guardian and champion of our rights, and responsible for the proper enforcements of the provisions of the Act. I am sorry to say we all know only too well that to look for help in that direction is utterly vain; for it either cannot or it will not assist us. It may be that both the chemists themselves and the Society are to blame. The latter is not supported sufficiently by the former, and as a consequence we are deserted, our distinctive title of pharmaceutical chemist is lost to us, and we are delivered over to the spoliator. Had the chemist evinced greater sympathy with the Society, and taken a more active interest in the election of its council, that council and that Society might have been made to represent every class and branch of the drug trade and have been composed of men pledged to do their utmost to protect our interests and vindicate our rights. But there is no immediate prospect of such a consummation, however devoutly it may be wished, and our only hope lies in the issue of the Conference now assembled.

The only means that I consider feasible and likely to be successful in its efforts to assist us is the formation of a trade society, which shall not be antagonistic to the Pharmaceutical Society, but which shall rather if possible act as an auxiliary to it; but if this is not possible it must be prepared to act independently of it. This society should have for its object, the defence of our rights by the enforcement of the Pharmacy Acts against all unregistered chemists, and against all shopkeepers and others who are found dealing in medicines containing poisons; to try by process of law the rights of co-operative societies to dispense and deal in poisons; to point out to the public analysts another and better field for the exercise of their abilities, namely that of investigating the quality of the drugs not sold by druggists; and to attempt to obtain such alteration of the Pharmacy Act as shall secure us increased advantages. I do not think there will be a person present who will deny the urgent necessity of some such steps being taken, and it is sincerely to be hoped that the chemists throughout the country may be roused from their lethargic state, to unite together for the common weal. There are many who would go even further than this and restrict entirely the sale of drugs to the chemist and druggist, but any one who calmly reflects on the subject will at once see that this is an object which it would be folly at present to attempt. Neither do I think it would benefit us aiming at too much, we must prove our demands to be just and moderate, and there is little doubt but that ultimately our demands would be complied with.

In conclusion let me just point out what I think would be the result of a short period of vigorous action undertaken by such a society by simply enforcing the present Pharmacy and Adulteration Acts. First by a thorough enforcement of the Pharmacy Act the sale of poisons and dispensing by unregistered men would soon be stopped. The drug stores, medical halls, etc., would have to put up their shutters or their owners make an effort, and pass the requisite examinations, and thus a large portion of our trade of which we are at present defrauded by these men would accrue to us.

The legality of co-operative dispensing could be put to the test; if illegal there would soon be an end of this grievance, and if it should prove to be legal, we should then know the worst, and could at least attempt by an alteration of the law to make it illegal.

The proper enforcement of the Adulteration Act would speedily rid us of three-fourths of that wretched competition with petty shopkeepers to which all chemists except in better class neighbourhoods are subject. It has often struck me that the inspectors would much more effectually cope with this subject if instead of always purchasing goods from the recognized dealers, as drugs of chemists, groceries of grocers, etc., they would take samples of those things not properly belonging to the business of the traders from whom they are purchased. They would thus not only be more likely to meet with cases of adulteration, but would also protect the different classes of tradesmen from unfair competition with each other.

Again, I think it would be quite possible to obtain some modification of the Pharmacy Act, so as to render it somewhat more just. This might be done by confining the sale of all patents containing poisons to the chemist, and by either extending the number of poisons in part 2 of Schedule A, or by creation of a part 3, which should contain a number of powerful remedies, such as carbolic acid, sugar of lead, nux vomica, phosphorus, lobelia, caustic, digitalis, and chloral hydrate, and all their preparations. These should only be sold by the qualified chemist, but it should be left to his discretion whether they should be labelled poison or no. These, however, are all subjects which would be taken up by the society it is proposed to form.

Let the proposal be considered as dispassionately as possible, and then whatever action we decide to take, let us unitedly strive to accomplish the purpose for which we undertake it. No local grievances, no spirit of petty jealousy or personal animosity, no trifling differences of opinion must be allowed to turn us from our purpose; we must determine to gain the favour of the gods by doing all we can for ourselves, we must keep the goal before our eyes, and swerve neither to the right nor to the left until we reach it. Let us strive to do this, and the consciousness that our efforts are not prompted by defiance, but by defence, and that our demands are just and right, will materially assist us in our endeavours, and ultimately lead us on to victory.

The CHAIRMAN: I am sure you will feel very much indebted to Mr. Thresh for his vigorous paper. We have had the pleasure of knowing Mr. Thresh for some years; I won't say a number of years, for we must speak of Mr. Thresh as one of our young able investigators. You will see how often his name occurs in the pharmaceutical and other prints, in connection with pharmaceutical science, and I am glad he has given us his clear judgment on such a question as this also. The suggestion which was made concerning Mr. Southall's paper, that it ought to be considered with some other matters yet to be brought before the Conference will apply also to this. The allusion especially to the subject of patent medicines may very properly be considered when Mr. Shaw and Mr. Arblaster give us their views on the same subjects. Some of Mr. Thresh's statements, particularly as to the abuses by small wholesale druggists acting as retailers, and also as to the quality of drugs sold by unauthorized persons, I am quite sure, are the result of his own experience, and his experience would indicate to us, even if we had not made up our minds as to what should be done or how to do it, that the collection of information is a worthy object for an association like this. I hope that we shall always bear in mind that the charter of the Pharmaceutical Society, after referring to the purpose of its education, has a definite statement that it is to be also for the protection of those who carry on the business of chemists and druggists. Let us not think that we are asking something unreasonable in asking for reasonable protection.

Mr. EDWIN YEWDALL (Leeds) then read the following paper:—

THE DIFFICULTIES OF CHEMISTS UNDER THE ADULTERATION ACT.

The practical working of the "Sale of Food and Drugs Act, 1875," having resulted in the prosecution of several respectable tradesmen whose previous honourable dealings lead to the supposition that they are the innocent victims of a stringent law, it has been thought that a consideration of its various sections may be interesting and productive of mutual advantage. With the object of obtaining the opinions of others I have undertaken to bring the subject before you to-day, though well aware that there are many here present who could have treated it in a much more able manner had they been invited to do so. The preamble of this Act states that it is desirable all Acts relating to the Adulteration of Food and Drugs in force at the date when this Bill became law shall be repealed, and the 1st section gives a list of these Acts, amongst which will be found the 24th section of the Pharmacy Act, the repeal of which seems to very much modify the provisions of that Act. You will remember that according to the section referred to any registered chemist and druggist selling an adulterated drug would, unless the contrary was proved, be deemed to have knowledge of such adulteration, and whilst thus rendering himself liable to the penalties of the Acts then in force for the purpose of preventing adulteration he was liable under the 26th section of the same Act to have his name erased from the Register had the Privy Council, in whom was vested the power, considered his offence deserved such further punishment. The repeal of the 24th section relieves the retail chemist of any charge of adulteration under the Pharmacy Act. Referring to the "Sale of Food and Drugs Act, 1875," the 2nd section interprets the word "Food" to mean every article used for food or drink by man other than drugs or water; also, that the term "drugs" shall include medicines for internal and external use, but it does not say for man, consequently, I presume that this term applies also to medicines for cattle. The 3rd section refers to the penalties which can be imposed for mixing any injurious ingredient with food and selling it in that condition. By the 4th section any person selling a drug to which any article has been added calculated to affect injuriously its quality or potency is liable to a penalty for the first offence of a fine for a sum not exceeding fifty pounds, and for a second or any subsequent offence of imprisonment with hard labour for a term not exceeding six months. With these heavy penalties hanging over us it is of the greatest importance that we should if possible avoid a first conviction, especially as the success of a retail chemist depends very much indeed upon his character for supplying genuine articles. There is a provision in the next section that no person shall be liable to these penalties if he proves to the satisfaction of the Court that he did not know of the articles being mixed or adulterated and could not with reasonable diligence have obtained the knowledge. It will be observed that it is incumbent upon the retailer to be in a position to assert either from his own knowledge or from information obtained from the person of whom he purchased the article that it is genuine. To be able to speak from his own knowledge requires that he should have examined the article thoroughly, which to some chemists and druggists who have little knowledge of the use of the microscope or the process of chemical analysis, and to others who are fully employed in the usual routine work of a retail business, would be almost an impossibility; they will therefore adopt the alternative of relying upon those from whom they have purchased it, but in order to make themselves safe will probably require a warranty. How can they obtain this warranty? As the provisions of the Act apply to the wholesale dealer, it follows that if an order is given for an article and it is supplied, with it will be sent an invoice giving the quantity and name. That invoice I consider is a warranty. It is well known, however, that the sale of drugs is very slow with some retail dealers and it might happen that a drug obtained some time ago is the one respecting which action is being taken; and those who are familiar with the usual retail chemist's business are aware that when new stock is received it is often put into the store bottle in which there is perhaps some old stock obtained from another house, or if from the same source it has been so long upon the shelves, subject to the varying temperature and humid atmosphere of the shop, perhaps also exposed to direct sunlight, that it is almost inert; and yet on the ground of economy this will be mixed with that just received, thus seriously affecting its quality. Again, there are many articles which are constantly deteriorating. Under all these circumstances would it not be unfair to expect that the wholesale dealer should be held responsible for an unlimited period or even until the stock was sold,—as by improper storage the quality of a drug may be quickly altered. How long should the wholesale dealer be held responsible? To meet this difficulty, it is very probable that the wholesale dealer will, by a notice upon his invoice, intimate that he will not hold himself responsible for the genuineness of the article if it is removed from the bottle or wrapper in which it is forwarded. I have little doubt there are, in many retail shops, parcels of old drugs which have lain for years; it will be apparent to the owners of such, that for their own safety it is absolutely necessary to go through the stock, throwing out all articles of questionable character, including all powders, extracts, or similar preparations, which have become altered in their colour, smell, or taste; and if any costly article is found, respecting which there is a doubt, it will be more satisfactory to send a fair sample either to the Laboratory of the Pharmaceutical Society or to some competent analyst, of which there are many to be found in our ranks, whose practical knowledge of the various articles used as food, and also of drugs, renders them well qualified to fill the position of public analyst, providing they considered such an appointment a *quid pro quo* for relinquishing the business of a chemist and druggist. There are several articles of every-day demand, respecting which a doubt exists whether they can be sold without danger; amongst these will be found cera flav. and cera alb., which, being used in the preparation of medicines for external use, come under the definition of the term drug and therefore ought to be sold genuine, though it is a well-known fact that both are liable to sophistication. When asked for carbonate of iron, we usually supply the sesquioxide. Sapo mollis is frequently used in the preparation of linimentum saponis.

Flavouring fruit essences are artificial, and prepared in the chemists' laboratory instead of from the fruit.

Crocus in placentâ (cake saffron) is sold in large quantities in some towns, and used for similar purposes as crocus in fœno; yet it is questionable whether there is a vestige of saffron in it.

Is the retailer liable to a conviction for the sale of any of these articles under the names mentioned?

Lac sulphuris is another preparation which has already resulted in several vexatious proceedings. Respecting the last prosecution in your town, I wish to call your attention to the report in the *Pharmaceutical Journal*, which I presume is correct, and in which I observe that Mr Herbert, who appeared for the town clerk, stated that in this case it could not be pleaded that the article has been unavoidably mixed, because it was purchased in a pure state and was extensively adulterated with sulphate of lime; this adulteration having, I presume, by this statement been carried out by the defendant after he had bought it pure. If this is a correct report you will fail to see any way by which the defendant could evade the penalty, but if Mr. Herbert is wrong and the article sold was the one usually known as milk of suphur, then we are brought to a consideration of the question, What is milk of sulphur? Was the imposition of a fine in this case the proper administration of the law? I am not prepared to bring before you the whole of the correspondence which has taken place with regard to this preparation; several very eminent pharmacists have expressed an opinion that it should be considered as a separate and distinct preparation from the precipitated sulphur of the Pharmacopœia, in which opinion Dr. Redwood agrees, and there are also several most intelligent chemists, amongst whom is Dr. Attfield, who assert that the term milk of sulphur applies only to precipitated sulphur; they further argue that if an imperfect process was originally introduced for its manufacture, that process has been superseded by another in which pure sulphur only is obtained. With such a diversity of opinion we can scarcely wonder at the difficulty the learned stipendiary of this town, Mr. Kynnersley, felt in giving judgment in this case, or fail to admire his candour in expressing a hope that the question would be taken to a higher court. At the same time inasmuch as there was a doubt whether it should be considered an adulterated article or not, the English law gives the defendant the advantage of the doubt. I am disposed to think it ought to have been dismissed, yet the opportunity now afforded ought not to be allowed to pass, and as the question is one which affects the whole trade you will no doubt concur with me in thinking that the expenses attending such an appeal ought to be borne by the Pharmaceutical Society, though I must admit this Society has not received that encouragement from the trade which should have been given to it, especially by those who when danger threatens are the first to apply for assistance. If the Society refuse to take up this case, then the necessity for some trade organization for obtaining a proper settlement of this and othe questions which will no doubt arise is undeniable, and it is for the purpose of considering the desirability of such a course that we are met to-day. Pending the settlement of the question, I think a label "Milk of Sulphur, prepared according to the Pharmacopœia 1724," would probably prevent any further actions, as showing that it was manufactured by a process according to which the presence of sulphate of lime was unavoidable, and therefore might be considered exempt according to the 4th clause of the 6th section. The omission of any standard of comparison up to which the pharmacist may work or by which the analyst may judge of the quality of the article submitted to him is to be regretted, from the fact that preparations bearing the same name are prepared of many different strengths; for instance, tincture of camphor, which if prepared according to the British Pharmacopœia is frequently taken with benefit. Cases are upon record in which the homœopathic tincture has produced alarming poisonous effects. Although all preparations of the British Pharmacopœia used for the dispensing or compounding of medicines according to prescriptions written since its publication must be of the strength ordered in that work, yet large quantities of drugs are sold daily by shopkeepers which are of inferior quality and in the case of preparations bearing the pharmacopœial name prepared with very weak spirit, or if of the nature of spirit of nitre mixed with water, nevertheless the want of a legal standard to judge of the qualities of these drugs and preparations is a serious obstacle in the way of any attempt to enforce the provisions of this Act against such dealers. Instead, therefore, of appointing an inspector to search for the articles we know are to be met with, would it not be better to appoint some energetic chemist as analyst, we can all obtain from our own neighbourhood specimens of the article sold, but it is not every one who has the time to examine them; if such an appointment was made, or arrangements entered into with Dr. Attfield for the same purpose, such specimens could be forwarded, and if the report showed the presence of any article restricted by the Pharmacy Act to the registered chemist and druggist, information could be given to the local inspector, and the case would be carried on by him in the usual way and without the appearance of any animosity or ill feeling on our part. It would be uncharitable to suppose that the object of the legislature was to harass the well meaning tradesman, but unfortunately if any person who, from pique or vicious disposition, or supposed injury, seeks to do a tradesman harm, this Act appears to lend a means by which he may carry out his design, unless great care is exercised. In the *Pharmaceutical Journal*, April 1, 1876, is the report of a case where a milk dealer was summoned for selling adulterated milk. Although it is not stated under which section the information was laid, I presume from the remarks of the stipendary that it was under the 6th section. Mr. Arnold pointed out that to ensure a conviction under this section it must be proved that the sale was to the prejudice of the purchaser, and as the inspector could not affirm that such was the case, he—the magistrate—would take time to consider the point. I have carefully searched in the Journal for the final decision, but have not yet met with it.

Having briefly laid before you some of the points requiring your attention, I hope due consideration will be given to them, as well as to those which may be adduced by the papers which are to follow, that some well digested scheme whereby we may avoid the penalties of this Act may be the outcoming of our meeting.

The CHAIRMAN: Our thanks are due to Mr. Yewdall for his very excellent paper on this subject, and a most important one it is. Those of us who live in the same town as Mr. Yewdall, know how important his services have been towards the organization of associations for promoting the common advantage. There can be no objection to the paper being discussed now, as I do not see any subsequent proceedings which can be taken with it. If we are to be practical, I suppose the first matter would be the consideration of the Birmingham milk of sulphur case. I should be glad if some local member would give us a little information. We have read what has been published, but it is not probably known to the meeting generally whether the person who sold this milk of sulphur was a registered chemist and druggist, or not. I should be glad to have this information, and also whether the legal technicalities which would be needful for the case to be carried to a higher court have been complied with, or whether it is now too late for such a step to be taken.

Mr. ALFRED BIRD (Birmingham) said: There have been two milk of sulphur cases, the one against Mr. J. Sumner, chemist and druggist, of Coleshill, and the other against a drysalter. As I conducted the scientific defence of Mr. Sumner, and to a successful issue, at Coleshill, we thought the same arguments and the same reasoning as was employed in the Coleshill case would suffice before our learned stipendiary. The argument which we brought forward at Coleshill was very simple. We showed distinctly that there were two preparations, and that milk of sulphur was separately quoted on the drug trade lists. I told the magistrates that I had sold milk of sulphur in my shop nearly forty years, and I should continue to sell it. The magistrates were so convinced that there were two preparations that they dismissed the summons. One of the reasons why the prosecution was resisted, was that there was a foul word in the summons, charging Mr. Sumner with fraud. I do not know, gentlemen, how you would feel, but I know how I should feel if I were charged with fraud, and I was determined in this case, regardless of expense, to hurl back the charge. We were successful, for the magistrates dismissed the case and coupled with it that Mr. Sumner did not sell a fraudulent article, but a legitimate one and was perfectly justified in so doing. When the second milk of sulphur case came on at our public office we thought that the same arguments temperately stated to our magistrate would settle the case, in fact we thought it would convince Dr. Hill. However, the result was different, and Mr. Kynnersley distinctly enunciated that the term milk of sulphur is only applicable to the precipitated sulphur of the last Pharmacopœia; that the terms are synonymous, and that if you sell the old milk of sulphur you must be good enough to put a label that there is sulphate of lime in it. I beg to say that though this unfortunate fellow who was summoned was fined a shilling he has not been able to carry on the case, for he is a very poor man and anything in the way of a reference to a higher court is a most costly proceeding. This man did not feel in a position to find money to fight the cause of the chemists and druggists, therefore the case has dropped without any appeal to the Court of Queen's Bench whatever on the point. Mr. Bird suggested that those who supplied these preparations should take particular care under what name the article is purchased. If the customer asks you for milk of sulphur, give him milk of sulphur; if he asks for precipitated sulphur, give him precipitated sulphur; then you are safe. The effect of Mr. Kynnersley's judgment has been to carry alarm and dismay into the chemists' shops throughout the whole town, and last night I had a most curious and comical instance of it. An old woman came into my shop with a tumbler glass and a spoon, and she said, "Just look here, what's this?" She was stirring away at something in the glass, and she said, "I went into a certain shop for two ounces of milk of sulphur, and this is what they gave me." She got it on Saturday night and she was still stirring at it. I asked her to give me a small portion which I tested in a spoon, and in a few moments I saw that the chemist had given her some of this unmanageable preparation. I said—"This is not milk of sulphur, you have been sold the wrong article. You look like a woman who knows how to defend yourself." I said—"Go down to the magistrates to-morrow morning and ask for Mr. Kynnersley, and just tell him your grievance, and tell him also I sent you." I do not know whether she has gone down, but I had reason to think she would. I told her first to go back to the chemist's shop and tell them she had not got the right article, when she replied, "Its no good doing that, as they would just take it away and give me something else." She said—"This is an abominable adulteration, and I don't see why a poor creature like me should be served so." I hope we shall not refuse to sell milk of sulphur when it is asked for, and that we shall not put anything on about sulphate of lime.

Mr. R. HAMPSON (London): I fully agree with what has been said about calling things by their own names. A reference has been made to the Pharmacopœia that it will be taken as the standard, and must be upheld and obeyed by chemists. Now, I hope in the future, when a time comes for another Pharmacopœia, we shall have some voice in the making of it. It is not a pressing subject now, but I feel sure it will be our interest, as well as simply just, that we should have a voice in the making of that Pharmacopœia, that we shall stand in the same position in England as upon the continent, and that the work shall be that of the pharmacists as well as of medical men. Another thought strikes me in reference to the Adulteration Act, and that is, that we have analysts appointed with very imperfect credentials. We have gentlemen no doubt very worthy, but not having the requisite skill and knowledge for their position; and it does seem exceedingly hard that examined men—chemists—should be tackled by incompetent men, and should have their reputations damaged by them. A case may come forward of adulteration, or presumed adulteration, of some article sold by a chemist, and the chemist may not have the resolution and the pluck to face it out, but may think it the best policy to abide by the analyst's statement. But what I most desire is, that in future we should bear in mind that the analyst should be a qualified analyst—an unadulterated analyst in fact—and that we should have men thoroughly qualified to undertake the responsible duties attaching to their post.

Mr. CHURCHILL (Birmingham): I think it would be well to bear in mind that our Birmingham milk of sulphur case was not directed against a chemist and druggist. The reader of the paper on the Adulteration Act suggested that in the event of such a case being brought against a chemist and druggist the defence should be undertaken by the Pharmaceutical Society. That idea has been held by many chemists, and I may state that I myself wrote to the Secretary of the Pharmaceutical Society suggesting such a view, but I received a reply that the Society was not a trade union. That seemed to point very clearly to the necessity for the formation of such an association as is now proposed.

Mr. G. ELLINOR (Sheffield): I have looked into the Pharmacopœias, especially the one of 1721, when lac sulphuris was officially named and the process given. We next find that the name was changed from lac sulphuris to sulphur præcipitatum. The present process was not adopted till 1809, therefore the name milk of sulphur applies to the present Pharmacopœia article sulphur præcipitatum. The name applies, because the name was changed before the process. I think, if you take the London Pharmacopœias as they are in the London Society's Library, and examine them, you will find there is no ground whereby you can stand with the adulterated milk of sulphur. I believe that is the only official regulation we can have, and that convictions can be obtained and will be obtained if contaminated milk of sulphur is sold either as milk of sulphur or sulphur præcipitatum. We cannot get away from the Pharmacopœias; they are the legal standards.

MR. ANDREWS (Bayswater): I am going to suggest a manner in which you may give the public what they ask for, for undoubtedly there is a demand for this adulterated —as it is termed—article. I would simply suggest that you should have a label "Milk of Sulphur—not the Precipitated Sulphur of the Pharmacopœia." Do not say adulterated with anything. Then have another label, "Precipitated Sulphur, British Pharmacopœia—such a date." I think that by this means you will escape all difficulty.

MR. G. WARD (Sheffield): I should like first of all to demur to the term "adulterated milk of sulphur." I hold it is not adulterated. I should like also to say, that the solicitor engaged in our case at Leeds, advised a label exactly such as has been recommended by the last speaker—of "Milk of Sulphur, not the Precipitated Sulphur of the British Pharmacopœia." Such a label is becoming somewhat common in our neighbourhood. There have been a great many instances in which this pure precipitated sulphur has been sold as milk of sulphur and has been returned as not being the article desired by the purchaser. A good deal of force undoubtedly rests in the remarks about the names in the Pharmacopœia but, I think, there is also some force in the custom of the trade. If I have been accustomed to buy for twenty years an article which I have known by a certain name, and which most people know by a certain name, I hold that if I go and ask for the article by the same name, the seller has a right to supply me with the article I want. That is simply what has taken place in this milk of sulphur case. Precipitated sulphur certainly is not milk of sulphur, and milk of sulphur certainly is not precipitated sulphur, according to the present Pharmacopœia, and I think the case would be established if it were taken up. I trust that it will be one of the objects of this Trade Defence Association. I am sorry to see that in some cases the advocacy of the contrary view was sought to be strengthened by the imputation of impure motives.

Mr. ELLINOR: I hope my remarks did not lead to the conclusion that I thought milk of sulphur was an adulterated article. It is a different article, and I think if the distinction is observed on our labels we shall avoid future difficulties.

Mr. WALKER (Longton): Allow me to say that some people have a very strong opinion about this milk of sulphur. On two occasions, within twenty years, I have been persuaded by friends, against my own opinion, to give up selling milk of sulphur and to sell only sulphur præcipitatum, but with very unsatisfactory results. I may say that on scores of occasions people have brought it back and have complained bitterly of being supplied with an article they did not want. It was not what they wanted; and this has been the case with other chemists who have sold pure precipitated sulphur. Where people ask for milk of sulphur they want a different article altogether, and I think all will agree they ought to be satisfied with what is known as milk of sulphur. If they ask for precipitated sulphur, let them have it; but if you supply it to them under the name of milk of sulphur they are dissatisfied, and they have not got what they want. I may mention that in my own neighbourhood certain chemists were summoned for selling milk of sulphur when precipitated sulphur was asked for. Eight or nine such cases occurred, and the defence in the case upon which the whole were decided was that they were synonmyous terms, and that when asked for precipitated sulphur we were quite justified in supplying milk of sulphur, because they were the same thing. The magistrate at once decided against that. He decided that the terms were not synonymous, that the two articles were entirely different, and that if when asked for precipitated sulphur the dealers supplied an article in which sulphate of lime was an ingredient, they broke the law, and in each case a conviction followed.

Mr. THONGER (Birmingham): I am perfectly satisfied that if the opinion of the trade was canvassed as to whether it would be wise to turn our backs on what I have no fear to call a very nasty article—the old fashioned lac sulphuris,—we should find the great majority in favour of doing so. I was told before I went into business to look at it as a nasty thing and a useless thing, and I have never had the slightest difficulty in selling the sulphur præcipitatum. I would propose that the subject should be one of the first that should be taken up by the association, and that a good plan of going to work would be first to consult some high medical authority as to whether such a society would be wise in doing its best to remove the thing altogether from the trade. If there is any value in it as a medicine it is for the medical authority to say so. That I cannot answer. If it be proved that there is some advantage in it which sulphur præcipitatum does not possess, the sale of it need not be followed with any great difficulty, I am sure.

Mr. COUNCILLOR STEAD (Leeds): Like some other gentlemen, I, after the milk of sulphur case at Leeds, sold in three instances sulphur præcipitatum, and in each case it came back.

Mr. MASON (President of the Liverpool Chemists' Association): It appears to me that the locality in which milk of sulphur is sold would in great measure decide what is to be sold for it. I agree entirely with Mr. Thonger, and I agree perhaps with the public analysts and medical men in thinking that there is not any virtue in lac sulphuris, and that one of the good results which may come from the Adulteration Actis to put away its sale. I was most amused when I heard of the first milk of sulphur prosecution; my wife read it to me, and while she was so doing she said, "If they wanted cream of sulphur, why did not they ask for cream of sulphur?" I do not know whether it is known as cream of sulphur anywhere, but I believe there is some distinction of the kind in Guernsey, and that they ask for milk of sulphur if they want lac sulphuris, and for cream of sulphur if they want sulphur præcipitatum.

Mr. CUBLEY (Sheffield): I think a question has arisen which should be looked into with the greatest care, and that is the necessity of having the Pharmacopœia as the standard of purity. I am afraid the question of milk of sulphur is one of those where, after all, the greatest profit will go into the pockets of the lawyers. But I think it should be our duty, as far as we possibly can go, to see that everything should be as nearly as possible to the Pharmacopœia. I say so for this reason, and this reason only, that however you may put the sale of drugs by further enactments into the hands of the chemists only, there would be behind them, for vending by unlicensed persons, the calomel, milk of sulphur, and other things which may not be mentioned in the Pharmacopœia. If any further restriction is to be made as to the sale of drugs you would have to take the Pharmacopœia as the standard of purity. It is not in the wish to make no difference between milk of sulphur and precipitated sulphur that I would hold to it, but it is that we should endeavour, if possible, to get the principal articles of the Pharmacopœia into our hands. If, however, we raise a lot of these dual articles, there will be the more to be left in the hands of unlicensed people.

Mr. ELLINOR: If we do not combine the old and new names together we shall have great difficulty in getting convictions against small shopkeepers. Where there are two names in the Pharmacopœia, we must take them as synonymous.

Mr. BIRD: We are bound, in dispensing prescriptions, and medical men are bound in writing them, to adhere to our codex and to it alone; and we must not say that the old and the new names are synonymous.

Mr. THRESH: I would suggest that in any future Pharmacopœia it would be advisable to increase the number of synonyms.

Mr. AYRES (Bridgwater): I think, as a practical man of business, that we cannot get over the fact that a demand by the public exists for lac sulphuris. The article is in demand, and in certain localities it has a very considerable sale. In our associations at Taunton and Bridgwater we have adopted a label declaring the actual article as it exists. We, as individuals, do not create the demand; the public come to us for the article, and we supply to them the article to which they have been accustomed.

The CHAIRMAN in closing the discussion said: Any proposal to place in the hands of the medical authorities the decision as to what should be an article of sale or should be forbidden to Englishmen would be to open up some of the principles of the liberty of the subject a great deal wider than we propose to discuss. The customs of the purchaser have a right to be considered. It is not a question merely of synonyms. On that, perhaps, we might have no great difficulty but we have to admit that the two things are different, that it is because they are different that prosecutions have taken place, and that the public say that they wish to have what they and their forefathers have been accustomed to. I think that the chemists would be disposed for the sake of avoiding trouble and annoyance, to give up a trifling gain from the sale of a particular article, but still there is a principle concerned which if we were to disregard altogether might be applied to other matters, so that we must still maintain that we have a perfect right to go on honestly selling the article which the public ask for. A very useful suggestion of Mr. Hampson's should be borne in mind, and that is, that it is one more reason why pharmacists should be consulted in the formation of all parts of the Pharmacopœia.

Mr. J. T. SLUGG, F.R.A.S., read the following paper on:—

THE CASE OF WIDOWS AND TRUSTEES UNDER THE PHARMACY ACT, 1868.

This is soon told. By clause 1 of this Act it is made unlawful for any person to carry on the business of a chemist and druggist whose name is not on the register; and by the 11th clause, on the death of a chemist and druggist his name is to be removed therefrom. By the 16th clause certain exceptions are made to the operation of the 1st clause, and it is there enacted that "upon the decease of any chemist and druggist actually in business at the time of his death, it shall be lawful for any executor, administrator or trustee of the estate of such chemist and druggist to continue such business if and so long only as such business shall be *bonâ fide* conducted by a duly qualified assistant." In 1873 the Council of the Pharmaceutical Society obtained the opinion of their solicitor as to the right interpretation of this clause, from which it appears that in the case of the death of a man who has made a will appointing executors, and creating certain trusts, providing, for instance, that the business shall be carried on for the benefit of the widow or children, so long as the trust exists the executors may carry it on. But the strangest thing is that no one's name will appear on the register in connection with such business. The very essence of the Act appears to be complete and unexceptional registration, and yet it allows numberless executors in various parts of the kingdom to carry on the business without registration of any kind. Hence to this extent, which may be a large one, the register will be incomplete, and will not show the actual number of chemists and druggists in business. Here is one glaring instance of the incompleteness of the Act. But a still more glaring one,—and a most unjust effect of this incompleteness,—is the following, that the widow of a druggist cannot carry on the business for herself. If the husband should leave his business to his widow for her absolute benefit and appoint her sole executrix, she could only carry it on until his debts were paid, or the business sold, and not a day longer. The day she puts the profit into her own pocket she breaks the law. Exactly the same results follow if the husband dies intestate, and the wife takes out letters of administration. What a hardship this is, will be seen from a consideration of cases like the following, which is mentioned as a type of many others. The writer intimately knew the parties—a druggist and his wife without children. The wife who was much the younger, took an active part in the business, and in course of time became the more popular of the two. She acquired quite as competent a knowledge of it in every respect as the husband, and was even more trusted than he by the public. Since the Act was passed the husband has died, leaving his little all to his wife for her maintenance, fondly hoping she would have the profits of the business she had helped to build up, for her support. She was only allowed to continue the business till she had paid the debts due at his decease, and was then compelled to sell it. So that notwithstanding her intimate acquaintance with the business, equal in all respects to that of her husband, and her perfect competency to carry it on, she could not do so even with the aid of a legally qualified assistant. The extreme stringency of the Act in this respect appears very illogical when contrasted with its incongruous and absurd laxity in another. For a druggist once having his name on the register may open any number of shops in any number of towns, and if he chooses may appoint an apprentice or a porter, or any person, whether much or little qualified, to manage each shop. Of course it is admitted that self-interest would lead to the appointment of managers with some qualification, but the law in question, which is so absurdly strict in one point, goes to the opposite extreme in another, and makes no provision for the adequate management of any of the branch shops a druggist may be the proprietor of. The writer believes that if an executor, who in all probability knows nothing of the business, may carry it on by the aid of a qualified assistant, a widow, who in many cases knows something of it, may be allowed to do the same for her own benefit, on similar conditions.

The CHAIRMAN: The meeting is much obliged to Mr. Slugg for his lucid explanation of a matter which many have not looked into very carefully. The matter is one most interesting to us and I shall be glad to hear any remarks.

Mr. RADLEY (Sheffield): There is one point to which I should like to call attention. The Council of the Pharmaceutical Society is the body entrusted with seeing that the law is carried out, and in no case has the Council taken action to oppress any widow. I believe a feeling of tenderness and compassion has always been felt towards a widow.

Mr. RIMMINGTON: I think it is only an anomaly of the Act.

Mr. HOLDSWORTH: I think that what has been advanced will show that it will be very wise for a druggist to make his will. I apprehend in the case of a man being in the position Mr. Slugg has referred to, the difficulty would not have happened if there had been a nominal executorship, and somebody had been appointed trustee to carry on the business for his widow. At all events it would be well for gentlemen who wish to leave their businesses to their widows to look into the matter.

Mr. R. G. JONES (Lye): Two trustees are required. I had a legal opinion on that point.

Mr. SLUGG: And then comes the difficulty of getting two gentlemen from mere friendship's sake to bear the responsibility which does rest upon anybody carrying on a druggist's shop.

Mr. DYER (Halifax) said: The question is a very difficult one. The more we look into the operation of the clause of the Act in question, the more we shall see how detrimentally it may operate against descendants of members of the trade. It is one of those questions which I think this Society should put its shoulder to the wheel to set right. One of my friends has suggested what would be the position of an executor employed in one of these trusteeships, who is not registered, administering poisons with fatal results. What would be the result to the persons implicated under such circumstances?

Mr. DAVISON (York): I should like to ask one question—Whether any parties except the Council of the Pharmaceutical Society are in a position to set the law in motion according to the clause read? We have no evidence that the Council of the Pharmaceutical Society has ever taken any action whatever against widows; the local associations for very obvious reasons never liked to appear in these matters; therefore if no other individuals have any right or power to insist on the provisions of the clause being carried out, it is evident the clause is likely to be quite inoperative.

Mr. ANDREWS: I think it is quite within the power of any one to take action to cause the clause to be carried out. I do not think there is anything which touches the interest of the druggists more closely than the settlement of the affairs of their families. I can tell of a case in London where very great injustice was done to the widow of a pharmacist who thought she had succeeded to a good business. She asked the Secretary of the Pharmaceutical Society whether it was legal for her to carry it on. She was told that it was not, and she was obliged to sell the business for a sum about equal to what the annual income would have been. While a widow may not carry on her late husband's business any registered chemist may set up any number of businesses all over the country and put any one he pleases in charge of them, competent or incompetent. Here is a glaring iujustice which ought to be remedied, and I think some substantive resolution ought to be carried by this meeting affirming that something should be done. When I went to consult my solicitor some time ago he said that the Act was very badly drawn, that you may do almost what you like, but that if you want to be in a secure position you must get two gentlemen to act as trustees; and therein consists the difficulty.

Mr. WOOTTON (Editor of the *Chemist and Druggist*): I should like to say, that so far as the business of a chemist and druggist approaches a profession, this clause is no injustice; because when a surgeon dies you cannot claim that his practice shall be retained by his widow, with any number of trustees. His practice dies with him; and so it must be with the professional part of a chemist and druggist's trade. At the same time, there is no doubt a great deal of property in a trade business, in reference to which there is much opportunity for rectifying the Act.

Mr. HAMPSON: I should not like to do anything injurious to women, but we ought to bear in mind that it was the intention of the legislature that the owner of the shop should be an examined person; and if we attempt to amend the Act in an opposite direction, we shall do injury instead of good. We ought to bear steadily in mind that the owner of poisons should be a responsible person. The widow, unfortunately, does not occupy that position. It is one of those unfortunate things in connection with this Act which occur in almost every kind of legislation—that there is personal hardship inflicted somewhere.

Mr. SLUGG: The executor is not an examined person.

Mr. HAMPSON said the object of an executorship was simply to wind up the concern. It was never intended that the executors should carry on the business in perpetuity.

Mr. A. BIRD: Would it not meet the difficulty by allowing ladies to pass the pharmaceutical examination? If the wife had been examined, she would then be in a position to carry on the business. Is not that some reason for allowing ladies to pass our higher examination? I say in my judgment that it is.

A DELEGATE: They can pass.

Mr. BARCLAY: I should like to advise any chemist who has not made his will, that it would scarcely be wise for him to make it in such a way as that his widow should carry on his business after him. I have known several cases throughout the country, and in almost every case the business has suffered. Instead of the business continuing a lucrative one as it was when carried on by the chemist himself, it has in the hands of a manager suffered considerably. I know a few exceptions where a manager has carried on a business satisfactorily, but they are quite the exception. It was only the other week I was consulted by a widow who was left some six months ago with a capital businesg in a neighbourhood where there was very little competition, and where one would have thought that the business could have been carried on by means of an ordinary assistant. In six months she had had three or four assistants, and just now the business is in such a condition that she is obliged to sell it—it is slipping away entirely from her, and she is in the greatest extremity about getting a manager, and altogether it is a most lamentable thing. She has been teased and worried during the last six months to such an extent that she would be glad to get rid of it almost at any price. Looking at the matter in a benevolent view certainly widows ought to have the privilege which executors are allowed, yet at the same time I should like to give the Conference, as the result of my experience, that it is not wise to make arrangements for widows to carry on the business as a rule. There is another point which ought not to be lost sight of, and that is that in the carrying on of businesses by widows and executors there is a loophole for illegal competition. I think there are many businesses carried on professedly by executors, which are really carried on by unregistered persons for their own benefit. As the Pharmaceutical Society does not appear to have pushed the matter, I should think the object of Mr. Slugg will be gained without pressing the matter further.

The CHAIRMAN: The discussion of this matter in a calm and dispassionate way cannot fail to do good by letting us all know the position of the law. Although manifest hardships may occur to the individual in some cases, which would at first dispose us to seek an alteration of the law that would permit greater latitude, I think there is great force in such suggestions as have been given us by Mr. Barclay. In the interest of the widows it probably is better that they should leave property of such a risky and responsible nature as this. We must recollect that in addition to the difficulties which any business may have there are liabilities under Lord Campbell's Act which apply specially to this trade. In view of this, and of the abuses by unauthorized persons, it is very doubtful whether it is in the interest of the general body that we should have much extension of the powers of widows. There are cases of wills being made which would give a widow power to continue a business two or three years in anticipation of the coming of age of a son. It appears that for this there should be some protection, but that a business should be carried on by a widow for a long period he did not think was particularly desirable.

The Conference then adjourned for luncheon and were entertained by the Birmingham Chemists' Association at the Midland Hotel. On resuming,

Mr. JOHN HARRISON (Sunderland) read a paper on —

JURIES.

Although the subject I have to bring before you is one of great practical importance to every chemist, yet I am happy to say that I shall not require to trespass long upon your time, as the reasonableness of the proposition I shall advance is so clear that very few words on my part will be required to enlist your sympathies with me.

The principle by which the members of certain professions are exempted from jury service on account of the peculiar character of their duties is a very ancient one, and has been so frequently adopted by Parliament that no defence of it is required on the present occasion. Since the year 1513 surgeons have been exempt from such service, and in the year 1694 this exemption was extended to apothecaries, for the following reason, which I quote from the Act by which the extension of the Act of 1513 was enacted:—

"Whereas the art of apothecaries is of great and general use and benefit by reason of their constant and necessary assistance to his Majesty's subjects, which should oblige them to attend solely to the duties of their profession."

It was no doubt felt at the time that as the physician and surgeon who prescribed the medicine were free from service on juries that it was only the correct logical consequence that he who compounded the medicine should be likewise free.

Public opinion in this country is proverbial for the slow rate of its growth, and it is perhaps therefore not a matter for surprise that nothing more was done in making further extensions of this principle in our own direction until the year 1862, when pharmaceutical chemists were included in the lists of those entitled to exemption from jury service, and they, observe, not because they were pharmaceutical chemists, but being a registered body and only able to obtain registration by passing a recognized system of examination there was no difficulty in limiting the privilege to those who were really entitled to it. Chemists and druggists were not included in the provisions of this Act, simply on account of the difficulty it was felt would occur in defining who were and who were not entitled to it.

This difficulty has, however, been removed by the Pharmacy Act of 1868, and every one now who aspires to the rank of chemist must reach it through the examination room.

My contention is, therefore, that as the whole of the members of our profession, whether pharmaceutical or not, must be registered, and when so registered discharge the same duties and incur the same responsibilities, so they ought also to be accorded the same protection. This contention will I imagine be at once conceded, as I trust there is no necessity at this advanced period of the nineteenth century to argue that equal conditions should entail equal rights.

The reasonableness of this proposition is so clear to my own mind that I can only account for the fact that it did not receive legislative sanction at the time of the passing of the Pharmacy Act, 1868, by supposing that it must have been overlooked or that it was withheld by Parliament simply because it was not asked for by those most interested in it. I am strengthened in this conclusion by comparing the principle upon which both the Act of 1694 and that of 1868 are based. You will have observed from the quotation which I made from the Act of 1694 that its principle was that persons engaged in the dispensing of medicines should give their personal attention to the same, for it speaks of "their constant and necessary assistance," and you will find that in the Pharmacy Act, 1868, the same principle is acted upon, for in the 17th clause, after defining what the penalties shall be for certain offences against the Act, it is enacted "and for the purposes of this section the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller." Now it is very clear from this that the intention of the Legislature has been that a chemist's business shall enjoy the continual personal supervision of the chemist himself, and I ask where is the consistency to lay down such a principle in one Act of Parliament and enforce the contrary by another Act, even to perform so important a duty as that of a juryman.

I need not trouble you with any instances of the hardships the present law entails, there will be plenty of such instances present to the mind of each one of you. The immortal Dickens has supplied in his trial of Bardell *v.* Pickwick such an one, which may differ somewhat in degree but certainly not in kind from realities which take place daily amongst us.

On two recent occasions have our claims been before Parliament. In 1872 Sir John, now Lord Coleridge, and again, in 1874, Mr. Lopes, introduced bills dealing with the juries question, and in the last bill were clauses exempting chemists from service on juries. In both cases, however, the bills failed to make their way through the Parliament, not, however, I am glad to say, from any opposition to the clauses especially interesting to ourselves, but on account of objections raised to other portions of the measures.

I think we should now proceed on a new basis, and not wait for so simple an act of justice until such time as the whole jury question can be dealt with, but urge upon Government or some private member to introduce a bill by which the provisions of the Juries Act, 1862, may be extended to all chemists and druggists.

And I hope that this Conference will not only express with a decided voice its dissatisfaction with the present unequal state of the law, but will also place the question in a favourable position for its successful agitation, and of this I am firmly convinced that, if it be taken up with spirit and prosecuted with zeal, its justice and reasonableness will ensure for it a speedy success.

The CHAIRMAN: I feel sure we shall all feel under an obligation to Mr. Harrison for his paper on the subject of juries. He expects to have your general consent, but there may be some remarks to be made.

Mr. BARNET (Rochester): I was engaged with many persons at the time of the Amended Pharmacy Act in getting the amendments, and one point which we pressed on the attention of the government was that we should be exempted from serving on juries, and the answer which was given was that they could not afford to spare so many intelligent men.

Mr. A. BIRD: I think there is a good deal of force in the able paper which has been read but there is one point I think we should not overlook. There does appear to me a sort of slinking, a sort of moral cowardice, in not being prepared on suitable occasions to assist our fellow countrymen in the difficult operations of doing justice. Although I think it is desirable that those who are engaged in dispensing medicines should be to a certain extent exempt, I think it would be desirable that they should have the option of serving on juries, as there may be cases where it would be of the greatest consequence to have a good chemist and druggist on the jury. I think it should be optional. If a chemist declines to serve he should not be called upon, but if he is willing to serve the country would receive benefit from his services.

Mr. SLUGG: I am very glad the subject has been taken up by the Conference because I have always considered it a great injustice that while members of the Pharmaceutical Society should be exempt the ordinary chemist and druggist could not be.

The CHAIRMAN: Not members of the Society; you mean pharmaceutical chemists?

Mr. SLUGG: Well, pharmaceutical chemist really means nothing, because men who were in business at the passing of the first Act were on certain payments made pharmaceutical chemists. I know the case of an ostler who groomed the horses of a surgeon and was occasionally called into the surgery and so obtained a knowledge of drugs. When that Act was passed he became a pharmaceutical chemist, having previously set up in business. I think it a great injustice that men of that kind should be exempt from serving on juries while I am not.

Mr. HAMPSON: As a pharmaceutical chemist I coincide with a great deal of what has been said. I think that as the legislature in its wisdom compels a certain standard of examination as a condition of entrance to the trade those so exempt are entitled to all the advantages which accrue to pharmaceutical chemists. With respect to the option of serving or not serving on juries I think the proposition that they should have the option is certainly a desirable one. It would be a pity if intelligent men should not have an opportunity of serving on juries if they think proper. I should certainly support any proposition which should exempt a properly registered druggist from being obliged to serve.

Mr. ARBLASTER (Birmingham): I am afraid the returning officer would find it very awkward in serving notices if chemists and druggists were to have an option.

Mr. ELLINOR: I think it is only right chemists and druggists should be exempt from serving on juries, seeing that many of them are not able to leave their business without getting a temporary assistant. They had no one regularly to manage for them, and as they were held responsible for any accidents or mistakes of those they employ, I think they should be exempt.

Mr. DELVES (Exeter): Speaking as a Major man, and especially in answer to Mr. Slugg, I may say that the only advantage we have in passing our examination is exemption from juries. I don't wish to speak as to the merits or demerits of others.

Mr. DYER (Halifax): If it would be competent for us I should like to propose a resolution that the Pharmaceutical Society be requested as soon as possible to procure the exemption of chemists and druggists from the liability of serving on juries. I believe there is no point upon which there is greater unanimity among the registered chemists and druggists throughout the country than that they ought to be exempt.

Mr. HARRISON: I rise for the purpose of seconding the resolution. When the pharmaceutical chemists were exempted it was not because they were pharmaceutical chemists but because they were registered. Now we are registered I contend we ought to enjoy the same exemption.

Mr. BIRD asked the mover of the resolution to amend it by adding the word "optional."

The CHAIRMAN explained the manner in which the jury lists were compiled, pointing out that exempted persons were omitted from those lists on their claiming exemption. It was from the lists that juries were summoned. If any chemist wished to be called upon to serve it would be necessary that there should be no claim for exemption by himself nor by anyone on his behalf.

Mr. ANDREWS moved as an amendment, "That in the opinion of this meeting, it is most desirable that chemists and druggists be exempted from serving on juries, and that as soon as possible the attention of the trade association be devoted to the purpose."

Mr. BIRD: I beg to move an amendment that the word optional be a portion of that amendment.

Mr. JONES (Leamington): I have been anxious that all members of the trade should be exempt, because there are many of our brethren who have not the means of obtaining an assistant. I hope Mr. Bird will not press his amendment as regards it being optional. I hope the legislature will release us entirely, or that it may be optional only as a matter of favour. In Leamington, I have been asked by the summoning officer whether I would act on a jury as a favour in certain cases where it was thought desirable to have a chemist or two.

Mr. BIRD: All I wish is that registered chemists and druggists should not be absolutely disqualified from serving

Mr. JONES: They are not disqualified from serving.

Mr. ANDREWS: I have had a like experience to Mr. Jones. We should not be disqualified in any way.

Mr. BIRD withdrew his amendment, and the amendment of Mr. Andrews, being accepted by the mover of the resolution, was carried unanimously.

Mr. R. HAMPSON read the following:—

CIVIL SERVICE AND CO-OPERATIVE STORES.

BY R. HAMPSON.

This subject which has revolved in the mind of the trade for a considerable time, is at length likely to receive adequate and unfettered discussion. It has been a forbidden one to ventilate in the pages of the *Pharmaceutical Journal*, and at the annual meetings of the Society it has been mentioned with bated breath, as if this particular question was so involved and peculiar that neither discussion would throw light upon it, nor deliberation help to remove it from our path.

The main plea uttered by presumably intelligent men for all this folly of silence and reticence was that a public discussion on the illegality of the co-operative stores, would simply result in gratuitously advertising them to the public, and would otherwise do no good. This plea can no longer be advanced. The stores still abound and flourish, and the pernicious example set in the metropolis is bearing the expected fruit in the provinces.

The time has come when the assumed and hollow decorum of silence investing this subject must be utterly broken through and put aside, and the question—notwithstanding the inordinate apathy and patience that clings to the trade in reference to it—be fought out to the best issue that remains for it.

It is not needful for me to bring you detailed evidence as to the number of the stores in which the Act of Parliament is infringed and set at nought, or a precise estimate of the amount of damage done by them to the legitimate trader. It is admitted by all, except perhaps some of the so-called *élite* of the trade, who may possibly be unaffected, that the injury done is great and increasing, and that in some cases the result is absolute despair and ruin.

If discussion be stifled elsewhere, here at any rate there will be liberty of speech, ending I hope in deliberate counsel and action. Some persons in their commendable desire to raise the so-called status of our business seem to forget that the true basis of the fabric they would build is that of a prosperous and contented trade; and they would appear to be utterly oblivious of the fact that without a proportionate money compensation to the trader, this status is merely attenuated moonshine.

When the Pharmacy Act had passed, those who had worked with unselfish zeal for the enactment gave vent to much jubilant feeling. They had fair grounds for so doing. They spoke as if the panacea of pharmacy had at length been found. The President occupying the chair at the time, our much esteemed Mr. Sandford, publicly stated, and he only gave expression to the prevailing hope, "that as no man could in future commence business without passing an examination, there could be no doubt that the status of pharmacy would be improved." The reverse of this expected result time has proved to be true. The Act of 1868 is now openly set at defiance, not only by illegal traders of the ordinary stamp, but by large wealthy and influential bodies of traders who tag on a department of pharmacy as they would one of millinery in the midst of a heterogeneous mass of mixed trades, and in this manner openly break the law, not only by serving their own members but the public at large.

I do not intend to enter into the question of the right or equity of civil officers of the state to become traders to the detriment and ruin of the ordinary trader, who has to contribute in the shape of taxes to their support, but I shall confine myself to the question of the right and legality of co-operative trades "keeping open shop for the sale and dispensing of poisons."

Our trade has been legislated for because of its exceptional character. It is subjected to clearly defined state restrictions and regulations which affect all its members, and as a consequence we are quite justified in taking distinct and well assured grounds of criticism in dealing with the question of co-operative stores. Our stand-point totally differs from that occupied by the ordinary trader, who is not subject to legal restrictions or onerous regulations.

It cannot have entered into the head of either the registrar, or any other person interested in pharmacy, that whilst the Pharmacy Act of 1868 was deliberately intended by the wisdom of Parliament, and in the interest of the public, to prevent and punish the illegal trader who opened "shop for the retailing and dispensing or compounding of poisons" without having first passed the legal examination, that a large number of persons putting their capital together were to be exempt from the operations of the statute.

It is admitted, and sundry convictions in courts of law prove the fact, that an uncertificated person keeping a qualified assistant cannot assume the title of chemist and druggist or its equivalent, "or sell or keep an open shop for the retailing, dispensing or compounding of poisons" without breaking the law. Surely both law and equity are infringed and common sense outraged if a number of unqualified persons keeping open shop (although they employ a qualified assistant as their servant) are permitted to "retail, dispense, and compound poisons" with impunity, whilst an individual is held liable to a conviction in a court of law for doing precisely the same thing.

If there exists a reason or cause for this unequal and partial interpretation of the law it is too profoundly occult and mysterious for my discovery.

The infringement of the law and of our legal privileges, of which we justly complain and of which we demand the rectification, should have been immediately called into question and put to the legal test.

Years are quickly passing away and the Pharmaceutical Society, supported by the money of the legal traders and the fees of the examined men, is yet asleep and dumb, and the safety of the public and our own legitimate trade interests, both of which are trusts the Society is bound to take cognizance of, are apparently forgotten and neglected.

But some of the members, whose sentiments would almost lead me to doubt their fealty to the Society, have assumed that the public might consider that their safety was not in any way imperilled, if the drug departments of the stores are managed by qualified assistants.

The interpretation of the statute in the courts of law is testimony in an opposite direction.

A grocer or any ordinary tradesman keeping a qualified assistant, has been held to be thoroughly unfit to have the ownership and control of a chemist's business; and a person unable to pass the technical examination in his business, yet trained by years of experience to practical knowledge, is also held to be an illegal trader, notwithstanding that he may employ a qualified assistant to help him in the conduct of his business; and even the poor widow's shop as been closed in obedience to the same law.

The Act has likewise been legally construed, that a partnership, consisting of a qualified and unqualified person, cannot legally exist.

Is it to be supposed therefore, that if these interpretations of the statute be warrantable and consistent with the true interests of the public, that the public safety is well and legally conserved in the drug departments of an unwieldy store, one perhaps of ten or twenty departments, where there is no one possessed of the requisite training and knowledge to overlook and control the qualified servant or to bear the great and unceasing responsibility that attaches to the properly qualified employer and owner?

The intention of the statute is, that the owner of the drugs and poisons should be the carefully instructed and legally qualified and responsible person, and to him mainly the public looks for safety and not to the qualified assistant.

There is another aspect of this very pressing question to which I must ask your attention.

The second object contemplated by pharmaceutical legislation was the conservation of the interests of the legal trader. The words of the charter assign as its special object, "the protection of those who carry on the business of chemists and druggists."

If this specific object were not so formally stated in the charter of incorporation as it is, the provisions for restricting the trade in poisons, as clearly set forth in the Act of 1868, denote that the legally qualified person is entitled to the full benefit from all the legal trading coincident with the carrying out of the enactment.

This is a just and dignified claim, however much it may be the fashion in some quarters to deny or doubt it.

Before the passing of the Act of 1868, there was much said about the vested interests of those already in business, and of those who had voluntarily passed the examinations of the Pharmaceutical Society. These claims were reasonably advanced and entertained.

If there were vested interests acknowledged and claims to be considered before the Act had passed into law, there are greater and more pressing claims and better established interests belonging to the legally qualified men to be urged now. They are the natural and anticipated growths arising out of the operations of our state-regulated and restricted trade, and the vested interests may be represented as the expenditure of much time, money, energy, and intelligence in obedience to the system directed by law. And I maintain that it is strictly equitable and in perfect accordance with the spirit and letter of the law, that the fairly earned equivalent in trade should be reaped only by the legitimate trader.

These claims and interests I wish most fervently still to entrust to the quickened guardianship and conscience of the Pharmaceutical Society, and I hope they may not be ignored or forgotten.

Should these our interests and claims, however, remain unheeded or inadequately recognized, the Society will be called upon to justify its existence afresh, on grounds not to be found in the statutes; it will lose the prestige that is attached to its good name, and become an unpopular and effete body.

I would not have accepted the unenviable responsibility of introducing this subject for your consideration had I not deeply felt that the stability of our calling and the safety of the Pharmaceutical Society were deeply endangered by the evil that prevails unchallenged in our midst.

The continued existence of the evil arising from this most gross infringement of the law and of our legal privileges, will have the effect of stunting the growth of pharmaceutical knowledge, as well as causing the impoverishment of the trade to which we are attached.

It is our duty to request the Pharmaceutical Society, to whom I trust we desire most faithful allegiance, to resolve upon a course of prompt resolute action. The sooner this obligation is undertaken the better, as the lapse of valuable time increases the evil and renders the position in every way more difficult and doubtful. If upon the test being fairly made it should be found there exists some unexpected legal flaw or weakness in the Act of Parliament, which inadvertently permits the existence for the time being of the excrescence we would uproot, we must be prepared to ask of the legislature an amendment of the law upon the fair and already accepted grounds of enlightened expediency—namely, "the safety of the public, and the protection of those who carry on the business of chemists and druggists."

A period of absolute finality in pharmaceutical legislation has certainly not yet arrived, that we need hesitate or fear to approach Parliament, if we should find it necessary, with the open and honourable request that our Act shall be so far amended as to carry out more completely the objects for which it was originally framed.

The present crisis is one of singular doubt, embarassment and dissatisfaction. It is admitted on all hands that a glaring and grievous evil exists that cuts at the root of the Pharmacy Act—an evil which, if allowed complete development, will to a great degree render worthless and obsolete the legislation which we have been accustomed to look upon with so much satisfaction, and which was earned after the expenditure of much zeal and toil.

We assume that the Act of 1868 is strong enough to put an end to the evil of which we complain, yet there appears to be a total absence of the necessary public spirit and resolution in the Pharmaceutical Society to enable it to take up the leadership which devolves upon it, so as to bring this question to a satisfactory issue.

I deeply regret that I have found it necessary—occupying, as I do, so close a connection with the Society—to speak thus plainly of the institution to which I feel sincere regard; but he is not a friend who covers up and conceals the danger which menaces the Society, in polite phrases and useless encomiums.

The CHAIRMAN: There has certainly been no case in which our obligation can be greater than it is to Mr. Hampson. He has treated the question with great judgment, and in a most convincing manner.

Mr. SLUGG: While Mr. Hampson was speaking I could not exclude the idea from my mind that if the able reasoning contained in the first part of his paper was transferred to the brief of an able advocate and addressed to the Court of Queen's Bench I think it would convince the judges that the sale of poisons and the dispensing of prescriptions are illegal on the part of the societies to whom reference has been made. At the same time I admit that the whole question is one full of difficulty. It is, however, worth discussing, and I compliment Mr. Hampson on the great ability with which he has brought the subject before us. I repeat that if his able argument could be transferred to the brief of an able advocate it would convince a jury. During the last twenty years a great change has taken place in the drug trade, of Manchester at all events. There are fewer drugs sold now than ever, and more patent medicines. All drugs seem to be crystallizing themselves in the shape of patent medicines. The sale of these is a very important item in the druggist's business.

Mr. MYERS (Hull): I beg to submit the following resolution:—"That this Conference of chemists and druggists urges upon the Pharmaceutical Society the necessity of testing the legality of the co-operative societies selling and dispensing poisons." I believe myself, as other speakers have expressed it, that if a proper brief were constructed by a gentleman of Mr. Hampson's capabilities, and such a case were taken up by the Pharmaceutical Society and brought into a court of justice, we should put a stop to these co-operative stores dispensing and selling poisons.

Councillor STEAD (Leeds): I have great pleasure in seconding the resolution moved by Mr. Myers. The subject before us is called on the programme "Civil Service and Co-operative Stores." I do not know what the co-operative stores do in the south, and though I am not going to justify the action of one in Leeds, it occupies a position which, in contrast to that of the Civil Service, is that of honest men. They do not dispense but they sell ordinary drugs. You cannot obtain from them a box of Cockle's pills under 1*s.* 1½*d.*, but if you go to the Civil Service you can get them for 11½*d.* Perhaps the service is not altogether to blame, for I remember somebody boasting that he and others had sent to a wholesale chemist and bought half a dozen boxes of Cockle's pills for 4*s.* 6*d.*, and divided them amongst them. At the Leeds co-operative store, which was originated by working men, you cannot buy a bottle of medicine one penny cheaper than the usual price. They are honest traders because they charge the usual price and divide the profits among them. We had one society which whether its liabilities were limited or not its trade certainly had been, and I hope to see the other follow its example. I am sorry to see the one now standing in Leeds is supported by men who might well set a better example, and is actually supported by middle class shopkeepers. If we were to band ourselves together, as certain of the chemists of Leeds have done and who have eschewed certain solicitors, certain doctors, as well, I am sorry to say, as clergymen, both Dissenting and Church, who are subscribers and shareholders in these companies, we might give them a Roland for an Oliver, and stop the supplies to them if they stop the supplies to us. I have great pleasure under the circumstances in supporting the resolution.

Mr. JERVIS: May I ask whether it it has been well considered that these stores have not the same privileges as a club?

The CHAIRMAN: There is no doubt about it, that there is a great deal that is hollow and a sham. There are five shilling tickets given as a sort of proof of membership, which are lent about by one person to another, and in consequence of that being the case, I do not think the claim to be a club could be sustained.

Mr. JERVIS: It cannot, and if the matter were followed up I have no doubt we should obtain some success.

Mr. SOUTHALL: And there are some which profess and call themselves Limited Companies.

Mr. READE (Wolverhampton): With regard to this motion which is before you, I think you would be decidedly very likely to gain the point if you confined the restriction to their selling and dispensing poisons and prescriptions. That is a point I think we should dwell upon in any memorial upon the subject. I think there has been some decision lately which would strengthen a view of that kind. The London and North Western Railway Company at Crewe have until lately been manufacturing engines to sell. Now their powers, while they enable them to manufacture all they require, are found not to warrant them in selling, and I think there is some analogy between the two cases. These societies may have a perfect right to dispense for themselves, but not to sell to others.

Mr. RIMMINGTON: In the railway case objection was taken by some shareholder on the ground that trading in engines was likely to turn out disastrously to the Company. In the present case, unless we can get a member of some co-operative store to object as to the conduct of the business, there is no analogy between the two cases.

The CHAIRMAN: I think I may put a case which will act as an illustration. A few weeks ago there was an injunction brought against Price's Candle Company, for having given a holiday to the workpeople. It was by a shareholder who wished to show he was suffering damage by this holiday having been given to the workpeople, as, consequently, the dividend was diminished. I am told he was a clergyman, and had once been chaplain to the company. I think it shows that it is the shareholders who generally move in these matters. Of course the gentleman in that case was very properly defeated.

Mr. READE: I do not see at present where the analogy fails. These people are doing, to a certain extent, what they have a right to do, but beyond that point they have no right to go, and I think we, as a body, are the people to point where they should go and where they should stop. We may say, "You shall make what you like for yourselves, but not for the public. The law will prevent you."

Mr. DYER: They don't sell to the general public.

Mr. RIMMINGTON: Some of them.

Mr. ELLINOR: I would suggest another way of getting out of the difficulty; and that is, all members of firms should be registered, and none should be allowed to enter into any partnership, or any benefit, or any society without they are registered.

Mr. RADLEY: I should like to move an amendment to the proposition; not that I disagree with the feeling of the meeting, but I think this association—if it can be considered such—can take up the subject, and let it be relegated to the committee of the association. That is what I propose instead of the other resolution. The amendment is—"That this question be remitted to the Committee of the Association, to take action such as they may be advised." I think we now can act independently, and I should like the matter to be carefully gone into by the committee of the association.

Mr. ANDREWS: As a tradesman in the West-end of London, I am very much interested in this question, and although I go almost entirely with Mr. Hampson in his very able paper, yet I am afraid the resolution as it now stands would be productive of no good whatever. It is well that this meeting should consider whether we should not go to the root of the evil, and see whether something cannot be done to prevent civil service stores dispensing, because, as the law now stands nothing can. The action must come from the House of Commons, your action must be on its Members, not on the Council of the Pharmaceutical Society.

Mr. BIRD seconded Mr. Radley's amendment.

Mr. HAMPSON replying said: I feel considerable delicacy in reference to this question, but I believe that the resolution as proposed is a straightforward course. I do not attack the Council at all; I attack the Society, and the Society is responsible for the action of the Council. Even supposing we are beaten in this matter shall we be worse off? The position I take is simply this, that the Pharmaceutical Society is bound to take action if it receives our money at all. If we allow this system to continue we are setting an example of illicit trading, and if we do not take action against these it is not just to prosecute individuals. I think it is unjust to prosecute individuals and permit these great sharks to remain untouched. It is thoroughly unjust to shut up the widow's shop or prevent a small trader from selling a pennyworth of laudanum when we allow these great stores to start up and defy a law which was made for the safety of the public and for the protection of legitimate trade. I believe it is our duty to take the matter in hand. If the Pharmaceutical Society does not do it I believe we ought to do it, and I would sooner resign my seat on the Council to-morrow than continue to occupy a position of such ignominy as a member of the Council, and if my advocacy of this cause should compromise my position on this Council, I would resign my position to-morrow. I feel that the protection of the small trader does not affect your large West-end shops but to a trifling degree, but it affects the man who has just passed his Major standard, who having passed that standard expects to obtain the public confidence, but who, without he has set up his shop at a rent of perhaps £100 a year, finds the trade is cut from beneath his feet and he can scarcely keep the wolf from the door. This is a humiliating position for the Society to occupy. I maintain that this is the work of the Society and if the Association can help the Society in carrying forward the prosecution it is its duty to do so.

Mr. RADLEY withdrew his amendment and the resolution was carried unanimously.

Mr. G. A. CUBLEY (Sheffield) then read the following paper:—

NECESSITY FOR A CHEMISTS' ASSOCIATION.

The subject I have undertaken to bring before your notice is "The Necessity for a Chemists' Trade Association." This must of itself have been sufficiently shown by the papers already discussed; for in each one, and in those to follow, the remedy offered to the evils complained of, is trade combination. In each case if any good is to be effected it will be accomplished, not by individual effort but by a union of the members of the trade bound together for mutual defence and protection. It is the old, old story over again of the bundle of sticks, with its antiquated, but equally true moral "Union is Strength."

It has no doubt occurred to many of us that our parent society and governing body, the Pharmaceutical Society, should or ought to be able to take up each of the questions discussed to day and many others that will arise from time to time, but whether from apathy on the part of the Society or the individual chemist, those questions affecting our trade have been kept in the background, and those respecting our professional attainments and knowledge have been mostly attended to.

It has been examinations and regulations regarding us as a profession that have hitherto been the chief object of attention, whilst the defence of our trade and of our daily living has been left alone, for the single efforts of some particularly aggrieved member. Although this is not altogether satisfactory it has been productive of some good, and it has been the means of drawing us together here, to end in what we hope will be an Association that can defend us from all undue pressure and preserve intact our trade and privileges. Many amongst us believe it to be an anomaly, nay an injustice, that although we as a trade number some 14,000, we are governed as to examination and trade restrictions by about one-fifth of the whole body.

It may be easily said, "Oh! it's your own fault. If you wish, you can pay your entrance fee and a guinea a year, become members of the Society, and thus help to govern yourselves." That is quite true, and no doubt it would be well for all to do so and thus have a voice in the election of those who virtually govern us. Yet every one does not like to pay for what hitherto has appeared to him to be merely an examining and restrictive body; a body that has paid very little attention to the protection of its trade interests.

It is in no spirit of opposition to the Pharmaceutical Society that we are met here to-day, but as it seems to be thoroughly understood in high quarters (I will quote the organ of the Pharmaceutical Society,—the Journal) that "there are under existing conditions so many difficulties in the way of obtaining the requisite precise information necessary for dealing with particular cases, that without the aid of some organization, the chances of escaping detection are greatly in favour of those who systematically infringe the Act,"—then I am sure you will coincide with me, that we must help to remove those "difficulties," get the required information, and finally, do away with the existing conditions that prevent our being protected in the responsible trade we pursue.

But it is not only against infringements of the Act that a trade association would be useful; there are the cases where we have to defend ourselves from undue and unjust attacks from other sources. There are prosecutions of druggists under the Medical Act. What is more unjust than that any dabbler in herbs, or pretentious quack can physic at will, whilst a druggist is sought to be restrained from giving a dose of a drug he has been acquainted with a life time; or that a doctor's errand lad, when he has grown a little, should be made a dispenser, and finally, when too big or wanting too much wages, should be turned adrift amongst us to start a shop, a mere blind for quackery, for the illegal sale of poisons. I will venture to say that there is more harm done in prescribing by the setting up of one of these places than by a score of establishments conducted by properly apprenticed and educated chemists. What the medical men complain of, they to a great extent must thank themselves for. We can never forego our just right to be able to give over our counter a dose of medicine when asked for. This would be one object that a trade association could properly defend, and which could give the answer of the whole trade, that the only settlement possible of the dispute between the doctor and the chemist shall be on this basis. You prescribe and not dispense; and we will dispense and not prescribe. Then there are prosecutions, and vexatious ones, under the Adulteration Act, that require to be protected against. I am sure no one here would defend adulteration; our object as honest tradesmen (having in view the responsible position we hold) is, and ever ought to be, to adhere to the highest standard of purity; yet we ought to resist any prosecution founded upon a merely legal quibble. In these cases it can be hardly expected that the Pharmaceutical Society will at once take them up. But if it does not, pressure must be put upon it, and it is through the medium of a trade association that the pressure can be put; or it would be by a trade association that such attacks could be resisted. How easily and quickly we could acquaint the Society and the country of the feeling of the trade upon any particular subject, if in each important town or district there was a branch of such an association!

We must remember that in case of a society founded upon charter and Act of Parliament, action is slow and deliberate; that I believe is rightly so. It is difficult for it to act quickly, for no step can be taken except through the authorized channels, and in the case of the Pharmaceutical Society we know that the feeling that naturally has most weight is that of its members; perhaps they are less affected as a body by the evils we complain of than the rest of the members of the trade, therefore an outside body that shall be able rapidly and easily (by its freedom from legislative restriction) to express and give force to the opinion and wants of the whole trade, will, I believe, not only be of the highest benefit to chemists generally, but to the Pharmaceutical Society itself. There is one thing I cannot endeavour too often and too deeply to impress upon you, that we are tradesmen. Tradesmen no doubt requiring an almost professional education, and with responsibilities far beyond those of other trades, yet tradesmen still; it is in the endeavour to make our calling into a purely professional one, where so great a danger lies. It would be to leave the substance to grasp at the shadow. It is constantly dinned into our ears that it is derogation in our position to sell this, that, or the other; but I would hold (it may be I am alone in the opinion) that it is no disgrace to us to sell any one thing so long as we do it honestly and fairly. If we are to go on much further, as some wish, we shall merely take the place of the old apothecary, and leave to spring up behind us a new body of men who will occupy the position that the majority of us now hold, and they untrammeled by Act of Parliament and not subject to examinations. Therefore, it will be far better for us to join a defence association, having regard to our trade interest, and leave the Pharmaceutical Society the duties it is more adapted to, whilst we should be able from time to time to make known to it the wants of the bulk of the trade, to restrain it when tying our hands too tightly by causing it to put new action into the powers it possesses for our benefit, so we both may mutually benefit each other. But if left uninfluenced by a trade association there is danger of the Society going to sleep, regardless of the interest of the whole of the trade.

It is easy so long as things go on quietly and the balance-sheet is pretty good, for the Society to feel that all is well, and yet for us to know that there are plenty of cases where attention is wanted. The Society would be all the better for an association to wake it up a bit now and then.

But we must look still further. The time will come when some alterations of the Pharmacy Act must be required, even if there is not already a necessity for it. There are further extensions of the schedule of poisons. Such questions as confining the sale of drugs to registered persons only, the appointing inspectors to discover illicit trading by unqualified persons and sale of poison by them. There is the constitution of the Council, for we must remember that eventually if the Pharmacy Act remains unaltered the Council will be elected from pharmaceutical chemists only, members being chemists and druggists will die out, and then the trade would be governed by a council elected from a very small proportion of the entire body. Here then is another field for a protective association to enter upon. Another class of questions a trade association alone could entertain is that of a price current, a trade mark for prescriptions, early closing, defence against co-operative stores, against the sale of patent medicines and drugs by grocers, and, if needful, combination against those who supply them with patent medicines, and drugs. Here is a case where the Society could not possibly interfere, but where we, if combined together could at once make ourselves felt. This is what is doubtlessly wanted by the provisional committee when they say it would also be within its functions to take active measures in such ways as it is deemed desirable for their legitimate trade interests.

There is yet another and that a most important office we can combine together for, that is for mutual relief in cases of accident. We all know that being human we are liable, however well our establishments may be organized, however careful we may be personally in the discharge of our duties, however highly trained and qualified ourselves and our assistants may be, at some unfavoured moment, and through some untoward train of circumstances, to the occurrence of an accident, injurious, perhaps fatal to our customer, and of untold disgrace and pecuniary damage to ourselves. Here again the association could be made useful, not to cover any wilful neglect, or guilty carelessness, but to aid and protect any one who may be accidentally the unwilling and unconscious means of a distressing and painful accident.

I think I have pointed out plenty of work to do; but how and by whom is it to be done? It will never be accomplished by men talking and writing, or by men grumbling and complaining each one about his own particular and private grievance. It can only be done by banding together; by mutual support with united energy.

It is only as an united body we can make ourselves felt and heard.

Let us urge upon each and all to join together with us in removing the difficulties that lie before us; in punishing those encroachments on our well earned privileges, in resisting all oppressive and injurious attempts on our freedom of trade, and in combining together for our mutual support and advancement. It is not merely meeting and talking together that will do us good; it is systematic and wide spread organization that will enable us to defend ourselves from all attacks. If we separate from this place without laying the foundation of a trade association, our time will have been merely spent in having had an enjoyable meeting and, perhaps, making a few new agreeable friends. But as far as the trade at large is concerned it will have been time wasted. It has not been my duty to point out how this organization is to be effected. It has only been to show how necessary and urgent it is to be done. It cannot be done without each one putting his shoulder to the wheel by influencing all with whom he comes in contact, also by that test, a great support in liberal contribution to start with. Then come the details of organization, and after that the fruits of being a firmly united body. I know that I have left out many points that might have been touched upon, that I might have urged more strongly and placed more decidedly before you the advantages ages that will result from union. These, I trust, will be gone into and made clearer by those who follow me, but the object that I have had in view will be accomplished and my duty fulfilled, if I have in any way shown you the necessity for a Chemists' Trade Association.

The CHAIRMAN: The paper Mr. Cubley has been good enough to put before us must certainly in many respects be considered the paper of the day. It is one which will bear practical results. If gentlemen are convinced by his argument they will soon have an opportunity of showing their convictions in a very tangible shape by voting for a resolution which will be moved upon this subject.

Mr. RADLEY: I have been very much pleased with the paper which has been read to us. I have great pleasure in moving that we have an association, in the following terms:—"That this meeting of delegates from Liverpool, Birmingham, Leeds, and Halifax, Sheffield, Leicester, York, Wolverhampton, Dewsbury, Sunderland, Taunton, Bridgwater, Hull, Exeter, Shrewsbury, etc., also for members of the trade from several other towns, is of opinion that it is necessary to establish a chemists and druggists' association for the protection of trade interests, and to defend druggists and chemists from illegal and vexatious applications of the Adulteration Act, also that those present agreeing with the objects in view, now form themselves into an association, having the following constitution:—This Association shall be styled the Chemists and Druggists' Trade Association; that the management of the Association shall be in the hands of a committee, consisting of a president, treasurer, honorary secretary, and other members named in the following list, with power to add to their number; that the minimum subscription of members shall be 5*s.* per annum, and that larger subscriptions shall be invited; that a meeting of members shall be held, to which the committee shall present the report of the year's proceedings, and the treasurer his financial statement; that the officers shall be elected annually at this meeting; that Mr. S. U. Jones of Leamington be elected President for the ensuing year, Mr. T. Barclay Vice-President, Mr. W. Southall (Birmingham) Treasurer; and that the members of the provisional committee and the following gentlemen be the Committee:—Messrs. F. Andrews (London), H. Barnaby (Rochester), C. B. Bell (Hull), W. B. Clarke (Leicester), Clifton (Derby), G. A. Cubley (Sheffield), R. Davison (York), W. Dyer (Halifax), F. Earle (Hull), W. Fleeming (Wolverhampton), Frost (Derby), Greaves (Chesterfield), Greenish (London), J. Harrison (Sunderland), J. Jessop (Halifax), S. S. Johnson (Manchester), A. H. Mason (Liverpool), F. Parsons (Leicester), W. V. Radley (Sheffield). Reade (Wolverhampton), B. Shaw (Halifax), J. C. Thresh (Buxton), and A. C. Wootton (London)."

Mr. CROSSBY (Shrewsbury): I think that to have different amounts of subscriptions would be to place some of the members of the association in an invidious position. I think that I should fix the subscription, and if 5*s.* is not sufficient fix it at 10*s.*, only let one member of the association be as good as another. Mr. Bird mentioned that the Grocers' Association had an absolute subscription of one guinea per annum, which was not found too much to supply funds in the defence of costly prosecutions.

Mr. ANDREWS: Whatever the subscription is it should be a uniform one. I think it would be invidious to have a rising scale.

Mr. CUBLEY: I might say that if you adhere to the 5*s.*, you would probably be better off, because one association ought to include the whole of the country. We ought to have the whole of the 14.000, druggists who are on the register, and if we keep our minimum subscription low, we shall have greater chance of including the whole of them, there are many amongst the druggists in the smaller districts, and the poorer districts of larger towns, to whom 10*s.* or a guinea would be a large sum. If we can unite a large body their little subscriptions will amount to a large sum. With regard to the Grocers' Association which has been mentioned, that is the Association of one town only, and our object is to have a trade association of the whole country.

Mr. BELL: I must say I support the subscription of 5*s.* per annum. I have had some experience in getting up the East Yorkshire Association, and I must confess I found the small subscriptions come in better than the large ones.

The CHAIRMAN: Do you wish the 5*s.* to be the minimum or the absolute subscription?

Mr. BELL: I would say absolute the first year and if more was required I would appeal to the liberality of the members afterwards.

A DELEGATE (from Taunton) said: The unanimous opinion of those whom he represented was that an absolute sum of 5*s.* as an annual subscription shonld be the subscription for the Association.

Mr. CHURCHILL: I have been engaged talking among many gentlemen during the afternoon and I find many not only prepared to give us a handsome donation but also to give us a subscription much larger than 5*s.*, and I cannot see that any harm would result from receiving a larger subscription than 5*s.* It is simply as a sort of annual donation. There are many chemists who may be thankful that they have good businesses and good incomes and can afford to give a fair sum to an association like this, but there are, on the other hand, unfortunately many chemists who have small businesses, who just manage to make a living, and who stand in need of defence, and they cannot afford to pay more than this 5s. I think the association would be very unwise not to accept larger subscriptions than 5s., but I think this minimum amount should be as small as possible. I do not think the fact of a member being a minimum subscriber should at all be to his detriment. None but the Secretary and officers would know who were the minimum and who were the maximum subscribers.

Mr. NICHOLSON (Sunderland): I think the fact of there being two subscriptions would tend to keep many away who would otherwise join.

Mr. THONGER: I rise just to say that my opinion agrees with that of the friend who spoke last. From what experience I have had I think it would be very foolish to have two rates of subscription. Many of the small chemists would be altogether deterred from giving the smaller sum of five shiliings, and would not join the society. It would be for the rest of us to give donations at any time, but I do feel strongly that we should have one subscription, and that subscription the sum of five shillings.

Mr. ANDREWS moved an amendment, "That the subscription be five shillings, and if any gentleman desired to give more than that he could give it in the form of a donation."

Mr. CROSS seconded this, and it was carried by a large majority.

The general resolution was amended in this particular, and also carried; after which Mr. Jones, the President-elect, took the chair. Having thanked the Conference for the honour they had done him, he called upon the reader of the next paper.

Mr. JESSOP (Halifax), read a paper by Mr. B. SHAW, on

PATENT MEDICINE LEGISLATION.

Although the misadventures arising from the careless or injudicious use of patent medicines are not, to judge from the reports that appear, so numerous as those which follow mistakes made by ignorant or temporarily incompetent persons in the dispensing of medicines, yet there have been recently cases of poisoning of the former class so startling as to attract public and general attention, and to call up a demand for protection. At present there is no remedy at law, or at least no power of blame laying in the event of death, subsequent to taking a patent medicine or nostrum. Its composition is for all practical purposes known only to the maker. It is quite possible that in some cases, through careless mixing or want of due precaution at the time of putting up a secret medicine, that its composition is variable, and that too in respect of the most active of its ingredients. I name chlorodyne to indicate how easily variability might occur under such conditions. But the composition being secret and the article having the protection of a Government stamp, the public have no safeguard in the item of variability of nature, and therefore of power and efficacy, in a so-called patent medicine.

It is equally helpless in respect of there being an unsafe quantity of a powerful medicine, such as opium, chloroform, chloral, antimony, etc., in each dose, as ordered in the directions attached to a patent medicine, even provided the conditions producing variability have been absent.

It is well for our own interest, therefore, to cast about and ascertain whether it is feasible to frame suggestions for legislation on this important matter which, if made law, would not restrict the profits of those who prepare safe nostrums, appreciated by the public, and yet at the same time afford some safeguard against the lamentable accidents which have occurred through the indiscreet use of patent medicines containing powerful drugs or chemicals.

In the first place, let the name patent medicine as applied to a secret remedy be a reality instead of a misnomer, as it is at present.

This change seems to require the submission to a properly constituted authority of a form of specification as to nature and composition, in many respects corresponding to what is required before protection or letters patent are granted in the arts. Let this authority be a Board of Commissioners sitting in London, and paid by the Inland Revenue. There is room for much discussion as to the powers to be delegated to, and exercised by, these officers. What profession should they be chosen from? Should they have the right to refuse any proposal for a secret medicine, licence, or patent, that they deemed undesirable, or to require an alteration to be made either in formula or size of dose for safety's sake before they issued their licence?

The dealers in nostrums consisting mainly of the registered chemists of the country would naturally look with a strong foreboding of ill, were a Board of Commissioners in patents for medicine to be chosen solely from the medical profession. The writer is disposed to think that a number of public analysts or professional chemists would be preferable to a board composed of medical practitioners only, or one of trading chemists only, or to a mixed board of persons from both these classes.

In setting the patent medicine business on a new footing, the proposed Commissioners would have to deal with existing patent medicines, and thus come in contact with vested interests at once. Let all makers of nostrums now in the market be compelled to name all the ingredients in their several preparations, and to state the proportion of the most active in the maximum dose, as set forth in their directions for use. Let this be a private procedure before the board either by personal appearance or affidavit.

The Commissioners shall then certify what medicines, the composition of which having been duly declared unto them, may be sold freely, and in case of powerful medicines such as Jeremie's solution of opium, James's powder, chlorodyne, Hunter's solution of chloral etc., shall state in a schedule what medicines shall be registered at the time of sale in the same way as a poison in schedule 1 of the Pharmacy Act, 1868, requires registration.

It should also be binding on all makers of secret medicines to state distinctly on the outside wrapper round their several preparations whether they require registration or not.

The Commissioners should admit all patent medicines that are before the public by a date specified, to licence or letters patent when they have duly lodged their specification of composition, to make and sell their nostrums, and they should demand for the same a fee of five pounds.

So far as relating to existing patents; and I would suggest a similar application and granting of licence to persons desiring to introduce medicaments to the public, with this difference, that ten pounds shall be demanded in their case.

The protection to be granted by suggested licence should be continued for ten years, at the end of which the holder of the licence should have the option of renewing it for a term of the same length, on payment of a fee of five pounds. In regard to any nostrums the licence for making which has expired and not been renewed, the Commissioners shall make public the specifications of such secret medicines. Such action would give a respectable funeral to patents whose popularity had declined, and enable those partial thereto to have a fair imitation prepared by their own chemist.

Let the retail sale of patent medicines be restricted to pharmaceutical chemists, and registered chemists and druggists, and apothecaries keeping open shop, who are the proper persons under the Pharmacy Act to register and retail poisons and preparations containing them.

The licence to retail should, as things are at present, be raised to a guinea for the whole country. Should the sale be secured to chemists only, and should there be an early prospect of this, either keep it at five shillings, or better still—abolish it altogether.

The payment of fees on obtaining letters patent by makers would, I think, be a mild but effectual check against the universal quackery that has of late prevailed, and would also restrain the wholesale rush of nostrums under the eyes and nose of the public, a rush which is far from being convenient or desirable, whether the convenience of the dealer or the service of his customers be considered. In case of misadventure through the careless use of a patent remedy, the police authorities should purchase a sealed-up, unopened bottle, box, or parcel of the same medicine at the same shop, where that had been bought, the taking of which was alleged to have caused illness or death. This bottle, box, or parcel should then be transmitted by the police with a certificate to the Board of Commissioners, and the contents thereof be analysed by them. And in case the medicine should be found to contain a greater proportion of the most active ingredients as stated in the specification supplied by the maker to the Board, and in case that proportion in the maximum does exceed the true proportion as stated therein in the degree of one-half additional or upwards, or if the preparation should be found to contain a powerful drug or chemical not stated in said specification, the maker, not the seller, should be liable to a fine of large amount not less than £20 and not more than £100, one half of which should go to the revenue and the remainder to the unfortunate subject of the mishap, or his or her representatives. No analysis should be made or any proceeding set on foot in respect of accident from using a nostrum, unless it can be proved that the patient took or had given not more than a maximum dose of the remedy as directed by the label or circular attached thereto at the time of purchase. The Inland Revenue authorities have pushed the use of medicine stamps in many cases to an extreme; and I think it quite consistent with the plan sketched out for a new system, to suggest further that only where a secret medicine shall be recommended for internal use by man, shall its manufacture require a licence or letters patent!

The registration of the more potent remedies would very likely throw a certain amount of suspicion upon them, and the public would avoid them to some extent, and thus the sale thereof and the dangers possible to result from their use or misuse would lessen together. At the same time the more harmless ones, not requiring that ceremony, would become still more popular.

No secret medicine should have licence or protection if the price of the smallest size, less the stamp, were below a shilling.

The payment of fees for licence would certainly help to rid us of the tiresome little patents. I am not prepared to advocate the abolition of the stamp at present, and as for joining the medical men, the rank and file thereof would certainly not have much regard for our interest, and would be more likely to seek the abolition of the secret medicine business itself.

Seeing we have the safety and welfare of the general public to secure in this matter, I can suggest no other plan with reference to secret remedies prepared abroad than the application for license and submission of specification in every respect identical with the one sketched out for British nostrums.

The sale having been restricted to the classes before named, any others retailing patents shall be liable to be sued and fined in the way and degree that unregistered chemists are liable to prosecution.

Let us not forget in conclusion that no code of regulations or system of license and registration, however elaborate will prevent a person of intemperate habits, the subject of mania, delirium or ignorance taking a dangerous dose by accident or of intention; yet if the business in these secret medicines, the names and prices of which are indeed legion, be somewhat hedged about, the use of some of these may in case of accidental suffering or decease be traced from the taking, back to the sale; and if the evidence as relates to the physic be made clear, it is so much towards the adjustment of the balance held by the blinded divinity. What though the life of the taker be departed, if the scruples of the legal mind be laid to rest!

Mr. C. J. Arblaster (Birmingham) read the following paper on the same subject.

Patent Medicines.

That what may be called the patent medicine question is largely engaging the attention of the chemists of the country is, I think, well known to all here present, and that it is one deserving of this attention is, I think, equally admitted. In a pecuniary point of view, the returns in some districts from the sale of patent medicines form no inconsiderable part of the gross return in the business of a chemist, and it is not to be wondered at, that when he finds a large portion of his trade is being taken by others under cover of the Patent Medicine Act, he feels himself somewhat aggrieved. It would take too much time to mention all the grievances under which, whether rightly or wrongly, he considers that he suffers. I am informed, however, and can readily believe that in some districts tinct. opii is largely prepared with methylated spirit, and sold under an assumed name by others than registered chemists, under the provisions of the Patent Medicine Act. Preparations again of that useful but very dangerous chemical, chloral, are largely retailed and bid fair to become as destructive in their continued use to the Englishman, as absinthe is to the Frenchman. These and the sales of powerful external applications, prepared with the deadly aconite, belladonna, etc., demand, not only in the interest of the public but also in that of the registered chemist, some alteration of the law. If this meeting can find a remedy for this and other evils, it will, I think, ensure to this association the support of the great majority of the trade. Let us look then at the present state of the law in relation to these matters. In the year 1868, an Act of Parliament was passed entitled the Pharmacy Act, and I am pleased to see here to-day so many that are fully acquainted with its main provisions. In the preamble of this Act there are one or two points that I wish prominently to bring before you. I will not take up the time of this meeting by reading at length its different provisions, but under correction state in a few words the main points to which I more particularly beg to draw your attention. The first line then contains this important declaration, "Whereas it is deemed expedient for the safety of the public that persons keeping open shop for the retailing of poisons, etc., should be duly qualified." Secondly, "That persons should be those as shall be deemed to be such by the Council of the Pharmaceutical Society, with the consent of the Privy Council." Thirdly, "That nothing in this Act shall extend to, or interfere with, the making or vending of patent medicines." These three points then are all that I think that we have to consider in discussing this question. Here I would just notice in passing, the anomaly that one clause of the Act, for the safety of the public, prevents all but registered chemists from selling poisons, and allows it to these only under the greatest restrictions, and another clause permits (under cover of a paper stamp) unqualified persons to sell poisons (in any quantity), and these too of the most virulent character, without any restriction whatever. I do not find fault with this Act of Parliament, for in some respects it has, I believe, by decreasing the facilities for obtaining the more common poisons been productive of good, but I do say that it is wrong in principle to place restrictions on the sale of such things by qualified persons, and at the same time take away those restrictions when poisons are sold under other names by unqualified persons. I would then reiterate these main features of the Pharmacy Act that have to be considered:—The safety of the public; the sale of poisons by chemists only; and the sales of patent medicines. The safety of the public is its main consideration, and *not* the well-being of the chemist; and in my opinion if we are to succeed in getting an amendment of this Act, it must be by giving as our main reasons that the safety of the public demands it.

The next point is this: "Are poisons pure and simple sold by chemists only?" This question must I think be answered in the negative, and here it is that a powerful organization, which I trust to see this day formed, would be of the greatest benefit to the registered chemist. The third point is already answered in the instances that I have given of evasions of this Act under cover of the stamp duty. Before proceeding to suggest a remedy for these evils, it will be well just to notice some of the various antidotes that have been made public. One suggests that the law of France, by which the makers of patent medicines are bound to furnish the proper authorities with their formulæ for the same, and by which also all vendors of the same must be registered pharmaceutists, should be put in operation here. This in our free trade England would, I think, be found impracticable to get passed into law. Another would confine the sale of all patent medicines to chemists only. Some would do away with the so-called patent medicines and licence for sale; but here I am afraid that it would be found a difficult matter to persuade any government to relinquish a tax collected so easily and at so small a cost, and which at the same time contributes so large a sum as £100,000 to the revenue. Other suggestions have been made, but I will not detain you with more, but proceed at once to state what should be the remedy for this unsatisfactory state of things. I start then with this proposition, "That if it be considered expedient for the safety of the public that certain poisons and their preparations should be sold by registered chemists only, that it is equally expedient that patent medicines containing such poisons should also be sold by chemists only." The safety of the public would be by this means assured, as much as it now is in respect to the sales of other poisons. The patent medicine maker is our last point, and to him I would say this, "You shall make a declaration to a proper authority that your proprietary article contains one of the scheduled poisons,"—I would respect his private formula and not ask which it is,—"place upon the same a label the same or somewhat similar to those introduced on the passing of the Pharmacy Act, reading as follows: 'In conformity with the sale of Poisons Act, 1868, this preparation must be labelled poison, but its composition remains unaltered with this addition. This article may only be sold by a registered chemist.'" By so doing you respect the rights of the makers of patent medicines, you show that the medicine is one requiring care in its use, and you also keep in the hands of chemists the sale of articles, which by some of the clauses of this Act, were deemed to be poisons. Whether, in conclusion, the sale of such should be registered; whether the poison list might not be largely extended; whether patent medicine licences in the future might not be fairly confined to those that are supposed, at any rate, to know somewhat of the action of drugs and chemicals, are subjects which may be considered at a future time. For the present I beg to thank you for so kindly listening to these remarks, and if they are productive of any good, I shall feel amply repaid for any trouble that I have taken in the matter.

The Secretary read the following paper by Mr. Fairlie, of Glasgow:—

On the Medical Acts in their Relation to Chemists and Druggists.

It was at first suggested that the title of this paper should be "On the Apothecaries Act in its Relation to Chemists and Druggists.' On making inquiry for a copy of the Apothecaries Act, however, I found it was out of print, and as that Act does not apply to Scotland, and thinking that any paper on such a subject should bring out the relations between medicine and pharmacy north of the Tweed, I suggested that the words "Medical Acts" should be substituted for "Apothecaries Act." It will not be possible, however, in the short space of time at our disposal, to refer to all the medical acts that have been passed from time to time, all of which have no doubt more or less relationship to the dispenser; even if time did permit it would still be impossible, as we were told the medical acts are so numerous that it would be difficult to say whether even the half of them could be procured.

For our purpose, therefore, it will be necessary to refer specially to three Acts of Parliament, all of which have direct reference to the pharmacist. First, the Apothecaries Act of 1815; second, the Glasgow Medical Act, obtained about the seventeenth century; and the Medical Act of 1858.

During the sixteenth and seventeenth centuries the position of the apothecary in England seems to have been somewhat similar to that of the chemist and druggist of the present day; from various causes, however, they gradually adopted the practice of physic in conjunction with their dispensing business. The College of Physicians endeavoured to put a stop to this, and after a long and hard struggle, both in the law courts and in Parliament, the apothecaries ultimately established for themselves the right to treat diseases.

About this time, also, a schism took place in the College of Physicians, one party establishing a number of dispensaries for the supply of medicines, and being placed in the charge of parties who were neither physicians nor apothecaries, there gradually sprung from this class the body since known as chemists and druggists.

In 1815, the Society of Apothecaries, with consent of the College of Physicians, got a bill passed entitled "The Apothecaries Act," appropriate enough when it is considered that it gave power to the Apothecaries' Society not only to examine and grant licences to practice as apothecaries, which was proved to be practically that of the physician, for the distinction between the two had been almost entirely lost sight of, but also to one and the same person to practise pharmacy as well. Anomalous as this may seem, it is borne out much more clearly when it is remembered that the same Act created a corporate body of physicians, who affirmed that the practice of medicine should have no connection with the practice of pharmacy. Why the College of Physicians gave their assent to such an Act cannot now be explained; probably they were not so watchful of their interests as the chemists and druggists were, for the history of the passing of this measure, meagre as it is, brings out clearly that but for the firm stand taken by the then chemists and druggists, their occupation would have been gone. We learn from a most interesting volume on the "Unity of Medicine" by Dr. Davies, that a petition was presented by the druggists against the Bill, and which was the cause of some delay in its becoming law; that petition no doubt would set forth the kind of business carried on by chemists and druggists, and appears to have resulted in the adding of the 28th section, which provides that nothing in the Act shall interfere with the "buying, compounding, dispensing, preparing and vending of drugs by chemists and druggists." How the apothecaries might have acted, had this clause not been inserted, it would be unsafe to predict, but if their recent conduct with regard to counter prescribing by the druggist may be taken as a criterion, it would most certainly not have been their fault if the chemist and druggist had not been altogether extinguished. There is a common saying in broad Scotland "that every man should stick to his last," that is to say that whatever trade or profession a man adopts, he should adhere to it, and the inference is that it is unfair for the joiner for example, to interfere with the legitimate work of the cartwright, or the mason with that of the sculptor. Tradesmen doing so are looked down upon by their fellow-workmen, and why gentlemen of education and refinement should continue to usurp the best things of two professions, unless it is that having been brought up like those amphibious animals which live partly in water and partly on land, they cannot rid themselves of the old habits, is more than one can comprehend.

But badly as you are situated with the apothecaries in England and Wales, your position is not so bad as in certain parts of Scotland. So far as I can learn, the diplomas granted generally by the medical schools in Scotland, confer the right with them to practise pharmacy, and in this way the Scotch medical practitioners have ever been the controlling power in the drug business. It is only in the north of Scotland, however, where this is felt to any great extent at the present time. In Edinburgh, Dundee, Aberdeen, Greenock, Perth, and other large towns, there are few surgeons who keep open shop; whether it is that in these towns they originally wrought under a different law in respect to medicine and pharmacy, or whether it is there being a better class of inhabitants, or that a better understanding exists between the physician and the pharmacist, I am not aware; but things are conducted far differently from that in and around Glasgow. In the former places the physician attends to his practice, and leaves the dispensing almost entirely to the chemist and druggist. In the north of Scotland however, the great bulk of the retail drug business is carried on by surgeons. This state of matters has no doubt arisen from the fact that the faculty of physicians and surgeons of Glasgow, by charter granted by King James VI. of Scotland (James I. of England) in 1599, and confirmed by the Scottish Parliament in 1672, were empowered to examine all persons and license them to practise as physicians, surgeons, and apothecaries in the city of Glasgow, and the counties of Lanark, Dunbarton, Renfrew, and Ayr. The names of three parties are given in the original charter, namely, Peter Low, Robert Hamilton, and William Spany, who are designated as a physician, a surgeon, and an apothecary. It will thus be seen that the faculty of physicians of Glasgow adopted a much wiser course, in their own interest, than did the College of Physicians of London. For about 200 years the Glasgow faculty continued to examine and license apothecaries as well as physicians and surgeons, but as there were no restrictions on the latter also practising as apothecaries, surgery and pharmacy were generally combined, only a very few from time to time confining themselves solely to pharmacy. It is a curious coincidence worthy of record, that some of the clauses in this old Scottish Act have a most striking resemblance to some of those in the Pharmacy Act of 1868, especially the regulations regarding the registration of poisons, and the pharmaceutical examinations, and but that they are worded in the ancient "Doric," I should have been disposed to quote some of them here. A good many years ago the faculty ceased to license for the simple qualification of apothecary, and at present there is only one gentleman in the business in Glasgow, known to have been examined and licensed by the faculty under this Act; and a druggist who made application to be examined previous to the passing of the Pharmacy Act was refused; very probably the faculty had profited by the state of affairs in England and Wales, and took the most effectual mode of preventing the apothecary from usurping the physician's office, by cutting off the supply altogether, and retaining in their own hands the practice of pharmacy—hence the very backward condition of pure pharmacy in the West of Scotland, and the curious anomaly of duly qualified medical practitioners carrying on in conjunction with their practice as physicians a mixed trade in drugs, patent medicines, confections and tobaccos. In 1850 the faculty of physicians and surgeons of Glasgow procured an Act "for better regulating their privileges, and amending their charter." Amongst its provisions the principal are those relating to the exclusive privileges enjoyed previously by the faculty, giving liberty to duly qualified physicians and surgeons from other faculties to practise within their bounds, and also granting them power to enable their licentiates to practise beyond the prescribed bounds. No reference is made in this Act either to pharmacy or apothecaries, but as by the sixth section they retain the powers contained in the original charter, they continue to include the practice of pharmacy in their licentiates' diplomas, though we understand that by a bye-law, the "Fellows" of the faculty have to sign a declaration to the effect that they will have no connection with any secret remedy or in the dispensing of medicines. The "Licentiates" however, that is, those who hold the minor qualification, are by far the most numerous; they, with the large numbers of medical practitioners from the universities and various other medical schools and colleges, have completely overrun the next country with "Surgeries" and "Apothecary Halls." I have been unable to obtain the precise number of open shops in the district, and the exact proportions kept by druggists and by doctors, but the numbers given generally are about one druggist to two surgeons with open shops. The injustice of this arrangement, however, lies in the fact that the druggist is expected to be constantly behind his counter, while it is impossible for a medical practitioner to do so, and in the great majority of cases those surgeons' shops are left in charge of mere boys and often girls.

In the midst of this state of matters both in England and Scotland, the question naturally arises can any step be taken to get dispensing done by chemists only? My answer is, Yes! And the first step seems to be that we should organize a strong union of druggists of all parts of the kingdom, with an energetic executive representative of the various sections of the trade, as well as the different districts of the country. This formed, they should at once put themselves into communication with the General Medical Council created by the Medical Act of 1858 and with whom now rests most of the matters appertaining to medicine and pharmacy. It seems to me that they have power under the Act to remedy very many of the evils we are suffering under at present; for instance, if it was made known to the General Council that certain medical men were surreptitiously aiding unregistered druggists to keep open shops for the sale of poisons, as is the case by several in Glasgow, it would surely be their duty to investigate the matter and probably deal with the parties. Then I think they ought to prevent that system of attaching unintelligible names to compound mixtures, I refer to the "Mist. Comp.", "Lin. Co." "Ung. Rub." "Pil. Asiatici," a class of prescriptions, which are a frequent annoyance to some chemists who do not care to enter into secret alliances with medical practitioners. And referring to secret alliances I believe the telegraph has been brought into requisition, that a wire reaches the chemist's shop from the physician's consulting room in some towns in Scotland; the medicine being sent up to the doctor while the patient is waiting, and in this way the physician procures a profit on the drugs as well as his consulting fee, and is saved the degradation of keeping an open shop. Any druggist carrying on such an arrangement as that must be driven into it by fear that the physician will open an "Apothecary Hall," and take away all his trade. The question, therefore, comes to be, are the practices I have indicated not an evasion of the Medical Act of 1858? The fifty-fifth clause provides that "nothing in this Act contained shall extend or be construed to extend to prejudice or in any way to affect the lawful occupation, trade, or business of chemists and druggists and dentists, so far as the same extends to selling, compounding, or dispensing medicines." Is this clause not a sufficient preventive against such things as I have been referring to? for are they not extending both directly and indirectly to the prejudice of the legitimate and upright druggist? It seems to me that we have an admirable case to present. All that is wanted is united sympathy and action amongst ourselves, because if we are not united as one man all our efforts will be futile, and I would here call upon my brothers in trade to rouse themselves from their apathy and indifference. Why should pharmacists be under the necessity of humbling themselves before the medical profession? Why can they not as a body show something of that spirit of independence which has made our country what it is, and emancipate themselves once and for ever from the tyranny and injustice of those of them at least who would keep us down, for they are not all alike, and there are many honourable men amongst them. I say we ought to free ourselves from such, who if they had the power would prevent our progress not only as individuals but as a class. Failing any good result arising from negotiation with the Medical Council, probably we may have to approach Parliament, a course I would be disposed to make the last resort, however. The question would then come, that suppose chemists obtained for the future the sole right to dispense, should physicians who have at present a vested interest in the drug business be allowed to keep open shop with unregistered assistants? Most assuredly not. This I apprehend is the great grievance of the druggist, as against the apothecary in England; at all events it is the point upon which the druggists in the west of Scotland feel most keenly, and we most firmly maintain that if a medical practitioner is to be allowed to compete with the chemist at all, both must be put on an equality. We must, however, bear in mind that the medical men interested in this will also have their say, and will advance objections against the druggists; as for example, that a chemist has no right to dispense a prescription whenever it is presented for the purpose. Some physicians hold that the prescription is not the property of the patient, and that the druggist has no right to repeat the recipe without the written order of the physician. If medical men can get the public to concur in this arrangement I presume that the druggist would not object; but until they can get the people generally convinced that they must not take a single dose of medicine without previously consulting the physician, the druggist must also maintain his right to dispense any prescription that is presented to him.

Then there is the vexed question of counter-prescribing, and this point appears to me to lead to one of the most powerful arguments why we should have a strong society of chemists and druggists, if it were for nothing else than defensive objects; for with Baron Bramwell's decision flaunting us in the face, and observing the temper of some of the correspondents to the medical press, we cannot fail to see that without some definite and united action on our part there may be no end of prosecutions and harassment. But with a powerful Society, prepared for any emergency, to defend the rights of the druggist, even the "Medical Defence Association" will hesitate before risking another similar prosecution. But have chemists and druggists the right to prescribe simple medicines? Personally I avoid it as much as possible, but I believe that in some districts it is impossible to avoid it, and it is therefore our bounden duty to maintain the just rights of every section of the business. So long as the druggist makes no charge for his advice the medical profession have no cause of complaint. Where, I wonder, would they stop in preventing one person from making a recommendation or a suggestion to another, and how could they draw the line? I fancy they would require to suppress Dr. Buchan's works, and all books of the "family doctor" description. The public will have gratuitous advice; and far better that they should be permitted to consult a conscientious druggist than that they should be driven to ignorant quacks.

In conclusion, I have to express the hope that nothing will be done at this meeting in antagonism to the Pharmaceutical Society, and if a separate organization is formed it will be to co-operate harmoniously with it in all that affects the interests of the trade at large. Our mission as a Conference is an educational one; the end and aim must be improvement, and for us as members of one body to endeavour to leave to our successors a legacy they may not be ashamed of. We are not perfect ourselves; many of us interfere in our business with other traders, and while smarting under the opposition of medical practitioners and unregistered persons we must bear in mind that "charity begins at home." Let us therefore endeavour, as far as in us lies, to purify our own profession; and thus acting out the principle of doing to others as we would wish to be done by, we may rest from our labours confident in this,—that we have done what we could.

The CHAIRMAN: You have heard a very able paper by Mr. Fairlie, and I am sorry he is not here in person to receive the thanks to which he is entitled.

Mr. JONES (The Lye): With reference to chemists prescribing, we should like to give up the risk of prescribing if the medical men would give up dispensing. There is a population where I reside of between 7000 and 8000 inhabitants, and during the summer I have had forty, and even fifty, persons come to me in twenty-four hours with diarrhœa. They say that they could not find a medical man nearer than Stourbridge, and that if they sent to him he would not come. There is another question which often arises; a chemist is often called up in the night by a surgeon to dispense medicine, and having obtained it, he expects you to charge him the very lowest possible amount,—such an amount that I would not get up for, but for consideration for a person who might be suffering. Only recently a surgeon came to me for an 8oz. of mixture and a box of pills, and tendered me the respectable amount of 10*d*. I thanked him, and politely told him he might put it in the poor-box.

The CHAIRMAN: I think you deserve very great credit for having had the moral courage to tell him so.

Mr. HAMPSON: The business of this Conference having come to an end I think there is one duty we must not forget. I refer to the exertions and the skill which have been used by the firm of Messrs. Southall, Brothers, and Barclay. It is impossible to forget that through their agency or intervention we have now this trade association. I have much pleasure in moving that our thanks are due to Messrs. Southall, Brothers, and Barclay.

Mr. RADLEY seconded the motion, and it was carried unanimously.

Mr. BARCLAY: I am sorry our senior partner is not able to respond to the vote of thanks. We felt that it was a very hazardous undertaking to call this Conference, and if it had ended in failure we should have felt it most acutely but having gauged the feelings of the trade throughout the country we felt that this must be a successful Conference. We felt that there was a very deep feeling in the country that something must be done, and that if only an opportunity were given men would come from all quarters as they have come today. We have been blamed in some quarters for not consulting others before we took this step. But my experience in such matters is, that when you have made up your mind that a cause is right, the thing is to do yourself what is needed and do it the best way you can, and you are most likely to be successful. I am quite sure if we had gone to many quarters we should have had cold water thrown upon it, and very likely our own enthusiasm would have been damped in such a way as to have prevented the Conference etc., going forward. Success is the great thing, and I am very glad indeed to congratulate the chemists of Great Britain on the successful results of this Conference. There is every prospect that with such an excellent chairman, and such a committee good work may be done.

Mr. GREENISH proposed "That the best thanks of the meeting be given to Mr. Reynolds for the manner in which he has filled the chair."

Mr. RIMMINGTON seconded the motion, which was carried unanimously.

Mr. REYNOLDS: Mr. President and Gentlemen,—I thank you most heartily for the expression of your thanks and your approval of any efforts I have made for this common cause of ours. I am glad to hear that there is between £200 and £300 guaranteed towards our new association. It really does not appear to be so serious a thing to get up an association when you have thoroughly gauged public opinion. The associations we already possess we have used, I believe, for the public good. Some of them have been used for political and educational work, for the advancement of pharmacy, and this one may very fairly be used for the promotion of our legitimate trade interest.

The Conference then broke up.

The following journals have been received:—The 'British Medical Journal,' July 8; the 'Medical Times and Gazette,' July 8; the 'Lancet,' July 8; the 'London Medical Record,' July 8; 'Medical Press and Circular,' July 8; 'Nature,' July 8; 'Chemical News,' July 8; 'Gardners' Chronicle,' July 8; the 'Grocer,' July 8; 'Journal of the Society of Arts,' July 8; 'Grocery News,' July 8; 'Produce Markets Review,' July 8; Practical Magazine,' for July.

BOOKS, PAMPHLETS, ETC., RECEIVED.

HANDBOOK OF RURAL SANITARY SCIENCE. Edited by LORY MARSH, M.D., London: Smith, Elder and Co. 1876. From the Publishers

A COURSE OF PRACTICAL CHEMISTRY. Arranged for the Use of Medical Students. By WILLIAM ODLING, M.B., F.R.S. Fifth Edition. London: Longmans, Green and Co. 1876. From the Publishers.

Notes and Queries.

CHLORAL CREAM.—The following formula for "Chloral Cream" appears in the *Répertoire de Pharmacie* for June 25:

White Sugar, finely powdered	100	grams
Chloral Hydrate	5	"
Water	15	"

Dissolve the chloral hydrate in the water and mix the sugar by trituration in a mortar. Flavour it with either artificial essence of pine apples (butyrate of ethyl-oxide) or with essence of peppermint. The preparation contains 50 centigrams of chloral hydrate in 12 grams, or about a teaspoonful. It is semi-fluid, and beautifully white. It can be dissolved to form a syrup by the addition of water. After a time, however, a liquid layer forms at the top, which contains a larger proportion of chloral hydrate than that underneath.

SOLUBILITY OF SALICYLIC ACID.—According to M. Cassan (*Rep. Pharm.*, June 25, p. 353), the solubility of salicylic acid in water or alcohol is considerably increased by ammonium citrate. Two grams of salicylic acid will dissolve readily in 120 grams of water if 2·5 or 3 grams of ammonium citrate be added. The ammonium citrate, which may be prepared by saturating solution of ammonia with solution of citric acid, is said not to communicate an unpleasant taste or interfere with the action of the medicament.

ALBUMINATE OF SANTONIN AND SODA.—According to Pavesi a combination of santonin and sodium bicarbonate with soluble albumen forms a good vermifuge. The preparation is made by heating together 1 part of santonin, 4 parts of sodium bicarbonate, and 2 parts of dried soluble albumen, with sufficient water, to 60° or 70° C., until the whole is dissolved, and then evaporating with a gentle heat to dryness. The "albuminate of santonin and soda" forms white shining scales, soluble in water. Mineral acids precipitate the santonin and albumen, with disengagement of carbonic acid. Pavesi states that the use of this preparation is not followed by coloured vision as in the case where santonin is used alone.—*L'Union Pharmaceutique*, May, 1876.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

"CONCENTRATED MEDICINES."

Sir,—Only a few weeks since one of these ill-advised and perplexing mixtures was ordered for a lady. "Two tablespoonfuls to be mixed in half a pint of water (8 ozs.), and two tablespoonfuls to be taken three times a day."

The lady, according to directions received, very carefully measured the quantity, and in compliance with the doctor's orders transferred it into an eight ounce bottle, filling it up with water, and from this she took the dose ordered, placing the bottle on a sideboard. So far all was right, but on going for the second dose, and being in a hurry, she poured out a dose of the concentrated medicine and swallowed it off before she found out her mistake, which she only discovered by a severe burning in the throat, and by a sense approaching to suffocation. As the dose taken contained nearly 4 drams of sp. am. ar. and 2 drams of spts. chloroform, with a quantity of potass. bromid. and very little water, this was not much to be wondered at.

For myself I do not think that the dispenser incurs any moral or legal responsibility in sending out these medicines, such responsibility resting entirely upon the prescriber. All the dispenser can do is to make the directions as distinct as possible, and to point out to the patient the necessity for care.

My reason for troubling you with the present case is because it is one strongly pointing out the danger attending this plan of prescribing. The lady in question is one of the most intelligent, clear-headed, business-like women I have ever met with. The bottle sent had a very large prominent label affixed to it by myself, with the words "Concentrated Mixture" as well as the directions, and yet the mistake was made, demonstrating to my mind most distinctly the great risk that must always arise from medical men advocating and encouraging private dispensing.

What is the object of ordering these "Concentrated Medicines?" The unjustly saving the pockets of the patients at the expense of the dispenser. And these are the men, forsooth, who rise up against the chemists and druggists for dispensing on their own account. The present style of things cannot last long; we shall not quietly submit to be crushed out of existence.

"ONE WHO HAS KNOWN THE DRUG TRADE MORE THAN THIRTY YEARS."

THE BENEVOLENT FUND.

Sir,—In view of the approaching election of annuitants on the Benevolent Fund, I would wish to suggest that subscribers should refrain from recording their votes in favour of candidates who canvass them by means of post-cards or circulars, as it is obvious that candidates who are in a position to do this are those who least need the grants.

If a few subscribers would intimate their intention through the columns of your Journal of acting in this manner I am of opinion that much would be done to eliminate this objectionable practice.

I notice with pleasure in this week's *Pharmaceutical Journal* a recommendation from the Secretary that former subscribers who, from reduced circumstances, are compelled to apply to the Fund for assistance, should have a number of votes placed to their credit corresponding to the total amount of their subscriptions. I am confident all will admit the justice of such a proceeding.

Norwich, July 10, 1876.

H. NORVICUS.

C. Jarvis.—We cannot say; apply to the authorities at Apothecaries' Hall or the College of Surgeons.

"*A Student at the Square.*"—The quotation from the Calendar, as given by you, is correct; we believe no limitation is intended. If you wish for an official exposition of the regulation you should apply to the Secretary.

W. T. E.—European honey is said to be at times adulterated with glucose, molasses, flour potato meal, dextrin, tragacanth, etc. According to the last report of the adulteration committee of the American Pharmaceutical Association most of the so called strained honey sold in the United States is made by melting cane or other sugar in a decoction of slippery elm bark, or in a solution of gum and starch, Cuban honey being used for flavouring.

COMMUNICATIONS, LETTERS, etc., have been received from Dr. Muter, Mr. E. Saunders, Mr. Beall, Mr. Strongitharm, "Country Pharmaceutical Chemist," "Enitar," "An Associate," "Tau," H. H.

NOTES ON BRAZILIAN DRUGS.*

SICOPIRA (BOWDICHIA MAJOR, Mart.).

BY DR. THEODOR PECKHOLT,

Apothecary to the Imperial Brazilian Court.

The *Bowdichia major* is an imposing primeval forest tree, called by the Brazilians "Subupira," "Sebipira," "Sebupira," and "Sicopira," the latter two names being used especially in the provinces of Rio and Minas Geraes. It was first described by Pison as "Cebipira-guassu," and afterwards by Marcgrave as "Carubai-merim." Dr. Von Martius named it in his 'Reise' *Sebipira major*, and afterwards, in the 'Flora Brasiliensis,' *Bowdichia major*.

The dense, heavy, very resinous wood is much esteemed for building, and a decoction is used as an antisyphilitic. Occasionally when some of the old trunks are felled a dark yellow liquid that froths strongly and has a bitter taste flows from the hollow sap-wood; this is called by the woodcutters "Cerveja de Sicopira (Sicopira beer), and is popularly used for disorders of the stomach. The stem bark has been indicated as possessing therapeutic properties, but the author has not found any special result following its administration. The root bark, however, which has a still greater therapeutic reputation, the author thinks actually deserves a place in the materia medica.

The root bark obtained from trees growing in the Campos district, upon the so-called capoes (tree-islands) is most esteemed. According to the quality of the soil the root bark is red-brown or flesh-coloured, and is known by the natives as "Sicopira vermellia" or "Sicopira branca;" the latter comes almost exclusively from the Campos district, and is the most valued. For the last nine years it has been prescribed by Brazilian physicians in cases of syphilis and rheumatism, but mostly in affections of the skin (psoriasis, etc.). The people use a decoction, an ounce of root bark to a pint, taken in tablespoonfuls, and externally a strong decoction as a lotion. The late Dr. De Mattos, who introduced its use officially and published a memoir upon the subject, prescribed principally a tincture (one part bark and four parts alcohol) and an alcoholic extract. One part by weight of the tincture was mixed with ten of simple syrup, and a tablespoonful three times daily was the dose for an adult. The spirituous extract was made up into pills, each containing 0·15 gram, three to six of which were taken daily. The administration of the pills in skin affections has been observed at first to intensify the disease, which afterwards gradually disappears.

In the spring the trees are pierced by insects, and there flows out a thick light-brown juice which quickly hardens in the air, and forms pieces resembling Senegal gum. This gum is called by the Brazilians "Gomma de Sicopira," and consists in 1000 parts of—

Green fatty matter	0·278
Light-brown acid resin	30·000
Brown resin, containing tannin	11·252
Tannin precipitating ferric salts green	29·258
Glucose	traces.
Gum	310·500
Bassorin-like substance	440·600
Moisture	137·000
Inorganic substances	39·020
Loss	2·090

The gum is used against diarrhœa. The result of an examination of this gum was published by the author in 1872.* This he now supplements by the following notes on the wood and root bark:—

100 grams of air-dried wood sawdust lost 12·652 grams of moisture and yielded 6·400 grams of ash. The sawdust was treated with various solvents, and extracted with acidulated water, and an aqueous decoction was treated with lead acetate, but no crystalline product was obtained. The ethereal extract yielded a red resin which was insoluble in dilute alcohol, but very soluble in 80 per cent. alcohol as well as in alkalies. By soda solution the resin was coloured superficially green and then dissolved with a brown colour; from which solution it was again precipitated in flocks by acids. Treatment of the sawdust exhausted by ether with alcohol gave only a trace of a brown resin. The sawdust boiled with water gave a dirty yellow decoction, which upon evaporation yielded a brown extract having a disagreeable taste, having for its principal constituents a tannin colouring iron salts green, gum, and colouring and extractive matters.

In 1000 parts of air-dried sawdust was found—

Moisture	126·520
Acid resin soluble in ether	7·490
Resin insoluble in alkalies and ether	10·009
Tannin, gum, and extractive	30·000
Fibre	825·981

When boiled with alum and water and treated with a solution of ammonium carbonate a product is obtained which upon drying forms a beautiful orange yellow powder very useful in water-colour painting. When a solution of sodium carbonate is used instead of ammonium carbonate the product is not so bright.

In consequence of the belief of the Brazilians in the therapeutic value of the stem bark, the author made an examination of it. No crystalline product was obtained, but the constituents of the wood, gum and root bark were found to be partially present, the stem bark being richest of all in tannin.

Dr. Mattos was in the habit of prescribing only the root bark and its preparations, and preferred that the root bark used should be collected from trees growing in the Campos district, and especially in the diamond territory in the province of Minas Geraes. The author, therefore, examined root bark from that locality, and obtained from it an organic crystalline body. The supply being limited he also experimented with root-bark from the province of Rio Janeiro, and found the same constituents, including the crystalline principle, "Sicopirinum," but as the Campos root bark appears to contain it in larger proportion, it may be, if this crystalline body is the active principle, that Dr. Mattos was right in thinking that variety the most active.

The Rio sample of bark was obtained from a forest tree under the superintendence of Dr. Peckholt himself. Besides the colossal tap root the tree had very wide-spreading rootlets, which frequently almost appeared through the surface of the soil, and so were most convenient for the work of removing the bark. Most of the rootlets ended in a kind of

* From "Mittheilungen aus der Materia Medica Brasiliensis" (Zeitschrift d. algemenien österreichischen Apotheker-Vereines, July, p. 290).

* *Archiv der Pharmacie*, 1872, p. 37.

knob, or sometimes three to six knobs united like a rosette. The knobs were of a long oval shape, tapering off very thin at both ends, about 20 c.m. long and 7 c.m. in diameter, and weighed on the average 380 grams. They were covered with a thin pale yellow pellicle, which peeled of as in the mandioc. The underlying bark was like the ordinary root bark, yellow and smooth externally, orange yellow in section, and 5 mm. thick. The knob-like swellings, after being freed from bark, consisted of a solid, thick fibred, very tough woody substance, resembling ivory, and probably capable of being put to technical use. Whether the trees in the Campos district possess similar knobs, the author has not been able to learn.

100 grams of fresh root bark lost 62·773 grams of moisture. The powder of the dried bark was completely exhausted with absolute ether, the ethereal solution distilled, and the red brown resinous residue treated with 32° alcohol as long as anything was dissolved; there was left a crystalline residue which the author has named Sicopirinum.

The alcoholic solution distilled and evaporated to dryness yielded a reddish-brown resin (α Sicopira resin). The bark exhausted with ether was dried until the smell of ether was no longer perceptible and repeatedly exhausted with boiling absolute alcohol, the united extracts distilled, and the residue after being evaporated to dryness treated with distilled water as long as any dissolved. The portion insoluble in water was β Sicopira resin.

The aqueous solution after treatment with lead acetate yielded tannin precipitating iron salts green, and an extractive matter having an intensely bitter taste, similar to gentian bitter.

The bark after having been extracted with ether and alcohol was then treated with alcohol; but it gave only a very small yield of an insipid extract.

100 grams of dried root bark gave about 16 grams of alcoholic extract, which was prepared by repeatedly extracting the powder with boiling 80 per cent. alcohol.

α Sicopira resin, when perfectly dry, is viscous, cannot be pulverized and may be kneaded in hot water. It is of a reddish-brown colour, without smell, tasteless at first, with a bitter after-taste. Heated on platinum foil it melts to clear liquid; it inflames and burns with an odourless but cough-provoking smoke, leaving no residue. Alcohol dissolves it easily, the solution forming with water an emulsion-like liquid, which is coloured violet red by perchloride of iron. It is insoluble in alkalies, and is very different from the resin soluble in ether from the wood sawdust.

β Sicopira resin is a yellow-brown resin, which when dried can be easily pulverized and forms a dark yellow powder. It is insoluble in ether, very soluble in alcohol, soluble in akalies, and forms with metallic salts precipitates of metallic resinates.

The bitter substance is soluble in water and alcohol and is precipitated from the solutions by tannin; with iron salts it gives a blood red colour.

In 1000 grams of fresh root bark the following constituents were found:—

Moisture	627·730
Starch	19·830
Albumen	1·830
α Sicopira resin	12·340
β Sicopira resin	66·433
Sicopirinum (cryst.)	0·190
Sicopira tannin matters	8·350
Bitter and extractive matters	91·047
Gum, etc.	36·690
Fibre	135·560

Sicopirinum forms conglomerations of acicular crystals resembling poppy seeds. The crystals have a bitter slightly pungent taste and a faintly alkaline reaction. They are soluble in absolute alcohol and may be purified by repeated solution and recrystallization from it in the presence of animal charcoal. Heated on platinum foil they melt to a clear liquid, and burn without residue. They are soluble in ether and boiling alcohol, but water only dissolves traces. When treated with sulphuric acid there is a formation of glucose.

An elementary analysis of sicopirinum made for the author by Dr. Geuther, of Jena, gave results closely corresponding with the formula $C_{16}H_{12}O_5$.

When sicopirinum has been dried over sulphuric acid it loses no more at 100° C.

Whether sicopirinum is the active principle against skin affections has yet to be tested by experiment.

THE ALOIN OF BARBADOES ALOES.*

BY DR. ERNST SCHMIDT, UNIVERSITY LABORATORY, HALLE.

The first specimen of aloin examined by the author was obtained from an English manufacturer, and was supposed to have been prepared from Barbadoes aloes. After recrystallization from alcohol this aloin agreed in physical characters with the aloin originally described by Stenhouse, but the results of its analysis exhibited considerable discrepancies. The author therefore induced Mr. Liebelt to prepare some of the crystalline principle from a well marked specimen of Barbadoes aloes and to examine its characters more closely.

Of the different processes which have been recommended for the preparation of aloin the method proposed by Tilden ('Year-Book of Pharmacy, 1870'), was found to give the most satisfactory results. According to this method the aloes crushed small is dissolved in nine or ten times its weight of boiling water acidified with sulphuric acid. After cooling and standing for a few hours the clear liquid is decanted from the resin and evaporated. The concentrated solution deposits a mass of yellow crystals which can be purified by washing, pressure, and recrystallization from hot spirit. After several recrystallizations the aloin is obtained in the form of beautiful yellow needles which are pretty soluble in water and in alcohol, but soluble with difficulty in ether.

The melting point was found to vary according as the crystals contain water or not. The crystals melt between 70° and 80°, and the anhydrous substance at 146°—148° (Stenhouse 150°).

Aloin contains water of crystallization which it loses completely when left over sulphuric acid or when dried at 100°. The quantity of water present, however, is by no means constant, for not only do different preparations differ from one another, but even the same material according to the concentration and temperature of the solution from which it is deposited.

* Abstracted from the *Archiv der Pharmacie*, vol. v., No. 6, 1876.

The air dried substance heated to 100° lost in three experiments—

I.	II.	III.
5·89	6·77	7·01

per cent. of water.

Another product lost under similar circumstances—

IV.
11·93

per cent. of water.

In another case the first crop of crystals dried in the air then at 100° lost—

V.	VI.	VII.	VIII.
11·56	11·89	11·79	11·60

Whilst a subsequent deposit of crystals gave the following percentages:—

IX.	X.	XI.	XII.	XIII.
13·76	14·04	14·29	13·90	14·01

Some aloin exposed for a long time over sulphuric acid lost 13·44 per cent. of water, a loss which was not increased by afterwards heating it to 100°.

It appears from these results that aloin is capable of uniting with water of crystallization in several proportions which depend upon the temperature and state of concentration of the solution from which it is obtained.

According to the formula $C_{15}H_{16}O_7$—

One molecule of water requires .	5·52 per cent.
Two molecules	10·46 „
Three molecules	14·91 „

With the formula $C_{16}H_{18}O_7$—

One molecule of water requires .	5·29 per cent.
Two molecules	10·11 „
Three molecules	14·44 „

It seems, therefore, that aloin may crystallize with either one, two, or three molecules of water.

This variation of the water agrees with the observations of Flückiger upon the aloin of Zanzibar aloes, a substance which, according to Tilden, is isomeric with the aloin of Barbadoes.

Mr. Liebelt made numerous combustions of the aloin dried at 100°, and the percentages of carbon and hydrogen obtained by him are as follows:—

	I	II.	II.	IV.
C	58·68	58·30	58·41	58·33
H	5·73	5·71	5·71	5·47
	V.	VI.	VII.	VIII.
C	58·42	58·48	58·17	58·66
H	5·57	5·70	5·33	5·23
	IX.	X.	XI.	Mean.
C	58·66	58·33	58·71	58·46
H	5·81	5·84	5·69	5·61

With these data there is a choice between two empirical formulæ $C_{15}H_{16}O_7$ which requires

C 58·44
H 5·19

and $C_{15}H_{17}O_7$ for which the percentages must be—

C 58·25
H 5·50

Various considerations seemed to indicate that the former of these two expressions should be adopted, especially as von Sommaruga and Egger had obtained similar results with the aloin of Socotrine aloes.

Nevertheless this formula cannot be accepted. Soon after the publication of Mr. Liebelt's analytical results in the *Berichte d. Deutsch. Ges. zu Berlin* (November, 1875), the author became acquainted with the paper read by Dr. Tilden before the British Pharmaceutical Conference in August, 1875. In that paper the formula $C_{16}H_{18}O_7$ is proposed on the basis of analytical results obtained with the aloin and with its chloro-, bromo- and acetyl substitution derivatives.

These results led the author to recrystallize the aloin in his possession and to submit it again to analysis, this time drying it in a vacuum. The results showed that Mr. Liebelt's analyses had furnished somewhat too little carbon. The following numbers were obtained:—

	I.	II.	III.	IV.	Mean Schmidt.
C	59·31	59·45	58·96	59·19	59.23
H	5·39	5·63	6·08	5·34	5·61

The formula $C_{16}H_{18}O_7$ requires—

C 59·62 per cent.
H 5·59 „ „

This formula therefore seems to be established.

The author's results with the bromo- and chloro-derivatives, however, do not entirely agree with those described by Tilden.

When an aqueous solution of aloin is mixed with excess of bromine water a copious yellow precipitate is obtained, as long ago shown by Stenhouse. This yellow precipitate dried and crystallized from alcohol yields beautiful yellow needles. This compound, however, is not a homogeneous substance, for it seems to contain not only tribromaloin, which is the chief product, but also small quantities of compounds richer as well as poorer in bromine, which are very difficult to separate on account of their almost equal solubility. Although several preparations were made, especially by the introduction of aloin solution into excess of bromine water, and the composition of these specimens was not altered by repeated crystallization, the analytical results were found to agree sometimes with the formula

$$C_{15}\genfrac{}{}{0pt}{}{H_{13}}{Br_3}O_7$$

sometimes with the formula

$$C_{16}\genfrac{}{}{0pt}{}{H_{15}}{Br_3}O_7$$

All these brominated compounds exhibit much greater stability than pure aloin. They crystallize readily from alcohol in golden needles which are almost insoluble in water and in ether. The melting point appears to be at 190° to 191°. Bromaloin also contains water of crystallization.

The air-dried substance lost at 100° the following quantities per cent.:—

I.	II.	III.	IV.	V.
9·00	9·22	9·06	11·93	10·56

A variation in the amount of water is exhibited here as in the case of pure aloin. The formula $C_{16}\genfrac{}{}{0pt}{}{H_{15}}{Br_3}O_7$ with $3\,H_2O$ requires 8·81 per cent. of water, with $4H_2O$ 11·41 per cent.

The substance dried at 100° gave when burnt with chromate of lead the following percentages of carbon and hydrogen. The bromine was determined by the method of Carius.

	I.	II.	III.	IV.	V.
C	33·36	33·38	33·49	33·17	33·13
H	3·17	2·76	2·89	2·93	3·06
Br	43·31	43·38	43·60	43·63	43·70

	VI.	VII.	VIII.	IX.	X.	XI.
C	33·47	33·84	33·71	35·15	34·27	34·24
H	2·69	2·70	3·02	2·97	3·11	2·01
Br	43·47	43·22	——	41·44	43·08	

The following percentages are required for the two formulæ referred to

	$C_{15}H_{13}Br_3O_7$	$C_{16}H_{15}Br_3O_7$
C	33·03	34·34
H	2·39	2·68
Br	44·03	42·93

The author has not been successful in producing from aloin a definite chlorinated product by the action of chlorine either in the gaseous form or in aqueous solution. But by the action of potassic chlorate and hydrochloric acid, according to Tilden's process, a yellow substance was obtained which crystallizes in beautiful needles. The analysis of this compound, however, led to numbers which vary still more than those obtained in the analysis of the corresponding brominated derivative. The percentages of chlorine obtained were as follows:—

I.	II.	III.	IV.	V.
23·02	24·47	25·67	25·55	26·83

The formula $C_{16}H_{15}Cl_3O_7$ requires 25·03 per cent.

The author finds that barbaloin when digested with nitric acid yields chrysammic, picric, oxalic and carbonic acids.

The action of zinc dust when heated with aloin has already been observed by Graebe and Liebermann, who obtained a hydrocarbon which they believed to be anthracene. As, however, it is not clear as to which kind of aloin these chemists operated upon the author has repeated the experiment with Barbadoes aloin, and finds that the hydrocarbon derived from this source is principally methyl-anthracene.

The melting point was at 210°–202°. By oxidation with chromic acid dissolved in acetic acid it furnished anthracene mono-carbonic acid (melting point 281) soluble in ammonia, also a small quantity of a body having the properties of anthraquinone. The melting point of this latter was, however, not constant (210° to 240°) and it may, therefore, be assumed that it consisted of a mixture of anthraquinone and methyl-anthraquinone. Whether this anthraquinone is a product of the decomposition of methyl-anthracene or is formed by the direct oxidation of a small quantity of anthracene cannot be at present determined. The quantity of methyl-anthracene obtainable from barbaloin is exceedingly small (about 1 part of the hydrocarbon from 200 of the aloin), so that the aloin can scarcely be regarded as a direct derivative of methyl-anthracene.

The author is not at present continuing his experiments upon the oxidation of aloin, having been informed by Professor von Sommaruga and Dr. Tilden that they are already occupied in a similar investigation.

PERSIAN INSECT POWDER.*

BY R. ROTHER.

The powdered flowers of *Pyrethrum caucasicum, roseum,* etc., have in the course of a few years attained celebrity as an insecticide.

The non-poisonous character of the powder widens its range of application to an unlimited extent, and places it prominently above the numerous often highly poisonous substances used for the same purposes. Its general use has, however, been restricted by reason of its costliness. This feature, though, is becoming less apparent year by year, and bids fair to come to a normal basis very soon.

Persian insect powder is analogous in its action to Cocculus Indicus. Its contact promptly stupefies, and, if prolonged, death rapidly ensues. It appears to be harmless to the larger animals, but if much of its dust is inhaled, dizziness will result. That the substance must possess medicinal virtues cannot be questioned, and probably before long will be largely employed otherwise than as a vermin destroyer.

The powder has never been thoroughly investigated. It was found not to contain an alkaloid nor santonin, so that its virtues were ascribed to the volatile oil it contains. Early last summer the writer made a preliminary examination of it, and, by operating upon 3500 grains of the powder obtained results which were recently confirmed by a second experiment upon 20 ounces of the material, but an altogether thorough investigation was cut short by an accident, through which most of the material was lost.

The writer found that an aqueous percolate, as also an aqueous ammoniacal one, when treated with chloroform, ether and benzine, gave no indications of an alkaloid soluble in these liquids. Three acid bodies were, however, isolated. An oleo-resinous greenish-yellow acid, which the writer denominates Persicein, was found having the odour of the powder and its sub-bitter taste. It is, however, not the active principle of the plant. This acid resin is soluble in ether, alcohol and benzine, but insoluble in chloroform; it is instantly dissolved by ammonia and the fixed alkalies, from which acids in not too dilute solutions precipitate it milky white. It is somewhat soluble in water, imparting a greenish-yellow colour and its characteristic odour and bitter taste. It forms insoluble salts with the heavy metals.

A second acid was found; it has a light-brown colour and is nearly insoluble in cold water, slightly soluble in hot. It is soluble in alcohol, with a red-brown colour; but insoluble in chloroform, ether and benzine; water reprecipitates it from the alcoholic solution. It forms soluble salts of dark brown-red colour with ammonia and the fixed alkalies; acids, again, precipitate it from the solutions of its salts. Strong sulphuric acid dissolves it with dark-brown colour; the addition of water precipitates it from this solution unchanged. Strong nitric acid acts on it with great energy, liberating nitrogen tetroxide in profusion, yielding a deep yellow solution, and an insoluble yellow acid, probably a nitro-acid. This new acid is soluble in alkalies, from which acids again precipitate it. The yellow nitric solution was not examined. The writer designates this second acid as Persiretin. The powder was found to contain 4·3 per cent. of it. It is not the active principle, but a decomposition product of it.

A third and very soluble acid was found. This body the writer names Persicin. It is a glucoside, and is split by boiling with acids into persiretin and glucose. It appears to be a polybasic acid, forming an insoluble and a soluble lead salt. It is remarkable for having a pleasant odour resembling that of fresh honey. This acid is exceedingly unstable; contact with dilute chlorhydric acid in the cold or evaporation of its solution, or of its salts, converts it into persiretin and glucose. It is, therefore, almost impossible to obtain the free acid dry in a pure state. The colour of persicin is, in solution, light wine-red, and that of its neutral salts dark wine-red.

Plumbic acetate does not precipitate its neutral solutions, but diplumbic acetate produces a voluminous greenish-white precipitate. Excess of persicin dissolves the neutral lead salt, forming a pale yellow solution, which on evaporation yields an amorphous mass insoluble in alcohol, which latter also precipitates the salt from its aqueous solution in yellowish-white curdy flakes.

The acid potassium salt of persicin can be crystallized;

* From *The Druggists' Circular and Chemical Gazette,* July, 1876.

it is also soluble in alcohol. The neutral salt is apparently amorphous, and but sparingly soluble in alcohol. Persicin gives a fresh-coloured precipitate with argentic nitrate, which is insoluble in acetic acid, but soluble in ammonia. Persicin is soluble in alcohol, but insoluble in chloroform, ether and benzine. It is apparently the active principle of the plant.

The investigation was conducted by percolating the powder first with water, then with water containing ammonia. The aqueous percolate yielded nothing to chloroform. Addition of chlorhydric acid threw down the persiretin. After filtration, ammonia gave a crystalline precipitate of ammonio-magnesian phosphate.

The ammoniacal percolate had a ruby-red colour. Addition of chlorhydric acid precipitated persiretin in great abundance, showing that the small amount extracted by water in the first percolation existed in combination with some base, but that the most of it is uncombined. The acid filtrate was then treated with ammonia in excess, united with the first filtrate and the whole evaporated on a water-bath to a syrupy liquid. This residue, now having an acid reaction, was treated with alcohol, which produced a gummy precipitate and a dark red liquid. The solution was evaporated on a water-bath to expel the alcohol, slightly diluted with water and shaken with ether. The ethereal solution on spontaneous evaporation yielded a residue of persicein. The aqueous residue was now shaken with chloroform, which after decantation and evaporation left no residue. The aqueous liquid was then treated with benzine, which took up the ether and chloroform held in solution; on evaporation no appreciable residue was left, thus showing the probable absence of alkaloids.

The liquid from which the benzine had been decanted was treated with chlorhydric acid, producing a slight turbidness; shaken with ether, it dissolved, and the yellowish ethereal solution yielded on evaporation more of the persicein. This result shows that the persicein taken up by the ether in the first instance had parted with the ammonia during the evaporation, and that the remainder could only be removed after its liberation by the chlorhydric acid.

The red acid liquid was now mixed with the filtered solution of the matter precipitated by the alcohol, neutralized with ammonia and treated with diplumbic acetate as long as a precipitate formed; this was collected, washed and treated with dilute sulphuric acid in slight excess, whereby the persicin was liberated, and the peculiar honey odour at once became perceptible. On evaporation on a water-bath, a red acid residue was obtained; however, it was much contaminated with insoluble persiretin, into which a part of the persicin had been converted. The fresh solution of the persicin, neutralized with potassium hydrate and boiled with Fehling's solutions, yields an emerald-green liquid, but no cuprous oxide. If the solution is, however, first boiled a few moments with dilute chlorhydric acid until it becomes turbid, then neutralized and boiled with Fehling's solutions, cuprous oxide is profusely precipitated. This makes it evident that persicin is a glucoside, decomposable into persiretin and glucose.

THE USE OF ARNICA.

Strong opinions having been expressed by various writers that the external application of arnica is not only valueless but often positively noxious, and that arnica lotion applied to excoriations sometimes occasions severe outbreaks of acute inflammation, Dr. Patze, of Washington, has published the following remarks on the subject in *New Remedies* for June:—

"Though the German name for Arnica is *Wohlverleih*—weal-bestowing—it deserves this name only under the condition that it be properly applied, for it has not only its well defined indications, but also such serious, terrifying contra-indications that German governments, especially the Prussian, classing arnica among the acria, have already more than fifty years ago, issued laws to their apothecaries prohibiting its sale, except on prescriptions from authorized physicians.

"Experiments with arnica on horses have, according to Schuchardt, rendered the following results: small doses accelerated the pulse, raised the temperature of the skin, increased the secretion of urine, and caused tremor of the muscles. The violence of these phenomena increased with the augmentation of the dose, causing frequent evacuations of fæces and urine, violent tremor, accelerated respiration and prostration. Injections of an infusion of arnica-flowers into the veins caused considerable excitation, soon followed by intense languidness, vertigo, and even death, and on examination the organs of the chest and abdomen, the cerebrum and spine were found engorged with blood.

"In man the series of symptoms are the following: any part of the arnica-plant applied to the skin causes an itching, burning sensation, accompanied by redness; though its fragrance is agreeable, it will, in closer proximity, cause sneezing, so much so, that the Savoyards are using it instead of snuff. Small doses of 4 to 10 grains exert an irritating effect on the fauces and larynx, on the stomach and the alimentary canal, manifesting itself by a burning, scratching sensation, cardialgia, abdominal pains, nausea, belching, vomiting, frequent evacuations, the circulation is accelerated, accompanied by increase of warmth of the body, the secretions are increased, especially those of the urine, the skin and the lungs. The continued use of the arnica will cause numbness of the head, vertigo, mental depression, restless sleep, oppression of the lungs, jerking pains, like electric strokes, in the extremities, etc.; increase of the dose will aggravate all these phenomena, especially the affections of the brain.

"The hot infusion acts more severely than the tincture, and the flowers are more exciting than the root. This series of symptoms indicates that arnica may find its place in all those diseases which manifest a character of torpor, wherever an acceleration of the circulation is desirable, in order to remove and scatter stagnating humours.

"Arnica is in Germany so extensively, so frequently used, that some apothecaries have to keep the infusion, by the quart, on hand, preparing it every morning fresh, (℥ j of the flowers steeped for 15 minutes in 6 ounces of boiling water). It has maintained its old reputation as *Wohlverleih* in a variety of cases, especially where the vitality of the nerve-centres, brain and spine, is oppressed, in extravasations, paralyses consequent upon apoplectic strokes, rheumatism, catarrh, pleurisy and pneumonia, in traumatic commotions of the brain, in typhoid fevers with torpor and paralytic affections, etc.

"The external use of arnica is very limited, and especially contraindicated in recent traumatic cases; it should never be applied before all tendency to inflammation is removed by the antiphlogistic applications; it can therefore seldom find its place before the lapse of seven days after the injury; then, and not before then, the tincture, properly diluted in combination with other remedies for the stimulation of the capillary vessels may be applied, perhaps like this: ℞ Tincturæ flor. Arnicæ ℥ ss, Aceti ℥ ss, Aq. Camphoræ ℥ vj d. g. for external use."

THE PHARMACEUTICAL PREPARATIONS OF PHYSOSTIGMA.*

BY GEORGE W. KENNEDY.

One of the subjects suggested by the American Pharmaceutical Association was an essay on Calabar Bean, giving the readiest method of obtaining the various pharmaceutical preparations and isolating its active principle.

* Read at the fifth session of the American Pharmaceutical Association.

In response to the above query, the writer reports the following as being as easy and simple a process for the various pharmaceutical preparations of Physostigma venenosum, in my opinion, as can be offered for your acceptance. I experimented with various menstrua of alcoholic strength, and none of them gave the satisfaction as the one I herewith present for your consideration. Most of the preparations of Calabar bean that have heretofore been manufactured were made of strong alcohol, with very few exceptions. Our deceased colabourer, Professor William Procter, recommended a menstruum composed of seven fluid ounces of alcohol, and three fluid ounces of water, and one troy ounce of bean, which makes a half-pint of tincture when the preparation is completed.

I do not favour the use of strong alcoholic preparations, so long as a weaker alcohol will answer the same purpose. Physostigma is the active principle of the bean, a certain per cent. of which is soluble in water; and, knowing this to be the case, I therefore recommend a menstruum composed of alcohol and water for the different preparations, and used in the proportions of three (3) parts alcohol and one (1) part water; and, as the seeds are so tenacious, I would also recommend a preliminary maceration of the drug before proceeding with the percolation, otherwise the exhaustion will be imperfect. The following embraces all the preparations of the bean that I am acquainted with, solid extract, fluid extract, tincture, calabarized paper, and calabarized gelatin, besides the alkaloidal principle physostigmia.

Extractum Physostigmatis.

Take of	Calabar Bean in moderately fine powder	12 troy ounces.
„ „	Alcohol (95 per cent.) . . .	9 fluid „
„ „	Water (distilled)	3 „ „
„ „	Glycerin	1 „ „

Mix the alcohol, water, and glycerin together; moisten the powder with five fluid ounces of the mixture, pack in a conical glass percolator, and cover the surface of the powder with a disk of paper; pour on the balance of the mixture, cork the percolator, and cover closely, and set aside in a moderately warm place for four days, after which remove the cork, and proceed with the percolation, with a menstruum composed of three parts alcohol and one part water, until completely exhausted; distil off the alcohol, and evaporate in a porcelain vessel by means of a water-bath to the proper consistence. The object of the glycerin is to keep the extract in a soft condition, which makes it more convenient for manipulation, and especially when it forms one of the component parts of a pill mass.

Extractum Physostigmatis Fluidum.

Take of	Calabar Bean in moderately fine powder	16 troy ounces.
„ „	Alcohol (95 per cent.) . . .	12 fluid „
„ „	Water (distilled)	4 „ „

Moisten the powder with six fluid ounces of the above menstruum, pack in a conical glass percolator, after which cover the surface of the powder with a disk of paper, and pour upon it a sufficient quantity of the menstruum until the liquid begins to drop from the percolator; then close the lower aperture with a cork, and cover closely, and set aside in a moderately warm place for four days, after which the cork should be removed, and more menstruum added until thoroughly exhausted, the first twelve ounces being reserved, and the balance to be evaporated to four fluid ounces, and mixed with the reserved portion, and after standing a few days should be filtered through paper. This preparation is but little used in our locality, and I believe but little used anywhere else, but makes an excellent preparation to prepare calabarized paper or calabarized gelatin.

Tinctura Physostigmatis.

Take of	Calabar Bean in moderately fine powder	4 troy ounces.
„ „	Alcohol (95 per cent.) . . .	24 fluid „
„ „	Water (distilled)	8 „ „

Mix the alcohol and water; moisten the powder with two fluid ounces of the menstruum; pack in a conical glass percolator, and cover the surface of the powder with a disk of paper, and pour six fluid ounces of the above menstruum on it; cork, and cover the percolator closely, and allow it to remain in this condition four days, after which remove the cork, and proceed with the percolation and with the same menstruum until two pints of tincture are obtained, which will be found sufficient to thoroughly exhaust the bean. Some of the formulas which have been published for making this preparation contain a much larger proportion of the bean. My object in making it four troy ounces to the quart of tincture is so that it will conform in the proportion of solid material with most other tinctures.

Calabarized Paper.

This is readily prepared by taking paper deprived of its size—thin letter-paper, not ruled, is the best—and the size got rid of by boiling in water and drying. By dipping the paper three or four times in the fluid extract, of which I have given you a formula, and drying it after each immersion, the paper will be impregnated with a sufficient amount of the extract to perform the necessary service when applied to the eye. This plan of obtaining the effects of Calabar bean is objectionable, by being inconvenient, as it necessitates the removal of the paper subsequently. Calabarized gelatin is a much preferble preparation, and I would recommend the following formula:—

Calabarized Gelatin

Gelatin	30 grains.
Water (distilled)	2 fluid ounces.
Glycerin	gtt. xx.
Fluid extract Physostigma . .	♏c.

Make a solution of the gelatin in the water and glycerin, and, while the solution is still warm, filter through paper in a warm funnel; add the fluid extract, and evaporate. When it is evaporated to the proper consistence, spread on a glass plate or marble slab, with edges slightly raised, and with perfectly even surface, and place another glass plate or slab on top, which will keep it even and smooth; when it is hard enough, remove the plates, and divide into one hundred equal squares of about an eighth of an inch square, or as some might perhaps prefer, in circular form. The object here of the glycerin is to prevent its brittleness. The slabs should be slightly greased and warm, so as to prevent the shrinking and sticking of the gelatin. One of these small disks, containing about one grain of the bean, placed in the eye, will be immediately dissolved by the secretions, and the remedial agent absorbed, and the effects of the bean produced.

Physostigmia

I obtained by treating the extract as prepared according to the formula given, with a small quantity of dilute sulphuric acid, and diluting the mixture with water, filtering, and supersaturating with ammonium carbonate. The whole is now shaken with strong ether, and the ethereal solution which contains the alkaloid is separated after standing, which yields on evaporation the physostigmia in an impure condition, being contaminated with a red foreign matter, which obstinately adheres to it, and requires repeated solution in ether and crystallization to remove all the impurities.

NOTE ON CARVOL.*

BY F. A. FLUCKIGER.

Volckel, in 1840, pointed out that oil of cumin consisted of a hydrocarbon and a portion containing oxygen, to which Berzelius afterwards gave the name of carvol. This body was more minutely examined by Schweizer in 1841. He found that upon treatment with caustic potash, glacial acetic acid or iodine it undergoes a remarkable change; that it is specially soluble in potash, acquiring a very acrid taste, for which reason Schweizer designated the product carvacrol. When in 1842 Claus prepared camphor creosote by boiling camphor with iodine, Schweizer at once recognized its analogy with carvacrol. In 1844 he also obtained this compound by similar treatment of oil of *Thuja occidentalis*. Since then the methods of obtaining this body—at present looked upon as oxycymol, but probably more correctly oxycymene—have been multiplied. Pott obtained it by melting potassium cymensulphonate with potassium hydrate, the cymene employed being prepared by the action of phosphorsulphide upon camphor. H. Müller melted caustic soda with sodium cymensulphonate with the same result, the cymene (cymol) having been obtained from the oil of ajowan fruit (*Ammi Copticum*, L. = *Ptychotis Ajowan* and *P. coptica*, D.C.).

It now appears probable that cymene can be obtained by suitable treatment from any of the essential oils having the composition $C_{10}H_{16}$, as well as from many, if not all, that differ by the addition of O or OH_2, and the chemical identity of cymene from the most diverse sources may now be accepted; but the optical properties of this substance have hitherto only attracted the attention of Schiff and Guareschi. It remained to be seen whether cymene from other sources possessed for instance the same rotatory property as that prepared from cumin oil by Guareschi. The author thinks that this property will generally be found wanting in artificial cymenes, whether prepared synthetically or by reduction of $C_{10}H_{16}$, $C_{10}H_{16}O$, or $C_{10}H_{18}O$. Probably oxycymene is always without optic action, carvacrol prepared by the author from oil of cumin being without rotatory power. The author points out that oxycymene differs from carvol in being permanently coloured green by alcoholic perchloride of iron, refracting light strongly, not penetrating the cork so readily, and not giving the creaking noise peculiar to carvol and other thin volatile oils when rubbed against the side of a glass vessel.

Carvol is the only oil that, as noticed by Varrentrapp in 1849, combines directly with SH_2. The author has used a slight modification of Varrentrapp's method in testing whether carvol is as limited in its distribution in nature as the corresponding hydrocarbon, cymene or cymol. The oil to be tested is diluted with one-fourth its volume of alcohol (sp. gr. ·830) and then saturated with sulphuretted hydrogen. Upon the addition of only a little concentrated ammonia, or better still absolute alcohol saturated with ammonia, it solidifies to a crystalline paste of carvol sulphydrate $(C_{10}H_{14}O)_2SH_2$, or $C_{20}H_{30}O_2S$. Pure carvol is not necessary to the obtaining of this product; it is yielded by both the crude and rectified cumin oil of commerce. If the crystallization does not take place immediately it can be rapidly induced by the passage of a few bubbles of sulphuretted hydrogen. The crystals can be washed with cold alcohol and after further purification by recrystallization they have neither smell nor taste. They can be decomposed by gently heating with alcoholic soda, and upon dilution with hot water pure carvol separates.

Carvol from cumin oil rotates the polarized beam strongly to the *right*, giving with a column of liquid 25 mm. long, in a Wild's polaristrobometer, and with the sodium light, a deviation of not less than 15·6°. The hydrocarbon of cumin oil, carvene, is very strongly dextrogyre, to the extent of 26·8° under the same conditions.

Bolley had stated that in distilling oil of curcuma he had found the portion passing over 230° and between 250° C. to give upon analysis results closely corresponding to the formula $C_{10}H_{14}O$, whilst its behaviour with sulphide of ammonium pointed to its being an isomer with carvol. The author, however, failed to get from curcuma oil a product corresponding either in boiling point or composition with carvol; and four different portions, equally with the crude oil, failed to give the crystals $C_{20}H_{30}O_2S$.

The author next examined oil of myrrh, which, according to Ruikoldt's analysis, agreed in composition with carvol. An oil prepared by him from good myrrh, under the conditions above mentioned, rotated 15° to the *left* and yielded no sulphuretted hydrogen compound. Further its elementary analysis did not correspond with carvol. Herr Buri found in the crude oil C=84·70, H=9·98 per cent.; and in the principal portion, distilling between 262° and 263°, C=84·70, H=10·26. The formula $C_{22}H_{32}O$ would require C=84·62, H=10·25, O=5·13.

Oils of the composition of $C_{10}H_{14}O$ have been reported with more or less probability as present in oil of nutmeg and eucalyptus oil. Gladstone had already shown that the elements of the first formed no combination with oil of nutmeg, and this the author confirms, and gives the same report of oil of mace, his experiments having been made with samples distilled by himself. Neither did he obtain carvol sulphydrate from a commercial eucalyptus oil.

Oil of dill fruit (*Anethum graveolens*) yielded to Gladstone a portion behaving like the carvol of cumin oil, and the chemical identity of the two oils has been established by Nietzki. The author finds it unnecessary to separate the carvol, as the crude oil gives an abundant yield of crystals, $C_{20}H_{30}O_2S$. The carvols from the two oils also correspond in their optical properties. They do not differ more in smell than many sorts of turpentine oil or oil of citron and oil of lemon.

The author examined a sample of oil of *Mentha crispa* and found it to rotate 9·3° to the *left*. Treated with sulphuretted hydrogen it gave the crystals $C_{20}H_{30}O_2S$. The liquid portion, after separation of the alcohol and sulphuretted hydrogen by a gentle heat, amounted to about 70 per cent. of the crude oil, and showed a diminished rotatory power (7·0° to the left). The portion not acted upon by sulphuretted hydrogen gradually deposited crystals in the cold, and upon continuing the passage of sulphuretted hydrogen, adding a little ammonia, a thick oil separated, which, after washing, formed a vitreous mass ($C_{20}H_{30}S_3$, or $(C_{10}H_{14}S)_2SH_2$), the hydrothion sulphocarvol or thiocarvum first obtained by Varrentrapp from cumin oil carvol. This compound, so very rich in sulphur, has at first an agreeable spicy smell, but when purified is odourless.

As the oil of *Mentha crispa* rotated the plane of polarization to the left, it would result that the carvol it contained would also have a lævogyre action, although chemically it was perfectly identical with carvol from cumin oil. The author had supposed that the rotatory powers of the two carvols might be equal, but exercised in opposite directions. Examined, however, under the same conditions as those before mentioned for cumin carvol the crisped mint carvol showed a deviation to the *left* of about 9° only. It would be interesting to compare these two carvols still more closely, as the author thinks that that from crisped mint would probably also yield an oxycymene (carvacrol) without optical action, as well as other derivatives identical with those from cumin carvol.

The author has not met with carvol in any other case, although he has examined a large number of essential oils.

* Abstract of a paper read before the Berlin Chemical Society, from the *Berichte d. Deutsch. chem. Gesselsch.*, ix. 468.

OFFICINAL TINCTURES.

A Contribution to the Literature of the Proposed International Pharmacopœia.*

BY B. F. MCINTYRE.

The difficulty of finding a feasible method of solving the question of a universal standard of formulæ is evidenced by the comments in pharmaceutical journals, medical publications, and reports of societies abroad and at home.

The necessity of a universal standard is marked when we examine the French Codex, British, German, and United States Pharmacopœias with reference to correspondence of proportions in formulas of the same name and medicinal character. The urgency of investigation and comparison of Galenical formulas has received special emphasis during the past year by a publication from the German apothecaries' union of New York, giving the comparative strength of many preparations in the German and United States Pharmacopœias. The tincture calculations found therein are based on proportion of drug to *measure* of menstruum or finished tincture.

Weights and measures of the several pharmacopœias are apt to confuse, and a reform is needed in the directions of parts by weight. This system prevents errors when the weights used have a uniform relative value.

The impracticability of framing an international codex as a substitute for national standards cannot be questioned, but the revisions made occasionally in their standards admit of an opportunity to harmonize and level down discrepancies in formulas, and also to adopt well-tested improvements in pharmaceutical science. Classes of preparations and new remedies tried and found of intrinsic value will advance from national to international endorsement, as secondary preparations are promoted to primary in the U. S. P., when found worthy of transfer.

Percolation, when conducted with moderate care and skill, is an unexceptionable process; but when the conditions are the reverse, maceration with the full quantity of menstruum, as directed by the German and French Pharmacopœias, is preferable. The question of pressing from the dregs all of the adhering tincture is medicinally unimportant, as the tincture has throughout a uniform strength.

The British Pharmacopœia directs maceration of the drug with only a portion of the menstruum, the residue to be freed from tincture and extractive by percolation with fresh spirit until a prescribed measure is obtained.

The German process would be more in harmony with other authorities if a definite measure or weight of tincture could be got from the specified parts of drug; the difference now is considerable where force from hand-screw or hydraulic press is applied to the expression of marc or residue. This, however, is only an economic point for consideration. The loss may be seen in the annexed table, by comparing the actual weight of tincture obtained from the drug after maceration, with the theoretical quantity, or the proportional medicinal strength of the finished tincture given in the next column.

In the experiments tabulated below, the manipulations directed by, and characteristic of, the several pharmacopœias were followed, though the menstruum for the exhaustion of the drug was disregarded, except when they were of the same spirit strength as that designated in the U. S. Pharmacopœia. This was necessary in order to sustain the object of this paper, the finding of the exact parts by weight of drug in parts by weight of tincture; the determinations being based on repeated experiments and calculations made from weighings of hundreds of gallons of officinal tinctures.

As the German Pharmacopœia specifies that tincture of belladonna and digitalis be prepared from the fresh herb, calculation was made for loss in the drying of the herb, and the powdered drug was used instead.

* Read before the Alumni Association of the College of Pharmacy, New York.

PARTS BY WEIGHT OF TINCTURE CONTAINING THE SOLUBLE PORTION OF ONE PART BY WEIGHT OF DRUG.

TINCTURE.	U. S. P.	Br. P.	German Pharm. ‖	German Pharm. †	French Codex.
Aconite Root	2·13	6·71	9·30	10	5·00*
Belladonna	7·20	19·18	7·62	...	5·00
Cannabis Indica	17·80	15·54	20·00	20	...
Calisaya Bark	4·67	4·74	4·12	5	5·00
Cantharides	29·25	76·26	9·36	10	10·00*
Colchicum Seed	7·09	7·33	9·08	10	10·00*
Foxglove	7·30	7·73	5·95	...	5·00
Ginger	3·16	6·24	4·88	5	5·00
Henbane	7·29	7·64	...	...	5·00
Lobelia	7·12	7·61	8·85	10	5·00
Nux Vomica	8·15	8·41	8·97	10	5·00*
Veratrum Viride	1·59	3·63			Ext. of Opium.
Opium	11·52	12·88	9·30	10	12·00*
Stramonium Seed	7·21	7·65	9·28	10	...
Valerian	7·13	7·68	4·79	5	5·00
‡*Opium Camphorated.*					Ext. of Opium.
Opium, Powdered	234·24	207·50	198·00	200	215·00
Benzoic Acid	234·24	207·50	49·50	50	215·00
Gum Camphor	315·36	276·66	99·00	100	323·00
Oil of Anise	257·88	138·33	99·00	100	215·00
Honey	14·66	...	...	...	...
Cinchona Compound.					
Cinchona Red	8·63	9·35	11·62	...	...
Orange Peel	11·50	18·74	34·87	...	...
Serpentaria	46·00	37·56	...	...	...
Saffron	...	154·69	...	...	...
Cochineal	...	309·38	...	...	...
Gentian	...	...	34·87	...	...
Cassia	...	...	69·74	...	...
Aloes.					
Aloes Soct.	30·82	38·16	5·90	...	...
Licorice Extract	10·27	12·58	...	...	...

TINCTURE.	U. S. P.	Br. P.
Benzoin Compound.		
Benzoin	10·12	9·80
Soot. Aloes	60·76	58·60
Storax	14·23	13·09
Balsam Tolu	80·33	39·67
Cardamom Compound		
Cardamom	48·70	78·40
Caraway	145·83	78·40
Cinnamon	58·33	39·20
Cochineal	291·66	142·43
Honey	18·22	...
Raisins	...	9·76
Aloes and Myrrh.		
Aloes	9·26	...
Myrrh	9·26	...
Catechu.		
Catechu	9·64	...
Cinnamon	14·47	...
Gentian Compound.		
Gentian	14·36	18·06
Orange Peel	28·72	26·15
Cardamom	57·44	78·49
Rhubarb.		
Rhubarb	9·69	9·71
Cardamon	58·17	77·98
Coriander	...	77·98
Saffron	...	77·98
Rhubarb and Senna.		
Rhubarb	43·75	...
Senna	175·00	...
Coriander	350·00	...
Fennel	350·00	...
Licorice	700·00	...
Raisins	21·87	...

TINCTURE.	U. S. P.
Iodine Compound.	
Iodine	28·07
Iodide of Potassium	14·07
—	
Assafœtida	6·35
Arnica	4·86
Benzoin	4·81
Bloodroot	7·12
Black Hellebore	7·29
Capsicum	28·00
Conium	6·97
Castor	12·76
Cardamom	7·06
Cinnamon	8·96
Columbo	7·18
Cubeb	7·19
Guaiac	4·41
Guaiac Ammoniated	4·86
Galls	7·44
Hop	5·69
—	
‡Iron	...
Iodine	13·53
Jalap	4·73
Kino	9·49
Lupulin	6·43
Myrrh	8·83
Opium Deodorized	12·50
Opium Acetated	9·27
Quassia	13·97
Orange Peel	7·80
Rhatany	4·86
Serpentaria	7·16
Squill	7·46
Tolu	9·69
Valerian	7·13
Valerian Ammoniated	6·60

‡ One fluid drachm of Tincture of Iron. U.S.P contains 3·53 grains of oxide of iron. One fluid drachm of the same tincture, B.P., contains 3·90 grains of ferric oxide.

‖ Parts by weight of tincture actually obtained from one part by weight of the drug.

† Parts by weight containing the active principles of one part by weight of the drug.

* Tinctures directed to be made by maceration.

Several gummy and resinous tinctures in the U. S. Pharmacopœia are made by maceration without special directions concerning the amount of tincture to be got from the drug; in these instances, if the filtered tincture was less in measure than the menstruum employed, the residue on the filter was percolated with fresh spirit until the measure was obtained.

The tincture of aconite root, given in the table with the French Codex tinctures, is unofficinal; the formula used was that recommended in Dorvault's *L'Officine*. All the Codex tinctures are made in accordance with the system of weight by parts.

Some are directed to be made by maceration, and a great number by percolation. The second process is nearly indentical with that of the United States Pharmacopœia. Such of the tinctures as are made by maceration are in the table marked (*).

A brief study of the table will show a startling exhibit of variations in the strength of several of the dangerous tinctures, whilst the difference between many of the more important ones, including a few that are considered as requiring particular precaution in dispensing, is so slight, that no serious confusion would arise, were they revised so as to correspond with each other.

Nothing but a lingering prejudice against innovation, and an antique veneration for traditional formulas need prevent a systematic and wholesome reform in the direction of a simple and scientific basis for our pharmaceutical authorities to stand upon.

IMPURITIES IN THE HYPOPHOSPHITES OF SODA AND LIME.*

BY M. PATROUILLARD.

The hypophosphites soluble in water may be recognized by the following characters:—They reduce, by the aid of a gentle heat, salts of binoxide of mercury and those of silver, and more readily if the liquor contain a little hydrochloric or sulphuric acid. With bichloride of mercury they form a white precipitate of protochloride, or sometimes the colour is grey from the presence of metallic mercury through the more complete reduction of the chloride. With nitrate of silver, even in a neutral liquid, there is produced a dark-brown precipitate of phosphide of silver mixed with reduced silver.

Dry hypophosphites of the alkalies and of the alkaline earths, heated carefully in a test tube are decomposed giving off phosphuretted hydrogen which inflames spontaneously within the tube and burns with a pale greenish flame, depositing on the sides an orange-yellow or brownish body. Lastly, heated slightly with concentrated nitric acid an active effervescence is suddenly produced, accompanied by an abundant evolution of nitrous vapour. These experiments should be made carefully upon small portions of the substance, in consequence of the violence of the reactions.

Hypophosphite of soda is white, usually amorphous, although it can be obtained crystalline, inodorous, deliquescent, and completely soluble in water and even concentrated alcohol. One part dissolves in about two parts of water and in fifteen parts of 90° alcohol.

The impurities which this salt sometimes contains are due to want of care in its preparation. To obtain it it is usual to decompose hypophosphite of baryta with sulphate of soda, insoluble sulphate of baryta being formed and hypophosphite of soda, which remains in solution. If the sulphate of soda is not used in sufficient quantity, undecomposed hypophosphite of baryta remains mixed with the hypophosphite of soda, giving when tested with sulphate of soda a white precipitate insoluble in hydrochloric acid. If on the other hand an excess of sulphate of soda is used, and this is the more frequent case, the salt gives with chloride of barium the same precipitate of sulphate of barium. When treated with 90° alcohol a residue of sulphate of soda is left. The author reports that he has met with notable proportions of sulphate of soda in commercial hypophosphite of soda.

The residue insoluble in alcohol may also contain phosphate of soda formed during the evaporation of the solution of the hypophosphite. In this case the residue dissolved in distilled water gives with neutral nitrate of silver a yellow precipitate very soluble in nitric acid and in ammonia.

Hypophosphite of lime is white, unaltered by exposure to the air, soluble in about six parts of distilled water and insoluble in alcohol. The salt is rarely completely soluble in water, because in its preparation, during the evaporation of the solution, there is always formation of phosphite and consecutively of phosphate of lime. When triturated with water it ought to dissolve without giving off the alliaceous odour characteristic of phosphuretted hydrogen. The solution of hypophosphite of lime acidulated by acetic acid should give with oxalate of ammonia a white precipitate insoluble in acetic acid in excess, but soluble in hydrochloric acid. The same solution should not precipitate upon the addition of sulphate of lime, as that might show the presence of a baryta salt: neither should it precipitate with chloride of barium.

* *Journal de Pharmacie et de Chimie* [4], xxiii, 445.

CHEMICAL INVESTIGATION OF SASSY-TREE BARK.*

(*Erythrophlœum guineense.*)

BY N. GALLOIS AND E. HARDY.

The Sassy-tree (*Erythrophlœum guineense*, G. Don) is a tall tree belonging to the Leguminosæ, sub-class Cæsalpinieæ, and a native of West Africa. Its wood is very hard and enduring and is not attacked by ants. The bark is used by the natives to poison their arrows and to prepare an ordeal drink for criminals. It is met with in irregular flat reddish brown pieces, with a rough surface. It is hard, fibrous, and odourless, and its pulverization is provocative of sneezing. A specimen of this bark has been examined by the authors, who have succeeded in extracting from it an alkaloid.

The powdered bark was exhausted by repeated macerations for three days in cold 90 per cent. alcohol slightly acidulated with hydrochloric acid. The tinctures were united and filtered and the greater part was distilled over from a water-bath; the remainder was then evaporated at a low temperature. A red brown extract was thus obtained rich in resinous matter. This was treated five or six times with lukewarm distilled water, and the liquor cooled, filtered and evaporated in a water-bath. When suitably concentrated it was again allowed to cool, decanted, saturated with ammonia, and poured into four or five times its volume of acetic ether, from which any acid present had been previously removed. After shaking several times the ether was removed by means of a funnel having a robinet. The aqueous solution was then exhausted a second time with four times its volume of acetic ether. The ethereal solutions were filtered, evaporated in a water-bath at a low temperature and the yellowish residue treated several times with cold distilled water. The aqueous solution was filtered and allowed to evaporate in vacuum of an air pump. Another process employed was that of Stas, with the substitution of acetic ether for ordinary ether after the saturation with carbonate of soda.

A substance was thus obtained that was soluble in water, and gave a yellowish red precipitate with iodine and iodide of potassium, white with the double iodide of mercury and potassium, yellow with iodide of bismuth and cadmium, white flocculent precipitate with iodide of

* *Journal de Pharmacie et de Chemie* [4], xxiv, 25.

cadmium and potassium, yellowish with bichromate of potash, white with bichloride of mercury, white with chloride of palladium, and a dirty yellowish green with phosphomolybdic acid. To the alkaloid thus indicated the authors have given the name "erythrophleine."

Erythrophleine is described as being colourless, crystalline, and soluble in water, alcohol, amylic alcohol, and acetic ether. It is only slightly, or not at all, soluble in sulphuric ether, chloroform and benzol. It combines with acids to form salts; the hydrochlorate is colourless and crystalline and gives a white crystalline precipitate with potash solution. The approach even of a rod dipped in ammonia to a concentrated solution causes an immediate formation of an opaque white precipitate, crystalline under the microscope. In contact with permanganate of potash and sulphuric acid erythrophleine develops a violet colour, less intense than that given by strychnine, and soon becoming dusky.

Erythrophleine is a very energetic poison, quickly paralysing the action of the heart. Its effects are retarded by curare.

A fruit and a leaf of *Erythrophlœum coumenga* were also examined by the authors, who found indications of an alkaloid very nearly allied to or identical with that present in *E. guineense.*

THE DECAY OF FRUITS.*

At a recent meeting of the *Gesellschaft naturforschenden Freunde zu Berlin*, Dr. Brefeld reported the results of his investigations on the decay of fruits. He says it is a universally recognized fact that a rotten apple will infect a sound one with which it may be in contact. We cannot conceive infection in the absence of an active agent producing it, and calling forth and determining the form of this phenomenon. These investigations embraced the examination of rotten fruits of various kinds from the most widely diverse localities, and at different seasons of the year. The tissue was invariably found to be exhausted and withered, the cells had lost their turgidity, the contents were contracted, and the cell-sap dispersed in the inter-cellular spaces. With certain exceptions, alluded to below, Brefeld found the entire mass of cells permeated in all directions by the easily seen spawn of fungi, but the threads were merely interlaced among the cells, never piercing the cells themselves. The fungi present belong to very common moulds of two distinct kinds; one with broad, dense tubes without partitions, the other with narrower, frequently septate tubes, both being very much branched. The former consisted mainly of *Mucor stolonifer*, more rarely of *M. racemosus*, and the latter of *Botrytis cinerea* and *Penicillium glaucum.* There seems to be no doubt that these parasites are nourished by the cell-sap which has escaped into the inter-cellular spaces; but the most important question for elucidation was whether these fungi are the cause of decay, or simply accompanying conditions. To determine this point, several series of experiments were undertaken with the pure fungus and perfectly sound fruit. Spores were thickly sprinkled over sound fruit, and, to make the experiment more conclusive, the spores were conveyed to the fruit in water, and the fruit afterwards placed under a bell-glass in a moist atmosphere. As might have been expected, the fruit remained sound, the spores failing to germinate altogether, or germinating only very sparingly. In consequence of the absence of a nourishing fluid, the spores possessed no power to attack the tissues of the fruit.

A second series of experiments was instituted, in which the spores were dipped in a nourishing solution of fruit pulp, in which they could germinate and form a mycelium, and this was laid on sound fruit with a pencil. Soon some of the fruits began to show here and there, in the least protected places, symptoms of decay, spreading with varying degrees of rapidity over the whole fruit. Nothing was easier to observe than that the penetrating fungus was actually the cause of the decay. Another set of experiments more fully proved this to be the case. Some sound apples were artificially wounded, and infected with the spores, which grew and spread in the same manner. Other sound, bruised, but not infected apples showed no symptoms of decay. From a large number of experiments it was found that the more unripe the fruit, and the denser its tissue, the less power the fungus had of taking possession of it; but with the increase of saccharine matter, and the decrease of acids, the fruit becomes more susceptible. Unripe fruit artificially infected with fungus did not decay, as the fungus did not find a suitable host. Concerning the relative rate of growth of the fungi named above it was found that *Mucor stolonifer* was by far the most rapid. Pears infected with this fungus become thoroughly decomposed in a few days, and, strange to say, no outward trace of it is usually discernible before the whole interior is destroyed. Now arises the question, Do fungi always cause the decay of fruit? This is easily answered in the negative, for many pears, and in a still more striking manner the medlar, exhibit a kind of spontaneous decay, equally as rapid in its course as is the case where moulds are present. This kind of decay is what we find in a "sleepy" pear and a blet medlar, in which, according to Brefeld, there is no fungus present. Otherwise the decomposition of the tissue proceeds in exactly the same manner in both cases. The foregoing extracts fully confirm practical experience, and suggest the means for preventing the spread of these insidious organisms—the moulds—in the fruit room.

* From the *Gardeners' Chronicle*, July 15, 1876.

HANBURY MEMORIAL FUND.

Subscriptions Received.

	£	s.	d.
Amount previously acknowledged	178	18	6
Abel, Professor F.A., F.R.S.	1	1	0
Aitken, Dr. W., F.R.S.	1	1	0
Allen, W., In memory of	1	1	0
Allman, Dr. G. J., F.R.S.	1	1	0
Barry, J. T., In memory of	1	1	0
Beale, Lionel, F.R.S.	1	1	0
Bentham, G., F.R.S.	1	1	0
Betty, Samuel C. ..	1	1	0
Bourdas, Isaiah	1	1	0
Brown, David	1	1	0
Butt, E. Northway ..	1	1	0
Cracknell, Charles ..	1	1	0
Cooper, George	0	10	6
Delves, George	0	10	6
Dittrich, Josef	1	1	0
Dragendorff, Prof. G.	1	0	0
Dymock, Dr. W., ..	1	1	0
Edgeworth, M. P. ..	1	1	0
Evans, John, F.R.S. ..	1	1	0
Forbes, David, F.R.S.	1	1	0
Foster, Dr. M., F.R.S.	1	1	0
Fox, Dr. W., F.R.S.	1	1	0
Gadd, Henry	0	10	6
Gadd, Robert	0	5	0
Gale, Samuel	1	1	0
Gamble, David	1	1	0
Garrod, Dr. A. B., F.R.S.	1	1	0
Gerrard, Alfred W. ..	0	10	6
Glaisher, J., F.R.S. ..	1	1	0
Gossage, W.	1	1	0
Greenhow, Dr. E. H., F.R.S.	1	1	0
Groves, Henry	1	1	0
Hanbury, C., In memory of	1	1	0
Haselden, A. F.	1	1	0
Havill, Paul	0	10	6
Hayward, W. G. ..	1	1	0
Hills, Walter	1	1	0
Houghton, R. W. ..	1	1	0
Howard, David	1	1	0
Howard, J. E., F.R.S.	1	1	0
Howard, W. D.	1	1	0
Hudson, W. B.	1	1	0
Jones, Walter Robert	1	1	0
Landsdell, Mark J. ..	1	1	0
Lister, Joseph, F.R.S.	1	1	0
Long, Henry	1	1	0
Lorimer, John	1	1	0
Macfarlane, A. Y. ..	0	5	0
Martindale, William ..	1	1	0
Matthews, William ..	1	1	0
Montefiore, Sir Moses F.R.S.	1	1	0
"The Holy Land" ..	1	1	0
Müller, Hugo, F.R.S.	1	1	0
Paine, Standen	1	1	0
Palmer, Robert	1	1	0
Parsons, William ..	1	1	0
Paul, Dr. B. H. ..	1	1	0
Penrose and Son ..	1	1	0
Perkin, W. H., F.R.S.	1	1	0
Pharmaceutical Society of Prague	1	1	0
Prior, G. T.	1	1	0
Ransome, Dr. A. ..	1	1	0
Redwood, Prof. T. ..	1	1	0
Reeves, J. R., F.R.S.	1	1	0
Robinson, R. A.	1	1	0
Saunders, W. F. ..	1	1	0
Smith, Thomas	1	1	0
Spencer, Thomas ..	1	1	0
Squire, P. W.	1	1	0
Stanford, E. C. C. ..	1	1	0
Stenhouse, John ..	1	1	0
Stuart, John Edwd. ..	1	1	0
Thompson, Andrew ..	1	1	0
Tichborne, C.R.C. ..	1	0	0
Tupholme, J. T. ..	1	1	0
Umney, Charles ..	1	1	0
Walker, J. F.	1	1	0
White, Leedham ..	1	1	0
Wigner, G. W.	1	1	0
Wilson, G. F., F.R.S.	1	1	0
Wright, Dr. C. R. A.	1	1	0
Yates, Francis	1	1	0
Yates, Robert	1	1	0
Young, James, F.R.S.	1	1	0
young, John	1	1	0

The Pharmaceutical Journal.

SATURDAY, JULY 22, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, *17, Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACISTS' DANGERS.

IF a non-pharmaceutist had been present last week in the room at Birmingham when Mr. WILLIAM SOUTHALL described the conscientious pharmacist as waking up in the night after a doubtful two-pence worth of laudanum has passed over his counter, assured that somebody has been poisoned, he might pardonably have looked upon the statement as a little dramatic colouring But pharmacists themselves know that even if their slumbers are as a rule unbroken this is not to be attributed to the absence of disturbing possibilities, and that scarcely a day passes without fresh evidence of the supreme necessity for the exercise of almost superhuman vigilance in carrying on the operations of a pharmacy. Two cases have recently been published, one in England and the other in France, in neither of which was there wanting what an ordinary tradesman would call carefulness, yet a little oversight in each nearly resulted in death, and in one case brought very disagreeable consequences to the pharmacist. We think it may be useful to put both of them on record.

The English case was the misreading of a badly written prescription, the result being an illustration on a human subject of probably the extreme amount of nitrobenzol that can be taken in forty-eight hours without inducing death. The details have been published by Dr. THOMAS STEVENSON in a pamphlet illustrated by a lithograph of the prescription. A young man having consulted a physician for a pain in the chest and troublesome cough, received the following prescription with a request to have it dispensed by a particular druggist:—

℞ Benzole rect., ʒij
OL Menth. pip., ʒss
OL Olivæ, ℥x, gutt. xxx. t.d.s.

The medicine was dispensed and taken and the cough was relieved. Three months afterwards, the patient thinking he had occasion to take the medicine again had it made up by another chemist. Here, however, obscure caligraphy exercised a disturbing influence, and the "Benzole *rect.*" of the prescription, which a medical contemporary fairly describes as a curiosity in the way of illegibility, was read "Benzole *nit.*" and dispensed accordingly. After taking equal to 23 minims of nitrobenzol in forty-eight hours, the patient was compelled to leave business, but on his way home fell senseless in the street and was carried into Guy's Hospital apparently dead, although we are glad to add he subsequently recovered.

We quite indorse the opinion of the *Lancet* that here the pharmacist—who, indeed, remarked on the largeness of the dose—was not to blame, and that the accident was due to the "homicidal handwriting" of the prescriber. It appears that the word "*rect.*" was so written as to exactly resemble "*nit.*" with the exception that the "*i*" was not dotted, but neither was any "*i*" in the prescription. In fact so specious was the resemblance that when the prescription was produced those who saw it, including Dr. STEVENSON, thought nitrobenzol had been prescribed, and the truth was not discovered until the chemist who first made up the prescription having been communicated with his greater familiarity with the prescriber's caligraphy enabled him to show the correct construction of the prescription. We are also glad to see that our contemporary strongly condemns the "practice of relying on a particular chemist to interpret bad writing."

The other case to which we referred was the dispensing of arseniate of soda for phosphate of soda, arising apparently from using up odd stock without previous examination. A French lady having received a prescription ordering ten packets of phosphate of soda, each containing one gram, sent it to be dispensed at a Paris pharmacy. Shortly after taking the contents of one of the packets in milk the lady was seized with violent symptoms of poisoning, and an examination of the remaining packets showed that they contained arseniate of soda.

After the recovery of the lady, the chemist was prosecuted before the *tribunal correctionnel* for having caused involuntary damage through neglect of the law providing that all poisons in a pharmacy shall be kept under lock and key. One of his pupils was also included in the charge. The offence was acknowledged, but in extenuation it was urged that the poison had been taken by the pupil out of a bottle labelled "phosphate de soude," which had been lying unused in a cabinet from the time when the business had been bought from the present proprietor's predecesor three years before. The tribunal, however, decided that the accident had resulted from "imprudence, inattention, négligence et inobservation des règlements." It therefore sentenced the principal defendant to suffer one month's imprisonment and pay a penalty of one hundred francs and the pupil to one month's imprisonment and a penalty of fifty francs. Besides this, both the defendants were ordered to pay two thousand francs *dommages intérêts.* This judgment appears to be a rather severe one, but the case is a fresh illustration of the necessity for the careful supervision of old stock by new proprietors.

FRENCH PROPRIETARY ARTICLES.

A FORTNIGHT since we quoted a statement respecting the sale of a French *spécialité*, the figures in which were almost suggestive of exaggeration. The last number of the *Bulletin Commercial*, however, contains fresh evidence of the enormous value (to the proprietors) of some of these preparations in France. It is stated that upon the death of M. BOYER of the Rue Taranne, the interest in his "Eau de Melisse" was sold for 1,264,000 francs, and that another *spécialité*, the "Liqueur des Bénédictines de Fecamp," has recently been sold for 1,400,000 francs. Under these circumstances it is not surprising to find that French financiers are desirous of making the citizens of this El Dorado contribute more freely towards the taxation of the country. A M. LORGERIL is particularly enthusiastic in this direction, and has recently been urging upon the Minister of Finance, for the third or fourth time, the possibility of raising untold millions (of francs) by a tax on *spécialités*. M. LEON SAY confesses to being in the position of a second TANTALUS, unable to drink of the stream that is running past him, because—he is in want of a definition. He has consulted the learned societies as to what constitutes a *spécialité*, but without success, and his last hope now rests upon a commission. Perhaps he and the commission may be assisted by a suggestion made during the debate that a *spécialité* is anything that speculates upon human stupidity!

XANTHIUM SPINOSUM AS A PREVENTIVE OF HYDROPHOBIA.

IN a letter published in a recent number of Professor GUBLER'S *Journal de Thérapeutique* another addition is made to the already formidable list of prophylactics against hydrophobia. Dr. GRZYMALA, of Krivoe Ozeroe, Podolie, reports that during the last ten years he has treated at least one hundred cases—in human subjects as well as beasts—of bites by hydrophobic animals with the powdered leaves of *Xanthium spinosum*, with success in every case except one, although cases of bites inflicted at the same time, but treated in other ways, had terminated in death. The drug is described as possessing sudorific, sialagogue, and slightly diuretic properties, but less pronounced than those of jaborandi. The dose for an adult is 60 centigrams of dry powder of the leaves, repeated three times a day and continued during three weeks; to children under twelve years half the quantity is given.

EVOLUTION OF OXYGEN BY VALLISNERIA SPIRALIS.

MR. STANTON, in a letter to *Nature*, invites confirmation of the following observation. He says that if a blade of *Vallisneria spiralis* be cut or broken and held under water in sunlight, there is a rapid evolution from the broken end of bubbles of oxygen gas which can be collected by filling a test tube with water and allowing the gas to displace the water. Mr. STANTON states that in this way he has collected about a cubic inch of oxygen from one blade in eight hours. After forty-eight hours the pores of the broken blade close up and a fresh fracture is necessary to restore the evolution.

POISONING BY VIRGINIAN CREEPER.

THE details of two cases of poisoning by the well-known Virginian Creeper or American Ivy (*Ampelopsis hederacea*) have been communicated to the medical papers by Mr. BERNAYS, of Chatham. The sufferers were two children, aged respectively 2½ and 5 years, who had chewed some leaves of the plant, swallowing only the juice. They were quickly seized with violent vomiting and purging, with considerable tenesmus; then collapse, sweating and faint pulse; followed by deep sleep for two hours from which they were aroused by a return of the vomiting and purging. Milk, with some rum mixed in it, was freely administered, under which treatment the children soon recovered; but four hours after the commencement of the attack there was still considerable dilatation of the pupil.

CINCHONA EXPERIMENTS BY THE JAPANESE.

IN the last quarterly report respecting the Dutch Government Cinchona Plantations in Java, it is stated that an attempt is to be made to acclimatize the cinchona in Japan. An application has been received from the Japanese Government for a supply of young plants for the purpose, and a selection of specimens of the best varieties in the Dutch plantations has accordingly been forwarded.

WE learn that H.R.H. the PRINCE of WALES has enriched the Kew Museum by the presentation of a large number of specimens of seeds and fruits of economic or medicinal value, as well as of condiments, drugs, grains, etc., from Southern India, collected during his recent tour in that country.

THE fifth session of the French Association for the Advancement of Science is to be held next month at Clermont-Ferrand. The local committee includes a large number of medical men and pharmacists. The opening meeting is to be held on the 18th of August and the congress is to close on the 27th.

THE Office of Registrar of the General Medical Council having become vacant through the resignation of Dr. HAWKINS, advertisements have appeared inviting applications for the appointment, which will be made by the Executive Committee in October next. The salary is £500 a year.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

July 12th, 1876.

Present—Messrs. Ainslie, Borland, Buchanan, Gilmour, Kemp, Kinninmont, and Young.

Professor Maclagan was present on behalf of the Privy Council.

MAJOR EXAMINATION.

One candidate was examined, and passed, and was declared qualified to be registered as a Pharmaceutical Chemist.

Baikie, Peter........................Belfast.

MINOR EXAMINATION.

Ten candidates were examined. *Three* failed. The following *seven* passed and were declared qualified to be registered as Chemists and Druggists:—

Fowler, Donald.......................Inverness.
Laurie, John..........................Ipswich.
Lees, David...........................St. Andrew's.
Pittuck, Frederick William ...Hebburn.
Roberts, Joseph......................Liverpool.
Robertson, Andrew.................Markinch.
Veitch, Andrew.......................Shildon.

MODIFIED EXAMINATION.

Four candidates were examined. *Two* failed. The following *two* passed, and were declared qualified to be registered as Chemists and Druggists:—

Johnstone, Robert ....Langholm.
Thorburn, Henry W. ....Bishop Auckland.

July 13th, 1876.

Present—Messrs. Ainslie, Borland, Buchanan, Gilmour, Kemp, Kinninmont, and Young.

Professor Maclagan was present on behalf of the Privy Council.

MINOR EXAMINATION.

Nine candidates were examined. *Six* failed. The following *three* passed, and were declared qualified to be registered as Chemists and Druggists:—

Frazer, Alexander ....Liverpool.
Harris, Evan William ....Aberavon.
Weddell, George ....Kelso.

EXAMINATIONS IN LONDON.

July 12th, 1876.

Present—Mr. Savage, Vice-President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Schweitzer, Taylor, and Umney.

MAJOR EXAMINATION.

Sixteen candidates were examined. *Five* failed. The following *eleven* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Allen, Charles Bowen ....Penzance.
Bennett, Charles ....Bristol.
Best, John William ....Darlington.
Bowen, John William ....Handsworth.
Dimmock, Augustus Frederick .London.
Dymott, Frank ....Southampton.
Hunt, Arthur ....London.
Milton, Thomas Clement.........Exeter.
Newbury, Samuel..................Dorking.
Severs, Samuel Thomas ....Leeds.
Wright, Thomas David ....Lancaster.

MINOR EXAMINATION.

Twelve candidates were examined. *Three* failed. The following *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Cooper, John.........................Newcastle-under-Lyne.
Goodall, William Anthony ......Clifton.
Hollick, Richard ....Birmingham.
Johnson, William Henry.........Nuneaton.
Madden, Ronald George ....London.
Trevaskis, George Marrack ...London.
Walker, George......................Liverpool.
Widdowson, Reuben ....Nottingham.
Wilkinson-Newsholme, Geo. T. Huddersfield.

PRELIMINARY EXAMINATION.

The undermentioned Certificates were received in lieu of the Society's examination:—

Certificate of the University of Oxford.

Powell, Ernest George Burrup. Cheltenham.

Certificate of the Royal College of Surgeons in Ireland.

Goodchild, Thomas Archibald...Belfast.

July 13th, 1876.

Present—Mr. Savage, Vice-President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Schweitzer, Southall, Taylor, and Umney.

MAJOR EXAMINATION.

Seventeen candidates were examined. *Eight* failed. The following *nine* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Amoore, Lewis Perigoe ....Hastings.
Bessant, Frederick Railton......Hampstead.
Glegg, John ....Edinburgh.
Haworth, Benjamin Henry......Manchester.
Hicks, William Thomas ....Ipswich.
Jones, James Parry...............Newcastle.
Lewis, David.........................Cardigan.
Newton, Alfred Henry ....Kenilworth.
Weddell, Arthur ....Stamford.

MINOR EXAMINATION.

Ten candidates were examined. *Four* failed. The following *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Babb, James ....Taunton.
Collingwood, John Henry ......Little Gonerby.
Craske, Thomas Augustus ......Tunbridge Wells.
Stacey, Peter.........................London.
Wallas, Thomas Irwin............Carlisle.
Wardle, William Stephens ......London.

July 14th, 1876.

Present—Mr. Williams, President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Schweitzer, Southall, Taylor, and Umney.

Dr. Greenhow was present on behalf of the Privy Council.

MINOR EXAMINATION.

Twenty-seven candidates were examined. *Nine* failed. The following *eighteen* passed, and were declared qualified to be registered as Chemists aud Druggists:—

Alpe, Robert Bird ....East Dereham.
Bevan, Edward......................Swansea.
Clayton, Thomas ....Malton.
Collitt, William ....Gainsborough.
Davies, John.........................Carmarthen.
Evans, Thomas.....................Cwmbach.
Hart, James Connorton ....Horselydown.
Harrington, John Stephen .. ...London.
Jones, Richard Edward ....London.

Kendall, John ....Truro.
Knight, Lindsey ....Cheltenham.
Owen, Griffith Charles Roose ...Carnarvon.
Place, Frederick William.........Knutsford.
Ridgley, Thomas ....Newport, I. of W.
Robinson, Thomas Dexter ......Bedford.
Rumsey, James Window.........Crickhowell.
Treweeks, Richard Harwood ...Pembroke.
Truman, Henry Vernon ....Nottingham.

July 18*th*, 1876.

Present—Mr. Williams, President; Messrs. Allchin, Benger, Carteighe, Corder, Gale, Haselden, Linford, Moss, Schweitzer, Southall, Taylor, and Umney.

MINOR EXAMINATION.

Twenty-seven candidates were examined. *Seventeen* failed. The following *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Barron, William ....Leamington.
Ferguson, William Harry ......London.
Foggon, George......................Newcastle-on-Tyne.
Ford, Horace Sidney ... .Southsea.
Hughes, Benjamin Longmore...Chichester.
Jones, Thomas Mantle............Stafford.
Jones, William Henry......... ..Landport.
Lowe, William Foulkes ....Rock Ferry.
Wade, Robert Brady ....Shoreham.
Wastie, Francis.....................London.

July 19*th*, 1876.

Present—Mr. Savage, Vice-President; Messrs. Allchin, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Schweitzer, Southall, Taylor, and Umney.

Dr. Greenhow was present on behalf of the Privy Council.

MINOR EXAMINATION.

Twenty candidates were examined. *Twelve* failed. The following *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Abraham, Alfred Clay............Liverpool.
Allen, Joseph John William ...Haverstock Hill.
Carr, John Allen ....Lancaster.
Cocker, Robert Benjamin ......London.
Fargher, Henry Spencer ....Warrington.
Gall, Alfred ... .Woodbridge.
Nichols, Frederic Bulstrode ...Chelsea.
Tompsett, Leighton Stovold ...Strood.

MODIFIED EXAMINATION.

Six candidates were examined. *Three* failed. The following *three* passed, and were declared qualified to be registered as Chemists and Druggists:—

Goucher, Levi Tom ... .Manchester.
Morgan, John ....Poonah.
Williams, William David ......Salisbury.

PRELIMINARY EXAMINATION.

July 3*rd*, 1876.

Three hundred and two candidates presented themselves for examination, of whom *one hundred and twenty-eight* failed. The following *one hundred and seventy-four* passed, and have been duly registered as Apprentices or Students (arranged alphabetically):—

Adams, Thomas Edwin, jun. ...Liverpool.
Arthur, John........................Chesterfield.
Ashburner, Isaac ....Broughton-in-Furness.
Atkinson, John Lancelot ....Pickering.
Barton, Francis.....................Guernsey.
Benson, George William ....Bradford.
Bishop, Cecil.......................Brading.
Blyton, Thomas Bage ....Manchester.
Bolton, William Edward.........Rochester.
Bowering, John ....Taunton.
Brown, Richard ....Rochester.
Brown, Thomas ....Hull.
Burchell, Robert Henry ....Kettering.
Butterfield, Joseph William ...Blackburn.
Caton, Edwin Charles ....Shepherd's Bush.
Charles, Frank Henry............Pontypool.
Christie, Peter Crombie ....Aberdeen.
Christien, Frederick Joseph ...Bury St. Edmund's.
Clague, Thomas Maltby ....Douglas.
Cleland, Andrew Hutcheson ...Eastwood.
Cock, Charles Maidwell ....Shipdham.
Cooper, Albert ....Huntingdon.
Cooper, George Dodd ....Brightlingsea.
Corfield, Edward ....Birmingham.
Coverdale, George ... .Leeds.
Cowpe, John........................Southwell.
Cowx, Wilfred Henry Russell...Birmingham.
Crompton, Wm. Wolstenholme...Bury.
Crosby, Robert.....................Sunderland.
Cullwick, Herbert Ernest ......Knighton.
Cuthbert, George Bennard ......Caistor.
Cutts, Joseph Nix ....Chesterfield.
Dawson, Arthur Robert ....Southampton.
Dewes, George ....Wolverhampton.
Dunbar, George ....Dumfries.
East, William Alfred ....Princes Risboro.
Elliott, William Atherton ......Macclesfield.
Emerson, Henry Wall ....West Hartlepool.
Fairs, Thomas Carleton ....Folkestone.
Fell, Joseph ....Dumfries.
Field, William ....Shoreham.
Flintan, Francis Robert ....Weybridge.
Foggitt, John Blackett ....Thirsk.
Foote, James Forster ....Williton.
Fourness, James Herbert.........Leeds.
Frost, John Henry ....London.
Fugler, Augustus ....Probus.
Fulcher, Herbert Ashton.........Beckford.
Gibbons, Walter ....Manchester.
Gifford, Richard Lord ....Blackburn.
Glaister, John William ....Silloth.
Goodall, John Kenez ....Nottingham.
Goodwin, Alfred Herbert ......Macclesfield.
Graham, Thomas A...............Stirling.
Griffin, Frederick..................Cambridge.
Grigs, Emerson Fenwick Geo...North Shields.
Hall, David ....Eagley.
Halton, George Richard ....Douglas.
Hankinson, George Robert......Grange-over-Sands.
Harding, Joseph Thomas ......Stone.
Hardwick, William ....Driffield.
Harries, David ....St. Clears.
Harrison, Ernest ....Tranmere.
Harrison, Sidney Hope ....Coventry.
Hart, Herbert Wheatley ....Wimbledon.
Harthan, Herbert..................Manchester.
Hearnshaw, John William ......Spalding.
Hebron, Frank......................Knaresborough.
Hemmons, John ....Kingsdown.
Henson, William John............Maldon.
Herbert, Henry Seaton ....Thorparch.
Hewitt, Joseph Frederick ......York.
Hill, Arthur ....Leicester.
Hirst, Joseph ....Leeds.
Holme, William A. ....Northampton.
Holmes, James Henry............Kendal.
Hope, Ingham ....Hull.
Hopkinson, William Henry......East Retford.
Hopper, James Henry............Ryde.
Hornby, C. H. ....Stockport.
Hughes, Edward, jun.............Altrincham.
Hutton, Robert Sanders ....Darlington.
Hyde, Frederick William ......Cwamman.
Johnson, Leonard..................Aiskew.

Jones, John Evans	Llandyssul.
Joyner, Edwin	Cheltenham.
Kirk, John Johnstone	Kirkcaldy.
Kittle, Ernest John	Lower Edmonton.
Lane, Thomas Jesse	Barnstaple.
Laslett, Edwin Arthur	Hull.
Layng, Henry	Brandon.
Liddle, Frederic James	St. Neot's.
Lockyer, Eden Henry	Bristol.
McInnes, Archibald Sinclair	Glasgow.
Mackenzie, George Grant	Invergordon.
Mallen, James Edward	Llantrissant.
Mantell, Charles, jun.	Birmingham.
Martin, Thomas	Tuxford.
Matthews, John Henry	London.
Milford, James Emery	Bath.
Milne, Andrew Miller	London.
Moody, Lewis	Lincoln.
Morgan, Thomas Henry	York.
Naish, Walter	Bath.
Naysmith, Andrew	Arbroath.
Nettle, William Robert Pett	Plymouth.
Nesbitt, John	Edinburgh.
Newbould, John Matthew	Bradford.
Norval, Thomas Leishman	Perth.
Notcutt, William Brighty	London.
Oglesby, Arthur	York.
Ombler, William Henry	Windsor.
Paterson, James	Douglas.
Paul, Ernest	Windsor.
Peacock, James, jun.	Sunderland.
Penberthy, Harry Broad	Redruth.
Perkins, Charles Lynham	Torpoint.
Pheasant, William	Clapham.
Pike, Frank Horton	Reading.
Pratt, George	Bishop Auckland.
Procter, James Frederick	Kidderminster.
Prosser, James Alfred	Birmingham.
Quine, Richard H.	Warrington.
Reeves, Oliver Colston	Walsall.
Richards, Randolph Hutchings	London.
Roberts, Robert	Llangynidr.
Robertson, H. M.	Thornton.
Robinson, John Whiteley	Knaresborough.
Roderick, Thomas Alex. Henry	Pontypool.
Ross, Alexander	Inverness.
Ross, Charles	London.
Sanderson, William	Driffield.
Sassen, James Gerhard	Manchester.
Scupham, Herbert	Ulceby.
Seitz, Frederick Hartwig	Birmingham.
Sergeant, Joseph	Brigg.
Sewell, Thomas Arthur Williams	Lee.
Shepherd, Robert James	Wisbech.
Shillito, William Alsope	Sheffield.
Silk, Edward	Macclesfield.
Smith, Edmund Fauriel	Liverpool.
Smith, Joseph	York.
Smith, Robert Frazer	Glasgow.
Smith, Tom Henry	Howden.
Snodgrass, John Allan	Glasgow.
Southee, William Jennings	Hackney.
Talbot, William John Campbell	Howden.
Taylor, Solomon	Stafford.
Toms, Alfred	Swansea.
Tucker, Francis	Woolwich.
Tudor, William Thomas	Brecon.
Tunningley, Robert	Hambleton.
Turney, John Davy	Plymouth.
Underwood, Charles Joseph	Chatham.
Wall, Edward John	Peckham.
Wallis, Edwin	Streatham.
Webb, George Frederick	Shepherd's Bush.
Whiffin, Henry	Market Harborough.
Whiston, Edmund	Wolverhampton.
Whitehead, Frank Herbert	Oldham.
Whyte, George	Strichen.
Whyte, William	Busby.
Williams, Charles Adrian	Plymouth.
Williams, Joshua Edward	Brynglas.
Williams, John Wynne	Mold.
Wilson, William Joseph	Oxford.
Winder, Arthur Benjamin	Huddersfield.
Wise, Henry John	London.
Woods, William Herbert	Plymouth.
Woodward, Harry W. K.	Sheffield.
Wright, George	Nairn.
Yeates, Alfred	Kington.
Young, Edward Herbert	Tring.
Young, Herbert Edward	Binfield.

The Questions for Examination were as follows:—

(*Time allowed: Three hours for the three subjects.*)

I. LATIN.

1. Translate into English:—Flumen est Arar, quod per fines Haeduorum et Sequanorum in Rhodanum influit, incredibili lenitate, ita ut oculis, in utram partem fluat, judicari non possit. Id Helvetii ratibus ac lintribus junctis transibant. Ubi per exploratores Caesar certior factus est tres jam partes copiarum Helvetios id flumen traduxisse, quartam vero partem citra flumen Ararim reliquam esse, de tertia vigilia cum legionibus tribus e castris profectus ad eam partem pervenit, quae nondum flumen transierat.

2. Parse *quod, utram;* and decline *flumen, ratibus. tribus.*

3. Give the present, perfect, supine, and infinitive of the active forms of the following verbs: *fluat, junctis, transibant, traduxisse, pervenit.*

4. In what case is (*a*) the *manner*, (*b*) the *time*, (*c*) the *place* of an action put? Give *one* example of each.

II. ARITHMETIC.

(The working of these questions, as well as the answers must be written out in full.)

5. Multiply 716804 by 360; divide the product by 180, and express the quotient in *words.*

6. Of 21 people, 13 lose £116. 7*s.* 8*d.* *each*, and 8 lose £23. 0*s.* 9*d.* *each*; what is the average loss per man?

7. A bankrupt whose debts amount to £2653 10*s.* 6*d.* pays 6*s.* $3\frac{1}{2}$*d.* in the pound; what is the value of his effects?

8. Find the value of $\dfrac{4\frac{4}{15} \text{ of } 2\frac{5}{8}}{5\frac{1}{5}-4\frac{1}{2}}$; and of $1\frac{7}{8}$ of 10*s.* 6*d.*—$\frac{3}{4}$ of 2*s.* 6*d.* + £$\frac{1}{12}$ — $\frac{1}{14}$ of 21*s.*

9. Divide 172·9 by ·142 to three places of decimals; and express $\cdot 00\dot{4}\dot{9}$ as a vulgar fraction.

III. ENGLISH.

10. Write the following nouns in the plural number; *loaf, hoof, staff, hero, focus, genus, crisis;* and give the feminine forms of *hart, peacock, votary, fox.*

11. How are adjectives inflected? Give the superlative degree of *good, bad, little, lively;* and convert the following adjectives into adverbs: *first, pretty, good, hopeless.*

12. Parse the following lines:—

"Now Jove suspends his golden scales in air,
Weighs the men's wits against the lady's hair."

13. Give a short account of Cardinal Wolsey, Mary Queen of Scots, or Sir Walter Scott (*one* only); *or*, give a brief description of some scientific discovery or invention of the present century.

The following is a list of the Centres at which the examination was held, showing the number of Candidates examined at each Centre, and the result:—

	Candidates. Examined.	Passed.	Failed.		Candidates. Examined.	Passed.	Failed.
Aberdeen	5	2	3	Leicester	4	2	2
Aberystwith	2	0	2	Lincoln	3	2	1
Barnstaple	3	1	2	Liverpool	9	6	3
Birmingham	15	8	7	London	40	20	20
Boston	2	1	1	Lynn	3	1	2
Brighton	3	1	2	Macclesfield	2	2	0
Bristol	7	5	2	Manchester	18	11	7
Cambridge	6	4	2	Newcastle	8	4	4
Canterbury	2	1	1	Northampton	2	2	0
Cardiff	8	4	4	Norwich	4	1	3
Cardigan	4	0	4	Nottingham	8	3	5
Carlisle	3	2	1	Oxford	2	1	1
Carmarthen	3	2	1	Perth	1	1	0
Carnarvon	1	0	1	Peterborough	4	2	2
Cheltenham	2	2	0	Plymouth	10	5	5
Chester	1	1	0	Portsmouth	4	3	1
Colchester	3	3	0	Preston	3	3	0
Darlington	6	3	3	Reading	5	4	1
Doncaster	3	2	1	Scarborough	3	2	1
Dumfries	7	3	4	Sheffield	6	4	2
Dundee	5	1	4	Shrewsbury	2	1	1
Edinburgh	8	4	4	Southampton	4	1	3
Glasgow	6	3	3	Stafford	3	2	1
Guernsey	1	1	0	Swansea	5	2	3
Hereford	2	2	0	Taunton	2	2	0
Hull	9	8	1	Truro	2	2	0
Inverness	4	3	1	Worcester	3	1	2
Leamington	1	1	0	York	6	6	0
Leeds	14	10	4				

ERRATUM.—P. 32, col. 2, line 23, for Appleby, Edward Joseph, Devonport, read Appleby, Edward Joseph, Bath.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING MAY AND JUNE, 1876.

	£	s.	d.
Atkinson, Joseph, Tynemouth	0	10	6
Baker, A. P., 33, Norfolk Terrace, Westbourne Grove, W.	0	10	6
Balchin, Edward S., 7, Pont Street, S.W.	0	10	6
Betts, William, Horncastle	0	5	0
Butcher, Thomas, Cheltenham	1	1	0
Carrington, Edward G., Bakewell	0	5	0
Childs, Joseph L., Fortune's Well, Portland	0	5	0
Cleghorn, Dr. Hugh, Stravithy, St. Andrews	0	10	0
Collins, T. R., Lowestoft	1	1	0
Coupland, Joseph, Harrogate	0	5	0
Crang, Walter, 23, High Street, Ilfracombe	0	10	6
Curtis, Albert A., 121, Westgate Street, Gloucester	0	10	0
Daines, Thomas, King William's Town, Kaffraria	0	10	6
Dennis, John L., 148, Alfreton Road, Nottingham	0	10	6
Eminson, J. M. O., 79, Abbey Road, St. John's Wood, N.W.	0	5	6
Fudge, C. W., Shepton Mallet	0	5	6
Furze, Mrs., 6, Havelock Terrace, Forest Hill	0	10	6
Gibbons, Thomas G., 41, Market Street, Manchester	1	1	0
Grimwood, W., 22, Brook Street, Bond Street, W.	1	1	0
Haddock, James, 24, Queen Street, Bedford, Leigh	0	5	0
Hall, Robert, Camborne	0	5	0
Hardcastle, A. W., 2, Finkle Street, Stockton-on-Tees	0	10	0
Hill, Richard C., 67, Old Town Street, Plymouth	0	10	0
Hogg, Thomas, Bideford	0	5	0
Johnson, T. S., 75, Bury New Road, Manchester	1	1	0
Lett, Arthur J., 106, Bedford Street, Liverpool	0	5	0
Lloyd, John, Dunraven Place, Bridgend	0	5	0
Mason, James B., 124, Scouringburn, Dundee	0	1	6
Morrell, F. K., 306, Kennington Park Road, S.E.	0	10	0
Morris, W. W., The Tower, Talgarth	0	5	0
Noakes, Richard, 64, Geneva Road, Brixton, S.W.	0	5	0
Penrose, Arthur P., 5, Amwell Street, E.C.	0	10	6
Penrose, Arthur W., 5, Amwell Street, E.C.	0	10	6
Petrie, J. J., Aboyne, Aberdeenshire	0	5	0
Pughe, Rice O., Pwllheli	0	2	6
Ralfs, H. C., Old Brentford	0	5	0
Rayner, William, Mile Town, Sheerness	0	5	0
Rowe, Robert, 40, Alfred Place West, South Kensington	1	1	0
Sadgrove, Arthur A., Clitheroe, Lancs.	0	5	0
Scruby, William Y., Milton Cottage, Acton	1	1	0
Simpson, Thomas, 6, Havelock Terrace, Forest Hill	0	5	0
Smith, James S., Northfleet	0	5	0
Smith, Thomas, Heriot Hill House, Edinburgh	1	0	0
Smith, Thomas William, St. Nicholas Street, Diss	0	5	0
Sprackett, George, Bristol	0	10	6
Stewart, E. H., Royal South Hants Infirmary, Southampton	0	5	0
Stringer, Alfred, Homend Street, Ledbury	0	5	0
Sutherland, Daniel D., Fore Street, Totnes	0	10	6
T. F. B.	0	5	0
Taylor, John, 13, Baker Street, W.	0	10	6
Taylor, Philip N., Great Bridge, Tipton	0	5	0
Thompson, William, 133, Summer Lane, Birmingham	0	5	0
Tijon, Tom, Rotherhithe New Road, S.E.	0	5	0
Warburton, Thomas, Atherton	0	5	0
Wills, G. S. V., 133, St. George's Road, Southwark, S.E.	0	10	6
Woodcock, Joseph, 177, Scotland Road, Liverpool	1	1	0

DONATION.

	£	s.	d.
Garlick, John, Hollinwood	1	1	0

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A lecture was delivered at the rooms of the above Association, Halford Street, Leicester, on Tuesday evening, July 10th, 1876, by Mr. Joseph Young. Subject, "Specific Gravity." The President, Mr. W. B. Baron, occupied the chair.

The lecturer proceeded first to impress upon his hearers the necessity of thoroughly comprehending what is meant by the term specific gravity, and the various rules and laws which govern this particular branch of science; secondly to explain methods of taking specific gravities under the many varying conditions which necessarily arise.

The specific gravity of liquids was first taken into consideration, the lecturer illustrating his remarks by specimen bottles brought for the purpose, together with the method of procedure requisite in connection with each, the advantages and disadvantages being clearly demonstrated.

The specific gravity of substances by weight in water was next referred to, and a very interesting explanation of the hydrostatic balance given, also the manner of taking a specific gravity by means of the hydrometer. This plan, however, the lecturer pointed out is subject to many inaccuracies and should not be adopted when anything like a true result is required. The specific gravity of fragments or powders was next treated of at considerable length, and the different process each individual chemical or fragment would require indicated.

The lecturer next showed the way to procure a specific gravity when the substance to be operated upon is soluble in water, and the caution and rules to be observed; also when the article is in a mass and sinks in water, and on the other hand when it will not sink.

With regard to the arithmetical part of the subject, enabling students to express the result arrived at upon paper or in their note books, after referring to the means adopted by various scientific gentlemen, the lecturer, said he always resorted to the one containing the least figures, giving illustrations.

In conclusion the more important facts were impressed upon the members present, the lecturer stating he did not expect them to acquire a substantial knowledge of this important branch of science by simply listening to one lecture, but if only he was enabled to introduce them to the subject, especially as such a knowledge is so indispensible to each student of pharmacy, he should feel that he had done some good, in being present with them that evening.

The lecture, which occupied an hour and a quarter in delivery, was listened to with special interest and pleasure.

The President then proposed a vote of thanks to the lecturer, which was seconded by Mr. Thirlby, and carried unanimously.

Proceedings of Scientific Societies.

PARIS SOCIETE DE PHARMACIE.

At a meeting of this Society held on the 7th of June, under the presidency of M. Coulier, a report was read from a commission appointed to consider a proposition by M. Bussey, to form a Scientific Union of the Pharmacists of France. The report, which approved of the project and included a scheme for the regulation of the proposed society, was ordered to be printed and circulated among the members.

The Testing of Commercial Oils.

An instrument for determining the purity of commercial oils, constructed by M. A. Pinchon, and named by him a thermic areometer, was exhibited and explained. It consists of an areometer containing in a reservoir above the ballast bulb a small mercurial thermometer. Above this again is a fine stem graduated to correspond with the distance to which the instrument is immersed at different temperatures in a sample of pure oil. The test is made in a glass vessel through the sides of which the reading of the thermometer can be observed. The areometer being plunged into the oil, it is allowed to float in it for a little while until the thermometer indicates its true temperature. The degree on the graduated stem which corresponds with the surface of the oil is then noted, and this, if the oil be pure, should correspond with the degree shown by the mercury in the thermometer. Any difference between the two would be evidence of an adulteration. Thus if the temperature indicated be 20° C., the mark on the stem to which the areometer sinks in the oil should be 20 also. It will be seen that a separate areometer would be required for each kind of oil to be tested.

The following table will show the amount of the variation caused by an admixture of 25 parts of different oils with 75 parts of olive oil :—

Admixture.	Stem.	Thermometer.	Difference.
Sesame Oil	17·5	19·5	2
Poppy Oil.........	16·0	19·5	3·5
Nut Oil..............	13·0	16·5	3·5
Purified Colza Oil...	20·0	22·0	2·0

The following table shows the difference in the indications when an instrument constructed for olive oil is used for other liquids :—

Liquid.	Stem.	Thermometer.	Difference.
Leg of Beef Fat ...	22·5	17·0	5·5
Nut Oil..............	10·5	12·0	1·5
Purified Colza Oil...	19·5	15·5	4·0
Oleic Acid (commercial)	35·5	16·0	19·5
Oleic Acid (from distillation)	42·0	15·0	27·0

BRITISH PHARMACEUTICAL CONFERENCE.

Meeting of Executive Committee.

17, Bloomsbury Square, London, on July 5th, 1876, at 10 A.M.

Present :—Professor Redwood, *President*; Messrs. Frazer, Williams, Carteighe and Schacht, *Treasurer*; Professor Attfield, *Honorary Secretary*; and Mr. Davies, *Assistant-Secretary*.

Thirteen candidates were elected to membership.

The names of several members whose subscriptions were more than two years in arrear, and to whom repeated applications had been made by the Secretaries, were removed from the lists of members.

Twenty-six subjects proposed for research were received and considered.

Professor Attfield suggested that some competent member should be employed to revise and somewhat elaborate the "subjects for papers," named in the current list issued by the Conference. In the course of thirteen years the Conference had proposed some two hundred subjects, for research, of which nearly one hundred had been investigated, resulting papers forming about one third of the three hundred papers which had been read at the Twelve Annual Meetings of the Conference. The one hundred or so of subjects now on the list, especially the fifty or sixty which had been down for several years, required careful revision, information concerning any work already accomplished being added to each subject, and some hints given as to the direction which further investigation should take. Probably a few of the subjects might now be excluded from the list altogether. The Secretaries were ordered to give effect to the suggestion.

The Editor reported good progress in the preparation of the MS. of the 'Year-Book of Pharmacy for 1876.'

Professor Attfield reported that since the previous meeting, he had issued about 2500 copies of the current Year-Book. He also presented an analysis of his cash-book for the year ending, June 30, 1876, as follows :—

Dr.

	£	s.	d.
To Subscriptions from Members	826	18	4
„ Sale of Year-Books to Non-Members	20	8	6
„ Cash from Publishers	198	2	0
„ Cash from Treasurer	60	0	0
	£1105	8	10

Cr.

	£	s.	d.	£	s.	d.
By Expenses of Year-Book :—						
Editing	103	0	0			
Printing	452	2	0			
Publishing	46	11	3			
Delivering	71	12	7	673	5	10
„ General Printing				80	2	0
„ Postage of 10,000 letters				42	14	2
„ Expenses of Meetings, etc.				25	6	2
„ Salaries, etc.				50	0	0
„ Grants in aid of research				65	0	0
„ Balance, to Treasurer				218	15	8
				£1105	8	10

Parliamentary and Law Proceedings.

PAPER PRESENTED TO PARLIAMENT.

The Analysis of Butter.

The following "Report made to the Board of Inland Revenue by the Principal of the Chemical Laboratory, Somerset House, on experiments conducted by him for the Analysis of Butter," bearing the signature of J. Bell, has been included in a return made to the House of Commons.

We have deemed it desirable to institute special investigations into the chemical composition of a variety of commodities of ordinary consumption including the article butter.

At the time that these investigations were commenced there was a great difference of opinion among chemists as to the possibility of detecting the adulteration of butter, so far as related to the admixture of foreign fats. These divergent views were notably expressed in the scientific evidence on the adulteration of food given before a Committee of the House of Commons. Some chemists of considerable repute held that there were no means of detecting foreign fats in butter, and that it would be easy to make up a factitious butter which would baffle all attempts at analysis, so far as the then known tests would apply. Others, on the other hand, maintained that by certain empirical methods, such as taking the melting point of the fat, or determining its degree of solubility in mixtures of alcohol and ether, foreign fats could with certainty be detected.

It was in these circumstance that we undertook the investigation of butter, and we commenced by fairly trying all the methods of butter analysis that had been suggested, and which appeared to afford any hope of assisting in the solution of the question.

One of the methods most recently suggested was to estimate the amount of fixed fatty acids which a butter would yield. This test, which was devised by Messrs. Angell and Hehner, and which is based upon the fact that genuine butter contains a less amount of these fixed acids than other animal or vegetable fats, was the nearest approach to the solution of the question which had been made. But their standard of purity, which was founded upon the analyses of a few samples obtained from one part of the country and about one time of the year, was looked upon with suspicion, and met with but little acceptance from analysts, so that the test for some time practically fell into abeyance.

It was found, however, that although the test was sound in principle, it involved a somewhat difficult chemical process in its application, and required a considerable amount of manipulative skill to carry it out. We, therefore, directed our attention to the devising of a more simple and more easily applied test, and in this, I think, we have succeeded.

This method consists in the determination of the specific gravity of the butter fat in the liquid condition at 100° Fahrenheit. We are not aware that this method had ever before been applied in the analysis of butter. It is true that there had been an endeavour to determine the specific gravity of some of the constituents of butter fat when in the solid condition, but no useful result had been arrived at; in fact, the results were rather misleading than otherwise.

In applying the specific gravity test to butter, the curd, salt, and water are first removed, and the density of the melted fat at 100° Fahrenheit is taken in an ordinary specific gravity bottle. The bottle used for the purpose was of a pear shape, into which could be inserted the bulb of a sensitive thermometer, the mercurial portion of which extended nearly the whole depth of the bottle. The temperature of 100° Fahrenheit was adopted, as at that temperature nearly all the animal and vegetable fats likely to be used as butter adulterants assume the liquid state.

It will be seen from Table I. that the specific gravity of ordinary animal fats varies from 902·83 to 904·56, while the specific gravity of butter fat, as exhibited in Table II., rarely falls below 910, the usual range being from about 911 to 913. There is thus a material difference between the specific gravity of butter fat and that of ordinary commercial animal fats, and it is obvious that this difference affords a satisfactory basis upon which to found an additional test for determining the purity of butter.

It may be useful to describe here briefly the difference between the composition of ordinary animal fats and that of butter fat. The former consist of a mixture of stearic, palmitic, and oleic acids, in combination with glycerin, and as these acids are insoluble in water, and not readily volatilized, they are commonly called "fixed" fatty acids, in contradistinction to other fatty acids which are either volatile or soluble in water, such as butyric, caproic, caprylic, etc., acids. Butter fat also consists of fatty acids in combination with glycerin, but while by far the larger proportion of the acids are of a "fixed" nature, there are invariably present several of those which are volatile or soluble in water, and it is to the latter, the most important of which is butyric acid, that the characteristic taste and smell of butter are chiefly due. In rich butters the proportion of the volatile acids is comparatively large, the specific gravity of the fat is high, and the percentage of "fixed" fatty acids is correspondingly low.

In getting samples of butter we purposely selected a wide range, so as to obtain as far as possible fair representative specimens of the different variations that occur in the composition of genuine butters produced under different conditions. In short, the samples may be taken to fairly represent the various qualities of butter as made and brought to market by farmers both in England and Ireland. Every care was exercised by the Board's local officers in procuring them, and there can be no question whatever as to their being genuine.

Table I.—Results of Analyses of Animal Fats.

Description of Sample.	Specific Gravity at 100° Fahrenheit.	Percentage of fixed Fatty Acids.
Mutton Suet	902·83	95·86
Beef Suet	903·72	95·91
Fine Lard	903·84	96·20
Dripping (Commercial)	904·56	94·67
Mutton Dripping (Genuine) ..	903·97	95·48

Table II.—Results of the Analysis of 117 Samples of Butter.

No.	Whence Obtained.	Percentage of Water.	Salt.	Curd.	Butter Fat.	Butter Fat. Sp. Gravity at 100° Fahr.	Melting Point, Fahrenheit	Percentage of fixed Fatty Acids.
1	Surrey	4·15	—	—	—	913·49	86°	—
2	Ditto	6·80	3·27	·80	89·13	913·09	88°	—
3	Ditto	15·50	2·10	1·70	80·70	913·09	88°	—
4	Ditto	11·40	·76	·77	87·07	912·28	90°	—
5	Ditto	7·55	1·03	1·15	90·27	913·89	85°	—
6	Ditto	12·70	·80	·86	85·64	912·79	86°	—
7	Irish salt butter ..	11·67	2·20	·86	85·27	912·28	87°·5	87.20
8	County Galway ..	11·79	3·39	·68	84·14	913·09	88°·3	—
9	Ditto	14·04	1·63	1·51	82·82	911·58	88°·3	—
10	Ditto	10·12	2·62	·70	86·56	912·99	88°·2	—
11	Ditto	4·91	1·54	·43	93·12	912·08	89°	87·42
12	Ditto	11·73	2·11	·47	85·69	912·99	89°	—
13	Ditto	11·83	1·14	·80	86·23	912·69	89°	86·60
14	Devonshire	13·22	1·34	·68	84·76	912·69	87°·8	—
15	Cornwall	16·99	2·65	1·36	79·00	912·39	88°·7	—
16	Cumberland	12·26	4·52	·94	82·28	912·89	87°·5	—
17	Ditto	11·92	4·22	1·52	82·34	912·39	87°·5	—
18	Ditto	12·96	3·80	·36	82·88	912·99	88°	—
19	Ditto	9·72	2·82	·28	87·18	911·98	88°	—
20	Ditto	8·18	3·14	·92	87·76	912·69	87°	—
21	Ditto	12·84	2·78	·98	83·40	912·69	87°·5	—
22	Dorsetshire	16·35	2·77	·11	80·27	911·88	87°·8	—
23	Ditto	16·37	3·22	·56	79·85	911·88	87°·5	—
24	Ditto	17·06	2·13	·88	79·93	911·98	87°·3	—
25	Ditto	17·03	2·25	·86	79·86	912·28	87°·8	87·30
26	Ditto	18·37	1·63	·89	79·61	912·08	87°·3	—
27	Ditto	13·24	1·25	·40	85·11	912·18	87°·5	—
28	Cumberland	12·22	·61	·34	86·83	911·88	89°·2	—
29	Ditto	13·02	·72	·61	85·65	911·28	90°·2	—
30	Ditto	11·74	1·32	·42	86·52	911·68	90°	—
31	Ditto	8·72	·58	·70	90·00	912·18	88°·5	—
32	Ditto	9·55	4·17	·24	86·04	911·98	88°·7	—
33	Suffolk	14·41	3·10	·64	81·85	912·39	89°	86·87
34	Ditto	20·75	3·82	·61	74·82	911·58	92°	87·80
35	Ditto	14·26	3·82	·22	81·70	912·89	88°·5	86·45
36	Ditto	9·11	8·28	·40	82·21	912·79	88°·5	86·00
37	Ditto	11·52	3·92	·41	84·15	913·89	87°·5	85·50
38	Ditto	9·60	6·45	·82	83·13	912·28	89°	—
39	Devonshire	14·36	2·66	1·46	81·52	912·99	88°·5	—
40	Ditto	15·52	4·08	1·54	78·86	911·76	89°	87·40
41	Ditto	17·56	2·98	1·14	78·32	912·39	89°	—
42	Ditto	17·18	3·00	1·24	78·58	912·99	88°·5	—
43	Ditto	16·28	3·32	1·56	78·84	912·79	88°·5	—
44	Ditto	18·72	2·24	1·36	77·68	912·39	89°	—
45	Ditto	16·42	2·80	1·60	79·18	912·23	88°	86·87
46	Ditto	13·62	3·00	·60	82·78	910·78	90°	88·00
47	Suffolk	13·14	5·74	2·96	78·16	913·97	88°	—
48	County Londonderry	19·40	3·70	·56	76·34	912·96	89°	—
49	Ditto	13·70	2·30	1·86	82·14	912·28	90°	—
50	Ditto	15·94	2·40	2·68	78·98	911·06	91°·5	—
51	Ditto	18·52	4·84	2·16	74·48	911·91	90°·5	—
52	Ditto	14·90	6·04	1·50	77·56	911·88	90°·5	—
53	Ditto	14·98	3·74	1·14	80·14	910·97	91°·5	—
54	Kent	11·71	3·04	·76	84·49	913·14	88°·5	—
55	Ditto	13·51	2·90	·70	82·89	913·09	88°·5	—
56	Ditto	18·64	2·68	·79	77·89	910·50	93°	88·60
57	Ditto	17·60	2·60	·98	78·82	910·63	93°	—
58	Surrey	13·55	2·49	·80	83·16	910·93	92°	88·35
59	Ditto	14·60	—	—	—	912·23	89°	—
60	County Cork	13·63	·44	·62	85·31	911·06	89°·5	87·72
61	Ditto	16·46	1·13	1·12	81·29	910·19	92°·5	88·75
62	Ditto	13·57	·65	·84	84·94	911·40	89°	87·50
63	Ditto	14·98	·68	·68	83·66	909·87	92°·5	89·15
64	Ditto	15·34	·40	·69	83·57	910·62	91°	—
65	Ditto	14·64	·46	·82	84·08	910·41	91°·5	—

No.	Whence Obtained.	Percentage of				Butter Fat.		
		Water.	Salt.	Curd.	Butter Fat.	Sp. Gravity at 100° Fahr.	Melting Point, Fahrenheit.	Percentage of fixed Fatty Acids.
66	Carnarvonshire ..	11·41	3·03	70	84·86	912·39	92°	87·01
67	Ditto	10·43	2·46	·57	86·54	911·48	89°	—
68	Ditto	13·79	2·96	1·26	81·99	910·62	93°	88·32
69	Ditto	11·05	7·71	·44	50·80	910·73	93°	—
70	Ditto	11·36	4·97	1·04	82·63	911·06	93°	88·42
71	Ditto	16·24	9·20	·40	84·16	911·34	93°	88·12
72	Normandy	11·71	3·60	·95	73·74	911·45	90°	—
73	Irish salt butter ..	16·89	8·56	1·23	73·32	911·48	89°·5	—
74	Wiltshire	11·59	1·49	·44	86·48	912·01	90°·5	86·96
75	Ditto	13·21	1·74	·56	84·49	911·79	90°·5	—
76	Ditto	12·52	2·12	·79	84·57	911·46	90°·5	87·35
77	Ditto	11·99	2·23	·99	84·79	911·82	89°	—
78	Ditto	12·57	1·58	·89	81·96	911·48	90°·5	87·65
79	Cumberland	11·81	8·38	3·06	76·75	912·51	89°	86·91
80	Ditto	12·08	2·39	3·74	81·79	911·60	92°	87·74
81	Ditto	12·80	8·69	3·18	80·27	912·08	90°	86·92
82	Ditto	13·08	2·33	2·72	81·87	910·60	92°	88·29
83	Ditto	11·18	1·79	5·32	81·71	911·74	91°·5	87·60
84	Ditto	19·12	3·93	4·02	72·93	910·94	92°·5	88·40
85	County Monaghan ..	13·39	6·68	1·62	78·31	910·42	92°·5	—
86	Ditto	15·60	6·51	·54	77·35	910·14	92°·0	88·90
87	Ditto	13·59	15·08	1·36	69·97	909·47	93°·5	—
88	Ditto	13·50	2·58	·55	83·37	911·04	91°·5	—
89	Ditto	14·55	5·86	1·31	78·28	910·30	93°	—
90	Ditto	12·43	3·55	·55	83·47	910·70	92°	—
91	County Londonderry	11·81	2·85	·70	84·64	910·85	92°	88·62
92	Ditto	13·88	3·15	·75	82·22	911·47	90°	87·66
93	Ditto	14·34	8·31	·78	81·57	911·88	90°·5	—
94	Ditto	12·57	4·82	·51	82·60	910·65	92°	88·74
95	Ditto	13·56	2·29	·75	83·40	912·03	90°·5	87·42
96	Ditto	11·56	2·82	·47	85·15	911·79	90°·5	88·05
97	Dorsetshire	13·92	2·13	·52	83·43	910·58	94°	88·65
98	Ditto	8·88	4·50	·50	86·12	910·85	92°·5	88·46
99	Ditto	12·55	2·22	1·35	83·88	912·20	91°·5	—
100	Ditto	12·81	1·78	·74	84·67	910·80	92°·5	88·17
101	Staffordshire	10·61	1·11	·63	87·65	910·94	91°·5	88·21
102	Ditto	12·87	1·56	·76	84·81	912·44	89°·5	87·14
103	Ditto	12·84	1·67	·56	84·93	911·29	90°	87·90
104	Ditto	13·11	1·66	·46	84·77	911·78	91°·5	—
105	Ditto	10·93	1·25	·62	87·20	911·90	89°	87·30
106	Ditto	12·79	1·03	·66	85·52	910·11	93°	—
107	County Sligo	12·36	3·24	·87	83·53	910·11	93°	—
108	Ditto	11·02	1·89	·87	86·22	911·76	91°	—
109	Ditto	14·61	3·86	·85	80·68	910·91	90°·5	88·46
110	Ditto	14·12	2·28	1·06	82·54	912·80	90°	—
111	County Galway ..	13·78	·90	·85	84·47	912·41	91°·5	86·79
112	Ditto	10·24	3·99	1·22	84·55	911·41	92°·5	87·79
113	Ditto	11·75	3·63	1·93	82·99	911·51	93°	87·51
114	Ditto	15·17	1·96	1·99	80·88	911·28	92°·5	87·66
115	Ditto	14·37	3·21	1·89	80·53	919·37	94°·5	89·90
116	Ditto	14·50	1·44	1·61	82·45	909·39	95°	89·80
117	Cornwall	15·70	1·54	1·49	81·27	911·78	92°	—

The whole of the samples in Table II. have been tested by the specific gravity method, and it will be seen from the results that while a few samples were very poor in quality, and a few others exceptionally rich, the great bulk examined were found to possess considerable uniformity of composition, the principal variations being apparently due to a difference in the method of manufacture, the different seasons of the year when made, and the various modes of feeding. As might be expected, some of the poorest butters were produced by, and obtained from, small farmers in Ireland, at a time when there was very little grass and food was scarce.

It was also noticed, so far as the investigation could be carried out, that the butter was relatively poorer in its essential constituents when the food was chiefly cotton and oil-cake, than was the case when roots and grass formed the staple food.

When the fixed fatty acids test referred to is accurately performed, the correspondence between the amount of these acids and the specific gravity of the fat is so close that it is possible to predicate within a few tenths one result from the determination of the other. Owing to the pressure of other duties the proportion of fixed fatty acids in each sample was not ascertained, but a sufficient number of determinations have been made to establish the fact of this correspondence, as will be seen in Table II. in the column headed "Percentage of fixed Fatty Acids." A little variation may sometimes arise from the fact that the several fixed fatty acids are not always present in different butters in exactly the same proportion.

As the estimation of the fixed fatty acids is a lengthy process attended with difficulty, and, without great care, nearly always with a measure of uncertainty, and as on the other hand the specific gravity of the butter fat can be ascertained with ease and rapidity by any person of ordinary skill, it will be seen that an important additional factor in the analysis of butter has been furnished to chemists. The specific gravity of a fat may be repeated with but slight variation, which in several successive weighings will not exceed from ·02 to ·05 of a grain.

A noticeable feature in the results recorded in Table II. is the great variation in the quantity of water in the different butters, the lowest being 4·15 per cent. and the highest 20·75 per cent. The Devon and Dorset butters, which usually stand so high in the market, were found to contain in nearly all cases a high percentage of water, and No. 15, which was procured from the dairy of a private gentleman, contained as much as 16·99 per cent., and a second sample, recently obtained from the same source, contained 15·70 per cent.

Various attempts have been made by chemists to separate the glycerides of the fatty acids in butter, but without success. We have experimented in the same direction by treating butter fat with different solvents such as alcohol, mixtures of alcohol and ether, and ether alone, but the fractional parts still remained esentially a butter.

The following is an outline of the process which we adopted to separate the component fats of butter. A quantity amounting to four hundred and sixty grams was treated successively with twice its volume of alcohol of 92 per cent; the alcoholic solution on evaporation gave nine grams of an oily fat which yielded 79·7 per cent. of fixed fatty acids, the remainder consisting of glycerin and the volatile acids.

The butter fat insoluble in alcohol was next treated with twice its volume of warm ether, and allowed to stand for several hours. A white crystalline fat separated, which was thrown on a filter and washed with a small quantity of ether. The ether was evaporated from both portions, and the specific gravity and fixed fatty acids determined. The crystalline fat, weighing 90 grams, had a specific gravity of 909·55, and gave 89·50 per cent. of fixed fatty acids. The soluble fat, weighing 350 grams, had a specific gravity of 912·35, and yielded 87·95 per cent. of fixed fatty acids.

The portion soluble in ether was then treated with a mixture of alcohol and ether. Nearly one-half of the fat passed into solution. Both portions were freed from alcohol and ether. The soluble gave 86·50 per cent. of fixed fatty acids, and the insoluble 88·62 per cent.

We then proceeded synthetically, by adding to a mixture of beef-suet fat and dripping a given percentage of prepared butyrate of glycerin; 8 per cent. of the butyrin was dissolved in a fat of a specific gravity of 902·99 by the aid of heat. The specific gravity of the mixture at 100° Fahrenheit was 910·39. The mixture, when treated with alcohol, as in the preceding experiment, was almost completely freed from butyrin, as was shown by the residual fat giving a specific gravity of 903·44. The extractive by alcohol contained a little olein derived from the fat.

The conclusion which may be drawn from these results is that, contrary to the statement made by Berthelot and others, compounds of butyric and the other volatile acids present in butter with glycerin do not exist as simple glycerides, but are in all probability present in a complex form, the radicals of the volatile fatty acids being combined with glycerin and the fixed fatty acids in the same molecule to form compound ethereal salts.

It may be noted here as remarkable that the portion dissolved out with alcohol in the first experiment yields an amount of fixed fatty acids bearing out this theory. We purpose following up this part of the investigation, which appears to possess considerable scientific interest.

There is another point of interest which we have in some measure elucidated, and which has reference to the deterioration which certain butters undergo when kept in small quantities in glass or earthenware vessels. We have found that whilst some of the finest and best prepared butters undergo little or no change, there is in others a gradual disappearance of the characteristic principles of butter, and a consequent assimilation to the constitution of an ordinary animal fat. This change, which appears to be due to an incipient fermentation, and is generally accompanied by the development of fungi is probably caused either by the use of sour cream or by insufficient care in making the butter.

The following Table III. exhibits the amount of depreciation which different samples of butter have undergone in the respective time stated :—

Table III.—Analysis of Butter after Keeping.

No.	Original Butter.		Time Kept.	After Keeping.	
	Specific Gravity at 100° Fah.	Percentage of fixed Fatty Acids.		Specific Gravity at 100° Fah.	Percentage of fixed Fatty Acids.
1	912·28	87·30	12 weeks	910·74	88·97
2	911·58	87·80	7 "	909·19	90·00
3	913·89	85·50	7 "	913·57	85·72
4	911·78	87·40	6 "	911·00	87·97
5	911·06	87·72	8 "	910·61	88·40
6	911·48	87·65	6 "	911·33	88·00
7	912·39	..	12 "	911·28	..
8	912·18	..	12 "	910·39	..
9	912·28	..	12 "	911·21	..
10	913·97	..	16 "	913·92	..
11	910·19	..	8 "	908·15	..
12	910·62	..	8 "	910·13	..
13	911·04	..	6 "	910·75	..
14	911·40	..	8 "	911·00	..
15	910·70	..	5 "	910·57	..

As cases may occur where the melting point becomes of primary importance this test is never overlooked in the analysis of a reputed butter.

In determining the melting point we found that more uniform results were obtained if the butter fat were suddenly cooled by plunging the small platinum capsule containing it into ice water.

A small portion of the fat which had a somewhat vitreous appearance was taken up on the loop of a platinum wire and introduced into a beaker of water placed in a porcelain dish, and the loop brought close to the bulb of a thermometer. The temperature of the water was slowly raised and the temperature read off immediately the fat assumed the liquid condition.

Obituary.

Notice has been received of the death of the following:—

On the 28th of June, 1876, Mr. William Wilson, Pharmaceutical Chemist, Lowther Street, Groves, York. Aged 57 years. Mr. Wilson had been a Member of the Pharmaceutical Society since 1854.

On the 8th of July, 1876, Mr. Daniel Walker Scott, Chemist and Druggist, Sowerby Bridge. Aged 29 years.

On the 10th of July, 1876, Mr. William Baxter, Chemist and Druggist, of Leeds Road, Bradford. Aged 37 years.

On the 11th of July, 1876, Mr. Alfred Boyle, Chemist and Druggist, Poplar Dispensary. Aged 35 years.

On the 15th of July, 1876, Mr. Thomas Stocker, Chemist and Druggist, St. Ives. Aged 63 years.

BOOKS, PAMPHLETS, ETC., RECEIVED.

SCIENCE PAPERS, CHIEFLY PHARMACOLOGICAL AND BOTANICAL. By DANIEL HANBURY, F.R.S. Edited, with Memoir, by JOSEPH INCE, F.L.S., F.C.S. London: Macmillan and Co. 1876. From the Publishers.

THE DENTAL STUDENT'S NOTE BOOK. Edited by OAKLEY COLES. London: G. Butcher. 1876.

ETUDE SUR LES PRINCIPAUX PRODUITS RÉSINEUX DE LA FAMILLE DES CONIFERES. Par A. HERLANT, Pharmacien. Bruxelles: H. Manceaux. 1876.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

METHYLATED SPIRIT.

Sir,—I differ from Mr. Sturton as to druggists generally not being aware of the methylated spirit licence being only ten shillings.

An important clause in the Methylated Spirit Act prohibits licences being granted to retailers of spirits, wines, and sweets. So many druggists have embarked in the wine trade, Foreign and British, that in country districts the combination of these two trades is general.

As regards the sale of "finish" it would be better if druggists discontinued the sale of it, unless it is implicitly prepared according to the excise directions. But owing to the imperfect manner in which "finish" burns I am afraid that in many instances a deficiency of gum is a wilful omission in order to prevent complaints. I have seen several samples of "finish"—sold as such—which have contained the barest traces of gums or resins, and regret that I am unable to attribute such sales altogether to ignorance.

In all matters relating to the excise absolute integrity and the greatest care are essential. Where such are observed no litigation need be feared.

A COUNTRY PHARMACEUTICAL CHEMIST.

T. Colton (Selby).—We shall be happy to publish the information if you will furnish us with it.

E. B. J.—The best solvent of cantharidin is chloroform. It dissolves in 34 parts of cold ether, and in fixed and volatile oils. Are you satisfied as to the purity of the cantharadin?

The Trade Conference at Birmingham.—We are requested to say that the representative of Rochester, Chatham and district, was Mr. H. Barnaby, *not* Mr. Barnet as reported in last week's Journal.

"*Minor*" (who should have sent his name and address). We think the subject has been sufficiently discussed for the present.

W. Bray.—*Sherardia arvensis.*

"*Tau*" (Clifton).—(1) *Senecio Jacobæa;* (2) *Sedum,*—the species cannot be determined without the leaves; (3) *Malva moschata;* (4) *Galium Mollugo;* (5) *Scrophularia nodulosa;* (6) *Stachys Betonica;* (7) *Origanum vulgare;* (8) *Centaurea nigra,*—white variety; (9) *Teucrium Scorodonia;* (10) *Cotyledon umbilicus;* (11) *Scabiosa Columbaria;* (12) *Eupatorium cannabinum.* In future please limit your specimens to six.

H. H.—*Asclepias syriaca:* not a native plant.

"*Enitar.*"—The Flora may be obtained through Mr. J. W. N. Keyes, Bedford Street, Plymouth. The Curator would be happy to give you any information respecting Devonshire plants.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Balkwill, Mr. A. N. Palmer, Mr. Barnaby, Mr. Colton, E. A. T., "Minor," "Student."

THE UNION OF CHOLRAL HYDRATE AND CAMPHOR.

BY ERNEST C. SAUNDERS, MONTREAL.

It has long been known that a mixture of hydrate of chloral and camphor, in equal parts, formed a liquid, but it has, I believe, never been settled as to whether the result is due to chemical combination or to the solvent power of one article over the other. The following notes of an investigation into the subject may be interesting, and throw some light upon it.

Four ounces of chloral hydrate and the same weight of camphor, in lumps, were put into a bottle and allowed to stand, being occasionally shaken. In forty eight hours both were completely liquefied, forming a syrupy fluid, smelling of both ingredients, and of specific gravity 1·243. Five ounces of this were placed in a flask, fitted with a wide tube leading into a receiver immersed in ice-cold water, and having a thermometer passed through the cork, the bulb reaching into the liquid. Heat being applied, the temperature rose to 224° F. at which point the liquid boiled freely. The temperature rose gradually up to 300°, from which point it rose more rapidly to 402°, when the liquid distilled unchanged. The distillate was separated into two parts, the first being collected up to 300°, the other being that which passed over between that point and 402°. The vapour which passed over at this temperature solidified in the tube before reaching the receiver.

The first distillate was a soft greenish mass, consisting of small crystals mixed with liquid. It was found to consist of chloral hydrate, with a very small quantity of camphor, and owed the colour to a minute quantity of a greenish oil, apparently the result of some chemical action having taken place between the chloral and camphor. This oil could not be obtained in sufficient quantity to be examined.

The second distillate was a thick oily liquid, having a pungent odour of chloral hydrate. It combined with a small proportion of water, but was insoluble in a larger quantity. It was miscible with alcohol, of specific gravity ·937 and ·838 in all proportions, and proved to be hydrate of chloral with about enough camphor to liquefy it.

The residue in the flask, which boiled at 402°, was found to solidify at 248°, and was almost insoluble in water, but freely soluble in alcohol, sp. gr. ·838, was plainly camphor.

The original solution was decomposed by water, the camphor floating on the surface, while the filtered liquid gave abundant evidence of chloral hydrate on being tested.

Judging from these facts, it would seem certain that no chemical action takes place when the two articles are mixed in the cold. Both are volatile at ordinary temperatures, and the following experiment, which was performed to ascertain which was the solvent, conclusively proves that it is the vapours which act upon each other. Two lumps, one of chloral hydrate and one of camphor, were placed about an inch apart on a porcelain plate, and covered with a bell glass. In fifteen minutes the surface of the camphor was quite damp, but the chloral was quite dry. In three hours the chloral was still dry, while the camphor was quite wet and standing in the midst of liquid. In twelve hours the liquid had reached the chloral, the upper surface of which was still dry, while in twenty hours both lumps were half liquefied, and the inner surface of the bell glass was covered with moisture. This would almost seem to point out that the vapour of the chloral was the solvent, but it was found while one part of camphor would form a permanent liquid with three and a half parts of chloral hydrate, one part of chloral dissolved by the aid of heat with two parts of camphor solidified to a soft crystalline mass when cold, from the camphor crystallizing. It is most probable that the camphor is the solvent, which would also seem likely, as camphor is an essential oil, and is known to render other bodies fluid. The change of colour, with the formation of an oily liquid would seem to point to chemical action occurring when the mixture is subjected to strong heat.

The following notes of the solubility of the mixture in various articles may be serviceable to any who are called upon to dispense it, or to physicians who feel inclined to try the effects of it.

It is miscible in all proportions with alcohol, sp. gr. ·838, bisulphide of carbon, ether, and olive oil. It is soluble in eleven parts of alcohol, sp. g. ·937. It is insoluble in water. It forms a clear mixture with one and a half parts of chloroform, but a further addition of three parts of chloroform renders it turbid. Camphor forms a permanent liquid with three times its weight of chloral hydrate. The experiments were conducted with the atmosphere at a temperature of about 80°; the fact is mentioned as it may have influenced the solubility slightly.

LABORATORY NOTES ON THE DETERMINATION OF QUININE IN THE PRESENCE OF CERTAIN OTHER SUBSTANCES, AND ESPECIALLY IN "FERRI ET QUINIÆ CITRAS."

BY ALFRED NEOBARD PALMER.

The chemist is often required to determine the quinine in pharmaceutical preparations wherein the alkaloid is associated with other substances—such as glycerin, sugar, citrate of ammonium, etc.—and it then becomes important for him to know whether the presence of the substances just named at all interferes with the accuracy of his determination of the quinine when that determination is effected by shaking up the fluid with ether or chloroform after the quinine has been precipitated with an alkali. Moreover, still following this method of analysis, it sometimes becomes necessary, in the case of certain cinchona preparations, to add considerable excess of the alkali, so as either to re-dissolve some of the substances other than quinine precipitated together with the latter, or to render the line of separation between the aqueous layer and the chloroformic or ethereal layer quite clear and well-defined. And here, again, the analyst desires to know whether, in the presence of this possibly large excess of alkali, he still gets in his chloroformic or ethereal layer all the quinine that exists in the fluid operated upon. I have at various times made experiments with a view of satisfying myself upon some of these points, and since the appearance of Mr. Allen's interesting paper* have continued these as well as made two or

* *Pharm. Journ.*, June 3rd, 1876, p. 964.

three additional ones on the determination of quinine with *chloroform* in presence of sugar, Mr. Allen having confined himself to its determination under these conditions with *ether*. The result of these experiments I now present.

In all cases where the simple and rapid method of estimation above referred to can be employed I am now accustomed to use a pear shaped glass separating vessel, which may be obtained of apparatus dealers, of about four ounces capacity, the pear stalk being represented by a short tube provided with a tight-fitting stopper, while at the opposite end of the vessel, representing the top of the pear core, is another stoppered opening. Through this last opening fluids are poured into the separating vessel: by the tube they are run out of it. I will now describe distinctly my course of procedure in these experiments. Let us suppose we have a solution of sulphate of quinine, and we make two estimations of it—one by ether and one by chloroform The tube-cock of the separating vessel being closed, a measured volume of the solution to be examined was run in; then (out of a burette) the alkali; lastly, ether or chloroform was poured in, the whole well shaken, and set aside for at least two or three hours. When ether was used the underlying watery layer was drawn off down to the stop-cock; then a little water poured into the glass vessel, the stopper (which was of course removed while the watery layer was being drawn off) inserted; the whole well shaken and set aside for another two or three hours. The watery layer was now drawn off to the last drop down to the very bottom of the tube, and the ethereal layer run off through a small filter into a weighed dish; a little more ether was shaken up in the vessel and run into the dish in the same way: the ether in the latter evaporated, and the residue dried at about 270° F.,* and weighed. When chloroform was used, after the underlying layer was drawn off down to the tube-cock through a small filter into the dish below more chloroform was poured into the vessel, well shaken up, and after two hours drawn off down to the last drop through the filter, and evaporated with the first layer.

When the substances, whose effect on the accuracy of the quinine-determination was to be studied were present, these were added in solution to the sulphate of quinine solution and thoroughly mixed therewith previous to the addition of the alkali.

I have entered into these details so that my method of procedure and allusions hereafter may be clearly apprehended.

I may say further that in all my experiments specially prepared and quite pure sulphate of quinine and well washed ether and chloroform were alone employed.

I find then that, working under these conditions—

1. Whether the precipitant be ammonia, potash, or soda, whether added in slight or in large excess, whether the quinine solvent be ether or chloroform is quite indifferent. In any case, and in all cases the actual quantity of quinine present in the fluid operated upon is obtained.

2. The association of sugar or of glycerine with the quinine in the fluid under examination does not in any way affect the accuracy of the process when the precipitated quinine is dissolved by shaking up the mixture with *chloroform*, and drying the residue of evaporation of the latter at 260°-270° *until its weight is constant*. Mr. Allen has shown that *ether* also in the presence of sugar takes up all the quinine thrown down by an alkali. I believe this is also the case in the presence of glycerine. In one experiment undertaken with a view to satisfy myself hereon I recovered all the quinine present but in a second only ·1 grm. out of ·106 grm. It is possible, however, that in the latter case a little of the ether was spilled. I have had neither time nor inducement to proceed any further with the investigation of this particular point.

3. Nor does any loss of quinine occur when it is determined in presence of citrate of ammonium, so long as chloroform is the solvent employed.

4. But when in this last case ether is substituted for chloroform, the ethereal layer contains only a portion of the quinine present, the remainder being held entangled in the aqueous layer, from which it can be extracted by shaking the latter with chloroform, and this is still so even when the aqueous and watery layers are allowed to remain in contact for so long a time as eighteen hours. I may say that in such cases the aqueous layer, which tastes very bitter, has always a strongly ethereal smell; and from this fact as well as from other circumstances, I am inclined to think that the ethereal solution is rather mechanically entangled in the aqueous layer than that the quinine is chemically retained by it. But, however to be explained, about the fact of the retention of part of the quinine under these circumstances by the solution of citrate of ammonium, there can be no doubt at all. In one experiment 6·5 per cent. of the quinine was thus retained; in a second experiment 12·1 per cent.; in a third, 13·8; in a fourth, 37·5 per cent.; in a fifth, 50 per cent. It seemed to me that the percentage retained varied with the *strength* of the citrate of ammonium solution as distinguished from the *volume* of the latter. But I am not sure of this.

"Ferri et Quiniæ Citras" is sometimes estimated by shaking a solution of the substance with ether after addition of excess of ammonia, and weighing the residue obtained on evaporating the ethereal layer. But "Ferri et Quiniæ Citras," contains citrate of ammonium, and ether (as the results described above show) is incompetent (or at least cannot be relied on) to remove all the quinine which is precipitated in a solution of that salt. We are not therefore surprised to find "Ferri et Quiniæ Citras," when estimated by this process, showing very low percentages of quinine. If the alkalized aqueous layer which has been shaken with ether be tasted it will nearly always be found very bitter, and, if shaken up with chloroform, will yield to the latter an additional quantity of quinine. In three cases recorded in my note-book chloroform extracted an additional 2 per cent. or thereabouts of quinine, in each case the ethereal and aqueous layers having been allowed to remain in contact for several hours before the underlying layer was drawn off.

The same experimental results, however, that condemn beforehand the use of *ether* for the determination of quinine in "Ferri et Quiniæ Citras" indicate at the same time the employment of *chloroform* for

* The residue of quinine left on evaporating an ethereal or chloroformic solution of quinine on the water-bath does not contain a constant percentage of water. I cannot agree with Mr. Allen when he implies that the "ether residue" is always hydrated to the extent of 4·28 per cent. Constant results can only be obtained by weighing the residue after drying at 260°—270° F.

that purpose. When a watery solution of from 8 to 12 grains of the sample, contained in the "pear-shaped evaporating vessel," is *strongly* alkalized with ammonia, twice shaken with chloroform, and treated in the way described above, the whole of the quinine contained in the citrate will be found in the two chloroformic layers. The process, thus carried out, for accuracy, simplicity, and rapidity, leaves nothing to be desired. After the precipitated quinine has been shaken up in the separating vessel with chloroform, the latter need not remain longer than half an hour before being drawn off. The addition of the ammonia to *strong* rather than *faint* alkalinity is rendered necessary by a fact to be referred to presently, while this excess, as we already know, in no way affects the accuracy of the determination. Of course, if a preliminary experiment should show that only a portion of the alkaloid precipitated from the citrate, on addition of ammonia, is dissolved when shaken with a suitable quantity of ether, the total alkaloid obtained by this method will have to be dissolved in dilute acid, and the amount of quinine therein determined by any of the approved processes. Citrate of ammonium being absent from this solution, ether may now be relied on for taking up all the quinine precipitated in it, and unless employed in too great excess, for separating this from the other cinchona alkaloids present.

Samples of "Ferri et Quiniæ Citras," yielding by the chloroform method of analysis just described 13 per cent. of pure waterless quinine, will answer to the pharmacopœia tests; but the citrate sold as "P.B." of the best makers seldom contains less than 14 per cent. And when the substance referred to is made according to the process of manufacture recommended in the pharmacopœia, I do not think a much higher percentage of quinine than this will in general be obtained. Four samples of different makers (all of them of high repute and standing) gave, by the chloroform method, 14, 14·2, 14·4, and 15·37 per cent. respectively of the pure dry alkaloid.

When by addition (from a burette) of a dilute solution of ammonia to an aqueous solution of "Ferri et Quiniæ Citras," the latter has become distinctly alkaline to red litmus paper, further addition of ammonia gives a further precipitate of quinine, and this will continue until at last often more than twice the volume of ammoniacal solution has been added that was added at first. In one case further addition of ammonia to ferro-quinic citrate solution, after the latter already turned red litmus paper dipped into it distinctly blue, precipitated an additional 4·6 per cent., and in another case an additional 3 per cent. of quinine.

The method of estimating "Ferri et Quiniæ Citras" recommended in the pharmacopœia cannot be said to be at all satisfactory. If the indications of litmus paper be alone attended to, the "slight excess of ammonia" there prescribed may be, as we have seen, *too slight* to precipitate all the quinine present. We are not told, moreover, whether the precipitate so obtained when collected on the filter is to be washed or not: if washed, some of the quinine will be dissolved out by the wash-water; but, if unwashed, it will retain a very great deal of the solution in which it is precipitated, the ammonium and iron citrates of which will then be reckoned as quinine. In one experiment, the unwashed precipitate obtained from 50 grains of a sample of "Ferri et Quiniæ Citras" containing 13 per cent. quinine having been collected on a small filter, and allowed to drain in the funnel for forty-eight hours, was found, after drying, to weigh 8·2 grains; the filtrate (somewhat short of a fluid ounce in volume) yielding to chloroform an additional ·4 grain of quinine. Now as only 6·5 grains of quinine were present altogether, and of this ·4 grain was contained in the filtrate, there could have been upon the filter no more than 6·1 grains: 8·2 grains were however indicated, which quantity therefore consisted of 2·1 grains of citrates of iron and ammonium and 6·1 grains of quinine. At another time in the case of a sample containing 14·4 per cent. quinine, when the filter, with the precipitate from 50 grains upon it, instead of being drained in the funnel, was placed upon several folds of blotting paper to remove superfluous moisture, the precipitate was found to weigh 9·5 grains. But since the filtrate contained dissolved ·3 grain of quinine, there could not have been upon the filter more than 6·9 grains of the alkaloid, which were therefore here associated with 2·6 grains of foreign substances. Results more nearly approaching accuracy may be obtained by pressing the precipitate repeatedly between folds of blotting paper, and still more nearly by transferring it to a weighed capsule which is then slightly warmed: the quinine will immediately shrink upon itself and set free the greater part (about three-fourths) of the retained solution of the citrates, which may be easily poured off, the residual quinine being then dried and weighed. But our precipitate will not now amount to the 8 grains which the pharmacopœia requires. And it will still fail to represent the quantity of quinine actually present in 50 grains of the sample, since, on the one hand, it will retain even now about ½ grain or ¾ grain of iron and ammonium citrates, and will be deficient, on the other, in respect of the quinine dissolved in the filtrate and lost in other ways. It is true that these two opposite sources of error will sometimes balance each other. But we may well be impatient of a process giving results that are only approximately accurate, when in that by chloroform we have one which is as absolutely trustworthy as it is simple in application and rapid in execution.

69, Market Street, Manchester.

CHEMICAL CONSTITUENTS OF ANGELICA ROOT.*

BY CARL BRUNNER.

The following analysis of angelica root was given many years ago by John:—300 parts contain—colourless volatile oil of a penetrating odour, 2 parts; resin, with sour taste, 20; other extractives, 87·5; gum, 100·5; inulin, 12; product soluble in caustic alkali, probably combined with albumin, 22; woody tissue, with a trace of matter soluble in potash, 90; water, 16 parts. Similar figures were also obtained by Buchholz and Brandes, who found six per cent. of "angelica balsam." This product was afterwards found by A. Buchner to contain an agreeably smelling, camphoraceous, essential oil, a volatile acid, a waxy substance, an amorphous resin, and a crystallizable principle, analogous to imperatorin and peucedanin, to which he applied the term *angelicin*. The author prepared this substance from fifty pounds of root, grown near Schweinfurt; after complete extraction with boiling alcohol, and evaporation of the extract, 1090 grams of "balsam" separated, insoluble in water, whilst an aqueous

* *Journal of the Chemical Society* for June, from the *Neues Repert.* xxiv. 641.

liquid was also obtained, on which the balsam floated; this liquid was found to contain *cane sugar*, the values 73·2 and 73·04 being obtained by the polariscope, whilst the specific rotatory power given in text-books is 73·84.

The "balsam" thus obtained was heated with aqueous caustic potash (500 grams balsam, 180 of solid caustic potash), until a homogeneous, brownish-red, thick fluid was obtained; on distillation this furnished a small quantity of an ethereal oil; when this ceased coming over the residue was evaporated to a thick syrup, and dissolved in water. After standing all night and filtering, a minute quantity of insoluble matter was obtained, possibly *angelica wax*. The liquid did not deposit crystals of angelicin on standing, wherefore it was again evaporated, and the residue treated with alcohol, whereby much resin was left undissolved; the filtrate was saturated with carbonic acid, to remove potash, and the filtrate from the crystals of potassium carbonate evaporated to a small bulk, and then treated with ether as long as the latter became coloured; by spontaneous evaporation the ethereal extract gave a smeary residue, containing a few crystals; this residue became much more crystalline on stirring it up with alcohol, and again leaving it to evaporate spontaneously; finally the mother-liquors were removed by the filter pump, and washing with 80 per cent. spirit. The crystals of angelicin thus obtained weighed, after purification by recrystallization, only about 0·8 gram.

This small yield appeared to be due to the fact that the roots employed had been dried in an oven; from 30 pounds of air-dried roots a much larger yield was obtained by the same process; finally about 4 grams of pure angelicin were isolated, constituting fine white silky plates, destitute of taste and odour; slightly soluble in cold, more so in hot alcohol, and readily soluble in ether, chloroform, carbon disulphide, benzene, oil of turpentine, and warm olive oil. On analysis this substance gave numbers agreeing with the formula, $C_{18}H_{30}O$; from these figures, and the general properties of the substance, it appeared to be identical with the *hydrocarotin* of Husemann; it melts at 126·5 to yellowish oily drops, which solidify at 118° to an amorphous mass, soluble in alcohol and ether, but not crystallizing from those solutions (the original substance crystallizes readily in forms belonging to the monoclinic system). Concentrated hydrochloric acid does not change angelicin, but fuming nitric acid dissolves it with evolution of gas; concentrated sulphuric acid dissolves it to a red fluid, depositing brownish-white flakes on dilution with water; fusion with caustic potash, and treatment with bromine give rise to the formation of amorphous coloured products.

The resin insoluble in alcohol, obtained as above described, was fused with caustic potash in a silver dish; the product dissolved in water and acidulated with sulphuric acid evolved acetic, butyric, and other fatty acids, and the aqueous liquid yielded to ether a mixture of two substances, separable by addition of lead acetate. The precipitate thus thrown down gave, after decomposition by sulphuretted hydrogen, a small quantity of a crystalline acid, colouring ferric chloride green, the colouration becoming deep red on further addition of sodium carbonate. With silver nitrate this gave no precipitate, but on further addition of ammonia immediate reduction ensued; hence this product was doubtless *protocatechuic acid*. The filtrate from the lead precipitate was treated with sulphuretted hydrogen and evaporated, whereby crystals were obtained consisting apparently of *resorcin;* they sublimed between watch-glasses, coloured ferric chloride violet, reduced silver nitrate on warming, gave a highly fluorescent product on treating with phthalic acid and sulphuric acid (Baeyer's test), and formed a body which, like *diazoresorcin*, was red, and became blue on adding ammonia, on treating the ethereal solution with nitric acid containing nitrous acid (Weselsky's test).

The liquid from which angelicin was disssolved out by ether as above described, contained the potash salt of a volatile acid, which appeared to be *angelic acid*. This was obtained by adding sulphuric acid and distilling; oily drops insoluble in water thus came over, and on collecting these and placing them in a freezing mixture, crystals separated, which were drained and pressed in filter paper, and these possessed all the properties of angelic acid. Valerianic and acetic acids come over, together with the angelic acid, on the first distillation.

THE ANALYSIS OF MINERAL COAL (ANTHRACITE, BITUMINOUS COAL, LIGNITE, ETC.) FOR PRACTICAL PURPOSES.*

BY PROFESSOR G. C. WITTSTEIN.

Having been for many years extensively engaged in the examination of mineral fuels of all kinds, I may perhaps be justified in believing that the continued practice and experience in this branch of analysis has secured for me some considerable skill, leading me at the same time to methods possessing some advantages over many now in use. With these hopes the following article was published.

The question whether a given specimen belongs to the class of pit coals or to the class of lignites, has only on rare instances been put to me; as practical men are either well informed on this subject previously or consider the question of but little importance. It may be well, however, in the present article to give this point some attention, mentioning at least several methods by which the question can be satisfactorily answered. About as much of the pulverized specimen as can be held on the end of a spatula is to be heated with about 5 gms. caustic potash (sp. gr. 1·12), for several minutes, and then allowed to cool. If, after cooling, the potash has remained colourless or become but slightly yellowish the specimen under examination belongs to the class of pit coals. Should the alkali however have become dark brown or opaque, the coal examined is a lignite. This process, though quite old, has never been surpassed by any of the more recent, and is especially superior to the method of subjecting coal to dry distillation, and examining the watery portion of the distillate for acetic acid. The latter process depends upon the fact that the distillate of brown coals contains considerable acetic acid, while that of pit coals is entirely destitute of it. A still more unsatisfactory method is that according to which a distinction can be made between lignites and pit coals by the quantity of sulphur they contain. It is indeed true that in general lignites contain more sulphur than pit coals; yet it is practically impossible to fix any limit sufficiently accurate to serve as a distinction between the two.

The total analysis of coal may be divided into four principal operations, for each of which a separate quantity of the sample is to be weighed out. These operations are:—

I. Determination of Sulphur.
II. Determination of water and the constituents of the ash.
III. Determination of Carbon and Hydrogen.
IV. Determination of Nitrogen.

It is of course necessary to make a quantitative analysis of the coal in the condition in which it was delivered. It is therefore advisable, since powdered coal on exposure to air always loses appreciably in weight, to pulverize the sample as soon as received, and then immediately to weigh out for each of the operations just mentioned the following quantities:—

For I.—1 gm.	For III.—5 gms.
For II.—10 gm.	For IV.—1 gm.

I. *Determination of Sulphur.*

This may be conveniently carried on in a crucible of silver or platinum, which must, however, be sufficiently large to hold at least 30 gms. of water. The 1 gm. of the

* From the *American Chemist* for April, 1876.

sample, previously well pulverized, is to be mixed with 4 gms. of nitrate of potash, and 2 gms. anhyd. sodic carbonate, in a glazed porcelain mortar. (The latter flux is added simply to diminish the violence of the reaction.) This mixture is then to be transferred in small quantities at a time to the crucible, the bottom of which has been heated to low redness. After each addition the lid of the crucible must be immediately put on. A gentle deflagration ensues, which must, however, have completely subsided before a fresh quantity is added. After the whole of the mixture has been introduced, the particles which during the operation have been hurled against the sides and lid of the crucible should be carefully scraped down into the interior. The lid is then to be replaced, and the crucible heated for at least ½ hour to a lively redness. Hereupon the flame is to be withdrawn and the crucible inclined and turned in such a manner that the fused mass may principally distribute itself on the sides. This is done to facilitate the subsequent solution.

The mass after fusion is usually yellowish, sometimes green or greenish, from the presence of manganese. As the latter constituent is estimated with iron in II., no further account need be taken of it here.

The contents of the crucible are next to be treated with water, and the more or less turbid solution supersaturated with HCl. After this it will have become much clearer, and at times perfectly so. To this solution, filtered if necessary, $BaCl_2$ is to be added, and the S estimated from the quantity of baric sulphate precipitated. In the lignites which I have examined, the S has in some specimens amounted to as high as 7 per cent.; whereas in pit coals I have found as little as ½ per cent. Coals absolutely free from S I have never as yet met with.

In precipitating the sulphuric acid obtained by the action of sodic nitrate of the coal, there is, however, one source of error, which if not carefully guarded against, may possibly give high results. As the liquid will still contain considerable nitric acid, it frequently happens, especially if great excess of baric chloride has been added, that baric nitrate is formed. This salt, it is known, will sometimes adhere to the baric sulphate so powerfully that it cannot be washed out with water alone. When such a precipitation has taken place, the baric sulphate will on ignition evolve nitrous fumes, and will, after cooling, give with test papers an essentially basic reaction. To free the precipitate from this impurity, it should be digested with HCl, whereby the free baryta, formed during ignition, together with the nitrate which may still be present, will be converted into chloride, in which form it may be easily washed out.

One objection may perhaps be raised against the above method of determining total S: namely, that it obviously will include the sulphuric acid which may have preexisted in the coal. For the purpose of satisfying myself on this point I have made numerous experiments on fossil fuels, by treating them, in the state of very fine powder, with warm water, and adding $BaCl_2$ to the filtrate. I indeed obtained, after a time, a turbidity; the precipitate, however, in almost all cases, was so slight as scarcely to admit of further determination. All the sulphates could not, of course, have been extracted in this manner as the dense texture of coal will prohibit water from completely saturating it, even when in the finest powder. The omission of this determination is, however, without importance in the estimation of the quality of coal. For all preexisting sulphuric acid will remain in the ash, and will therefore be, I may say, passive or indestructive. This quantity, after being deducted from the total S, gives the quantity of active or destructive S present. It is the latter part of the total sulphur, which, being evolved as SO_2, gives rise to all the objectionable consequences which attend the escape of the gas (corrosion of metals, bleaching, etc).

II. *Determination of Water and the Constituents of the Ash.*

The 10 gms. of pulverized coal weighed out for this part of the analysis, are introduced into a platinum crucible, capable of holding at least 30 gms. of water. This crucible is then to be placed in an air-bath and heated to about 120° C. It would have been possible to expel all water even at 100° C. The time, however, required in the latter case would be so much greater, that it is always advisable to elevate the temperature as much as possible, without, however, allowing it to become sufficiently intense to decompose the coal. In any case, at least one and a half to two hours should be allowed for the complete expulsion of all water. The end of the operation may be determinined by holding a plate of glass over the open tubulure of the air-bath. When a film of moisture is no longer formed, all the water has been expelled. The tubulure must then be closed, the gas turned off, and the crucible weighed immediately on cooling. The loss is water.

The quantity of water contained in some coals is truly astonishing; and yet in none of the specimens would we be likely to expect it from external appearances. Even after pulverization the coal remains perfectly dry. This peculiar fact immediately brings to our mind certain salts containing much water of crystallization, and we are strongly tempted to conclude, that the water in coal does not merely adhere mechanically, but is chemically bound, however weak this union may be. It is true that I have never as yet met with such high percentages of water in coals, as are contained, for instance in alum (45½), borax (47), Glauber salts (56), phosphate of soda (60), soda (63). Nevertheless 20 per cent. was not unfrequent. Specimens with 30 or even 35 per cent. sometimes occur; at other times, on the contrary I have found as little as 2 per cent.

The sample from which water has been expelled is next to be ignited for the purpose of determining the ash. If it is desirable to determine, at the same time, whether a given specimen belongs to the class of caking, cinder, or sand coals, the lid should be kept on the crucible until the escape of volatile matter is no longer apparent. At this point the flame is to be withdrawn and the contents of the crucible examined. The residue will have the appearance of a dense, porous, apparently molten mass (caking coal), or will be but slightly coherent (cinder coal), or finally will remain in the state of a powder (sand coal).

For the purpose of hastening the progress of ignition it is well to give the crucible an inclined position, and to stir the contents carefully from time to time with a platinum wire. The operation will be complete when the combustion within the mass has entirely ceased. The residue, when cold, is to be weighed as ash.

The quantity of ash in coal varies as widely as the moisture. I have found as high as 30 per cent. and as low as 1½ per cent. As the ash always contains iron, it is never quite white; and according to the quantity of this metal present, the ash will vary from a light buff to a dark brick-red.

The ash thus obtained is to be introduced into a small flask and digested with HCl. (1·12 sp. gr.) for one or two hours. It is then to be filtered from the undissolved SiO_2 and the sulphuric acid contained in the filtrate precipitated with $BaCl_2$. The sulphur herefrom determined is that which I have above called "indestructive;" by deducting it from the total sulphur previously obtained, the quantity of "destructive" sulphur may be found.

To the filtrate from the $BaSO_4$, sulphuric acid is to be added to precipitate the $BaCl_2$ employed. The filtrate herefrom should be tested with H_2S, for the purpose of determining whether copper (which I have found on several occasions) is present. When this is the case it may be precipitated completely with H_2S, which precipitate after ignition is weighed as cuprous sulphide, and the copper calculated therefrom. Copper when found in coals always exists as sulphuret.

Should the process for the separation of copper have been necessary, the iron in the liquid will have been reduced to a ferrous salt. It is therefore necessary to oxidize the liquid by ebullition with nitric acid, after which the ferric oxide, alumina, manganese, and phosphoric acid may be precipitated by ammonia.

From this precipitate (previously well washed) alumina and phosphoric acid may be separated by digestion with KHO. If to the alkaline filtrate acetic acid be then added, the phosphoric acid (necessarily present only in traces) will be precipitated as phosphate of alumina ($Al_2P_2O_8$); and from the menstruum we may obtain the remainder of the alumina by precipitation with ammonia.

The residue insoluble in KHO will consist of ferric oxide, and at times small traces of manganese. (The presence or absence of the latter metal will have been previously indicated during the fusion with KNO_3.) As, however, the determination of manganese is a matter of no importance, and since the two metals, manganese and iron, have very nearly the same combining weights, we may without sensible error estimate the whole as ferric oxide. Iron exists in coals principally in the state of pyrites. It may therefore be better to report it as Fe, and not as Fe_2O_3. Coals usually contain more sulphur than would be necessary to combine with the iron present. There are, however, some specimens in which the iron is in excess, in which case the difference will most probably exist as oxide.

In the filtrate from the iron, lime may be precipitated by oxalic acid, and thereafter the magnesia with phosphate of soda, and the quantities present estimated as usual.

I have frequently tested for alkalies, but with such unsatisfactory results that I now neglect the matter entirely. The estimation is made somewhat inconvenient from the invariable presence of magnesia. It would for instance be necessary to expel ammonia salts in the filtrate from calcic oxalate by ignition; then to precipitate the magnesia together with the H_2SO_4 present (due to the excess previously used in precipitating baryta, after the sulphuric acid estimation) with baryta water, and finally, after having precipitated the excess of baryta used, with ammonic carbonate, evaporated the filtrate to dryness and ignited, to look for alkalies in the residue. As such a process might give a positive result, it is perhaps better, in order to avoid as many sources of loss as possible, to weigh the residue of sulphate of magnesia and perhaps sulphates of potash and soda, freed from ammonia salts by ignition, determine the quantity of magnesia and sulphuric acid present, and then to estimate the alkalies by difference.

III. *Estimation of Carbon and Hydrogen.*

The 5 gms. of coal for this determination, after having been completely dried at 120° C. and again weighed, are to be ignited with CuO, finally in a current of oxygen, or with chromate of lead, as in ordinary organic analysis, and the C and H estimated from the CO_2 and H_2O obtained. It is fully as efficient and far more convenient to generate oxygen from potassic chlorate, instead of using a gasometer. This salt, in pieces about the size of peas, is to be placed in the back part of the tube, separated from the CuO by a layer of asbestos, and heated when the ignition has been nearly completed.

IV. *Estimation of Nitrogen.*

As no specimen of coal is free from N, and since up to the present time we have no direct method of estimating O, the necessity of estimating all the other constituents of coal, including N, for the purpose of making our analysis complete, becomes at once apparent. The estimation of N may be best effected by igniting the 1 gm. of pulverized coal (from which the water need not be previously expelled) with soda-lime. The N thus evolved in combination with H as ammonia, may be absorbed by acids. It was at first customary to employ HCl, convert the sal-ammoniac thus obtained into platinochloride of ammonium, determine the quality of Pt. contained by ignition, and estimate the N from this result. Afterwards dilute H_2SO_4 was recommended. The quantity of H_2SO_4 left free after the gas had passed through was determined by a standardized solution of NaHO, whence the quantity of ammonia absorbed, and consequently the quantity of N in the coal, was calculated. Notwithstanding the fact that the latter method has been much praised, I cannot recommend it in the present analysis, as in the case of a minimum of ammonia, the quantity of free acid remaining is so great as to prevent the volumetric estimation from being sufficiently accurate. Let us, for instance, suppose that the specimen contains 1 per cent. N (more will seldom be found, 2 per cent. would be beyond the maximum). In this case the 1 gm. operated upon will contain ·010 g. N, corresponding to ·012 of ammonia; these 12 m. g. would saturate 28 m. g. sulphuric anhydride. Now since the quantity of acid proposed seldom contains more than 1 gm. of SO_3, only the $\frac{1}{36}$ part of it would be neutralized by the ammonia. The remainder ($\frac{35}{36}$) is to be saturated by NaHO, so that even a few drops would cause appreciable error in the estimation. For this reason I have continued to use HCl as the absorbent, without, however, converting the sal-ammoniac obtained into platinochloride of ammonium. The method consists in evaporating the acid gradually (finally in a watch-glass) at a temperature not exceeding 100° C.

Herewith the actual analysis of coal would be completed. The only determination further desirable might be the quantity of thermal units evolved by the ignition of the specimen. By a thermal unit I here mean, the quantity of heat necessary to raise one kg. of water 1° C.

1 gm. carbon, on ignition evolves 8080 therm. units.
1 gm. hydrogen . . . . . 34464 „ „

The thermal units desired may be obtained:

I. By taking the percentage of 8080, which expresses the quantity of C present.

2. By taking the percentage of 34462, which expresses the quantity of free H present, and adding the results; as, for example:

In a specimen analysed were found:

$$\left.\begin{array}{r} 51{\cdot}70 - \mathrm{C} \\ 3{\cdot}49 - \mathrm{H} \\ 10{\cdot}32 - \mathrm{O} \end{array}\right\}$$

The 10·32 of O require 1·29 H, for the formation of H_2O; there therefore remain:

$$\left.\begin{array}{r} 51{\cdot}70 - \mathrm{C} \\ 2{\cdot}20 - \mathrm{H} \end{array}\right\}$$

Hence,

$$\begin{array}{ll} 1. & {\cdot}5170 \times 8080 = 4177{\cdot}3600 \\ 2. & {\cdot}0220 \times 34462 = 758{\cdot}1140 \\ \hline & \text{Sum} = 4953{\cdot}5240 \end{array}$$

which expresses the number of thermal units produced by ignition of 1 gm. of specimen.

ALCOHOLIC SOLUTION OF SHELLAC.*

BY A. PELTZ.

The production of a clear alcoholic solution of shellac has been the subject of numerous experiments, but hitherto none has turned out satisfactory except slow filtration. As is known, by digestion of one part of shellac with six or seven parts of 70 per cent. alcohol, a solution is obtained which when warm is almost clear, but upon cooling becomes turbid and is only partially clear after standing a week. The plan of pouring sufficient alcohol over coarsely powdered shellac to form a thin paste, yields upon the addition of more alcohol after the lapse of eight or ten hours a liquor that does not deposit any more, but which is not clear. Another method suggested, of boiling the alcoholic shellac solution with

* *Pharmaceutische Zeitschrift f. Russland.*

animal charcoal gives a clearer liquid, but there is always loss through absorption by the animal charcoal.

The object sought by the author was to obtain a clear alcoholic solution in a short time without much loss. Previous communications upon the substance occurring in shellac to the extent of five per cent., which renders its alcoholic solutions turbid, and is described by some authors as wax and by others as a fat acid, suggested an attempt to effect its removal before dissolving the shellac. The shellac therefore was boiled with water, from one to five per cent. of soda or ammonia being added, but without satisfactory result, a somewhat larger addition of the alkali caused the solution of the shellac.

The author next prepared a solution with one part of shellac and six parts of 90 per cent. alcohol at the ordinary temperature, which was effected with frequent shaking in ten or twelve hours. To this he added carbonate of magnesia to about half the weight of the shellac used and heated the mixture to 60° C. The solution so obtained cleared more rapidly than a solution to which magnesia had not been added and filtered in less time; but it did not supply what was sought. When powdered chalk was substituted for magnesia, the solution after standing some hours became three-fourths clear, whilst the lower turbid portion could be rapidly filtered. It only required a little alcohol to wash the filter, and a clear alcoholic solution of shellac was obtained. Further experiments, for instance, with sulphate of baryta, did not give a better result. When such a solution is made on a large scale it would be best filtered through felt.

Nothwithstanding that the object of the author had thus been attained, one or two other experiments were tried. To three parts of the above mentioned shellac solution one part of petroleum ether was added, and the mixture was vigorously shaken. After standing a few moments the liquid separated in two layers; the upper light coloured layer was the petroleum ether with the wax dissolved in it, the lower yellow brown layer was a clear solution of shellac with only a little petroleum ether adhering. Upon allowing the petroleum ether to evaporate spontaneously, the wax that had been dissolved out of the shellac was obtained as a white residue. By using a stronger alcohol (95 per cent.) to dissolve the shellac, and subsequently adding petroleum ether a perfectly clear solution was obtained that only separated into two layers after the addition of water. Consequently an alcohol weaker rather than stronger than 90 per cent. should be used.

The shellac solution obtained by means of petroleum ether, however, has the disadvantage that the shellac is left after the evaporation of the petroleum in a somewhat coarser form and easily separates; this may be obviated by the addition of one to three per cent. of Venice turpentine.

Further experiments showed that the petroleum ether could be replaced by the ordinary commercial benzine.

BLACK WRITING INKS.*

BY C. H. VIEDT.

The aqueous solution of the tannin of the gall-nuts undergoes the following change by fermentation, the ferment being present in the Aleppo galls:—

$$\underset{\text{Tannin.}}{C_{27}H_{22}O_{17}} + 4H_2O = 3(\underset{\text{Gallic Acid.}}{C_7H_6O_5}) + \underset{\text{Sugar.}}{C_6H_{12}O_6}.$$

On boiling the nuts with water, and exposing the solution to the air, this fermentation sets in. The Chinese galls do not contain this ferment, and, therefore, to bring about the above decomposition some yeast must be added. Concentrated solutions of ferrous salts give, with tannic acid, a white voluminous precipitate; in dilute solutions no change takes place. Ferric oxide solutions, with excess of tannic acid, give a blue-black precipitate of ferroso-ferric tannate, a part of the higher oxide being reduced to the lower one. This ferroso-ferric tannate is also formed when solutions of ferrous tannate are exposed to the air, partial oxidation taking place. With great excess of tannic acid even ferric salts give no precipitate, being thus reduced to ferrous salts. After a longer time the solution becomes blue-black; later on blue-black tannate is precipitated, the solution remaining of a dirty green colour. By boiling a mixture of a ferric salt with tannic acid, it becomes colourless, with liberation of carbonic acid, and thus it becomes evident that prepared gall-nut inks ought never to be heated to boiling.

The behaviour of gallic acid to iron salts is nearly analogous to that of tannic acid. Ferrous salts have no effect on gallic acid, but on exposure to air the solution becomes at first reddish, then violet, then dark blue, and at length an insoluble and blue-back ferroso-ferric gallate is precipitated. This insoluble gallate precipitates much more quickly than the corresponding tannate, but the supernatant solution of the gallate remains somewhat strongly coloured with gallate retained in solution. In choosing tannic acids for the manufacture of ink, it should be remembered that only those giving blue reactions with iron yield the best coloured inks; those which give a green colour, as sumach tannic acid, cannot be recommended. Many of the former variety also contain substances which damage the colour of the ink, as the tannic acid of the *Tormeutilla ereeta*, which contains an injurious red pigment besides tannic acid.

Gall-nuts are considered the best source of the tannic acid, and of these the Chinese galls with 72 per cent. of tannin are recommended as cheapest and best, because they also contain less extractive mucilaginous bodies than the Aleppo galls; they furnish an ink less liable to become mouldy.

To extract the tannic acid from the gall-nuts, they are coarsely pulverized, and mixed with an equal quantity of straw, cut small. This mixture is shaken in a high, narrow vessel of oak wood, furnished with a tap at the bottom, and close above a perforated false bottom. Here it is treated with lukewarm water, and the tannic acid extract is allowed to flow very slowly out, after which it is returned several times, still further to exhaust the powdered galls. The mixture of chopped straw is to obviate the difficulty caused by the swelling of the galls on lixiviation, and the yielding of a quantity of slimy mucilage, which would otherwise have rendered the mass impermeable. It is suggested that a row of small "diffusers," similar to those employed by the sugar-refiner, might be used with even greater advantage.

To preserve the prepared ink from mildew, three to five drops of pure *carbolic acid* should be added, or if the smell of this be objected to, *salicylic acid*. The presence of lime in the water used for ink-making is not injurious. The ferrous salt recommended is ferrous sulphate, "green vitriol;" the proportions will be 100 *parts of tannin* to 90 *parts of crystallized ferrous sulphate*. Of course, by the use of the pure ferrous salt the ink at first is very light coloured, though it afterwards darkens on exposure to air. To overcome the difficulty of this pale writing, the ink is coloured with logwood extract, or some soluble colouring matter. Logwood and cupric sulphate are used for ink-making besides gall-nuts and ferrous sulphate. Both yield beautiful blue-black precipitates; galls and cupric sulphate, however, give a slimy brown-black colour, which spoils the tint of the ink. It is better, therefore, not to use the copper salt at all.

* *Journal of the Chemical Society*, May, 1876. From *Dingl. polyt.* J., ccxvi, 453—456.

LEECHES.

The following interesting note on a French leech farm appeared in 'Chambers's Journal' for July:—

The great demand which suddenly sprung up for leeches for surgical purposes at the end of last century, caused their natural haunts in the swamps and marshes to be invaded by armies of collectors, who soon denuded them of their ordinary stock. The French seem particularly partial to leeches, and their use in that country has always been more general than elsewhere. As a consequence of the drain upon her supplies, she was the first to suffer from a diminished yield; and in time the famine spread to Hungary, Turkey, Greece, and Germany, and even to Algeria and Syria, all of which countries were ransacked in the search for these bloodthirsty creatures. The scarcity and dearness of leeches at last attracted attention, and it was, we believe, about 1830 that the idea was conceived by a Frenchman that leeches might be kept in regular farms and bred, just like any other animal for which there is a steady market. The idea was soon carried into practice, and with such success that leech-breeding has come to be regarded as a distinct industry of no little importance, and is carried on to a considerable extent in different parts of the continent.

The success of such an establishment depends, of course, on the choice of a suitable locality, and as the spots best adapted for this purpose are generally tracts of marshy ground, which are either useless for any other purpose, or—worse than useless—a nuisance, the selection of such areas and turning them to account in this way, is a double benefit. As an instance of the advantages attending the establishment of the industry in such places, setting aside the actual and immediate profits of the trade, we may quote a French writer, who, twenty years ago, gave his experience of such an undertaking. Natural swamps previously neglected are cultivated and placed under control, their miasmatic effects are neutralized, and employment is given to many poor people, who would otherwise find it hard to get a living. In the department of La Gironde alone, about ten thousand acres of land have been devoted to this purpose; its value has risen six or eight fold; men's wages have risen from 1*s.* to 2*s.* 6*d.* and 3*s.* a day; women and children also find remunerative occupation; shops have sprung up where none previously existed; and the condition of the peasantry generally has been vastly improved.

Let us examine one of these farms which have been the means of doing such an amount of good. We will pay a visit to one of the first of many which were established by M. Laurens—namely, that at Parempuyre, about nine miles from Bordeaux. Here an area of about four hundred acres near the Garonne is devoted to this industry. The marsh is subdivided into compartments of five or six acres in extent, each of which can be inundated separately. It is surrounded by a ditch eight feet wide by five feet deep, outside which is a bank of earth which acts as an obstacle to the escape of the leeches, and which also enables the watchmen to go round the property at night without being seen; for there are some thieves who cannot resist the temptation of stealing even leeches when the opportunity presents itself. Outside the bank, is a second ditch, connected with the inner one by occasional breaches in the intervening bank. Each compartment is intersected with drains, and can be flooded or laid dry at will by opening the hatches with which the ditches are provided. In the case of draining the water off, the lower hatches are replaced by perforated metal ones, through which the water, but not the leeches, can escape. Besides these breeding-grounds there is a reservoir, similar to them in every respect, which is replenished at every opportunity with the larger leeches; so that, when the other beds are laid dry, there is always a stock on hand ready for the market. This reservoir is always kept covered with water to the depth of three to five inches, and holds from forty to fifty thousand leeches to the acre —a rate rather larger than that observed in the breeding-ponds, which are populated to the extent of thirty to forty thousand leeches per acre. During the cold season the leech remains quite underground; but the first rays of the spring sun bring him out, and then a troop of horses is made to enter the breeding-grounds, in the proportion of ten to the acre. The leeches attach themselves to the lower part of the legs of the animals, and then gorge themselves. The same troop of horses remain "on service" for five or six hours, when they are recalled and tended, and sent back to their pastures, where they are allowed to rest and regain strength. After eight or ten days' rest, the horses are again despatched on duty; the hitherto unfed leeches, and those that have digested their last repast come out again; and from about the 1st of March to the middle of June they are thus fed about eight or ten times each.

In June, the leeches all go underground, and the laying dry of the parks commences; the horses are kept out of them, the weeds and reeds are allowed to grow, and the soil becomes better knit together, as it were. In July and August the leeches come out to deposit their eggs in the tufts of herbage, and then the drains before mentioned are filled with water enough to keep the ground moist. The leeches having performed this duty, again burrow underground, and in a short time the young ones make their escape from the eggs.

The parks are inundated, and at the end of August the fishing commences. The fishers, protected by high boots, enter the pond arranged in lines, and beat the water with sticks, to arouse the dormant leeches, which soon appear in great numbers, ready, after their long fast, for another feast. The large ones are carefully lifted out and placed in bags, with which each person is provided; and the line of fishers gradually advances till the whole bed is thoroughly beaten. It is then left to be subjected, three or four days afterwards, to another careful search, a sufficient stock being always reserved in the shape of the young and small leeches, and those that, not having digested their food, do not put in an appearance on the unceremonious summons of the collectors.

An establishment such as that described above will produce several million leeches annually in a healthy condition. Serious losses are experienced in cold weather and in consequence of injudicious handling of the annelides; but the profits are nevertheless considerable, as the cost of maintenance and collection is not very great.

The method of feeding these interesting flocks is, as we have said, by sending a number of horses into the ponds periodically, for unless leeches are provided with an ample commissariat, they will take themselves off in search of forage elsewhere. The horses used for this purpose do not suffer to anything like the extent that might be imagined. They are closely watched during the operation, and carefully tended afterwards. In many cases, horses which have been bought for a trifle have, under the care bestowed upon them, improved so wonderfully as to have been sold afterwards at a profit, so little does the system injure them. Old horses, whose lives have hitherto been a succession of hard knocks and fastings, and a perpetual round of fatiguing journeys, here find a relief from their burdens; death is deferred for months, and even years, and the latter period of their life is passed in a paradise, compared with the experience they have gone through.

Paris alone "consumes" some twelve million leeches annually; and, prior to the establishment of the system of producing them in artificial reservoirs, the annual importation into France from abroad, exclusive of its own production, was nearly fifty millions. The enormous demand for these useful surgical attendants throughout the world may be estimated from the above figures.

THE PRESENT STATE OF THE BISULPHIDE OF CARBON INDUSTRY.*

BY O. BRAUN.

In 1872 the state of the bisulphide of carbon industry was the following:—

For the preparation of bisulphide of carbon, the only

* *Journal of the Chemical Society* for June. From *Chem. Centr.*, 1875, 810.

method used was that of Lampadius, depending on the passing of vapours of sulphur through red-hot coal. All the forms of apparatus described, except Galy-Cazalat's, are similar to each other, and consist of a retort, fixed vertically into a furnace, with a cover and two openings. Through one opening a tube open at both ends leads into the interior, and almost to the bottom of the retort; to the other opening a tube is attached, which forms a connection with the cooling apparatus. The latter is arranged so that it cannot be stopped up by the solidification of the sulphur, and thus prevent the outlet of the gases. After filling the retort to the brim with charcoal or coke, the cover is put on, the connection made between the tube and the cooler, and the fire lighted. Sulphur is now introduced into the retort through the tube, and passing from the bottom through the red-hot charcoal, combines with the carbon, and is condensed in the cooler to bisulphide of carbon. The process is continuous; the addition of sulphur takes place every 10 minutes, that of the coal every 12—24 hours. The great disadvantage in this mode of manufacture is the necessity of often completely emptying the retort, in order to remove the coal and sulphur residues, whereby the workmen are exposed to heat and vapours, and much loss of material and time is incurred, and these vapours cause great annoyance to the neighbourhood.

Galy-Cazalat and Huillard's patented apparatus consists of a retort, in which a portion of the coal is burnt, and then used for heating the remainder of the coke. This apparatus would doubtless answer very well if heat were liberated in the combination of sulphur with carbon. This, however, is not the case, and it therefore becomes necessary to renew the access of air; and although in so doing no violent explosions take place, since the bisulphide of carbon is ignited before forming a dangerous mixture of air and gas, still a considerable quantity of sulphur is lost, or at least only used as fuel. The author seems to doubt the use of this apparatus for the manufacture of animal charcoal, which was suggested by the inventor.

Clay retorts were probably used at first because the temperature necessary for the formation of the carbon bisulphide has been over-estimated. Cast-iron retorts are now used, the plates are about 50—70 mm. thick, and if well fixed last several months, so that with a retort weighing 1000—2000 kilos. 20,000 kilos. or more of bisulphide of carbon can be prepared. The mass of the retort is at the same time converted, with great increase of volume, into a sulphide of iron, difficultly soluble in dilute sulphuric acid. Vertical retorts ought to be used, the diameter not being more than 0·4 meter. It is also very advantageous to use elliptical retorts. Enamelled retorts might perhaps be durable. A considerable progress was made in the bisulphide of carbon industry when the sulphur was no longer put into the retort as a solid, but was passed into it in the form of vapour. Still the present method requires many alterations and improvements, especially with regard to the yield, the want of fuel, the wear and tear of the apparatus, and also the effect of the heat and the vapours on the workmen.

As charcoal and coke do not consist of pure carbon, but contain besides ash, also hydrogen and oxygen, other compounds are formed, such as sulpuretted hydrogen, which, as it contains sulphur, not only decreases the quantity of sulphide of carbon produced, but also escapes from the condenser, saturated with sulphide of carbon vapours. Besides this other gases are formed, which partly dissolve in the bisulphide of carbon, and give it a disagreeable odour. The quantity of gases increases with the amount of moisture (H and O) in the charcoal.

The crude bisulphide of carbon thus formed contains, besides about 10 per cent. of free sulphur, sulphuretted hydrogen and probably several other bodies, compounds of carbon, sulphur, and oxygen. Distillation alone does not give a pure product. Bonnière obtained a pure substance by arranging his rectifying apparatus in such a way that the vapours had to pass through solutions of potash, ferrous oxide, and salts of cupric oxide. Leyferth obtained a good product by precipitating the vapours with a stream of fresh cold water. Deiss recommends for the same purpose the use of soda, chlorine water, and chloride of lime. Sidot once rectifies his crude product, and then shakes it up with pure mercury. A very pure product is obtained by repeatedly distilling the bisulphide of carbon from pure oil; so long as the purification is not perfect, the oil has a very repulsive smell, and becomes sulphury.

The most important properties of bisulphide of carbon, with regard to its technical application, are its solvent power for oils, fat, resins, tars, sulphur, phosphorus, etc.; its insolubility in water; its specific gravity, which is greater than that of water; its low boiling point (46° C.); the high specific gravity of its vapour (38 compared with hydrogen); its low igniting point (170°C., but probably, under certain conditions, lower).

Several patents have been taken out describing details of the apparatus used for extracting with carbon sulphide, the principle being the same in all cases, viz., removing the oil with bisulphide of carbon until saturated, and recovering the same from the oil, as well as from the residue of the fatty raw material. From the exhausted residue the sulphide of carbon can be distilled with steam, hot air, or a mixture of both steam and air. Boiling water does not answer. From the oil the bisulphide of carbon is at first distilled with dry, and afterwards with wet steam.

In 1862 the author began to extract fatty wool residues, the difficulty consisting in recovering the bisulphide of carbon, after removing the oil, without spoiling the wool. A mixture of steam and air was passed into the wool, entering the vessel at the top, and thus causing the specifically heavier bisulphide of carbon to escape at the bottom. The apparatus was improved to such a degree that the escaping air was perfectly free from bisulphide of carbon, and that thus the consumption of the latter was but very slight (100 kilos. require 0·25 kilo. of CS_2).

In 1863 Bonnière patented an apparatus for extracting olive residues (Wagner's *Jahresbericht*, 1863, 562), and Moison's (*Annales du Conservatoire des Arts et Métiers*, iii, 55) apparatus was described by Payen.

Since 1868 the author has tried experiments on a large scale, for the purpose of extracting the press residues from oil factories where palm-nuts are worked up. These residues still contain about 25 per cent. of oil, and it is necessary to grind the fruits properly, in order to allow the bisulphide of carbon and steam to pass through them.

The author, in conclusion, describes an apparatus used by Braun Brothers, of Moabit, near Berlin, where 5000 kilos. of palm-nuts are exhausted in 12 hours, the apparatus consisting of a horizontal cylinder, holding about 10,000 kilos. of bisulphide of carbon, used for storing the same, four vessels holding smaller quantities of bisulphide of carbon, and used for measuring purposes; six extracting vessels, forming upright cylinders, 1·1 m. high, and 0·7 m. wide, holding 250 kilos. of pressed product, two distilling vessels with a worm and an air-pump.

Finally, the author states that petroleum cannot be profitably used for extracting purposes, as its solvent power is not so great as that of bisulphide of carbon, and as some residues, especially when wet, cannot be extracted by its use.

ON CHEMICAL NOTATION.*

BY M. M. PATTISON MUIR, F.R.S.E.,

Assistant Lecturer on Chemistry, The Owens College, Manchester.

1. In examining a chemical action we may pay attention to (1) the substances which take part in, and the final

* From the *Philosophical Magazine* for July, 1876.

products of, the action, or (2) to the force which is concerned in doing the work. Thus the action of sulphuric acid upon zinc is commonly represented by the equation

$$Zn + H_2SO_4 = ZnSO_4 + H_2,$$

which tells us that a given weight of zinc acts upon, or is acted upon by, a given weight of sulphuric acid, with the production of certain fixed weights of zinc sulphate and of hydrogen; and further, the equation implies that a certain amount of force is expended in the action. So again the equation

$$2H_2O = 2H_2 + O_2$$

not only states, in symbolic language, the fact that 36 parts by weight of water yield 4 parts by weight of hydrogen, and 32 parts by weight of oxygen, but it also implies the further fact that, in order to obtain the quantities of hydrogen and of oxygen from water, a certain amount of energy must be altered in form. The latter fact is not, it is true, stated in our ordinary chemical equations in the same prominent manner as the former, still it is, I think, unmistakably implied.

2. These two methods of regarding a chemical equation are not without close relationships to each other. In a paper published in this magazine by Dr. E. J. Mills, it is said that chemical substances are valued not for what they are conceived as being, but as doing—that the most important question with regard to a chemical substance is, how does it behave with this or that reagent? It appears to me that what a chemical substance *does* depends very much upon what it *is*, and that, although we are obliged to study these questions to a certain extent apart, we shall some day be able to express by one and the same formula the constitution and the various modes of action of all known chemical bodies.

3. In the following paper I shall endeavour to point out what appear to me to be some of the reasons for maintaining our ordinary formulæ, but at the same time, for supplementing them by investigations into, and symbolic representations of, the dynamical laws governing chemical transformations.

4. In the first place, all questions as to work done by different chemical substances imply the existence of these substances; change in the form of energy implies the existence of energy; but the existence of energy implies to our minds at any rate, a something which is the seat or vehicle of energy. This something is matter. Matter has been defined by two eminent naturalists as "that which is essential to the existence of the known forms of energy, without which therefore there could be no transformations of energy." The physical universe is often compared to a machine, the laws of the working of which are the laws of energy; but an investigation into these laws surely does not preclude, but rather prompts to an investigation into the structure of the machine itself. It may be urged that what we call matter has no existence outside of the mind of the observer; this objection, however, has been often refuted.*

5. One of the most well-founded generalizations concerning matter is to the effect that no particle of it can be destroyed, nor be produced by us. The mass of matter cannot be changed by us; its form may be changed, the forms of its energy may be altered, but its quantity remains the same. If this be so, surely it becomes of vital importance to every naturalist—and in the term naturalist we include the chemist—to have a symbolical language which shall express the weights of matter taking part in, or resulting from, any action between what we call different kinds of matter.

Now whatever theory we may hold concerning the constitution of matter, it can scarcely be denied that our ordinary formulæ do tell us the weights of those kinds of matter which take part in a given chemical reaction, or of those which result from that reaction. To the principle of the conversion of matter the writer already quoted appears to object. He would seemingly refuse his assent unless some one could experimentally prove to him that a given chemical compound has the same composition now that it had a hundred years ago.

Surely such a statement as this implies ignorance of the meanings of a scientific generalization. Elsewhere Dr. Mills speaks of the ideal reformer as one who "must have an infinite capability of doubting." Is the infinity of this capability to cause the ideal reformer to doubt every generalization which rests upon well known and most thoroughly trustworthy facts, because the special proof which *he* demands cannot, and that from the very nature of the case, be forthcoming?

6. A chemical equation expresses the weights of the different kinds of matter taking part in the reaction formulated; it therefore implies a dissimilarity of some sort between the *kinds* of matter. The equation $2H_2 + O_2 = 2H_2O$ implies that the kind of matter represented by the symbol $2H_2$ is different in its essential properties from that represented by either of the symbols O_2 or $2H_2O$,—and, further, that the kind of matter indicated by the last-mentioned symbol is in some way composed of the two other kinds of matter. To such an expression it has been objected that we do not know that the substance represented by the symbol $2H_2O$ is *composed* of the two substances $2H_2$ and O_2, that we have reasons for believing that each of these three substances is equally homogeneous. Now it appears to me that we may use such a chemical equation without commiting ourselves to any theory as to the manner in which the hydrogen and oxygen unite together to form water. When we say in chemical shorthand, 4 parts by weight of hydrogen, under certain conditions, so react with 32 parts by weight of oxygen as to produee 36 parts by weight of water, we state a fact. Here are three substances which exhibit to our senses different phenomena; with each of these substances certain definite phenomena are invariably associated; and we find that, under fixed conditions, for a mixture of certain weights of the two former a weight of the third equal to the sum of these two weights is invariably produced. In such a statement nothing is said of the homogeneity or non-homogeneity of the three substances; whatever views may be held on this subject, the fact of the production of the third substance by the mutual action of the other two is undeniable; and this fact is symbolically expressed in the equation we have been considering.

Of course chemists are generally in the habit of conceiving that water is *made up of* oxygen and hydrogen, that these substances exist in some way in the new substance formed by their action upon one another; and the equation will bear this meaning. On the other hand, it is at least possible, in the light of Mr. Lockyer's recent spectral researches, to imagine that hydrogen and oxygen may themselves be split up into simpler substances (just as water is split up into hydrogen and oxygen); but if this be the case the equation may remain unaltered; it expresses a truth, although probably not the whole truth. But we believe that chemical equations tell us much more about the composition of substances than the mere fact that certain weights of two bodies produce a certain weight of a third; this part of the subject, however, I shall defer to a later portion of the paper.

7. If we are to regard chemical substances chiefly in the light of what they *do*, it may, apparently, be urged

* 'Unseen Universe,' 1st edit. p. 71. "Some extreme thinkers write as if they would persuade us that a species of hallucination affects with similar impressions every individual mind, so that, for instance, one man may usefully warn another about a pitfall on a dark road, and so save him from a catastrophe which might otherwise be caused by something which exists, if at all, in the mentor's mind only—at all events not as yet in that of his pupil; though if the warning be unheeded, or not given, there will presently be another mind in which the pitfall will certainly exist with startling vividness. But this is altogether repugnant to every conviction which experience (our only guide in such matters) enables us to form, etc."

that our ordinary formulæ are of little use to us—that, inasmuch as these formulæ are based upon statical ideas, they are useless, or all but useless, when we come to deal with questions of kinetics.

If we investigate chemical formulæ, especially in their more recent outcome, I think we shall see that this is a mistaken idea.

8. Some chemists have affected to sneer at the "pictures," as they call them, which "deface" the pages of so many modern treatises. If they have convinced themselves that "Ignorance is bliss," then they are right in the conclusion "'Tis folly to be wise." That the use of structural or dissected formulæ may be carried to a pitch which does become ridiculous—especially in the case of compounds about which we know little or nothing, but whose graphic formulæ are, it would appear for that reason, to be continually sketched—can scarcely be denied. But why do chemists make use of such formulæ at all? is it not because they wish to express in the shortest possible manner the greatest amount of information about the *actions* of the substances formulated? Instead of putting down in words what this body will do under certain circumstances, how this body will react with other bodies, chemists seek to compress all they know of the *doings* of the substance into that shorthand expression by which they distinguish it from all other bodies. To say that structural formulæ do not tell us much about the actual, and even the possible, *actions* of the substances formulated, is simply to confess to ignorance of what these formulæ exhibit.

9. For proof of this statement I might refer to many researches; let one suffice.

In a remarkable paper published in the Philosophical Magazine,* Dr. C. R. A. Wright examined the relations between affinity and dissected or structural formulæ in the case of certain groups of compounds; and he showed that the dissected formula of a chemical compound may give us much information, not only with regard to the method of formation, and decomposition under the influence of various reagents, of that compound, but also with regard to the transformation of energy which take place during these actions. Thus, to take an example, it is shown that when an operation, "symbolically represented by the substitution of the group of symbols CH_3 for the symbol H in some constituent hydrocarbonous radical (CH_3, CH_2, or CH) in the dissected formula of the original substance," is performed upon a given vapour, then "heat is evolved during the performance of the operation," and the new and more dense vapour produced has a higher "affinity-value" than the original vapour. Here we have a most important generalization with regard to homologous series of compounds; as the series is ascended the 'affinity-value" increases; and these differences of affinity-values are "correlative with the differences between . . . dissected formulæ indicating substances chemically related together."

On the other hand, Dr. Wright shows that substitution of the group CH_3 for H in the OH group in the dissected formula of a vapour is attended with absorption of heat, and therefore with a decrease in affinity-value; thus the conversion of an acid into its methylic ether is attended with absorption of heat.

10. It may be urged that our formulæ do not express such relationships as those between transformation of energy and chemical action. At present they do not; but it would require only the addition of a symbolic expression of some kind, not the discarding of the formulæ and the invention of entirely new expression, to enable us to express such relationships. Dr. Wright's researches show (and this is the main point to be insisted upon) that there *is* a connexion between the commonly employed dissected or structural formulæ and changes in the energy of the substances formulated. This conclusion, might almost have been arrived at by a study of structural formulæ themselves. Such formulæ as

$$CH_4,\ CH_3(CH_3),\ CH_3(C_2H_5),\ CH_3(C_3H_7),\ CH_3(C_4H_9)$$

tell us that two volumes of each hydrocarbon vapour may be prepared from two volumes of the vapour of the hydrocarbon immediately preceding it by an operation symbolically represented by the replacement of H by a radical having the general formula C_nH_{2n+1}. Now there must be some change in the energy of these hydrocarbons before and after the performance of such operations; and inasmuch as we can ascend the series by a repetition of the same operation, we should expect that the change in energy, whatever it may be, would be regular, and would be related in some way to the regular change in chemical constitution.

11. Not only do the formulæ of compounds indicate the actions by which these substances are produced, and by which they may be transformed into other substances, but with the formulæ of the elementary bodies there is likewise associated information of a similar nature.

Mendelejeff* has pointed out that if the symbols of the elements be arranged in the order of their combining weights, beginning with the smallest, the elements may be divided into groups and series, the members of which are characterized by a gradation of properties, which gradation is closely related to the increase of the combining number. Each group possesses many properties in common, among these the power of forming oxides and other salts of similar type being very marked. We have here, then, a possible arrangement of chemical symbols such that, from its position in a regular series, each symbol shall tell us a great deal concerning the *power of doing* of the element which it symbolizes.

12. It appears to me, therefore, that our chemical formulæ do tell us very much about the *actions* of the substances formulated, about their methods of formation and of decomposition, and that as advances are made in a knowledge of the changes of energy, which are undoubtedly correlated with changes in chemical constitution these formulæ may be so modified as to express such knowledge. At present we know so little of chemical kinetics that it would be altogether premature to propose any method for giving symbolic expression to the few facts which have been brought to light.

13. In the symbolic expression of chemical actions such statements occur as these:—

$$K_2 + 2H_2SO_4 = 2KHSO_4 + H_2 \quad (1)$$
$$Ca_2 + 2H_2SO_4 = 2CaSO_4 + 2H_2 \quad (2)$$
$$Na_2 + 2HCl = 2NaCl + H_2 \quad (3)$$
$$Mg + 2HCl = MgCl_2 + H_2 \quad (4)$$

By comparing equations (1) and (2), it is evident that the quantity of potassium expressed by the symbol K has replaced, in sulphuric acid, a quantity of hydrogen represented by the symbol H, while twice this quantity of hydrogen has been replaced by the symbol Ca. The conclusion, therefore, to be deduced from these equations is, that, so far as the power of replacing hydrogen in sulphuric acid is concerned, the symbol Ca is equivalent to the symbol K taken twice. Similarly from a comparison of (3) and (4) it may be concluded that Mg is equivalent, in hydrogen-replacing power, to 2Na. From a consideration of such equations as these the idea of valency takes its origin. This idea has been largely developed; and chemists have been able to fix the valency of a large number of radicles, whether simple or compound. The valency of a chemical substance expresses a certain function which that substance is capable of performing; it tells us that the substance under consideration is capable of doing a certain amount of work; but inasmuch as the circumstances under which this work is done vary, the valency also will vary with the circumstances. Nevertheless we find that for each elementary radicle there is a

* December, 1874.

* *Ann. Chem. Pharm.* Suppl. vol. viii. p. 133.

fixed maximum valency; we have therefore a most useful means of classifying these radicals according to their power of doing a certain work. It is true that the unit of work done is not very strictly defined; it is only the unit weight of hydrogen displaced, or combined with. Yet this classification is in practice found to be most useful. Given the valency of a metallic radicle, and the basicity of an acid upon which that radicle exercises an action, it is possible to foretell what the composition of the resultant of that action will be. Hence those quantities of two or more radicles which are able to replace the same quantity of hydrogen may be truly said to be "equivalent" quantities.

14. Dr. Mills (*loc. cit.*) objects to this use of the word equivalent, and avers that "we might as well say that the values of the loads in a railway truck are always equivalent, whether the load consists of air, of hay, or bullion." They are equivalent in one respect, viz. in that they have displaced equal volumes of air. We have nothing to do with the general *value* of a radical when we speak of its valency in the commonly accepted meaning of the phrase. That amount of a given radical which will displace unit weight of hydrogen from an acid may not be that amount which will do some other kind of work, just as that amount of hay which will displace one cubic foot of air in the railway truck is *not* that amount which will do the work of an equal volume of bullion in so far as exchange is concerned, although it does accomplish the same amount of work when we define the unit of work as "replacing one cubic foot of air." Dr. Mills has introduced an unfortunate word by using the term *value.*

15. If we for a moment agree to view this matter of valency in the light of the molecular theory of matter, and of some recent researches of Michaelis and other chemists, the explanation given of the relation between valency and general chemical "value" would be something as follows. We may imagine the molecule of a chemical element performing a certain vibration in a definite period of time; during the performance of this vibration there are certain positions attained by the molecule, at each of which it is so situated as to be capable of exercising chemical action upon other molecules. The number of these positions is the valency of the molecule. But we can suppose that the total force exercised is not uniformly distributed, so that an unequal amount is capable of being exercised at each position; hence the valency may vary according to the reactions in which the molecule takes part. Again, it is clear that the total force exercised will not necessarily bear a simple relation to the number of positions in which the molecule may be capable of exercising this force; hence the general affinity (or chemical "value") of a molecule may be small, while its valency is large, or *vice versâ.*

16. Altogether, then, I think we have in valency a most useful means of classification, and that we are fully entitled to use the term "equivalent" in the acceptation generally assigned to it by chemists. This, however, does not prevent us from admiring Dr. Mill's proposal to determine the power of doing work, in terms of a fixed unit, of classes of chemical substances. Undoubtedly such investigations would be highly interesting, and would lead to most important results; but why we need do away with the advantages gained in order to gain further advantages I, for one, am at a loss to determine. Dr. Mill's has himself made some very careful and elegant experiments, by which he has determined the "dynamic equivalent" of various nitrates in terms of a fixed unit. It would be well that these researches should be extended.

But when we are in possession of a large amount of such information as this surely it will not be necessary to devise an entirely new system of notation, but only to modify the existing system so as to include the new knowledge. Our present notation is founded on facts; it does not necessarily involve any theory, only a generalization, as Dr. Wright has well pointed out; hence it is not to be thrown aside because at some future time it may not adequately express all our knowledge. Let us wait till that knowledge is gained, and then try to so modify our notation as to symbolize the knowledge.

But if we should not find it possible to do this, and it becomes necessary to have a new system of notation, it will be still a system which has been developed from, not a system which has overthrown, the old.

17. I have so far endeavoured to put forward reasons for believing that our existing system of notation symbolizes, to a certain extent, both the substances which take part in, and the final products of a chemical action, and also some of the relations existing between these substances and the changes of energy which accompany the action. In so far as the latter changes are concerned it must, however, be confessed that our ignorance is great, and that when more knowledge is gained it will be necessary for us to modify our notation so as to express this knowledge symbolically.

I have sought to show that our equations represent the initial and final distributions of matter during a reaction symbolized, that they imply changes of energy, that in the case of dissected or structural formulæ we can trace a close connexion between such changes of energy and the formulæ, and that in valency we have at any rate the rudiments of a method by which the power of doing work of different substances may be compared.

18. On looking at such an equation as

$$Zn + H_2SO_4 = ZnSO_4 + H_2,$$

one might imagine that the weight of zinc sulphate expressed by the symbols $ZnSO_4$ would be at once produced on the addition of that quantity of sulphuric acid represented by H_2SO_4 to Zn parts by weight of zinc, and that, were a somewhat larger quantity of acid to be added to the same quantity of zinc, the action would not be modified. The equation appears to convey this meaning; but the meaning is erroneous. Chemical action involves greater or less quantities of time; and it is certainly influenced by the total mass of the acting substances, as also by the mass of the resultants, and by the relation which these bear at any moment to the generating substances.

19. Hitherto we have not been able to express such facts as these symbolically. And at present it would be useless to attempt such a task; we are but on the threshold of such inquiries; we have been so long (perhaps too long) occupied with gathering facts concerning the substances produced by chemical action that we have had little time to devote to a closer study of the action itself in its various phases. Such study will form a part of the chemistry that is to be and will without doubt be rich in results of the highest importance. But granted that we cannot now express the process of a chemical change in our notation, this does not at all prove that the notation is founded on a false system. We know that one of the best-grounded generalizations of science is expressed by saying, that those substances which we call chemical elements, when they react together so as to form compounds (that is, bodies in which the characteristic properties of the reacting elements are merged), do so in simple multiples of a certain fixed number,—that the composition of the compounds may therefore be expressed by writing the names (or symbols) of the elements, with numbers attached to each expressive of the multiple of the certain fixed number which had before been assigned to each element.*

(To be continued.)

* See Wright, *Phil. Mag.* [IV], vol. xliii., p. 505.

The Pharmaceutical Journal.

SATURDAY, JULY 29, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACEUTICAL EDUCATION IN BELGIUM.

A CORRESPONDENT in Ghent has favoured us with the following account of the state of pharmaceutical teaching in Belgium, and the modifications which have been made by the recent legislation on the subject.

Pharmacy in that country forms part of the scheme of University instruction; the students entered for the study of this subject form part of the faculty of medicine. They undergo examination before a combined board, of which half of the professors belong to a State University, whilst the other half are connected with an independent school. The student entered for an examination, therefore, knew beforehand who would have been his examiners. By this system there was a considerable control which could not but be favourable, as well to the teaching body as for the pupils; on the one hand, the professors found themselves stimulated, and were obliged to keep themselves *au courant* with science because they had before them, each year, other professors engaged in the same teaching, and belonging to another university; on the other hand, there was a greater guarantee for the public, because the certificated pupils had been examined by two kinds of professors, belonging to rival schools.

Education being free in Belgium, and the independent universities being equal in number to the state universities, it was necessary in reference to academical degrees to accord to the professors of the independent universities the same rights that were enjoyed by the professors of the state universities. The granting of this privilege had another advantage, that as a natural consequence the Government thus exercised an indirect power over the independent schools, while the professors of the State universities exercised, through the examinations, a control over the teaching in those institutions.

The new law of 1876 has put an end to this state of affairs, and, from the beginning of 1877, when it is to come into operation, every university, whether it be independent or whether it appertains to the State, will have the power of conferring diplomas. The State will retain the chief power in the government of its own universities, but will no longer exercise any control over the teaching in the independent universities. Time will show the value of this system of equalizing degrees in Belgium.

If, on the one hand, the new law of 1876 gives ground of fear that there may be an abuse of power, on the other hand, the teaching of pharmacy will be raised to a higher standard, and the examinations will become more difficult. Thus the curriculum for qualification in pharmacy is divided into two parts; the first, comprising the study of botany, physics, chemistry, mineralogy, and the elementary principles of zoology, will form the subject matter of a preliminary examination, the passing of which will confer upon those who shall have satisfied the examiners, a right to the title of *Candidat en Pharmacie.* With the exception of adding elementary zoology, the subject matter of this examination has not undergone any other modification. But it is not the same in respect to the second examination, which confers on him who is already a *Candidat en Pharmacie*, a right to the title of *Pharmacien.* Before the new law was passed the student had only to undergo an examination upon theoretical and practical pharmacy, as to his knowledge of the characters, properties, and preparations of drugs and medicines, as well as their adulterations and alterations together with the maximum doses of the more potent drugs and preparations, and to carry out satisfactorily two chemical operations, two pharmaceutical operations, and two toxicological researches.

The new law of 1876 has introduced a very great modification of this examination for obtaining the degree of *pharmacien*, and it will be divided into two parts: the first will comprise a theoretical examination on analytical and toxicological chemistry, on drugs and medicines as articles of merchandise, their alterations, adulterations and maximum doses, also on theoretical and practical pharmacy. The second part of the examination will be purely practical, and will consist of two chemical operations, two pharmaceutical operations, a complete analysis, a toxicological operation, an operation for discovering the adulteration of medicines, and a microscopical research.

The reform which pharmaceutical teaching is about to undergo is therefore considerable, and cannot but have the effect of raising the position of pharmacists in that country. No one will be able to establish himself in business as a pharmacien until he has given evidence by certificate, authenticated by a medical commission, that he has been practically engaged in the business for two years as an assistant in the open shop of a certificated pharmacien. The new law, consequently, requires from the candidate more profound knowledge at the commencement of his curriculum, and it also places him under the further necessity of continuing his studies afterwards in a still more thorough manner. The opinion held in Belgium with regard to the probable influence of the reform now about to be introduced is that the number of workers in the pharmaceutical domain will increase, and it is expected that it will induce many who are engaged in pharmaceutical pursuits to occupy themselves with researches of a similar character to those which are conducted with so much advantage by pharmacists in other countries, among which we may particularize Germany as being the most active in this respect.

We have on various occasions placed before our readers some accounts of the state of pharmacy in foreign countries and of the educational systems adopted there for the purpose of showing the relative advantages, or disadvantages, which obtain here and abroad. Some modifications of the educational system hitherto followed in Belgium have recently been introduced by the Government of that country, and as these are in certain respects analogous to those which have within the last few months been introduced in the examinations of the Pharmaceutical Society, it will be useful to compare what has been done in this direction in the two countries.

THE EFFECT OF AGE ON RHAMNUS FRANGULA BARK.

It is due to Mr. Baildon that the merit of the bark of the black alder tree (*Rhamnus Frangula*), as a valuable vegetable aperient, has during the past few years attracted some attention in this country. Considerable personal testimony has been given in its favour, but on the other hand the drug has not always produced the expected results. This may find an explanation in the fact recently pointed out by Dr. Lamm, of Stockholm, that there is a considerable difference between the action of old and fresh bark, and that the complaints as to the non-activity of the bark may have originated from useing it in a too recent state.

The bark was made officinal in the fourth edition of the Swedish Pharmacopœia (1790), but it was afterwards omitted until the seventh edition (1869), the reason for its omission from the intervening editions being probably the diminished confidence in its activity. The recommendation of German physicians about 1850, again gave rise to a demand for the bark, and good results were obtained with the old stocks then held by the apothecaries. The restored popularity, however, led to the introduction of a quantity of fresh bark, and it was soon noticed that to obtain the same effect the strength of the decoction and the dose had to be increased and that the new black alder bark was not half so strong as that formerly used. The result has been that the drug has again become almost obsolete. The last edition of the Norwegian Pharmacopœia recognizes this fact by ordering that the bark shall have been kept at least one year before using it. According to Fristedt, the fresh bark produces colic and vomiting, symptoms that have been observed to follow the administration of the bark without their having been previously attributed to its freshness.

THE SALE OF MEDICINES BY GROCERS IN FRANCE.

Some months since a grocer at Rouen was condemned by the correctional tribunal for selling a pectoral paste, which was a preparation of liquorice, the sale of medicines in France being, as is known, strictly limited to pharmaciens. Upon appeal, however, the conviction has been reversed, one of the grounds being that the law had not for its object the creation of a monopoly for the pharmaciens, but solely the protection of the public health; another was that liquorice, although included in the Codex, is an inert substance, or only an emollient. The pharmaciens of Rouen are much chagrined at this unexpected result; the grocers are proportionally elated, and have been encouraged to present a petition to the Chamber of Deputies praying for more liberal legislation on the subject, and that the monopoly of pharmacists may be restricted to products directly prepared by them and constituting real medicaments.

BRAZILIAN TAPIOCA.

The mandioca (*Manihot utilissima*), flourishes in intertropical and temperate regions, but most luxuriantly where the soil is loose and dry, especially if it be sandy. No less than thirty varieties are grown in Brazil, and of all the crops it is the one that gives the best return and the least trouble. The flour prepared from its root forms a staple food of the inhabitants. Mr. Acting-Consul Austin, of Rio, reports that he has been informed by a Campos planter that a square of 220 metres of land will grow 40,000 mandioca plants, which even in inferior soil will produce regularly 80,000 lbs. of farina. At the lowest valuation, 60 reis per lb., this would give a revenue of £520, a result superior to that derived from sugar or cotton. The preparation of tapioca from it is easy and inexpensive, and very profitable.

A PANIC AMONG SPONGE DIVERS.

Mr. Vice-Consul Jago, writing from Beyrout, says that the last crop of Turkey sponge was very deficient, and prices of ordinary and common sponges have greatly risen in consequence. The deficiency is attributed to a panic among the divers caused by the appearance in the neighbourhood of Batroun, Mount Lebanon, the chief sponge-fishing locality, of a sea monster, alleged to have been equal in size to a small boat. Its actual depredations among the divers appear at the present time to have been limited to one man, whom he is said to have swallowed whole.

ALEPPO SCAMMONY, ETC.

We learn from the consular returns just issued that scammony, opium, and other drugs, which have in past years held their places more or less advantageously in the Aleppo market, were all absent in the export trade of 1875. Opium, saffron, and cumin, which were formerly grown in the province, were not cultivated last year. Castor oil seed, too, was not sown to any great extent, and the crop was insignificant.

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

A meeting for social and scientific purposes in continuance of the regular pharmaceutical meetings of this Society was held June 20th, 1876, Mr. James T. Shinn, in the chair.

A specimen was exhibited by Mr. J. U. Lloyd of a yellow neutral crystallized principle obtained from the root of *Eupatorium purpureum*. It is quite soluble in hot, slightly so in cold alcohol, and insoluble in water; it does not unite with dilute acids, is decomposed by strong sulphuric acid, is tasteless and as far as known has no medicinal value.

Professor Maisch read a note on—

Concentrated Solution of Salicylic Acid.

BY CHARLES L. MITCHELL.

A strong solution of salicylic acid, for convenience in both dispensing and prescribing, has long been a desideratum, and until recently no practical way of overcoming the difficulty has been known.

Salicylic acid itself is very sparingly soluble in cold water, and though readily dissolving by the aid of heat, nearly all separates on cooling. Its alcoholic solution is not adaptable to the purpose—for when diluted with water, the acid immediately separates.

Various methods have been recommended for rendering the acid more soluble, namely: the use of various salts, such as sodium orthophosphate, calcium chloride, ammonium acetate, etc.; and also by dissolving it in glycerin. None of these modes of procedure give a solution which contains more than ½ per cent. salicylic acid. The desideratum seems to be a concentrated solution which will bear dilution with water to any extent. Recently a writer in the *Druggists' Circular*, has recommended the use of sodium biborate and glycerin in the proportions of 1 part each of salicylic acid and of the biborate to 16 parts glycerin. This gives a solution containing about 6 per cent. salicylic acid, and one that is freely miscible with water in all proportions.

While recently experimenting with this formula, it occurred to the writer that probably a still stronger and more concentrated solution might be obtained by some slight modifications. After several experiments the following formula was adopted:—

Acid. Salicylic. pur.	ʒij
Sodii Biborat.	ʒj
Glycerinæ	q. s.

Mix the acid and borax with f℥iv glycerin, heat gently until dissolved, then add q. s. glycerin to make the measure f℥i This solution contains 25 per cent. salicylic acid, and can be diluted with either glycerin, alcohol or water to any degree desired.

The advantages of a concentrated solution of this description can scarcely be overestimated, as it affords a very convenient mode of both prescribing and dispensing salicylic acid.

Mr. J. T. Shinn observed when a solution was made with equal parts of borax and salicylic acid, the taste was very bitter, when, however, two parts of borax were used this was not the case.

Professor Maisch believed if the estimate of Professor Kolbe and others as to the virtues of salicylic acid are to be of value to physicians, they must use it in the free state as this is the only way in which it is effective; if salts are employed to effect a more ready solution, some chemical change is most probably the result.

Mr. E. M. Boring had, in common with many others, had trouble with prescriptions for this acid from physicians labouring under the error in regard to its solubility and the probable changes produced by the use of chemical solvents. Quite recently water of ammonia had been used to effect the solution of a large quantity of the acid in water. This was only another instance in which the elegant pharmacist gave the conscientious dispenser a great amount of trouble.

Mr. Boring exhibited honey which had been obtained by himself from the comb, and exposed to direct sunlight; it became candied in a short time, whereas a portion of the same lot exposed to diffused light had undergone no change. He said also that he had examined a sample of yellow wax which had the concave surface said to be characteristic of adulteration with paraffin, yet upon testing with sulphuric acid he failed to find any.

Professor Maisch exhibited a small branch of a plant from Oregon, probably a *Tetranthera*, natural order *Lauraceæ*, with a pellucid punctate leaf, having an aromatic ordour, and at first pleasant, but afterwards very pungent to the taste, which seems to indicate that it may possess medicinal properties.

Dr. Pile said that he had made dilute phosphoric acid by the second process of Professor Markoe, and succeeded very well, the summer temperature being favourable, and little attention being required. Other members had found it necessary to operate at a somewhat higher temperature than had been indicated by Professor Markoe. Dr. Pile also stated that he found written upon a prescription—"examined and found correct," and supposed this an additional method of indicating the correctness of an unusual dose.

SOCIÉTÉ DE PHARMACIE DE BORDEAUX.

The subject of preparations having for their base protochloride of iron having been selected by the Bordeaux Pharmaceutical Society as one it was desirable that the members should investigate, a note of which the following is an abstract was read at a recent meeting:—

Preparation of Protochloride of Iron.

BY M. DAMBIER.

The preparation of the protochloride of iron by direct combination, by a method analogous to that followed in the preparation of protoidide of iron for the corresponding syrup, is not convenient, as, instead of two solids, one gaseous and one solid body have to be dealt with. The best method of obviating this difficulty is the employment of hydrochloric acid instead of chlorine, and this is the plan usually described in chemical works, but without any information being given as to the exact quantities of iron and hydrochloric acid respectively required for the preparation. Having had occasion frequently to prepare syrup of protochloride of iron, the author was induced to pay some attention to this portion of the subject.

The formula $FeCl_2$ requiring 44·13 parts by weight of iron to 55·87 parts by weight of chlorine, it was necessary to calculate what quantity of hydrochloric acid of a certain density would be equal to this quantity of chlorine. Water saturated with gaseous hydrochloric acid at the ordinary temperature dissolves 38·38 per cent. of its weight; its density is then 1·19. In employing such an acid, therefore, 149·68 parts by weight would be required for 44·13 parts of iron.

In preparing the solution of protochloride, the author places in a tared vessel the proportion of hydrochloric acid above indicated with about double its weight of distilled water, and to this is added reduced iron rather in excess of the theoretical quantity—for a ten per cent. solution 14·968 of acid and about 5·000 of iron—the reduced iron of commerce never being in a state of absolute purity. The vessel is placed over the fire and the iron is added in small quantities at a time until the effervescence produced by the evolution of hydrogen ceases. The vessel is then removed from the fire, weighed, and sufficient distilled water added to bring the solution to the required strength.

The following table shows the quantities by weight of hydrochloric acid of different densities required to yield with 4·41 parts of iron, 10 parts of protochloride :—

Sp. gr. of Acid	Containing per cent. H Cl.	Quantity required	Containing real H Cl.
1·19	38·38	14·96	5·74
1·18	36·36	15·80	5·74
1·17	34·34	16·72	5·74
1·16	32·32	17·77	5·74
1·15	30·30	18·96	5·74
1·14	28·28	20·31	5·74
1·13	26·26	21·87	5·74
1·12	24·24	23·71	5·74
1·11	22·22	25·85	5·74
1·10	20·20	28·44	5·74
1·09	18·18	31·60	5·74

The author points out that the proportion of iron in the protochloride is nearly two and a half times greater than in the protoiodide, a point worthy of the notice of prescribers, the syrup of protochloride of iron having a much more decided styptic taste than the corresponding syrup of protoiodide.

The following table shows the proportion of iron to the other constituents in the ferruginous preparations usually employed :

	Iron	Other Constituents
Protocarbonate of Iron	48·28	51·72
Protoiodide of Iron	44·13	55·87
Protoxalate of Iron	38·88	61·12
Hypophosphite of Iron	37·34	62·66
Phosphate of Iron	36·84	63·16
Pyrophosphate of Iron	30·02	69·98
Bromide of Iron	25·93	74·07
Citrate of Iron	22·85	77·15
Tartrate of Potash and Iron	20·96	79·04
Lactate of Iron	19·45	80·55
Iodide of Iron	18·08	81·92
Antimoniate of Iron	13·65	86·35

It will thus be apparent that next to the protocarbonate, the protochloride contains the largest proportion of iron ; but the author finds that it presents the advantage over the protocarbonate of being much more easily preserved, and consequently more convenient for dispensing purposes, and also that its prolonged use does not induce constipation. The solution may be preserved unaltered for a long time by placing with it in the bottle several pieces of iron wire.

ROYAL SOCIETY.

Repulsion resulting from Radiation—Influence of the Residual Gas.*

BY WILLIAM CROOKES, F.R.S.

I have recently been engaged in experiments which are likely to throw much light on some obscure points in the theory of the repulsion resulting from radiation. In these I have been materially assisted by Professor Stokes, both in original suggestions and in the mathematical formulæ necessary for the reduction of the results. Being prevented by other work from completing the experiments sufficiently to bring them before the Royal Society prior to the close of the session, I have thought that it might be of interest were I to publish a short abstract of the principal results I have obtained, reserving the details until they are ready to be brought forward in a more complete form.

In the early days of this research, when it was found that no movement took place until the vacuum was so good as to be almost beyond the powers of an ordinary air-pump to produce, and that as the vacuum got more and more nearly absolute so the force increased in power, it was justifiable to assume that the action would still take place when the minute trace of residual gas which theoretical reasoning proved to be present was removed. The first and most obvious explanation, therefore, was that the repulsive force was directly due to radiation. Further consideration, however, showed that the very best vacuum which I had succeeded in producing might contain enough matter to offer considerable resistance to motion. I have already pointed out that in some experiments where the rarefaction was pushed to a very high point the torsion beam appeared to be swinging in a viscous fluid (194), and this at once led me to think that the repulsion caused by radiation was indirectly due to a difference of thermometric heat between the black and white surfaces of the moving body (195), and that it might be due to a secondary action on the residual gas.

On April 5, 1876, I exhibited at the *Soirée* of the Royal Society an instrument which proved the presence of residual gas in a radiometer which had been exhausted to a very high point of sensitiveness. A small piece of pith was suspended to one end of a cocoon fibre, the other end being attached to a fragment of steel. An external magnet held the steel to the inner side of the glass globe, the pith then hanging down like a pendulum, about a millimetre from the rotating vanes of the radiometer. By placing a candle at different distances off, any desired velocity up to several hundreds per minute could be imparted to the fly of the radiometer. Scarcely any movement of the pendulum was produced when the rotation was very rapid; but on removing the candle and letting the rotation die out at one particular velocity the pendulum set up a considerable movement. Professor Stokes suggested (and, in fact, tried the experiment at the time) that the distance of the candle should be so adjusted that the permanent rate of rotation should be the critical one for synchronism corresponding to the rate at which one arm of the fly passed for each complete oscillation. In this way the pendulum was kept for some time swinging with regularity through a large arc.

This instrument proved that, at a rarefaction so high that the residual gas was a non-conductor of an induction current, there was enough matter present to produce motion, and therefore to offer resistance to motion. That this residual gas was something more than an accidental accompaniment of the phenomena was rendered probable by the observations of Dr. Schuster, as well as by my own experiments on the movement of the floating glass case of a radiometer when the arms are fixed by a magnet.*

My first endeavour was to get some experimental means of discriminating between the viscosity of the minute quantity of residual gas and the other retarding forces, such as the friction of the needle-point on the glass cup when working with a radiometer, or the torsion of the glass fibre when a torsion-apparatus was used. A glass bulb is blown on the end of a glass tube, to the upper part of which a glass stopper is accurately fitted by grinding. To the lower part of the stopper a fine glass fibre is cemented, and to the end of this is attached a thin oblong plate of pith, which hangs suspended in the centre of the globe : a mirror is attached to the pith bar, which enables its movement to be observed on a graduated scale. The stopper is well lubricated with the burnt india-rubber which I have already found so useful in similar cases (207). The instrument is held upright by clamps, and is connected to the pump by a long spiral tube. The stopper is fixed rigidly in respect to space, and an arrangement is made by which the bulb can be rotated through a small angle. The pith plate, with mirror, being suspended from the stopper, the rotation of the bulb can only cause a motion of the pith through the intervention of the enclosed air. Were there no viscosity of the air, the pith would not move ; but if there be viscosity, the pith will turn in the same direction as the bulb, though not to the same extent, and, after stopping the vessel, it will oscillate backwards and

* From the *Chemical News*, July 21, 1876.

* *Proceedings of the Royal Society*, March 30, 1876.

forwards in decreasing arcs, presently setting in its old position relatively to space.

It was suggested by Professor Stokes that it would be desirable to register not merely the amplitude of the first swing, but the readings of the first five swings or so. This would afford a good value of the logarithmic decrement (the decrement per swing of the logarithm of the amplitude of the arcs), which is the constant most desirable to know. The logarithmic decrement will involve the viscosity of the glass fibre, but glass is so nearly perfectly elastic, and the fibre so very thin, that this will be practically insensible.

According to Professor Clerk Maxwell the viscosity of a gas should be independent of its density; and the experiments with this apparatus have shown that this is practically correct, as the logarithmic decrement of the arc of the oscillation (a c nstant which may be taken as defining the viscosity of the gas) only slightly diminishes up to as high an exhaustion as I can conveniently attain —higher, indeed, than is necessary to produce repulsion by radiation.

I next endeavoured to measure, simultaneously with the logarithmic decrement of the arc of oscillation, the repulsive force produced by a candle at high degrees of exhaustion. The motion produced by the rotation of the bulb alone has the advantage of exhibiting palpably to the eye that there *is* a viscosity between the suspended body and the vessel; but once having ascertained that, and admitting that the logarithmic decrement of the arc of oscillation (when no candle is shining on the plate) is a measure of the viscosity, there is no further necessity to complicate the apparatus by having the ground and lubricated stopper. A movement of the whole vessel bodily through a small arc is equally effective for getting this logarithmic decrement; and the absence of the stopper enables me to have the whole apparatus sealed up in glass, and I can therefore experiment at higher rarefactions than would be possible when a lubricated stopper is present.

The apparatus, which is too complicated to describe without a drawing, has attached to it—*a*, a Sprengel pump; *b*, an arrangement for producing a chemical vacuum; *c*, a lamp with scale, on which to observe the luminous index reflected from the mirror; *d*, a standard candle at a fixed distance; and *e*, a small vacuum-tube, with the internal ends of the platinum wires close together. I can therefore take observations of—

1. The logarithmic decrement of the arc of oscillation when under no influence of radiation.

2. The logarithmic decrement of the arc of oscillation when a candle shines on one end of the blackened bar.

3. The appearance of the induction-spark between the platinum wires.

1 measures the viscosity; 2 enables me to calculate the force of radiation of the candle; and 3 enables me to form an idea of the progress of the vacuum, according as the interior of the tube becomes uniformly luminous, striated, luminous at the poles only, or black and non-conducting.

The apparatus is also arranged so that I can try similar experiments with any vapour or gas.

The following are some of the most important results which this apparatus has as yet yielded:—

Up to an exhaustion at which the gauge and barometer are sensibly level there is not much variation in the viscosity of the internal gas (dry atmospheric air). Upon now continuing to exhaust, the force of radiation commences to be apparent, the viscosity remaining about the same. The viscosity next commences to diminish, the force of radiation increasing. After long-continued exhaustion the force of radiation approaches a maximum, but the viscosity measured by the logarithmic decrement begins to fall off, the decrease being rather sudden after it has once commenced.

Lastly, some time after the logarithmic decrement has commenced to fa lloff, and when it is about one-fourth of what it was at the commencement, the force of radiation diminishes. At the highest exhaustion I have yet been able to work at, the logarithmic decrement is about one-twentieth of its original amount, and the force of repulsion has sunk to a little less than one-half of the maximum. The attenuation has now become so excessive that we are no longer at liberty to treat the number of gaseous molecules present in the apparatus as practically infinite; and, according to Professor Clerk Maxwell's theory, the mean length of path of the molecules between their collisions is no longer very small compared with the dimensions of the apparatus.

The degree of exhaustion at which an induction-current will not pass is far below the extreme exhaustions at which the logarithmic decrement falls rapidly.

The force of radiation does not act suddenly, but takes an appreciable time to attain its maximum; thus proving, as Professor Stokes has pointed out, that the force is not due to radiation *directly*, but *indirectly*.

In a radiometer exhausted to a very high degree of sensitiveness, the viscosity of the residual gas is almost as great as if it were at the atmospheric pressure.

With other gases than air the phenomena are different in degree, although similar in kind. Aqueous vapour, for instance, retarding the force of repulsion to a great extent, and carbonic acid acting in a similar though less degree.

The evidence afforded by the experiments of which this is a brief abstract is to my mind so strong as almost to amount to conviction that the repulsion resulting from radiation is due to an action of thermometric heat between the surface of the moving body and the case of the instrument, through the intervention of the residual gas. This explanation of its action is in accordance with recent speculations as to the ultimate constitution of matter, and the dynamical theory of gases.

Parliamentary and Law Proceedings.

Alleged Poisoning by Antimony.

At the recent Waterford assizes, Bridget Reardon was indicted for having, on the 28th of November last, administered poison with intent to kill her husband. In a second count she was indicted for having administered a certain poison known as lunar caustic; and on a third count with having administered some poison unknown, with intent to kill and murder him. It appeared that the prisoner on one occasion gave her husband a cup of tea, and he gave his father another cup. In about three minutes afterwards both were attacked with violent vomiting and pains in the stomach. A doctor was sent for, and having administered appropriate treatment, carefully put into a jar the husband's egesta, and subsequently sent it to Dr. O'Keeffe, Professor of Medical Jurisprudence, Queen's College, Cork, who analysed it, and who found traces of antimony in it. Seven days after the man took the tea he died; and a *post-mortem* examination having been made, his stomach, a portion of his liver and the larger and smaller intestines were also forwarded to Dr. O'Keeffe, who, though he found no poison in them, still was of opinion that their appearance indicated that poison had passed through them. The jury, after a short deliberation, acquitted the prisoner.—*Medical Examiner*.

Prosecution by a Medical Association.

At the Wandsworth Police Court on Monday last, Mr. Sydney H. Witherington, a chemist, of 410, Wandsworth Road, was summoned by the East London Medical Defence Association, before Mr. Paget, for unlawfully pretending to be and using the titles of doctor of medicine and surgeon. It appeared that the defendant's name was outside his shop, and on a lamp in front the word "surgeon." In the window was placed a bill running as follows :—"Dr. Witherington may be seen by special arrangement." The defendant sold a box of pills to a constable bearing a label as follows :—"Antibilious pills. Dr. Witherington, surgeon, etc., Wandsworth Road, S.W." It also appeared that in March last, Dr. Carpenter, secretary of the association, called the defendant's attention to the titles outside his shop, and requested him to take them down. He said he did not put them up, and that he had not received any medical education.—Mr. Paget thought there had been an infraction of a very wholesome law, and fined the defendant £15 and £2 18*s.* 6*d.* costs, and, in default, ordered him to be imprisoned for twenty-one days.—*Standard.*

Compensation for Railway Accident to a Chemist and Druggist.

At the Manchester Summer Assizes, on Saturday the 22nd inst., the case of Eckersley *v.* the Manchester, Sheffield, and Lincolnshire Railway Company, came before Baron Bramwell and a special jury.

The plaintiff carried on business as a chemist and mill furnisher at Oldham. In this action he sought to recover damages from the Manchester, Sheffield, and Lincolnshire Railway Company for injuries he received in a collision on their line on the 27th of February, 1875.

On the day in question the plaintiff travelled by the 5·35 p.m. express train from Manchester to Oldham. On reaching Ardwick, the express came into collision with a goods engine, and the plaintiff received a severe shock to the brain, spinal cord, and nervous system. For a month he was obliged to keep his bed, and on getting up again he suffered a relapse, and all his nervous symptoms returned. Subsequently, by his doctor's advice he visited Whitchurch, in Monmouthshire, and also Blackpool. His recovery had up to the present time been very slow, and in the opinion of his medical advisers it would probably be a year before he would be completely well. His business as a chemist had fallen off owing to his absence from the shop.

The jury returned a verdict for the plaintiff—Damages, £600.—*Times.*

"Worcestershire Sauce" as a Trade Mark.

On Wednesday, July 26, in the High Court of Justice, Chancery Division, before the Master of the Rolls, a bill came on for hearing, filed by Messrs. Lea and Perrins, of Worcester, to restrain the defendant from using the name "Worcestershire" in connection with a sauce made and sold by himself under the style or firm of Richard Millar and Co., such name being claimed by the plaintiffs as exclusively belonging to the sauce manufactured by themselves from a recipe imparted to their predecessors in business by a nobleman of the county about the year 1835.

Mr. Fry, Q.C., Mr. Benjamin, Q.C., Mr. Davey, Q.C., and Mr. William Barber appeared for the plaintiffs; Mr. Chitty, Q.C., and Mr. C. P. Ilbert for the defendant.

The defence was that the name had become common property, having been openly and publicly used by the defendant and other persons in the trade for many years; and, on this being proved to be the fact, the plaintiffs' counsel declined to contest that part of the case any further, and addressed themselves to the subsidiary question, whether the defendant had infringed the plaintiffs' rights by imitating their wrappers and labels. In the result,

The Master of the Rolls said that he was of opinion that the plaintiffs' case wholly failed, and that Messrs. Lea and Perrins would have been better advised if they had not instituted the suit. Many years ago they might undoubtedly have succeeded in preventing other people from infringing their rights as the first makers of Worcestershire sauce, but they had allowed the maxim "*Vigilantibus non dormientibus subvenit lex*" to become applicable to their case. It appeared to his lordship to be established that Messrs. Lea and Perrins' predecessors in business either invented or obtained the recipe for an article to which they gave the name of Worcestershire sauce, and that they were the first persons to sell an article by that name. This was about the year 1836, and within a very few, probably not more than two, years afterwards other people, of whom one Batty seemed to be the first, began to sell an article under the same name. Indeed, the name, within a very few years after it was first used by Messrs. Lea and Perrins, appeared to have become a common name in the trade; and, as their own counsel had in the course of the argument abandoned their claim of an exclusive right to the word, he need say no more on that portion of the case. It remained for him to consider the question of infringement with regard to the label pasted on Messrs. Lea and Perrins' bottles prior to November, 1874. That label was printed in black, on a red ground, and contained the words, "Sole manufacturers, Lea and Perrins, Worcester," in bold black type. The defendant's label on his second quality of Worcestershire sauce differed only from the plaintiffs' label in the fact of the words, "Prepared and sold by Proprietors, London," being substituted for the words "Sole manufacturers, Lea and Perrins, Worcester." No doubt, this label was at some time or other copied from the plaintiffs', but it had been used by other persons as well as the defendant for over thirty years; and his lordship did not believe that any ordinary person could mistake the one for the other. At all events, it had not been shown or suggested that any person had been so misled. It had been argued that a person who could not read might be misled by the general resemblance between the two labels, but this could scarcely be the case, seeing that the plaintiff's sauce was sold at a shilling, and the defendant's at 6*d.* or 4½*d.* per bottle, according to the conscience of the retail dealer. The "proprietors'" label, as it had been termed in argument, appeared to have been in general use in the trade during very many years, and, in his Lordship's opinion, not a shadow of blame attached to the defendant for using a label which nearly everybody in the trade was in the habit of using, and which was kept in stock by at least three printers. Even if the label were an infringement, the Court was not in the habit of intervening unless damage was shown to have been sustained; and his Lordship did not believe that in this case the plaintiffs had sustained any real injury, seeing that the defendant's article was sold in an inferior class of shops and to a lower class of customers than those who were accustomed to buy Messrs. Lea and Perrins' more expensive compound. His Lordship was further of opinion that the plaintiffs had not shown due diligence in prosecuting infringers, and were out of Court on that ground. Besides, there was this conclusive answer to the suit, that the plaintiffs had in November, 1874, adopted a new label bearing their own signature as a distinctive mark, and had in the most public manner abandoned the old label, which they now sought to protect. His Lordship then dismissed the bill with costs.—*Times.*

Review.

Science Papers, chiefly Pharmacological and Botanical. By Daniel Hanbury, F.R.S., etc. Edited by Joseph Ince, F.L.S., F.C.S. 8vo, pp. 544, xii. London: Macmillan and Co. 1876.

Sixteen months have passed away since, on the authority of a brief telegram, we had to perform the painful duty of publishing that Daniel Hanbury was no more. Then it was generally felt that he had left no immediate successor to his preeminent position as a pharmacographist, *facile princeps*, at least in this country; nor has this feeling been diminished by anything that has happened up to the present time. No doubt this reputation was based largely upon the style of Hanbury's writings; so exact, terse, and thorough; as far removed on the one hand from the garrulous fulness of detail that sometimes passes muster for thoroughness of investigation as from superficiality on the other. Although, therefore, the most important results of his investigations were doubtless incorporated with his *magnum opus*, 'Pharmacographia,' we are glad, for the sake of students who desire to follow in his footsteps, that the masterly papers in which he first recorded many of his researches have not been allowed to lie buried in scattered graves of periodical literature. To such students, Hanbury, in these collected 'Science Papers,' "being dead, yet speaketh."

The volume before us contains no less than eighty-one papers from Daniel Hanbury's pen, sixty-seven of which appeared for the first time in the *Pharmaceutical Journal*, and the greater part of the remainder in the *Journal and Transactions* of the Linnean Society. They are not arranged chronologically, but more conveniently grouped, so that papers on the same subject, for instance those on storax, follow each other consecutively. A chronological list of the papers is however appended. It would be difficult to apportion to these papers degrees of merit, though of course the subjects are of varying importance. Notwithstanding the editor's opinion, however, we are inclined to think Mr. Hanbury's judgment was correct in giving the preeminence to those on Manna and Pareira Brava, which will probably leave their mark on the next British Pharmacopœia. But the spirit is alike in all, and is so well illustrated in the opening passage of the paper on Otto of Roses, that we quote it:—

"The importance of authentic specimens is well understood by naturalists. The botanist, who has had the opportunity of verifying the Linnean name of a plant by comparing it with Linnæus's own specimen, is sensible that no more satisfactory proof is wanting. The entomologist who can appeal to the specimens of Fabricius, or the zoologist who can point to those named by Cuvier as identical with his own, feels that he can rightfully adopt the names given by those authors. Nor is the student of Materia Medica much less in need of authentic or type specimens as standards of comparison. Yet how difficult it would be to point to a specimen of Sarsaparilla as indubitably the root of one particular species of *Smilax*, or to find in our museums a specimen of myrrh or olibanum, or gamboge, with indisputable data as to its botanical origin and place of production."

Another point, respecting which we venture to question the criticism of the author by the editor, is that relating to *Rheum officinale*. Mr. Hanbury looked upon this plant as "a true source" of rhubarb, but in the 'Pharmacographia' it is cautiously stated, "Whether the rhubarb of commerce is derived exclusively from this plant is not known." Mr. Ince, however, thinks that the Russian explorer, Prejevalsky, has ascertained beyond doubt that the true rhubarb of commerce is *Rheum palmatum*, and NOT *Rheum officinale*, and in a very prominently placed note states that "the passage, therefore, relating to the identification of the plant cannot stand good." Nevertheless, it is only recently that Professor Flückiger, also in possession of information respecting Prsevalsky's discovery, wrote, "In *Rheum officinale* we possess for the first time a plant, the root-stock of which agrees with the true rhubarb;" also, that "we require more exact information respecting *R. palmatum*, var. *Tanguticum*."

The papers are illustrated by the original lithographic plates and wood engravings, and the beautiful appearance that the skill of Messrs. Clay has given to the latter has made us regret that so much of their beauty had to be sacrificed to the necessities of journalism. A beautifully engraved portrait by Jeens fronts the volume, but it appears to have been taken from a left-handed photograph.

Mr. Hanbury did not write much upon strictly trade matters; but one passage at the close of his presidential address to the British Pharmaceutical Conference at Exeter is very pertinent to the present agitation respecting the sale of milk of sulphur:—

"Notwithstanding that attention has been repeatedly called to the desirableness of supplying this drug in a pure form, it appears that the calcareous *Milk of Sulphur*, consisting of about 34 per cent. of sulphur with 66 per cent. of sulphate of lime, is still very generally sold. In justification it is said that the public prefer the impure article as being whiter and more easily miscible with water, that it is the true *lac sulphuris* of the Pharmacopœia, *sulphur præcipitatum* being a distinct preparation;* to which I may add another consideration (too far fetched, let us hope, to be real), that the first is but half the price of the second. It is hard to combat popular prejudice, and sometimes impossible for a druggist to convince his customer that one article is less adapted to his requirements than another. I have heard a person require the rankest and most offensive cod-liver oil in preference to what was sweet and new; and have even known an ointment that was old and rancid habitually preferred to that which was freshly made. Yet in proportion to the amount of confidence reposed in the knowledge, skill and fidelity of the druggist, so will the public accept his judgment in matters pertaining to his own art; and even a druggist's dictum that pure sulphur is better than sulphur and plaster of Paris will come to be admitted as reasonable."

It is not our intention here to enter upon the biography of Mr. Hanbury; after all, little can be added to what was said within a few days of his death. The present book contains two memoirs, one by Mr. Ince at the commencement, and the other written by Professor Flückiger, and translated from the German by Miss Katherine A. Hanbury, at the end. We make no secret of our preference for the latter. Mr. Ince quotes from a note where Mr. Hanbury says, "It is as hard as iron for me to compose a decent piece of English—in fact, quite impossible, unless it is written out two or three times." What he who judged himself so unsparingly would have said respecting some of his editor's syntax we can only conjecture. Such sentences as—"and that the crowning honour was bestowed also in 1867, when he was elected a Fellow of the Royal Society, and placed on its Council in 1873" (p. 17); "The point at issue in the PAREIRA PAPER was that its botanical source was not *Cissampelos Pareira*" (p. 11); and others of which these are typical are not what we expect from so skilful and practised a writer as Mr. Ince. Neither were we prepared to read, after the statement (p. 9), that Mr. Hanbury undertook Spanish for the sake of the Peruvian balsam sketches, that he learned Spanish for the sake of reading the epistles of Senor Joaquim Correa de Méllo, of Campinas, Brazil (p. 19).

One statement we would venture to supplement, the imperfectness of which probably was due to the form of the entry in the Society's Calendar. It is true that Mr. Hanbury first became a Member of the Pharmaceutical Society in 1857, but he was elected an Associate as early as 1842.

In another article we intend to refer more particularly to some of the results of Hanbury's researches, as disclosed in these 'Science Papers.'

* It was true that the *sulphur præcipitatum* of the Pharmacopœia of 1746 was ordered to be made with sulphur, lime and sulphuric acid; and the *lac sulphuris* of that of 1721, with sulphur, lime *or salt of tartar*, and sulphuric acid. But it is questionable if the chemists of that period were aware of the essential difference of the products obtained, according to whether a lime or a potash-salt were decomposed with sulphuric acid, for Pemberton, in his 'Dispensatory,' 1746, calls the preparations "*similar*," but says that the one "*will not look so white*" as the other.—[D. H.]

Notes and Queries.

[518.] COCKROACHES.—Can any one give me an idea of the best thing to keep cockroaches out of a bedroom which is infested with them?—CHAS. M. FOOTTIT.

[519.] LIQ. AMMON. FORTISS. ODORIF.—BETA asks for a formula for an odorif. liq. ammon. fortiss. for pungent salts.

[520.] JAPANNING.—Will any gentleman be kind enough to publish a receipt how to polish japanned boxes?—COULTHARD.

[521.] GLYCERINÆ PHOSPHAS.—Could you kindly oblige me with the formula for preparing glycerinæ phosphas? I cannot find it in any work in hand.—EDWIN B. VIZER.

[522.] GUM.—Has any one noticed a mixture of what I take to be some foreign gum, with the gum arabic now in the market? Portions of several lots that have come under my notice lately, dissolve with difficulty and then in a most unsatisfactory manner, appearing more like white of egg, and only mixing when well beaten up.—SALED.

Obituary.

Notice has been received of the death of the following:—

On the 1st of July, 1876, Mr. John Bailey, Chemist, and Druggist, Tynemouth. Aged seventy-two years.

On the 13th of July, 1876, Mr. James Fowler, Chemist and Druggist, Warwick. Aged twenty-eight years.

On the 17th of July, 1876, Mr. William Henry Holt, Pharmaceutical Chemist, Altrincham. Aged thirty-five years. Mr. Holt had been a member of the Pharmaceutical Society since 1865.

On the 18th of July, Mr. James Charles Cruse, Chemist and Druggist, Bristol. Aged thirty-three years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

MUSEUM OF PHARMACEUTICAL APPARATUS.

Sir,—Mr. Schacht's scheme for the establishment of a Museum of Pharmaceutical Apparatus at Bloomsbury Square has been discussed and temporarily (I trust not permanently) abandoned. I do not therefore desire to open up a fresh discussion on the subject, but the present seems a suitable time for pointing out the fallacious nature of one of the most prominent arguments brought to bear against it.

The statements that the Society could not afford the expense or find sufficient room for such a collection were feasible enough in their way; but there were those who asked, If accomplished, what useful purpose would be served? and they seemed, with considerable satisfaction, to find a negative reply in the question itself.

But, sir, the Committee of the Science Loan Collection at South Kensington have deemed a similar but more extended scheme worthy the expenditure of some £25,000 and no end of trouble to accomplish even a temporary purpose. And the result is now sufficiently satisfactory that a memorial has been recently handed in to the Duke of Richmond and Gordon for the establishment of a permanent museum of pure and applied science. Do our pharmaceutical objectors see no moral here? May we not look forward to the time when their minds will have expanded sufficiently to grasp the utility of Mr. Schacht's scheme, and when the increased or better manipulated finances of the Society will enable them to carry it into effect? Meantime, would it not be better to return to the former custom of an annual exhibition at Bloomsbury Square, at the Conversazione, of matters interesting to pharmacists rather than the present useless promenade? I am told it cost considerably less, and the amount so saved would not be despised by the promoters of the Museum of Pharmaceutical Apparatus to form the nucleus of such a collection as I am persuaded will one day become a leading feature of the Society's establishment.

CHARLES SYMES.

Liverpool, July 22, 1876.

W. Roberts.—(a) *Vicia Cracca*; (b) *Equisetum arvense*; (c) *Polypodium vulgare*. It is impossible to name grasses without flowers, or to correctly name such fragments as d, e, and f.

H. S.—(1) *Rhus Catinus* (exotic); (2) *Centranthus ruber*; (3) *Cornus sanguinea*; (4) *Inula species* (exotic); (5) *Marrubium vulgare*; (6) *Clematis vitalba*; (7) *Ligustrum vulgare*; (8) An exotic plant, probably *Solidago Canadensis*. We must request correspondents not to send garden plants for identification.

M. P. S.—Try Pulv. Fol. Hyoscyami.

F. Bullock.—The formula for Ung. Boracis (Lister) is—

Boracic Acid in fine powder . . .	1 part.
White Wax	1 part.
Paraffin	2 parts.
Almond Oil	2 parts.

The ingredients, after being mixed by melting the wax and paraffin, are stirred in a warm mortar till the mass thickens, and then set aside to cool, after which the firm substance is reduced in a cold mortar in successive portions, to an uniform soft ointment.

"*Liverpool.*"—Colenso's 'Arithmetic,' published by Longmans, would probably answer your purpose.

"*Inquisitor.*"—*Aqua Lactucae.* Probably the *Eau Distillée de Laitue* of the Codex is meant. Lettuces, deprived of their lower leaves, 10 parts. Water, 10 parts. Distil over a moderate fire until the product amounts to 10 parts.

J. B. (who should have sent his name and address).—Your former communication has not been received. Dynamite is a mixture of nitro-glycerine and siliceous earth.

W. Strongitharm.—You are recommended to lay your views before the Council.

"*Umbel.*"—(1) *Œnanthe Lachenalii*; (2) Send a specimen in fruit; (3) *Agrostis vulgaris*; (4) *Carex pallescens*; (5) *Carex vulgaris*; (6) *Carex flava*; (7) *Carex ovalis*; (8) *Aira flexuosa.*

"*Flores,*"—(1) *Melilotus officinalis*; (2) *Erigeron acris*; (3) *Solidago Virgaurea*; (4) *Scutellaria galericulata*; (5) *Saponaria ocymoides*; (6) *Fœniculum vulgare*; (7) *Lathyrus sylvestris.*

W. M.—(1) Probably *Senecio crucifolius*, impossible to say without leaves; (2) *Scrophularia nodosa*; (3) *Hypochœris radicata*; (4) *Lychnis diurna*; (5) *Spiræa Ulmaria*; (6) *Stachys Betonica*; (7) *Geranium pratense*; (8) *Mercurialis perennis*; (9) *Galium verum.*

"*Syrupus, B.P.*"—*Malva moschata* and *Alisma Plantago.*

A. Robertson.—(1) Sheep dips containing a poison within the meaning of the Pharmacy Act, 1868, cannot be sold legally by any person who is not a registered chemist and druggist. (2) We cannot say. Communicate with the Registrar.

J. M. N.—(1) You will find several recipes for ginger beer powders in Beasley's 'Druggist's Receipt Book.' (2) No.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Colton, Mr. Fairlie, Prof. Dymock, Mr. Kinninmont, Student, E.A.F., E.B.J.

ON THE POWER OF ETHER TO EXTRACT QUININE IN THE PRESENCE OF AMMONIA CITRATE.

BY A. J. COWNLEY.

In last week's number of the Journal (No. 318) Mr. A. N. Palmer has been at some pains to explain his views on the capability of ether to extract quinine from solutions containing certain other substances and especially ammonic citrate. The conclusion arrived at by Mr. Palmer, viz., that ether does not extract the whole of the quinine in the presence of ammonic citrate, is one quite at variance with my own experience, and I am disposed to think that deficiencies so great as those particularized by Mr. Palmer, varying from 6·5 per cent. to one-half of the actual quantity of quinine, must be referred to some other cause than the impossibility of extracting quinine by ether even from solutions containing ammonic citrate.

It is beside the question at issue to consider whether the Pharmacopœia method of testing citrate of iron and quinine be good or bad as a means of determining the amount of quinine, and there is no doubt much to be said with Mr. Palmer on the discrepancies which are liable to occur by following that method; but parenthically it may be said that washing the alkaloid is only one of the sources of error; in addition to the possibility of quinine being dissolved by water, there is the further possibility that even a slight excess of ammonia may increase the quantity of quinine removed in solution, for, as is well known, the solubility of quinine in weak ammonia is so considerable that Kerner has proposed to estimate the other alkaloids in quinine sulphate by a method based on the relative solubility of quinine and other alkaloids in ammonia. But these facts are generally allowed, and it is with the statement that ether fails to extract quinine in presence of ammonic citrate that I wish particularly to deal.

When the liquid containing quinine has been shaken with ether and ammonia, there is always some ether retained in solution by the lower layer, and consequently some alkaloid is dissolved in it, so that unless this liquid be again shaken with a fresh quantity of ether there will be some loss, and incorrect results will be obtained. I am disposed to believe that this was really the cause of the discrepancies observed by Mr. Palmer, not only from my own experience of the use of ether, but also from the fact that in the case in point, the substratum was said to be very bitter besides having a strongly ethereal smell. If the plan I have indicated be followed there will be no bitter taste whatever in the aqueous liquid.

In repeating Mr. Palmer's experiments the following results were obtained from one and the same sample of Ferri et Quiniæ Citras. One gramme was taken in each case, and dissolved in 30 c.c. of water, the solution was then shaken in an ordinary separating funnel, with 10 c.c. of the solvent employed, and with ammonia in sufficient quantity to precipitate the whole of the alkaloid. The alkaline liquids in both cases were again shaken with the respective solvents. The total ethereal or chloroform liquid was then evoporated to dryness and the residue weighed.

	P. Cent.
(1) Residue from Ether . . .	12·9
(2) „ „ Chloroform .	13·35

As the citrate of iron and quinine operated upon had been kept for some time, the results are possibly abnormal as regards the amount of quinine. The sample when dried gave 8·97 per cent. of water, and this gives an expression to the results of—

	P. Cent.
(1) Residue from Ether . . .	14·17
(2) „ „ Chloroform .	14·66

In any case it appears that the difference between the results obtained with ether and with chloroform is very small.

These two experiments though not made with extreme care are sufficient to show the fallacy of the views put forward in the paper referred to, and they lead to the conclusion that even in the presence of ammonic citrate, ether will extract the whole of the quinine. As that was the only point intended to be elucidated, I have not dealt with the unadvisability of weighing the residue left by ether or chloroform and regarding that as pure quinine, but will reserve the consideration of this point for a future communication.

By the kindness of Dr. Paul these experiments were made in his laboratory.

106, *Fenchurch Street, E.C.*

NOTES ON INDIAN DRUGS.

BY W. DYMOCK.

(*Continued from page* 4.)

ACACIA CATECHU.—*Local name*, KHEIR.

Impure catechuic acid or keersal obtained from cavities in the wood, occurs in small irregular fragments like little bits of very pale catechu mixed with chips of reddish wood, the fragments often adhering closely to the wood. This drug is collected by men who split firewood and fetches a high price as it is only occasionally met with; it has a sweetish very feeble astringent taste, and under the miscroscope is seen to be composed of minute needle-shaped crystals. When placed in water the colouring matter of the particles of wood mixed with the drug communicate a red colour to it. Keersal is soluble in boiling water, but is thrown down in conglomerate masses of small needle-shaped crystals upon the water cooling; it is also soluble in rectified spirit and is deposited in the same form on the spirit evaporating. In native practice it is valued as a remedy in chest affections, and is thought to promote expectoration.

STRYCHNOS NUX VOMICA.—*Local name*, KAJRA.

The wood Goagurree or Kajra che lakor. Nux vomica wood is too well known to require description; it is commonly met with in the Bombay shops in sticks about 14 inches long, and from 1 to 1½ inches in diameter with the bark on. It is quite a domestic medicine among the Bunnias. When a tonic is required a small portion is brayed upon a stone and administered; its efficacy is supposed to be much increased by the addition of a piece of the kernel of the coco-de-mer (Lodoicea). There is no doubt that the preparations of nux vomica are particularly valuable in the atonic complaints so common in a hot climate.

FAGONIA MYSORENSIS.—*Local name*, DUMASO.

The whole plant is commonly kept in the shops, it is suffrutescent, much branched, with opposite, two stipuled leaves; the stipules are often thorny, leaflets linear cuspidate; the wood of the stem is white and very hard, covered by a ragged light brown bark, which becomes slimy and mucilaginous when moistened. Dumaso has no particular taste; it is used to prepare a cooling wash for the mouth.

CUSCUTA REFLEXA.—*Local name*, AKASWAIL.

A common parasite on bushes; it consists of a tangled mass of tough dark green stems, branched, marked longitudinally with delicate pale green lines; the largest are the size of a crow quill; the branches are provided with small round suckers like those of the common dodder. Sections of the stem show a strong fibro-vascular layer and loose central pith. The fruit is globular, of the size of a pea, and surmounted by the remains of the sepals; on removing the outer envelope of the fruit, which is leathery, an inner envelope is exposed which consists of two layers, the outer cartilaginous, the inner fleshy and lined with white hairs, each containing a delicate spiral filament; within this central cavity is a third delicate membranous envelope covered with hairs of a similar description and containing the seeds, it is not in contact with the second envelope except at the base and apex. Akaswail is used in native practice as an alterative in bilious affections and for piles.

CALOPHYLLUM INOPHYLLUM.—*Local name*, WOONDY.

The oil of the seed Woondy che tel; the resin Woondy cha gond. This tree grows in the neighbourhood of Bombay; the fruit is ovoid and green; it varies in size; on old trees it is often as large as a bantam's egg; the pulp surrounding the nut dries up when the seed is mature, and the previously smooth skin covering it becomes brown and much wrinkled; the endocarp is hard, woody, and white, as thick as the shell of a filbert; within it is an inner endocarp, soft and corky, of a red colour, thicker than the woody shell towards the apex of the fruit, but gradually becoming very thin towards the base; the inner surface of this layer is highly polished. The seed is of the same shape as the nut; it is very oily and has somewhat the taste of a rancid filbert; it consists of two cotyledons very closely united; under the microscope a stroma of small ovoid cells is seen through which numerous large vessels loaded with green oil run in a longitudinal direction. The green oil is valued as an application in rheumatism; it is also used for burning. The resin of *C. inophyllum* is translucent, of a greenish yellow colour, softening and becoming sticky when handled. It has an odour like parsley. I have not been able to ascertain that the resin is ever collected for sale in Bombay, or that any use is made of it by the country people.

IPOMÆA PES-CAPRÆ.—*Local name*, MURJA DEVI.

A perennial plant with a tough woody root as thick as the finger and many feet in length; it abounds in the sand on the sea shore; from the enlarged crown of the root grow a number of creeping stems, fleshy and purplish when young, but becoming woody as they mature; the shape of the leaf is indicated by the name of the plant; a section of the root shows in the central portion five wedge-shaped bundles of fibro-vascular tissue; external to these is a row of laticiferous vessels full of a viscid yellow latex, then again come a number of irregularly placed fibro-vascular bundles, and external to them another zone of laticiferous vessels. The cellular structure of the root contains starch and large conglomerate raphides. The whole plant is mucilaginous and is used externally in rheumatism in the form of decoction and internally in colic.

ALSTONIA SCHOLARIS.—*Local name*, SATWEEN.

The bark Satween che sal described in the 'Pharmacographia.' It is sufficiently remarkable from its large stony cells and wavy medullary rays. The tree abounds in the hilly districts at a short distance from the coast. The bark is much esteemed by the natives as a bitter tonic, but I have not seen it used in European practice. The discovery of Ditain will probably lead to its value being properly tested.

TERMINALIA BELLERICA.—*Local name*, YELLA.

The gum Yella cha gond. In vermicular pieces about the thickness of the finger, of the colour of inferior gum arabic. Hardly at all soluble in water, in which it swells up and forms a bulky gelatinous mass; its taste is insipid. I make no mention of the fruit of this tree, as it is well known.

HYMENODICTYON OBOVATUM.—*Local name*, SUFED KURWAH; and H. EXCELSUM.—*Local name*, KALA KURWAH.

Both of these trees grow in this neighbourhood, and both yield a bitter bark in common use among the natives as a tonic. The bark of *H. excelsum* is much the most bitter and may be distinguished from that of *H. obovatum* by its red colour; it is probably the most valuable, but I am not aware of either of the barks having been properly tested in European practice. The minute structure of these barks resembles that of the cinchonas, but the bundles of liber cells are larger, especially in *H. obovatum;* the spiral and laticiferous vessels also are more numerous, the latter being very large in *H. obovatum*, and exuding when cut a waxy latex. In *H. excelsum* many of the cells are filled with a red colouring matter as in cinchona bark, and there is a continuous ring of liber cells near the junction of the bark with the wood; the liber cells in both varieties exhibit a large central cavity. The bark examined was from a branch about one inch in diameter.

(To be continued.)

FURTHER NOTES ON OLIVE OILS.

BY W. GILMOUR.

In my last communication on the spectra of olive oils (*Pharmaceutical Journal*, 8th July), it may be remembered I confined my observations entirely to the variations to be found in ordinary commercial oils. Out of eighteen different samples (the number which I have examined altogether is very much greater) specified in the table,* no two may be said entirely to coincide, although several very closely approximate. Without attempting in the meantime to account for all the phenomena embraced in this diversity, there are still several features in this oil capable, under certain circumstances, of being developed, not without some general interest, apart altogether from any direct bearing which they may have on the points hitherto considered.

Olive oil, it need scarcely be mentioned, unlike most oils derived from the vegetable kingdom, is principally obtained from the pericarp. The ripe fruit is collected into heaps and allowed to stand for a few days until thoroughly softened, and the oil is then removed by gentle pressure. When thus obtained it is called virgin oil, cream oil, etc., and has a pale greenish yellow colour, with a peculiar sweetish nutty smell and flavour. It requires to undergo no process of clarification, with the exception of allowing it to settle gradually on the lees in the cisterns or jars into which it has been conveyed from the press.

So far as the finest oil is concerned there are several circumstances which doubtless very materially affect its nature as well as its quality (whether considered chemically or optically), and they must be given effect to in any attempt at creating a standard of comparison. The district in which the olives are produced, the season, whether in early autumn or later during the rains, in which the fruit is collected; the length of time that it is exposed previous to pressure, and the amount of heating and fermentation which it has in consequence undergone; the direct application of heat in the process of extraction, and above all probably the general care bestowed upon the whole operation, whether of pressing the fruit or storing the oils, are all modifying influences more or less directly affecting the oil produced. But apart from this, there are also inferior oils to be met with, obtained by other processes from the refuse of the finer oils. The cake or marc for example from which the finest oil has already been extracted is treated with hot water, from the surface of which a second and inferior oil is ultimately skimmed, or the marc is allowed thoroughly to ferment and is then treated several times with hot water and subsequent pressure, etc. These oils are frequently refined by agitating with a saturated solution of caustic soda, which converts them into a soapy mass from which a kind of saponaceous deposit is ultimately precipitated, the oil then floating on the surface clear and pure. Oils, it will thus be seen, may be genuine olive oils in respect that they have undergone no direct sophistication, and yet exhibit an almost endless variety of qualities. Are there, then, any limits within which good oil may be circumscribed, or any distinctive feature whereby an inferior oil may be readily recognized?

In answer to this, and without wishing to dogmatize on a matter which is to a considerable extent in the meantime beyond proof, I can only, after still further experiments, re-affirm of olive oils, what I have already said of fixed oils in general, namely, that I think it more than probable that the spectroscope will yet be able to afford very great assistance in disclosing something of their nature and history. An oil, for example, which showed no absorption bands I might have no hesitation in altogether rejecting, whilst on the other hand, one that had all the bands very distinct and dark I might look upon with considerable suspicion. Here we have, as it were the two extremes, and yet it must be confessed that two such oils as I have just imagined, might both, at the time of examination, be commercially good and genuine oils, according to the construction which we have already put upon the term, whilst a third, which showed the bands in what I consider their characteristic form, might altogether be an inferior or even an adulterated oil. The whole subject is fraught with difficulties similar to this, and in such circumstances the error consists in assuming that the spectroscope is *the* means and *the only means* for their detection, and ignoring it altogether on finding it is only a help, when from its very nature and the nature of the subject it probably can never be more.

The two cases however, which I have here, put of an oil with no bands, and one with bands very decided, are not altogether imaginary. I would look with considerable suspicion on the one with all its bands very dark, even when otherwise assured of its genuine nature, from the fact that I have found such oil, on further examination and testing generally, to be of inferior quality; and I would reject the other with no bands, even when assured of its being the finest virgin oil, from the fact that I have ascertained this to be the first stage of a chemical change in the nature of the oil. If now on the other hand, I had no assurance as to the original quality of the oil, I have in this case a double cause of suspicion or rejection, as it may happen, for now I would have in addition to my original doubts (I purposely refrain from putting it stronger) all the uncertainty of adulteration. In these circumstances, it is not, I think, unreasonable to say that we have surely here the limits within which a good oil may be recognized, or an inferior one altogether rejected.

(1) *Oils with bands very dark and of some considerable breadth.*—Chlorophyll, the substance to which these bands owe their existence, is the green colouring matter present in the leaves and other parts of plants. According to Lommel (*Pogg. Ann.*, cxl. iii. 568) the spectrum of even a dilute solution exhibits—1, a broad dark absorption band close behind B; 2, another band in the orange between C and D; 3, a third band a little behind D; and 4, another in the green close before E. In the case of all the oils which I have examined, only three of the bands at the most have been visible, and of these 1 is by far the darkest and most persistent, 3* being next in order, whilst 2 has been in most cases exceedingly delicate, and in several quite wanting. These bands are permanent so far as regards their position, but they vary very considerably, both as regards intensity and breadth, with the strength of the solution. Chlorophyll being soluble in most oils its presence in olive oil is readily accounted for, and the intensity and breadth of the resulting bands will of course depend upon the amount held in solution by the oil. This amount may probably vary according to the time at which the fruit is collected, the process of extracting the oil, or the amount of pressure applied in its extrac-

* See *ante*, p. 22.

* Through some obscurity in the original manuscript I placed the band in the diagram of the first paper before F. This is corrected in the second.—W.G.

tion. The last two conditions, judging from the intensities of the bands in all Gallipoli and other inferior oils which I have examined, and on which I could depend to any degree, are those most likely to affect the amount of chlorophyll in any given sample. At least, I have seldom failed to find that in most inferior oils, in their natural state, its presence was generally very marked so far as all the three bands were concerned. There are undoubtedly many inferior oils to be found with bands varying in degree down to ultimate disappearance, but such oils are not in what I have here called their natural state. They have either inherently or artificially undergone some change, and it is so far fortunate (avoiding, as it does, any complication) that the change is altogether, as we shall immediately see, in the direction of attenuation. The bands may be reduced in intensity and breadth, they may be modified in character, or even in certain cases so far changed in nature as to become split into two, but no extraneous agency has yet been found able to act in the opposite direction, and therefore, though an inferior oil may optically take the place of a superior one, the process cannot, so far as is yet known, by any possibility be reversed.

(2) *Oils with no bands.*—But if the process cannot be reversed, it must be confessed there seems practically little difficulty in the elevation, optically, of a very inferior oil to the position of a superior one. Caustic soda, which I have already indicated as being used extensively as a refining agent, together with caustic potash and heat, all exert a decidedly softening and refining action on the oil itself, whilst on the bands they have also a peculiar modifying influence. According to Chautard an alcoholic solution of chlorophyll mixed with a few drops of solution of caustic potash or ammonia is very little changed, but by boiling with solution of caustic potass the characteristic absorption band in the red is divided into two, whilst the rest of the bands disappear almost entirely. In the case of olive oils, however, I have invariably found that on being thoroughly incorporated with any of the caustic alkalies, even for a short time the bands thin very considerably, and if the action is continued the more delicate of the bands very quickly disappear altogether, and ultimately, though much more slowly, band 1 itself. I have little doubt from all my experiments that this action is accompanied and very probably hastened by some change in the constituents of the oil, but whether it is caused entirely by the action of the alkalies, or by the alkalies with atmospheric influence and exposure combined I have not been altogether able to determine. I am, however, inclined to think from the very powerful influence exerted by the latter on olive oils that they have as much to do with it as the former.

Six hours' exposure in direct sunshine, for example, in a bottle hermetically sealed, I found removed permanently every trace of a band, and otherways altered very materially the spectrum of what I have reason to believe was a pure virgin oil. This experiment was repeated with a second and third "cream" oil with the same results, and in none but the last only, which had assumed a slight cloudiness, was there to be detected, on even a minute examination (I refer to an ordinary examination), the least apparent change in colour, smell or taste. With an inferior oil, such as I have already described, under the same conditions the two more delicate bands had disappeared but the first was very broad and dark, while the oil itself had faded perceptibly in colour. Next, exposing the finer oils in an open vessel the action was found to be essentially the same only much quicker, and at the end of six hours the oils had paled somewhat in colour, and in addition had acquired a peculiar biting flavour, the first external indication of a somewhat important change in their nature and constitution. L. Moschini ('Gayzetta Chimica Italiana,' i. 580) refers to this change. He remarks, that, "Olive oil in its natural state contains in solution a yellowish substance which, when the oil is treated with acids or with caustic soda gives rise to the well known greenish colouration. By exposure to sunshine this colouring matter is essentially altered, the oil being thereby decolorized and no longer exhibiting a greenish colour when treated with the reagents above mentioned. Moreover, other changes take place at the same time in the constituents of the oil, the olein in particular being greatly altered, and acquiring the fundamental property of *elaïdin*, namely, that of not solidifying in contact with nitrate of mercury mixed with nitrous products. At the same time free acids are formed and the oil acquires a rancid taste and odour. From these results it appears that the method suggested by some authors of distinguishing olive oil from other oils by means of sulphuric acid, caustic soda, and nitrate of mercury, can be depended upon only when the oil is in its natural state, not altered by exposure to sunshine." The importance of the spectroscope as a means of detecting this change in the oil need not be commented upon.

When the oil is continued under exposure for several days the spectrum at the violet end undergoes a most peculiar modification. It is not only considerably elongated, but immediately behind F there also appears a dark shading—it can scarcely be called a band—extending over a considerable space and most intense towards the violet end. Whether this is only one of the characteristics of a chlorophyll solution mentioned by Lourmel when he says "that just before G the absorption is somewhat weaker, increasing again behind G," or one of the many peculiarities of it when modified or decolorized I can scarcely yet say. I have, however, only met with it in those oils which from exposure have undergone some considerable change and which have in consequence exhibited the somewhat high smell and flavour accompanying it.

There are several other features not without interest which might have been here referred to, but as these would have necessitated to a certain extent retracing ground already gone over in previous papers, I have purposely avoided them, and rather confined my observations within the limits originally intended. I cannot, however, avoid again noticing the very important assistance which it is quite apparent from all the foregoing, the spectroscope can yield us in determining the quality of an olive oil. These experiments have brought out amongst other things the close relationship there is existing in this oil optically and chemically, and probably no test will be found so delicate, so certain, or so simple, as the spectroscope in detecting even the primary stages of a decomposition, somewhat extensive, as well as interesting in its nature, and which has hitherto it must be confessed, frequently tried both the skill and the patience of the chemist.

ON CHEMICAL NOTATION.*

BY M. M. PATTISON MUIR, F.R.S.E.,

Assistant Lecturer on Chemistry, The Owens College, Manchester.

(*Continued from page* 100.)

This statement merely generalizes a vast number of observed facts. Unless we are to take the results of each individual experiment as expressive of the exact truth as regards the composition of the substance under examination, in which case a science of chemistry would be impossible, we must accept such a statement as this. As our chemical notation is founded on this generalization from facts as one of its main supports, it follows that the results of future experiments in the direction of tracing the exact steps of chemical action, and of measuring the various forces which there come into play, whatever the results may be, cannot overthrow our present system of notation; they may cause us to modify it greatly, perhaps so greatly that one who had been accustomed to the old would hardly recognize the new notation as in any way connected with it. Nevertheless we may be certain that the process will involve no breach of continuity.

20. But I must now pass on to consider chemical notation in the light of that theory which appears to me to explain the best-known facts of material science in a more thorough and satisfactory manner than any which has yet been proposed: I mean the Molecular Theory of Matter.

21. And in the first place I would insist upon the truth of Dr. Wright's remark (*loc. cit.*), that neither this theory nor the atomic theory, generally so called, is taken for granted in the formation of chemical equations, or in the general methods of chemical research. The meaning of the words "atomic theory,"and the distinction between the generalization and convention upon which our chemical notation is really based, and the hypothesis upon which it is so often *said* to be based, are so ably pointed out by Dr. Wright in the paper referred to,† and in a previous paper, that I need do no more than refer any one who wishes for clear ideas on the subject to those papers.

22. Premising, then, that chemical notation does not assume the existence of "atoms," but admitting that if the atomic hypothesis were granted the existing chemical notation would readily adapt itself to the necessities of an atomic notation, let me pass on to consider some of the reasons which appear to me to favour the adoption of the molecular theory of matter. "A molecule may be defined as a small mass of matter, the parts of which do not part company during the excursions which the molecule makes when the body to which it belongs is hot." This quotation from Professor Clerk Maxwell's 'Treatise on the Theory of Heat,' gives a clear definition of what is meant by the term molecule. The theory in question supposes that any given piece of matter consists of a definite number of molecules, that all the molecules of the same substance contain the same quantity of matter, that a molecule may consist of "several distinct portions of matter held together by chemical bonds," and, finally, that "the molecules of all bodies are in a state of continual agitation."

23. The molecular theory of matter is to be distinguished from a theory which would assert that there is an absolute limit to the divisibility of matter. What the theory asserts is, to use Professor Maxwell's words, "that after we have divided a body into a certain finite number of constituent parts called molecules, then any further division of these molecules will deprive them of the properties which give rise to the phenomena observed in the substance."

24. The "Daltonian atomic theory" cannot of course be regarded as identical with that which I have just sketched. It appears to me, however, that the atomic theory of the chemist is based upon and is an outcome of the molecular theory of the physicist, and that we can only rightly understand the former when we have gained a knowledge of the latter,—in fact that the atomic theory, so called, is implied in the molecular theory of matter, and stands or falls with it.

25. One of the objections raised by Dr. Mills* against the atomic (and therefore, it appears to me, against the molecular) theory of matter is, that this theory is not a result of inductive reasoning. An objection, in principle the same, is stated in his papers already referred to (*Phil. Mag.*, Jan. 1876), in these words (he is speaking of the examination of natural phenomena) :—"Instead of demanding a theory, it would be better to ask how we could dispense with one. It is juster and wiser to adhere to facts than attempt to transcend them."

In making such statements as these, it appears to me that Dr. Mills has misapprehended the method by which science gains her finest results. That method, I would make bold to say, is not entirely an inductive one; it makes use likewise of deductive reasoning. Science begins with facts; by observation and experiments she accumulates facts; by a proper use of imagination she frames hypotheses to account for the facts; and by subsequent appeal to facts she proves or disproves the truth of her hypotheses. Had science dealt with facts by strictly inductive methods only, she would never have been able to rise to those general expressions which we call laws. Hypotheses must be framed if science is to make any advances. Given a large number of facts, it might be possible, by arranging these in all possible combinations, to arrive at last at a proper classification; but this method is utterly impracticable, because of the vast number of data to be dealt with. It may be affirmed with a considerable amount of certainty that every great advance in science has been made by the use of hypotheses. Newton professed not to deal with hypotheses; but what is the 'Principia' but the record of wonderful discoveries which became possible only by the greatest freedom in theorizing? Kepler theorized; Hooke asserted that the natural philosopher must be ready to guess the solution of many phenomena; Sir Humphry Davy did not despise hypotheses; and who made freer use of his imagination than Faraday?—the greatest of all experimental philosophers. In framing hypotheses we must see that they agree with facts; in other respects they may be as inconceivable (not self-contradictory) as any fairy tale. The suppositions involved in the theory of gravitation, and in the undulatory theory of light are seemingly sufficiently absurd; in the latter theory we are compelled to imagine the existence throughout space of a so-called æther, possessed of the highest elasticity, and at the same time more solid than steel! Dr. Thomas Young even imagined (and it would appear that we cannot deny the possibility of his imaginings being true) "that there may be independent worlds . . . . pervading each other, unseen and unknown, in the same space" (I quote from Professor Jevons' work on the 'Principles of Science).' Provided that a theory does not go against the primary laws of thought and of Nature, we must accept it, however absurd it may appear, if it be in accordance with facts. But in applying the deductive method of scientific reasoning, we are apt to forget that a theory, however perfect and satisfactory it may appear, is to be put to the severest test; it is only by showing that the known facts are explained by the theory, by foretelling facts which must be facts if the theory be true, and again by showing that these are indeed true, that a scientific theory can pass successfully into the number of accepted hypotheses. Newton's method of treating the theory of gravitation, and Faraday's method throughout his magnificent series of 'Experimental Re-

* From the *Philosophical Magazine* for July, 1876.

† *Phil. Mag.* [IV.], vol. xliii. p. 503.

* 'Laboratory,' 1867, p. 6.

searches,' are typical examples of the true positions of Theory and Fact in scientific investigation. If it can be shown, therefore, that the molecular theory is not in accordance with facts, or is self-contradictory, it must be discarded; but to refuse to accept it because it has not been gained by purely inductive reasonings is simply, it appears to me, to show an ignorance of the true method of scientific investigation.

26. In examining the position of the molecular theory of matter as a scientific hypothesis, I would inquire —Is it in accord with known facts? does it enable us to explain what would else appear to be disconnected phenomena? and we are able by its aid to predict phenomena which are afterwards proved to be true? In the following statement concerning the physical proofs of the molecular theory, I have drawn largely from Professor Clerk Maxwell's 'Treatise on Heat.'

27. The molecular theory is in accord with known facts concerning the condition of hot bodies.

A hot body possesses a certain amount of energy. This energy is capable of being changed from potential into kinetic energy; but such a change involves motion of some kind. When a hot body loses heat by radiation, this radiation must be effected either by the motion of material particles from the hot body to the body which receives the heat, or by the motion of some medium which fills the space between the body giving out and the body receiving heat; hence the particles on the outer surface of a body radiating heat must be in a state of motion. But hot bodies are continually radiating heat; therefore their outer particles must be in a state of continual motion; hence part, at least, of the energy of a hot body exists in the form of kinetic energy. But the motion of the particles of a hot body cannot be the motion of the body as a whole; otherwise the motion would be visible to us; it must be the motion of exceedingly small parts: hence arises the conception of molecules, *i.e.*, of small parts which remain intact during the movements which each part makes when the mass of the body to which it belongs is hot.

28. Again, the molecular theory is in accord with known facts concerning diffusion. If two gases be arranged in distinct strata, it is found that in a short time the presence of that gas which was at first confined entirely to the lower stratum is perceptible in the upper stratum, and *vice versa*; further, it is found that if a stratum of gas be issuing through another gas which is at rest, the movement of the former tends to communicate itself to the latter, which, in its turn, reacts upon the moving gas, tending to bring it to rest. Again, if the upper stratum of a gas be heated, it is found that the heat is communicated to the lower stratum. We have here, then, three kinds of diffusion—diffusion of matter, diffusion of momentum, and diffusion of energy. As we have learned to think of small parts of a body in a state of motion, we may extend the idea to the phenomena of diffusion, and imagine the little parts of the two diffusing gases becoming mingled together in the diffusion of matter; we may imagine the particles of the moving stratum of gas passing upwards and downwards into the surrounding strata of gas at rest, and hence having their motion partly checked, while they in turn communicate somewhat of their motion to the particles of the surrounding gas; and we may imagine, finally, the communication of heat from one part of a heated gas to another by the diffusion of the heated particles of the gas. But the rates of these diffusions are slower in liquids than in gases, especially the rate of the diffusion of matter, which is slowest of all (if, indeed, it takes place) in solids. Why is this? Because these little particles of molecules (their existence being granted) have not in solids the same freedom of motion which they have in liquids, in which, again, they have less freedom of motion than in gases. Although the particles of solids are not possessed of the same freedom of motion as is granted to those of liquids, yet we can easily see how there may be a rapid diffusion of energy from particle to particle, and hence can understand the fact that rapid diffusion of heat through solids is so often noticed.

29. Again, the molecular theory is in accord with known facts concerning evaporation and condensation.

If we grant that a gas consists of a number of molecules in a state of motion, we must believe that these molecules will from time to time come into collision; hence, even if their initial velocity be the same, an inequality of velocity will be produced. In a liquid the average velocity of the molecules must be smaller than the average velocity of the molecules in a gas; nevertheless this does not prevent us from believing that the velocity of individual liquid molecules may be greater than that of individual gaseous molecules. Supposing that liquid molecules of such great velocities are moving at the surface of the liquid *from* the liquid, they will tend to escape from the liquid into the surrounding vapour. Supposing that a gaseous molecule of great velocity strikes the surface of the liquid, it will tend to become entangled in the liquid. Hence we shall have evaporation of the liquid and condensation of the vapour going on continuously.

30. So also I might go on to show that many of the facts of spectroscopy are in keeping with the molecular theory—that the vibration of each molecule may well be supposed to communicate itself to the ether in a regular manner, that an increase in density of a gas will cause the introduction of irregular motion among the molecules, and hence the appearance of a more or less continuous spectrum; but, for a consideration of the bearings of the molecular theory of matter upon the explanation of spectroscopic phenomena, I must refer to a lecture by Mr. J. Norman Lockyer, reported in *Nature*, vol. x. p. 69.

31. In those points which I have briefly touched on, the molecular theory is, it appears to me, not only in accord with known facts, but it also enables us to group together and so to explain what had appeared to be isolated phenomena. But this theory does more than this: we can deduce from it certain conclusions which may then be proved true by experiments. Thus the law of Boyle, the law of Charles, and the law of Gay-Lussac may be deduced from a consideration of the dynamical conditions which must prevail among a group of particles supposed to constitute the mass of a gas, the pressure and temperature of which vary from time to time.

32. It has been possible to predict certain results from a consideration of phenomena viewed in the light of the molecular theory, which results have afterwards been verified. Thus the rate at which diffusion of energy must take place through air when one portion is heated was predicted from data derived from experiments on viscosity. The actual measurement of the diffusion-rate, made by Professor Stefan, of Vienna, has proved to be in close agreement with the predicted rate.

33. If we interpret chemical notation in the light of the molecular theory, we assume that the symbol of each chemical substance represents a molecule of that substance, and that chemical equations represent the results of the mutual actions of molecules. The relative weights of molecules are therefore assumed to be represented by our chemical symbols. In order to deduce such weights with accuracy, we are obliged to determine the relative densities of the substances in the form of gas, and to assume the truth of the law of Gay-Lussac or of Avogadro. But this law can be deduced from the molecular theory of matter; hence, when we speak of "molecular weights," we assume the truth of the molecular theory; and I therefore think that it behoves us to know what this theory really is, and on what physical grounds it can be upheld.

34. I have already stated that the ordinary chemical notation does not appear to me to necessitate the assumption of the existence of molecules; but, granting that matter has a molecular structure, this notation will readily lend itself to the needs of such a theory. Can we, however, with equal facility explain the general pheno-

mena of chemical action in terms of the molecular theory of matter?

35. The definition of a "molecule" quoted from Professor Clerk Maxwell's work does not prevent one from imagining an inner structure for such molecules. We may think of one of these little parts which holds together while the body to which it belongs is hot as made up of a greater or less number of still smaller parts, parts either of the same or of different kinds of matter. In the conception of such smaller parts we have the idea of chemical atoms. Now it may legitimately be supposed that during the excursions which molecules are ever making, some of them will be so knocked about as to have their atomic structure disarranged; under ordinary circumstances this disarrangement will quickly be restored; but if a new force be called into play which shall act by increasing the tendency to molecular disaggregation, we shall have a more or less complete decomposition of the original molecules, attended, of course, with the production of new molecules. The electrolysis of liquids may be regarded as a directive action exercised by electromotive force upon those molecules which have undergone disaggregation by clashing together; whereby one component part of the disaggregated molecule is directed in one direction and another in another direction.

36. So also the phenomenon of dissociation meets with an explanation in terms of the molecular theory by supposing that at high temperatures the clashing of molecules is carried on so violently that more molecules suffer decomposition in a unit of time than are able to regain their original structure. Dissociation is then explained as a "change in the configuration and motion of a material system."

37. If this view of intramolecular action be adopted, we must regard chemical action as constantly taking place. To use Dr. Mill's words (*Phil. Mag.*, Jan. 1876), "Chemical action can begin, because it never has ceased."

38. Suppose, however, that the molecules of a given substance A come into contact with those of another substance B, and that these substances are capable of exercising chemical action upon each other, we shall have an interchange of "atoms" between the molecules A and B; at any moment, therefore, we shall have four kinds of molecules present—A and B, the generating substances, and A′ and B′, the products. We shall have an exchange of atoms taking place between A and B, an exchange of atoms taking place between A′ and B′ (and possibly an exchange of atoms taking place between A and A′, and between B and B′, etc.). Now the final condition of atomic distribution among the reacting molecules will depend chiefly upon the rate of atomic interchange; if more changes take place between the atoms constituting the molecules A and B than between the atoms constituting the molecules A′ and B′ in equal times, it is clear that an increase in the number of the molecules A′ and B′ will take place; and conversely, if more atomic changes take place between A′ and B′ than between A and B in equal times, the number of A and B molecules will increase; in other words, the decomposition of A and B will cease. Again, if by any means it is possible to remove the newly formed molecules A′ and B′ from the sphere of action, then the atomic interchange represented by the equation $A+B=A'+B'$ will proceed until A and B have entirely disappeared, and the sum of the weights of A′ and B′ is equal to the original sum of the weights of A and B. Such an action as this very generally takes place in ordinary chemical reactions. For instance, the equation

$$BaCl_2+Na_2SO_4=2NaCl+BaSO_4$$

represents the final atomic arrangement of the molecules taking part in the reaction; but we must imagine that a secondary reaction, symbolized thus,

$$2NaCl+BaSO_4=Na_2SO_4+BaCl_2$$

also takes place, but only to a very limited extent, because the molecule $BaSO_4$ is removed from the sphere of action almost as quickly as it is produced. It is true, as has been urged, that the equation $Zn+H_2SO_4=ZnSO_4+H_2$ has never been rigorously realized in practice. Why? Because, before the atomic interchanges symbolized are completed, so many molecules having the composition $ZnSO_4$ have been formed, and have *not* been removed, that the completion of the change becomes impossible. Remove the products of the action, however (as is actually done in general practice), and the equation represents the final atomic distribution. Yet, although the equation does not express everything that occurs when zinc and sulphuric acid are mixed together, it does express the great fact that a definite quantity of zinc is invariably associated with definite quantities of sulphur and of oxygen in the production of the substance called sulphate of zinc. (For a further discussion of this subject see the address of the President, Dr. Williamson, to the British Association at Bradford, 1873.)

39. Further, such atomic interchanges will involve changes in the form of the energy of the reacting molecules: potential will be converted into kinetic energy, or *vice versâ*. Such changes will be marked by absorption or by evolution of heat. These energy-changes will certainly bear a close relation to the general character of the products of the reaction. Thus evolution of heat (stoppage of molecular motion of some kind) is accompanied with the production of a substance whose "affinity-value" and whose boiling-point are higher than those of the generating substance (Wright, *Phil. Mag.*, Dec., 1874).

40. Now this change in the form of energy will be dependent upon a change in the relative position of the parts of the material system, the energy of which is changed; hence the mere fact of "heat-disturbances" taking place in chemical reactions is in perfect keeping with a molecular theory of matter.

41. But certain special cases of heat-disturbance have been cited as being apparently inexplicable in terms of the molecular theory. Thus Dr. Wright* brings forward the fact that there is a change in the form of energy of the material system accompanying the exchange of matter symbolized by the equation $H_2+Cl_2=HCl+HCl$ as opposed to, or at least as being probably incapable of satisfactory explanation by the molecular theory. He holds that, "granting that the substitution of chlorine for hydrogen is attended by a given change of motion, the inverse substitution must be accompanied by the opposite change." He supposes that in the reaction under notice an atom of chlorine in the chlorine molecule is replaced by an atom of hydrogen, while an atom of hydrogen in the hydrogen molecule is replaced by an atom of chlorine, and that "those complementary changes should cause, on the whole, no difference as to the ultimate amount of motion in the two original and the two resulting molecules." It appears to me that Dr. Wright has here assumed that two equal and opposite actions, called by him "substitution" and "inverse substitution," are taking place. It would, I think, be more in accord with the molecular theory to suppose that there is taking place so rapid an atomic interchange among the molecules both of hydrogen and of chlorine, that when these two substances are brought together, under suitable conditions, it is easy for the momentarily dissociated atoms to combine together so as to form the new molecules of hydrochloric acid, and that when these are formed there is not so rapid an atomic exchange taking place among them as there is among the molecules of the generating substances. The general result of such an action, so far as change of energy is concerned, would therefore be an evolution of heat. Indeed, the fact that it is possible to completely carry out the reaction symbolized above, appears to me to be in perfect keeping with the fact of the evolution of heat which is noticed during the reac-

* *Phil. Mag.* [IV.] vol. xliii. p. 511.

tion; for if the number of atomic exchanges between the products HCl HCl were as great as those between the generating molecules H_2 Cl_2 in equal times, the decomposition would cease before the equation was completely realized. But the actual result points to the conclusion (on the assumption that the molecular theory is true) that there are less rapid intramolecular movements occurring in the case of the molecules HCl HCl than in the case of the molecules H_2 Cl_2—in other words, that some portion of the initial molecular motion has disappeared. But inasmuch as the total energy of the system is supposed the same, the energy which has disappeared in one form must have reappeared in another; it *has* reappeared as heat.

42. Lastly, as to isomerism. So called isomeric bodies undergo different reactions; they are produced by different reactions, etc.; these facts may be expressed irrespective of any theory as to their cause, by means of structural or dissected formulæ. It has been supposed that isomerism is to be explained by imagining that the atoms are differently arranged in isomeric molecules. Again, it has been supposed that isomerism is to be explained by granting that isomeric bodies are endowed with varying amounts of energy, that in the formation of these bodies different quantities of energy change form, and that, conversely, the various reactions noticed with isomeric substances are to be traced to different degrees of conversion of one form of energy into another. Dr. Mills (*loc. cit.*) says, "to measure, both in quality and in quantity, the energy associated with each isomeric substance, is to give a complete account of the phenomenon of isomerism." Not, it seems to me, to give a complete *dynamical* account of the phenomenon of isomerism; for it is only when we explain a phenomenon as a "change in the configuration and motion of a material system," that we give a complete dynamical explanation of that phenomenon. If isomerism depends on changes of potential energy, we must remember, to quote Professor Clerk Maxwell ('Treatise on Heat,' p. 283, 1st ed.), "that potential energy depends essentially on the relative positions of the parts of the system in which it exists, and that potential energy cannot be transformed in any way without some change of the relative position of those parts."

Hence I think that the energy theory of isomerism is not altogether inconsistent with the position theory, and that both meet with their fullest development in terms of the molecular theory of matter.

43. I have thus attempted to show that our ordinary chemical notation is founded on facts, that it gathers together and symbolizes a great many phenomena, that it does not necessarily imply the acceptance of any theory as to the constitution of matter, but that it receives its fullest meaning when viewed in the light of the molecular theory. I have further briefly endeavoured to point out some of the deficiencies of chemical notation, but have expressed a belief that when the present system is superseded by a better, the new will be the legitimate outcome of, and will not be in any fundamental point opposed to the old.

LACTIC ACID, ITS USES AND ITS PREPARATION.

Lactic acid was recommended ten years ago in France, by Bricheteau and Adrian, for inhalation in the atomized state in order to dissolve croup-membranes of the larynx, so that they might be moved by coughing. The use of such inhalations after tracheotomy in croup by continental surgeons is said to have been attended with very favourable results. French observers have found that the false membranes were quickest dissolved in a solution of lactic acid, less quickly in lime-water, and even more slowly and incompletely in solutions of chlorate of potash or soda; other salts of alkali in solutions fit for use with the living subject proved entirely ineffectual.

Lately the pure acid or its soda salt has been made use of for internal application as a narcotic by German physicians, and it has been recommended for insomnia after hæmorrhage or exhausting disease, for quieting persons of anxious and diseased mind and in other mental derangements, though it acts less powerfully than opium. The most reliable mode of administration seems to be an enema, and it is recommended to give from 5 to 20 grammes in a solution with about an equal weight of carbonate of soda. Dr. Foster, of Birmingham, who has used this acid in cases of diabetes mellitus, noticed acute inflammation of joints after large doses in two patients suffering from that disease.*

The chemical preparation for pharmaceutical purposes is, of course, obtained by fermentation of lactic sugar solution, or may be formed by synthesis from aldehyd, hydrocyanic acid and hydrochloric acid. We take the following directions for its preparation from the well-known work of Professor Hoppe-Seyler, of Strassburg University:† A solution of cane sugar is to be mixed with sour milk and oxide of zinc and exposed with frequent stirring for some time in a warm atmosphere. The crusts of lactate of zinc which form are to be dissolved in hot water, then filtered, and from the still hot solution the metal is to be precipitated by sulphuretted hydrogen. Filter again, evaporate over a water-bath, and shake the syrupy remnant with ether which will absorb the lactic acid. Upon distillation the latter is obtained in a pure state. It is the aethylid lactic acid (aethylidenmilchsaure). The paralactic acid which forms an important constituent of Liebig's Extract of Meat, has been found also in many pathological secretions, as, for instance, in the urine after phosphorus-poisoning. The ethylen lactic acid which has been found in meat extract and in pathological liquids by Wislicenus (*Annalen der Chemisch. Pharmacie*, vol. 166 and 167) is always combined with the paralactic and is separated from it by dissolving its zinc-salt in alcohol and letting the paralactate of zinc crystallize, the salt then remaining in solution is aethylen lactate of zinc. The fourth lactic acid of the formula $C_2H_4(OH)\ CO_2H$, called hydracrylic acid has been produced artificially only from betaiodic propionic acid (beta-jod propionsaure).

THE DETERMINATION OF THE SOLIDIFYING-TEMPERATURE OF LIQUIDS, AND IN PARTICULAR OF SULPHUR.‡

BY D. GERNEZ

The determination of the temperature at which the passage of a body from the solid to the liquid state is effected, or inversely, presents, notwithstanding its apparent simplicity, uncertainties which have only been dissipated for a relatively restricted number of substances, even when the change of state takes place abruptly—that is to say, when the solid becomes suddenly liquid through an infinitesimal change of temperature. The slowness with which the fusion of a body is produced in a bath at a constant temperature but little above the fusing-point, and the imperfect conductivity of the substances (which permits certain parts of the liquid to attain temperatures above that of the part not melted), have led physicists to substitute for the determination of the fusing-point that, *supposed* identical, of the point of solidification: only it often happens in this case that the measurements are found to be falsified in consequence of the phenomena of surfusion. As I will show, these phenomena can be utilized to determine the solidifying-temperature of liquids with a precision only limited by the patience of the experimenter.

* *British Medical Journal*, December 23, 1871.

† 'Handbuch der Physiologisch und Pathologisch Chemischen Analyse,' 1875, p. 95.

‡ From the *Philosophical Magazine*, July, 1876.

For this purpose, into a glass tube 3 centims. in diameter, closed at one end, such a quantity of the solid is put that in the liquid state it forms a column 5 or 6 centims. in height; along the axis of the tube a thermometer, held by a cork, is arranged, the bulb of which, sufficiently small to have only a negligible effect on the temperature of the surrounding liquid, descends to within a few millims. of the bottom, without touching the tube. The fusion of the body is then determined by putting it into a bath of water or paraffin at a temperature a few degrees higher than the presumed point of solidification. When the body is entirely melted the tube is brought into a bath at a constant temperature lower than the temperature sought; and we wait until the indications of two thermometers (one internal, the other external) differ only very little. The result is accelerated by turning the tube on its axis—which does not provoke solidification unless in the movement the thermometer rubs against the sides of the tube bathed by the liquid. The body being thus in the state of surfusion, a fine glass needle with its extremity covered with a small quantity of the material in the pulverulent state is introduced through a second aperture in the cork, and this extremity brought into the liquid, the solidification of which is immediately determined. To urge on the phenomenon the cork is rotated about its axis, which moves the stem and carries the crystalline germs cylindrically round the thermometer, the indications of which are then followed, it soon attaining a maximum certainly not higher than the solidifying-point, but possibly lower. The experiment is then recommenced, the preceding maximum being chosen for the temperature of the surrounding bath; and by operating in the same manner the solidification of the liquid is determined: it is found that the thermometer rises to a maximum higher than the previous one. After two or three trials of this sort temperatures are arrived at which differ from one another by only a negligible fraction of a degree: the highest of them is taken for the solidification-temperature of the substance, applying to it the correction arising from the circumstance that the whole of the stem of the thermometer is not bathed by the liquid.

I have turned to account the precision which this process permits, especially to elucidate the various peculiarities presented by the change of state of sulphur; and the following are the chief results at which I have arrived:—

The most simple results is that which relates to sulphur insoluble in sulphide of carbon, obtained by exhaustion from flowers of sulphur. The solidification of this variety takes place at 114°·3 C., whatever may be the temperature at which it was melted: thus, in all the experiments, I have not found more than $\frac{1}{10}$th of a degree difference between the temperature of solidification of the sulphur which had been brought to ebullition and that at which the same substance solidifies after being heated to 170° only, or even 121°.

This constancy of the solidifying-point is not found in the other varieties. For octahedral sulphur the temperature of solidification is higher when it has been fused at the lowest possible temperature—for instance, at 121°; in this case it reached 117°·4. If the liquid has been heated to 144°, it is only 113°·4; it descends to 112°·2 for the sulphur kept five minutes at 170° (which renders it very viscous, and, according to M. Berthelot's experiments, produces the maximum of insoluble sulphur). Starting from this value, the temperature of solidification rises rapidly to 114°·4, the solidifying-point of the sulphur which has been heated to various temperatures between 200° and 447°. This last value is sensibly the same as that which corresponds to the solidification of the insoluble sulphur.

In regard to prismatic sulphur, its temperature of solidification depends on its previous state. If it comes from insoluble sulphur it behaves likes this; nevertheless, when it is submitted to several successive fusions and solidifications, not much exceeding the fusing-temperature, the solidifying-point may risé more than one degree. In like manner, if it comes from octahedral sulphur, its solidifying-temperature depends on the temperature to which it has been brought. Thus, if it comes from sulphur heated to 170° (the solidifying-point of which is 112°·2), and has been liquefied at about 120° or 123°, the temperature of solidification rises gradually each time, and after a sufficient number of fusions and crystallizations it becomes equal to 117°·4.

Soft sulphur, flowers of sulphur, and roll sulphur conduct, as might have been expected, to results intermediate to those which I have noted for insoluble and octahedral sulphur, both of which enter into their constitution.

These peculiarities account for the diversity of the numbers given for the temperature of change of state of sulphur by observers whose skill there is no reason for calling in question. They also show how tenacious are the modifications resulting from the tempering of sulphur, since, in order to cause their disappearance, a considerable number of successive fusions and crystallizations are necessary.

THE SUNFLOWER AND ITS USES.*

The cultivation of the sunflower (*Helianthus annuus*) is carried on extensively in some countries, as central Russia and Hungary, chiefly for obtaining the oil of the seeds, which forms an excellent salad-oil, while the residuary cakes find employment as food for cattle. The yield is so large and the labour connected with its cultivation so trifling, that it deserves the attention of agriculturists. Each acre of land may easily contain 16,000 plants without at all interfering with each other. Numerous trials have shown that each fresh plant weighs on an average 10½ pounds including the seeds, which amount to about ½ pound. The yield of one acre may be stated as 80,000 lbs. of stems, 80,000 lbs. of leaves, flowers (excluding seeds), and roots, and 8000 lbs. of seeds. The stems and leaves contain a considerable amount of potassium nitrate, and are therefore easily reduced to ash, which will yield to water about 2300 lbs. of potash. There are two varieties of the plant, one containing white and the other black and white seeds. The former contain from 25 to 28 per cent. of oil, the latter from 16·25 to 26 per cent.; but the amount of kernel varies in the two sorts. The average yield from 100 parts of kernel is about 44·6 per cent. of oil. But it must be understood that this percentage is the actual amount existing in the seeds, and extracted with ether. In practice, especially when pressure alone is resorted to, the actual yield will be somewhat less. Analysis of the ash of the plant (excepting the seeds) yielded the following results; the corresponding figures obtained from an analysis of the ash of the seeds are added after each constituent in brackets; potash, 47·687 [14·475]; soda, 1·092 [6·119]; lime, 9·851 [6·811]; magnesia, 5·291 [1·0960]; alumina, 0·280 [0.227]; ferric oxide, 0·170 [1·427]; chlorine, 5·004 [2·162]; sulphuric acid, 1·344 [2·036]; phosphoric acid, 6·968 [31·848]; silica, 0·687 [10·811]; carbonic acid, 21·626 [13·074].

PRESERVATION OF GRAIN, ETC., BY MEANS OF BAR-IRON OR METALLIC MERCURY.†

Mr. Massie has made a number of experiments on a novel method of preserving certain organic substances, the results of which are given below in a condensed form.

He has been in the habit for several years of using an iron bar of about 3 lb. weight as a means of preserving barley, rice, and bran in wooden boxes, well closed and of

* *New Remedies*, From *Arch. d. Pharm.*, 1876.

† From *New Remedies*, June 15, 1876.

a capacity of about 40 gallons. In order to thoroughly test the efficacy of this method, he filled thirteen sets of litre-flasks with various substances, there being three flasks in each set, one of which (*a*) was filled with the substance without any addition, the second (*b*) containing the substance and a bar of iron weighing 80 gm. (1234·6 grs.), and the third (*c*) containing the same substance, together with 5 gm. (77·2 grs.) of mercury.

Barley, rice, bran, and various grades of corn, some of which was badly worm-eaten and partly alive with corn-moths before its being placed into the flasks, were found to be entirely altered or destroyed in *a*; in *b* and *c*, however, they were perfectly preserved, and where alteration had already commenced before the addition of the protecting substances, the latter were found to have arrested the change. The same was found to be the case with ergot, in which case two different sets of flasks were used, one being left open and the other closed; the latter was found to have undergone less change in *a* (unmixed in closed flask); but in *b* and *c* both sets were equally well preserved. Whole Spanish flies were similarly treated, and also found completely protected from change. But the most remarkable case was an experiment with the government biscuits ("hard tack"); the unprotected biscuits (in *a*) were entirely destroyed; the mass resembled a collection of small sieves; in *b* only a few perforations could be seen; and in *c*, which contained the mercury, the biscuits were completely preserved, without a trace of perforation by weevils. Each set was allowed to stand for the space of seven months.

FERRIC AND ALUMINIC PHOSPHATES.*

BY M. MILLOT.

Ferric phosphate. $2P_2O_5.Fe_2O_3.8H_2O=Fe_2P_4O_{13}.8H_2O$.—This phosphate is obtained when ferric hydrate or oxide is dissolved in hydrated phosphoric acid, either cold or hot. If an insufficient quantity of phosphoric acid is employed, the mass hardens and more phosphoric acie must be added till it remains pasty. Water is added and the liquid is filtered. On addition of water to the washings, the phosphate, $3P_2O_5,2Fe_2O_3,8H_2O$, is deposited. The mass left on the filter, after purification, has the formula, $2P_2O_5.Fe_2O_3.8H_2O$.

The anhydrous salt is prepared by fusing ferric oxide with an excess of phosphoric acid, and removing the excess by washing: If a high temperature be employed, part of the product becomes insoluble in acids, but does not vary in composition from the portion which dissolves. The hydrated phosphate dissolves in ammoniacal ammonium citrate, and in alkalies and their carbonates, but is insoluble in acetic acid.

The precipitate obtained on adding water to the filtrate from the preparation of the above mentioned phosphate is white and crystalline. Its formula is $3P_2O_5.2Fe_2O_3.8H_2O=Fe_4P_6O_{21}.8H_2O$. It is more easily prepared by heating a solution of ferric sulphate with dihydric ammonic orthophosphate, thus:—

$$3(NH_4)H_2PO_4+2Fe_2(SO_4)_3= Fe_4P_6O_{21}.H_2O+6(NH_4)HSO_4.$$

The liquid is filtered while boiling, and the precipitate is washed with boiling water. When ignited it turns to a greyish-blue mass, which dissolves easily in acids. Its properties are similar to the preceding one.

Aluminic Phosphate. $2P_2O_5.Al_2O_3.8H_2O=Al_2P_4O_{13}.8H_2O$.—This salt cannot be prepared in the same manner as the corresponding iron salt, owing to the solubility of alumina. It may be obtained by treating the phosphate, $Al_4P_6O_{21}.16H_2O$, with two equivalents of phosphoric acid; it is dried, washed, and the treatment repeated. It may be obtained in the anhydrous state by igniting a salt of alumina with excess of phosphoric acid and washing out the metaphosphoric acid formed, with water. The product is partially insoluble in acids.

$$3P_2O_5.2Al_2O_3.16H_2O=Al_4P_6O_{21}.16H_2O.$$

This phosphate is obtained when two equivalents of aluminium sulphate and three equivalents of dihydro-ammonic orthophosphate are boiled together, thus:—

$$2Al_2(SO_4)_3+3H_2(NH_4)PO_4= Al_4P_6O_{21}.H_2O+3(NH_4)HSO_4.$$

The precipitate is filtered and washed with boiling water, for it is soluble in cold water. Free sulphuric acid must be present during its preparation, or it will contain excess of alumina. This salt is formed when commercial superphosphates are washed with water. When ignited it becomes partially insoluble in acids:

$$2P_2O_5 3Al_2O_3.8H_2O=Al_6P_4O_{19}.8H_2O.$$

If an acid solution of one of the previously described phosphates is precipitated with ammonia, taking care not to add sufficient to dissolve it, this phosphate is produced. When ignited it dissolves in acids.

All these phosphates are hygroscopic; they are all insoluble in acetic acid, but dissolve in ammoniacal ammonium citrate, ammonium oxalate, alkaline carbonates, and ammonia; those of alumina dissolve much more easily than the corresponding iron salts.

* From the *Journal of the Chemical Society*, for June. (*Compt. Rend.*, lxxxii., 89—92.)

AN ALKALOID OCCURRING IN THE BRAIN AND THE LIVER, AND IN THE WILD POPPY.*

BY F. SELMI.

In examining the brain or liver for poisonous alkaloids, if after treatment with ether, it is extracted with amylic alcohol to ascertain if morphine is present, and the solution is evaporated, a yellowish residue is obtained partially soluble in dilute acetic acid. On adding a drop of iodized hydriodic acid to this solution after it has been concentrated at a gentle heat, and *immediately* examining it under the microscope (650 diameters), brown crystalline plates will be observed, sometimes solitary, sometimes united to form a cross, and rapidly disappearing, being transformed into brown oily drops. The same phenomena are observed even when the acetic solution has been evaporated to dryness and heated for some time to 120°, if the residue is again dissolved in water and tested with the iodized hydriodic acid. As these crystals closely resemble those produced with morphine by the action of the same reagent, it is always necessary in toxicological researches to apply the iodic acid test. On agitating the amylic extract with water several times, the alkaloid is dissolved out, yielding an alkaline solution which after being acidulated with acetic acid, gives the above mentioned reaction even more definitely. The quantity contained in the brain and liver is, however, very small.

When examining the green heads of the wild poppy for morphine, by exhausting them with alcohol, mixing the extract with baryta, and finally treating it first with ether and then with amylic alcohol, the author observed that the amylic solution behaved in a manner precisely similar to that obtained from the brain and liver; the acidified aqueous extract giving fugitive crystals identical in form and colour with those previously mentioned; no morphine, however, could be detected, neither did the dried capsules contain any alkaloid giving these reactions. On keeping the alkaline solution obtained by agitating the amylic extract with water, it lost its alkaline reaction after a week and no longer gave the same kind of crystals with the iodized hydriodic acid. The solution, saturated with acetic acid, may, on the contrary, be preserved unaltered if mixed with an equal volume of alcohol. The alcoholic extract of the brain should be made with absolute alcohol, then precipitated by basic acetate of lead, filtered, and mixed with ether; this produces a second precipitate which is to be removed, and the clear solution evaporated after the lead has been separated by means of ammonium sulphide. The second lead precipitate produced by the ether, when decomposed in a similar manner, yields a substance differing from the new alkaloid, in that it does not give any precipitate either with the iodide of potassium and cadmium, or with Meyer's reagent.

* From the *Journal of the Chemical Society*. (*Gazetta chimica italiana*, v. 398-402.)

The Pharmaceutical Journal.

SATURDAY, AUGUST 5, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE USE OF METHYLATED SPIRIT.

WITHIN the last few days a general order has been issued by the Board of Inland Revenue concerning the use of methylated spirit and, as our readers will observe, the subject was brought under the notice of the Council at its meeting last Wednesday with the result that a deputation was requested to wait upon the Commissioners of Inland Revenue.

The object of the order now referred to is that of preventing the use of methylated spirit in the preparation of medicine for internal use, and we are entirely in accord with the Inland Revenue authorities as to the impropriety of such use of methylated spirit, inasmuch as it would be no less a breach of the Pharmacy Act than of the law which relates to protection of the Revenue.

But while the order just issued directs Excise officers immediately to remind all wholesale or manufacturing chemists in their respective stations, that the use of methylated spirit in preparing medicines for internal use is strictly prohibited by the Act, 28 and 29 Vict., c. 64, s. 8, it also directs them to make known that the Board does not consider the use of methylated spirit legal in any medicinal preparations except soap liniment and compound camphor liniment.

This specific limitation of the use of methylated spirit to these two preparations is, we believe, likely to involve chemists and druggists in some difficulty, for it is at variance with the practice which very generally prevails of preparing both the liniment of aconite and the liniment of belladonna with methylated spirit, not for sale or use as Pharmacopœia preparations, but in order to meet special requirements. In the general order it is directed that any infringement of the Act is to be at once reported to the Board by the Supervisors; and a sample of the medicine sent to the laboratory at the chief office. Until, therefore, some settlement of the question at issue is arrived at, as a result of the communication between the Council and the Board of Inland Revenue, it will be advisable to avoid the risk that might attend the sale of these preparations.

Meanwhile it may be useful if we indicate briefly what are the general facts of the case, and at the same time point out a circumstance which may to some extent account for the opinion evidently held by the Board of Inland Revenue.

The object of the Act of 1866, regulating the sale and use of methylated spirit, was exclusively the protection of the Revenue from fraud, and though the restrictions placed upon the use of methylated spirit comprised its use in the preparations of articles capable of being used internally as medicine, it may be assumed that this restriction was mainly intended to prevent this spirit from being used internally as a beverage. At any rate it is certain that in regard to medicinal preparations the prohibitory clauses of the Act apply specifically and only to those which are capable of being used internally.

It would, indeed, be inconsistent with the principle upon which the use of duty free methylated spirit was originally permitted by the Government, to suppose that there could have been at any time a disposition to impose upon any particular class vexatious regulations, interfering with the full enjoyment of that privilege, and in the general order issued shortly after the date of the Act now referred to, there was evidence of the utmost desire to be considerate in allowing the use of duty-free spirit. It was stated that, notwithstanding the provisions of the Act, the Commissioners had still power to authorize the use of methylated spirit in any branch of art and manufacture approved of by them, and chemists desirous of using methylated spirit for such purposes were directed to make application to the Commissioners for the purpose of obtaining the requisite permission.

The fact that copies of this general order were furnished to all chemists and druggists in the country was perhaps the cause of greater attention being given to it than to the Act itself, and owing to what may have been a clerical error, the omission of a single word seems to have given rise to the idea that it was not lawful to sell or to be possessed of any article in the manufacture of which methylated spirit had been used, unless by special permission.

In the Act itself it is stated that no person shall use methylated spirit in the preparation of any article capable of being used either wholly or partially as a beverage, or internally as a medicine; and it provides that if any person shall sell or have in his possession any *such* article, etc., he shall forfeit the sum of one hundred pounds, and such article shall be forfeited, together with the vessels or packets containing the same. This is clearly to be understood as not applying to preparations incapable of being used as a beverage or internally as medicine. But the word "such" which we have italicized is omitted in the General Order of 1866, and from that document it appears to be illegal to sell or possess *any* article in the preparation of which methylated spirit shall have been used.

It is therefore intelligible that, guided by this document and also by the direction to apply to the Board for special permission to use methylated spirit in particular cases, certain persons desiring to prepare liniment of aconite and of belladonna with methylated spirit should have actually applied for permission to do so, and have received it. Probably the fact that further applications have been made with the same object may have caused the Board to feel some difficulty in the matter which has led to the course taken in the recent general order, but as the subject is under consideration we abstain from entering upon that view of it and confine ourselves to such matters of fact as are within our cognizance.

In the first place we may instance the exception made in favour of soap liniment and compound camphor liniment as an indication that the Board does not contemplate enforcing upon pharmacists any greater restrictions in the use of methylated spirit than are requisite for protecting the Revenue from fraud, and that it has no intention in this respect of placing them at a disadvantage as compared with other classes of manufacturers.

In a recent article on this subject we expressed a doubt whether the permission of the Inland Revenue Commissioners to use methylated spirit would justify the application of it even for making Pharmacopœia preparations that are not intended for internal use—such as the liniments of aconite or of belladonna—since the Pharmacopœia orders rectified spirit to be used. But this is not a question affecting the Revenue, and it is provided for by other enactments specially relating to such matters.

The Pharmacy Act, however, while imposing a penalty on any one who should compound medicines of the British Pharmacopœia except according to the formularies of the said Pharmacopœia does not by any means preclude pharmacists from making and selling other preparations than those of the British Pharmacopœia. This is likewise the case with the Sale of Food and Drugs Act, with which the Pharmacy Act is incorporated, for while the sixth section of this Act provides that no person shall sell to the prejudice of the purchaser any drug which is not of the nature, substance, and quality of the article demanded and it may reasonably be held that this provision would apply to the use of any other than Pharmacopœia preparations in the dispensing of physicians' prescriptions, it does not interfere with the sale of preparations made by other formulæ so long as the articles are what the purchaser desires to have, and provided they are sold with labels so distinctly indicating their nature that they are not liable to be mistaken for the preparations of the Pharmacopœia.

It is to two articles of this description that the recent General Order of the Board of Inland Revenue more particularly applies, viz., the liniments of aconite and of belladonna, which it is well known are largely used in hospitals, dispensaries and other charitable institutions where cost is an important consideration. In such cases, no less with medical practitioners in country districts, it is a great advantage to be able to save the additional cost which the use of duty paid spirit would entail, possibly with the effect of preventing many from enjoying the benefits to be derived from the use of these preparations.

THE ROYAL GARDENS AT KEW.

THE annual reports on the Royal Gardens at Kew are always the records of interesting facts in botanical science, and the one just issued is no less interesting than its predecessors. Before now the reports have told us of the successful acclimatization in India of the Cinchonas or the Ipecacuanha, but this year there is no special reference to any medicinal plant. Nevertheless, considering the valuable services Kew has rendered to pharmaceutical science a few notices of the work done at that well known botanical establishment, as illustrated in this last report, will, we believe, prove interesting to our readers.

Dr. HOOKER states at the commencement that there has been a considerable falling off in the number of visitors during the past year as compared with the preceding. To this we do not attach much importance, as we think the value of the gardens lies in its scientific position and not as a popular place of resort. Every year, however, Kew is more frequented by scientific men, a record of whose names would show the real value of the establishment.

The erection of two new buildings, one for the herbarium and library and the other as a laboratory, will make the gardens still more valued by scientific men. The ground for the former, however, has only recently been cleared, while the building for the latter is already finished with the exception of the fittings and apparatus. In the laboratory will be conducted investigations in chemical physiological and microscopic work.

Much has been done at Kew of late years in collecting together in shrubberies or distinct beds plants belonging to the same natural orders, and during the past year collections have been thus brought together of species of *Clematis*, *Magnolia*, *Berberis*, *Cistus*, *Helianthemum*, *Hypericum*, *Hibiscus*, and allied genera; as well as of *Vitis*, *Rhamnus*, *Euonymus*, *Celastrus*, etc. Many of the genera here mentioned are well known to the pharmaceutical student and the fact of the species being found together will be a boon to all those in any way interested in plants.

To the museums contributions continue to flow in to such an extent that to an ordinary observer there seems but little room for fresh additions But by judicious selection, new and better specimens are being frequently substituted for those that have become changed by time and exposure. The issue of the sixth edition of the 'Museum Guide,' to which we have before had occasion to allude, abundantly testifies to the utility and popularity of these museums.

Altogether, the year 1875 at Kew was one that resulted in a good store both of scientific and practical work.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, August 2nd, 1876.

MR. JOHN WILLIAMS, PRESIDENT.

MR. WILLIAM DAWSON SAVAGE, VICE-PRESIDENT.

Present—Messrs. Atkins, Betty, Bottle, Cracknell, Greenish, Hampson, Hanbury, Hills, Mackay, Owen, Shaw and Stacey.

The minutes of the previous meeting were read and confirmed.

ELECTION OF AUDITOR.

Mr. HENRY AYSCOUGH THOMPSON was unanimously elected an Auditor of the Society in the room of Mr. Stacey, who vacated his office on being elected a Member of the Council.

The following being duly registered as Pharmaceutical Chemists were respectively granted a diploma stamped with the Seal of the Society:—

Allen, Charles Bowen.
Amoore, Lewis Perigoe.
Baikie, Peter.
Bennett, Charles.
Bessant, Frederick Railton.
Best, John William.
Bowen, John William.
Dimmock, Augustus Frederick.
Dymott, Frank.
Glegg, John.
Haworth, Benjamin Henry.
Hicks, William Thomas.
Hunt, Arthur.
Jones, James Parry.
Lewis, David.
Milton, Thomas Clement.
Newbury, Samuel.
Newton, Alfred Henry.
Severs, Samuel Thomas.
Weddell, Arthur.
Wright, Thomas David.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists

Allen, Charles Bowen ....London.
Bessant, Frederick Railton ......Oxford.
Best, John William ....Darlington.
Bowen, John William ....Southwark.
Dymott, Frank ....Southampton.
Glegg, John ....Lochhead.
Haworth, Benjamin Henry......Ramsey, Isle of Man.
Hunt, Arthur ....London.
Milton, Thomas Clement.........Exeter.
Newton, Alfred Henry ....Kenilworth.
Severs, Samuel Thomas ....Ripon.
Weddell, Arthur... ....Winchester.
Wright, Thomas David ....Lancaster.

ASSOCIATES IN BUSINESS.

The following having passed the Minor examination, and being in business on their own account, and having tendered their subscriptions for their current year, were elected "Associates in Business" of the Society:—

Ellison, John Clement ....Brisbane, Queensland
Griffin, Alfred William ....Bath.
Pittuck, Frederick William ...Hebburn-on-Tyne.
Spilsbury, James ....Leamington.

ASSOCIATES.

The following having passed their respective examinations, and having severally paid (as apprentices or students) or tendered the subscription for the current year, were elected "Associates" of the Society:—

Minor.

Abraham, Alfred Clay............Liverpool.
Babb, James ....Taunton.
Carr, John Allen ....Lancaster.
Clayton, Thomas ....Malton.
Elkington, Thomas Valentine...Spalding.
Fargher, Henry Spencer ....Warrington.
Foggan, George.....................Newcastle-on-Tyne.
Frank, John ....Whitby.
Goodall, William Anthony ......Clifton.
Hart, James Connorton ....Horselydown.
Hatch, James Oliver ....London.
Hollick, Richard ....Birmingham.
Johnson, William Henry.........Nuneaton.
Jones, Richard Edward ....London.
Jones, William Henry............Landport.
Kiddle, Richard Neller ....Lambeth.
Laurie, John.........................Ipswich.
Madden, Ronald George ....London.
Nichols, Frederic Bulstrode ...Chelsea.
Owen, Griffith Charles Roose...Carnarvon.
Place, Frederick William ......Betley.
Roberts, Joseph ....Liverpool.
Robertson, Andrew ....Markinch.
Rumsay, James Window.........Crickhowell.
Silverwood, Joseph ....Manchester.
Stacey, Peter.........................London.
Trevaskis, George Marrack......London.
Treweeks, Richard Harwood ...Pembroke.
Truman, Henry Vernon ....Nottingham.
Veitch, Andrew ....Shildon.
Walker, George ....Liverpool.
Wallas, Thomas Irwin............Carlisle.
Wardle, William Stephens ......London.
Widdowson, Reuben ....Nottingham.
Wilkinson-Newsholme, G. T. ...Huddersfield.

Modified.

Goucher, Levi Tom ....Manchester.
Thorburn, Henry William ......Bishop Auckland.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Bolton, Frederic William ......London.
Brown, Richard, jun...............Rochester.
Cliff, James ....Wakefield.
Emerson, Henry Wall............West Hartlepool.
Field, William ....Shoreham.
Flintan, Francis Robert ....Weybridge.
Frost, John Henry ....London.
Fulcher, Herbert Ashton.........Beckford.
Gifford, Richard Lord ....Blackburn.
Halton, George Richard ....Douglas.
Hardy, James Hammond ......Filey.
Hart, Herbert Wheatley.........Wimbledon.
Hemmons, John ....Kingsdown.
Holme, William A. ....Northampton.
Holmes, James Henry............Kendal.
Layng, Henry ....Brandon.
Lockyer, Eden Henry............Bristol.
Mallen, James Edward ....Llantrissant.
Norman, William Haswell ......Wellingborough.

Ombler, William Henry ....Windsor.
Paul, Ernest ....Windsor.
Pheasant, William ....Clapham.
Pike, Frank Horton ....Reading.
Roughton, William ....Loughborough.
Smith, Robert Frazer ....Glasgow.
Smith, Tom Henry ....Howden.
Stonham, William Burne ......Maidstone.
Talbot, Wm. John Campbell ...Howden.
Whiffin, Henry......................Market Harborough.
Woodward, Harry Joshua W...Sheffield.
Yeates, Alfred ....Kington.

Reports of Committees.

Finance.

The report of this Committee was read, and sundry accounts ordered to be paid.

Benevolent Fund.

Previous to the report of this Committee being read, the Secretary announced that he had received a donation of 100 guineas to the fund from Mr. Thomas Buck, late of Kingsland Road. A resolution was passed conveying the thanks of the Council to Mr. Buck for his liberal donation.

The report of the Committee contained recommendations of the following grants:—

£20 to the widow of a member, in great distress owing to the death of her husband who had for some time previously been in very straitened circumstances.

£5 to an associate, suffering from illness, and at present dependent on his friends.

£5 to an associate out of employment, having recently failed in business.

Two other cases were ordered to stand over, one for further information and the other because the applicant had had four previous grants, one very recently.

The report and recommendations of the Committee were received and adopted.

Library, Museum, and Laboratory.

This Committee had held two meetings, at the first of which the name of Mr. Stacey was added to the Committee.

Professor Attfield had reported that he had 57 students working in the laboratory, making 122 entries since the commencement of the session.

The Librarian had reported that the average attendance in the Library during the day had been 26; in the evening 11; the circulation of books had been 141 in town; country 28, to 17 places.

The Committee recommended the purchase of the following books from the general fund:—

Alcock's 'Botanical Names for English Readers.'
'British Homœopathic Pharmacopœia,' second edition.
Tilden's 'Chemical Philosophy.'

The question of obtaining the foreign periodicals before referred to was again discussed, and it was recommended that Messrs. Friedländer and Sohn, of Berlin, be commissioned to obtain the volumes or numbers required to complete the sets of the following:—*Repertorium für die Pharmacie und Neues Repertorium; Annalen der Chemie und Pharmacie; Archiv der Pharmacie; Jahrbuch für Praktische Pharmacie und Neues Jahrbuch für Pharmacie.*

The Curator had reported the progress he was making in preparing the sets of lecture specimens for the Professors; and that the materia medica portion of the catalogue had been carefully revised by Messrs. Betty and Greenish. It was recommended that this portion be printed forthwith. The average attendance in the Museum had been during the day 20; in the evening 5. The Committee considered what arrangements would be necessary to provide for the Hanbury collection, and the Secretary and Curator were requested to wait on Mr. Hanbury and arrange for the removal of the collection as soon as possible. An interview had been held with the printer of the Journal with reference to an improvement in the folding and cutting the Journal, and it was promised this should be attended to. The Committee recommended that the Library and Museum should be closed in the evening during August and September. At the second meeting of the Committee it was reported that the materia medica portion of the Hanbury collection was now on the Society's premises, and it was recommended that it be placed in the Museum in the portion at present devoted to Animal Materia Medica.

The report and recommendations of the Committee were received and adopted.

House.

This Committee had held two meetings, the principal business being the consideration of the water supply which had been found defective. At the second meeting it was reported that the turncock had been communicated with, and that since then the supply had been adequate.

Mr. Hampson thought the Council ought not to rely only on a turncock, but that the water company ought to be called upon to provide for an adequate supply of water for which so much money was paid.

Some discussion ensued upon the matter and ultimately it was decided to leave the matter still in the hands of the Committee, with the understanding that it should receive continuous attention.

The arrangements of the gas in the Laboratory had also been considered, and the cleaning, etc., in the house, necessary to be attended to during the recess, were recommended.

The report and recommendations of the Committee were received and adopted.

The Pharmaceutical Conference.

Mr. Mackay asked if it were not possible to make any exceptional arrangement for the next Council Meeting, so that members of Council might be able to attend the Conference in Glasgow, which would take place at the same time.

Mr. Bottle said if there were not a *quorum* present no business could take place; so that if they agreed amongst themselves not to come the business would simply be suspended.

The President said under such circumstances it would be better not to summon the Committees for the Tuesday preceding the Council.

Law and Parliamentary.

The report of this Committee included a report from the Society's solicitor as to various cases which had been in his charge. In one case proceedings had been commenced, and in others further information was being sought. The name of Henry Jackson, of Hartlepool, was recommended to be removed from the register, and prosecutions in other cases were ordered.

The report and recommendations of the Committee were received and adopted.

Methylated Spirits.

Mr. Hampson drew attention to an order recently issued by the Board of Inland Revenue concerning the preparation and sale of methylated preparations for external use. It was to the effect that it was only legal to use this spirit in the making of soap liniment and compound camphor liniments, thus excluding aconite, and also belladonna liniments. Now, this order seemed most arbitrary and uncalled for; and the Council knew that in hospitals, etc., large quantities of these liniments prepared with methylated spirits were used. It seemed quite absurd to allow soap and compound camphor liniments to be made and to exclude the stronger and more dangerous compounds. The only object of the authorities, he should imagine, would be to prevent the use of duty free spirit for drinking purposes, but the step they had now taken, amounted to a confiscation of large stocks of these useful liniments, and seemed to be very oppressive, in fact it amounted to preventing poor persons using these articles, since they could not afford the more expensive preparations made with pure spirit. He suggested that the President and Vice-President should have some communication with the Inland Revenue authorities on this matter.

The VICE-PRESIDENT said this was not a new subject.

Mr. GREENISH said it was a new phase of it.

The VICE-PRESIDENT having read the clause bearing on the question,

Mr. STACEY said if he had known this question was coming up he would have brought with him a letter he had received from the Inland Revenue Office on the previous Friday. In 1869 he applied with reference to the making of several preparations and after a good deal of correspondence obtained permission to make aconite and belladonna liniments, as well as soap and compound camphor liniments, with methylated spirit. A few months ago some one called at his premises and put one or two questions with regard to the manufacture and sale of these preparations. He did not happen to be at home at the time, but the person was shown his premises, and he did not think any more of it until last Friday, when he received a letter, signed "Adam Young," stating that the Commissioners saw reason to withdraw the permission granted in 1869 for the use of methylated spirit for aconite and belladonna liniments. The person who called to make inquiries stated that only one other house, he believed it was, but certainly not more than two others, had asked for permission for such use of the spirit. He inferred that the authorities were annoyed at finding that large quantities of these preparations were being made without leave having been asked.

Mr. MACKAY said it was well known that large quantities of these liniments were made with methylated spirit.

Mr. HAMPSON said the matter was very important, and if something were not done about it, any of their brethren might be liable to a fine of £100. He thought it would be well if some notice of it were taken in the Journal, and if the President and Secretary would kindly undertake to see the Inland Revenue authorities they would be doing good service to the Trade.

Mr. SHAW had always understood that methylated spirit might be used for external applications.

The PRESIDENT remarked that belladonna liniment contained camphor and he doubted therefore if a magistrate would convict for selling it as it might be looked upon as a camphor liniment.

Mr. ATKINS said this was a very important matter, and it would be a most serious thing with regard to parochial practice in the country if the regulations were insisted on. He knew a medical man who used large quantities of these liniments, which he could not afford to do if he were obliged to employ pure spirit. It seemed to him that if the only object was to prevent fraud on the revenue, these two potent poisons of all others might be safely permitted to be sold.

After some further conversation it was resolved on the motion of Mr. Hills, seconded by Mr. Mackay, that the President, Mr. Stacey, and the Secretary should wait upon the Commissioners of Inland Revenue and represent to them the hardship which was inflicted by this new regulation.

Mr. MACKAY suggested that in the meanwhile it would be well for chemists to abstain from dealing in these articles until the result of the interview was known.

General Purposes.

The reports of the Professors as to the examinations for the sessional prizes had been presented to this Committee.

Professor Redwood had reported very satisfactorily of the attendance, progress, and general conduct of the students in the chemistry and pharmacy class. There were nine competitors for the silver medal, and seven for the bronze medal at the termination of the second course.

Professor Bentley had reported with regard to the botany and materia medica class that the competition was a very good one, fifteen candidates having presented themselves. The number of students during the session showed a marked increase over last year, the total number being about 120. He was also able to report most satisfactorily of the general good conduct, diligence, and progress of the students.

Professor Attfield had presented an exhaustive report respecting the practical work in the laboratory, from which it appeared that 123 pupils had attended during the session, the highest number by ten that had ever worked in the laboratory since the establishment of the school. He was able to testify as usual to diligence and gentlemanlike behaviour of the students. Fourteen competed for the Council prizes at the close of the session, the result of which will be found below. Professor Attfield added some remarks on the importance of attending to manipulation as well as results in awarding the marks, and expressed his opinion that the results of the weekly examinations throughout the session should be taken into account by the Professors, in addition to the terminal examination now held, in determining the position of candidates for the Council prizes.

The Committee had also received the report of the two Examiners appointed by the Council as to the result of the competition for the Council Examination Prizes, also the report of the President and Vice-President, and the two Examiners appointed by the Board, as to the result of the competition for the Jacob Bell Memorial Scholarships.

Professor Bentley had reported with regard to the Herbarium Prize that only two collections had been sent in, viz., from Mr. C. B. Buck, Sandgate, and from Mr. N. Cooper, Bradford-on-Avon. The first contained 510 specimens, and the second 446, and though in both cases the drying was somewhat deficient, they were both so well arranged and named that he recommended that the silver and bronze medals should be respectively awarded.

Mr. SHAW said it was considered very desirable some time ago, by some gentlemen, that the Pereira Medal should be competed for in the country under the same conditions as the Bell Scholarships. There were eight competitors here, and one in Edinburgh, but it was not stated whether they belonged to London or came from the country.

The SECRETARY said most of the men were from the country; but strangely enough, hardly any one who had passed his examination in the earlier part of the session had put in an appearance.

Mr. SHAW was very pleased to find that the examination being restricted to London and Edinburgh, did not prevent a number of men from the country coming up to it.

Mr. ATKINS, having congratulated Mr. Greenish on the success of his son in the competition, said he was very much gratified at hearing the reports of the Professors, in particular that of Professor Attfield, who had analysed with great care the whole work of the session. He was especially pleased to find that 75 per cent. of the students came from the country.

Mr. GREENISH said the Pereira Medal was the highest honour which the Council had to bestow, and yet out of sixty-two who had passed their Major examination, and were eligible to compete, only nine had presented themselves. This was much to be regretted, and he could not help expressing a hope that at no very distant period some other system would be adopted, and that this medal should be awarded not merely for success in an examination, but that some proof of capacity for original research should also be required of the candidates.

The SECRETARY thought the competition was rather restricted by the examinations being confined to London and Edinburgh. Many who passed their Major examination in the early part of the session got drafted off into different parts of the country and would not undergo the trouble and expense of a long journey for the chance of obtaining the medal.

The PRESIDENT thought a more potent reason for not competing was a feeling on the part of the young men who had passed some little time before, that their knowledge was not quite so fresh, and that they would probably be surpassed by those who had only just finished their studies.

The SECRETARY said he thought the feeling should be the other way, and that those who had passed their examination earlier should rather be inclined to read up and study in order to compete.

Mr. SHAW also thought it would be well if the conditions of the Pereira Medal competition were assimilated to those of the Bell Scholarship.

Mr. HILLS said they had had so many changes lately that he hoped no further alteration would be made at present. Before very long they would have to settle the conditions for the Hanbury Memorial Medal, and they could then consider the matter.

The report and recommendations of the Committee were then passed unanimously.

PRIZE AWARDS.

The following awards were made on the recommendation of the General Purposes Committee.

Jacob Bell Memorial Scholarships.

George William Bullen.
George Frederick Gutheridge.

Chemistry and Pharmacy.

(Five months course.)

Bronze Medal ....Alfred Clay Abraham.

(Ten months course.)

Silver Medal ....Henry George Greenish.

Certificates of Honour... Arthur William Wheatly. Samuel Newbury.

Certificates of Merit ... Thomas Ridgley. William Champley Kidd. Frederick William Place.

Botany and Materia Medica.

(Five months course).

Bronze Medal ....Charles Edward Palmer.

(Ten months course).

Silver Medal ... .Henry George Greenish.

Certificates of Honour... Arthur William Wheatly. Thomas David Wright. Samuel Newbury.

Certificates of Merit ... Augustus Frederick Dimmock. Charles Edward Stuart. Thomas Ridgley. James Hart.

Practical Chemistry.

Silver Medal ....Henry George Greenish.

Bronze Medals .... William Champley Kidd. Samuel Newbury.

Certificates of Honour Frederick E. Pollard. Henry Campbell. Samuel Thomas Severs. Arthur William Wheatly.

Certificates of Merit ... Thomas David Wright. William Gardner. Augustus Frederick Dimmock.

Botanical Prize.

Silver Medal ....Charles Burton Buck.
Bronze Medal........ .....Albert Henry Cooper.

Council Examination Prizes.

Pereira Medal (Silver) and books value £5.
Arthur William Wheatly.

Pharmaceutical Society's Medal (Silver) and books value £3.
Harry Alma Thomas.

Pharmaceutical Society's Medal (Bronze) and books value £2.
Samuel Newbury.

REPORT OF EXAMINATIONS.

July, 1876.

ENGLAND AND WALES.

		Candidates. Examined.	Passed.	Failed.
Major	12th	16	11	5
"	13th	17	9	8
		—33	—20	—13
Minor	12th	12	9	3
"	13th	10	6	4
"	14th	27	18	9
"	18th	27	10	17
"	19th	20	8	12
		—96	—51	—45
Modified . . .	22nd	6	3	3
		135	74	61

SCOTLAND.

		Candidates. Examined.	Passed.	Failed.
Major	12th	1	1	0
Minor	12th	10	7	3
" . . .	13th	9	3	6
		—19	—10	— 9
Modified . . .	12th	4	2	2
		24	13	11

PRELIMINARY EXAMINATION.

Candidates. Examined.	Passed.	Failed.
302	174	128

Two certificates received in lieu of the Society's Examination :—

1 University of Oxford.
1 Royal College of Surgeons in Ireland.

Mr. GREENISH suggested that it would be well if the Examiners presented a report once a year or once in six months giving some idea of the general efficiency of the young men, and also stating what subjects they were found chiefly deficient in. This would enable the Council in some degree to judge how far the lectures given by the Professors were adequate to the requirements of the students.

Mr. MACKAY said this plan might be adopted with regard to the Preliminary examination, but he did not see how it could be applicable to the other examinations, since a man who was found hopelessly deficient in one branch of knowledge was sent back without examining him in all the others; and the Examiners had not the materials for furnishing such a report.

The SECRETARY said that the Examiners did not know where the candidates came from, or where they obtained their knowledge. Some years ago he used to ask the young men where they had studied, but that was objected to as being rather inquisitorial, and it had therefore been discontinued.

Mr. GREENISH said it was not a question of where a man came from, but what was the average weakness of his knowledge.

Mr. BETTY considered that to require such a report would be impolitic, and would be an abuse of their power by raising a question between the Examiners and the Professors.

The VICE-PRESIDENT said his experience had taught him that the greatest credit was due to the Examiners for the very kind way in which they treated the candidates; but it was certainly the case that when a man failed in one or two subjects he was at once told that there was no chance of his success, and that he had better retire, consequently they could not say how far he would fail in other subjects.

Mr. HAMPSON did not think Mr. Greenish wished to get any information in the manner Mr. Betty suggested, but rather to elicit information for the guidance of the Council, and if it could be obtained it would certainly be useful. It seemed, however, very doubtful whether the plan was feasible.

The PRESIDENT said the information certainly could not be obtained through the Board of Examiners. They were there to examine not those who passed through the Society's school, but all comers, and they had no right to inquire where a man had been educated.

THE BIRMINGHAM CONFERENCE.

The SECRETARY read a letter from the Secretary of the Birmingham Conference enclosing a copy of a resolution to the following effect:—

> "That this Conference urges upon the Pharmaceutical Society the necessity of testing the legality of co-operative societies selling and dispensing poisons."

There was also a letter from a chemists' association at Bridgwater to the effect that it is desirable that the Pharmaceutical Society should endeavour by all means in its power to protect the interests of the trade throughout the country.

Mr. ATKINS said he was very glad the Council decided at the previous meeting to obtain a full report of the proceedings at the Conference, but with regard to the immediate request before them he thought the best way would be to refer it to the Parliamentary Committee. He desired, however, to say that he was not yet convinced that the Society was not both able and willing to undertake the work which he saw certain speakers at the Conference seemed rather to suggest that they were unwilling or unable to carry out. He very much wished that members of the pharmaceutical body throughout Great Britain should understand that a very large amount of important business in the way of protection of every just and legitimate interest was being constantly conducted at the Council Board. All matters were not reported, and wisely so in some cases, but the information was available for those who wished to have it. He had learnt that morning that some of the more important questions which they were charged by some men—who could not be perfectly informed—with neglecting, did receive the most careful attention they could bestow; and, therefore, while he did not stand up to deprecate the gathering of that assembly, but hoped and believed that it would be fraught with good results, yet he should personally deprecate the existence of an association outside their own as a permanent institution. The gathering of that body for the purpose of debate might act as a useful stimulus, but to have two institutions, so to speak, existing side by side, necessarily with some degree of antagonism, and certainly with an alienation of part of those funds which many could but ill afford to spare, would not be desirable. With regard to the immediate question before them he thought it was a point for very careful consideration in committee, and consultation with the aid of those legal opinions which the Society had at its command. There certainly existed outside the Pharmaceutical Council, and to a large extent outside the Society, an impression that they did not sufficiently care for the practical trading interests of the body, but he felt before he entered the Council, and he wished to say as the result of his very brief experience in the Council Room, that they did, and were prepared to, give due consideration to every question and every grievance that came before them. If he found that there was not the ability or the disposition to deal with such matters he should certainly protest against it, but he respectfully declined to attend that great and important gathering at Birmingham, because he considered that Council possessed the means of rectifying, so far as possible, every fair grievance that came before them.

The VICE-PRESIDENT said, whilst the Society was always ready to take up cases laid before it, yet it would often happen, to take an illustration, that a local secretary communicated to the Registrar that some one in his neighbourhood was infringing the law, the Registrar then wrote suggesting that the local secretary should obtain the necessary evidence for prosecution, but the reply to this generally was that the local secretary could not do so without making himself a marked man. That was the position the Council was constantly placed in. If the trade Association could do anything to meet that difficulty by employing some one to go round and get up evidence for prosecutions there might be a good result, but unless it did something of that kind he did not see how it could be of much assistance.

Mr. HAMPSON thought they were not called upon to discuss the suitableness of a trade organization being formed, but simply the resolutions which had been sent to them. He also suggested that they were out of order in entering upon the discussion unless some resolution was before them.

Mr. BETTY thought they had a right to discuss the letter which had been received, even without a formal resolution.

The PRESIDENT said it was necessary to have some discussion before deciding on the course to be taken, but he presumed a resolution would be proposed to carry out the wishes of the Council.

Mr. ATKINS said he should be prepared to move a resolution that the correspondence be referred to the Law and Parliamentary Committee.

Mr. BETTY could see no disadvantage to any one in treating of the correspondence now before the Council as a whole. He then proceeded to comment on a suggestion in Mr. Hampson's speech at Birmingham as to the incompatibility of a seat on the Council and the performance of a public duty, which led to a remonstrance from that gentleman. Mr. Betty continued that there was no one present for whom he had a greater personal regard than for Mr. Hampson, and he felt assured his friend would not less esteem him for the freedom of speech which had not overstepped the bounds of debate. There was no doubt that the Council was placed in a somewhat difficult and unenvious position by that part of the Birmingham Conference proceedings which urged the Pharmaceutical Council, by a formal requisition, to involve the Society in a costly legal process which the Council had been advised could not but be abortive. He would much have preferred that this subject should have been dealt with by what he would beg to term a more constitutional mode of procedure—that is, by one that would have brought together for the consideration of it the Council and its constituents in the form and manner provided for the conduct of the Society's affairs; at least this would have been fair play, for at any annual or special general meeting of the Society both sides would have been heard. It appeared to him that the remarks of Mr. Hampson in introducing the resolution at the Conference had tended to throw down the apple of discord between the Council and their constituents; he was fully convinced that no ground for disagreement existed, and he should be prepared to second a resolution that the communication from Birmingham be referred to the Parliamentary Committee to report the form of reply for the Council's sanction, a reply which would prove that frequently and earnestly the subject of co-operative dispensing had been considered by the Council, and that in their resolutions they had acted for the best interests of the Society.

Mr. Hampson said no apology was needed from him as a member of the Council for having taken part in the meeting at Birmingham, and he should not, therefore, offer any. He did feel, and had felt for some time, that the Council had not done its duty in reference to the question of co-operative societies, and if he were permitted to have a seat at the Board two or three months longer he should endeavour to take an opportunity of bringing the question again before the Council for reconsideration. That would perhaps be the most straightforward course to adopt, though he should have preferred some other gentleman holding similar views to himself doing so. He felt that he had a duty to fulfil there, but he had also a duty to fulfil with reference to the well-being of the trade. He had more than once been told at that Board that it was unwise for them to meddle in almost any trade matter, in fact, he had been told by an old member of the Board that it was unwise to refer to any profit derived from their calling. When such remarks were made there was no justification required for members of the trade supposing that the Council did not take a really genuine interest in trade questions. He did not think it was desirable to prolong the discussion at this time, and would only add that nothing but a sense of duty would have led him to attend the Conference, and if such circumstances arose that he felt the two things were incompatible—his seat at the Board and his action as an independent member of the Society—he should be prepared to resign his seat rather than give up his independence.

Mr. Atkins wished it to be mostly distinctly understood that he did not deprecate the meeting being held at Birmingham, and personally he was very glad that not only Mr. Hampson, but another member of the Council had attended it. He might be wrong in his judgment, but he desired to record his feeling that it would not be desirable to have a permanent institution of that kind existing. As an occasional meeting to express the opinions of the trade, and to give a stimulus to themselves, it might serve a useful end, but with his present views he should deprecate the existence of two institutions collaterally. He moved that the matter be referred to the Law and Parliamentary Committee for two reasons—first, because anything coming from that Conference deserved careful consideration; and, secondly, because the Committee might have had this very point before them already, and in fact carefully considered it. They had a large number of earnest struggling men in the trade doing their best to pay their way—men who were members of a trade rather than of a profession—and who thought that the Council did not sufficiently sympathize with them. These men deserved their deepest sympathy, and ought to be assured that the Council would entertain every fair and just representation which came before them. It was out of the question to think they could snuff out or extinguish an important meeting such as that at Birmingham, and it was from no desire to make light of the resolution that he proposed its being referred to the Committee. On the other hand he was sure they would give it the most cautious and calm consideration, and he believed great good would result.

Mr. Betty seconded the resolution.

Mr. Shaw could not agree that the organization set on foot at Birmingham was to be looked upon as antagonistic in any way. Some months ago they started a similar association in Liverpool, but their objects were in the first place to bind the whole of the trade together and to protect themselves, and in the second place to support the action of the Pharmaceutical Society. Another object was to promote the exemption of registered chemists and druggists from serving on juries, and another to take cognizance of any proposed legislation having special reference to the trade. They had an organization with president, vice-president, secretary, treasurer, and funds in hand, and therefore if occasion required, they could at once put themselves in action and assist the Secretary and Registrar in carrying out what was desired. Another object was to assist the Registrar in preventing illegal trading, because there was a difficulty which had often been alluded to with regard to persons engaged in the business taking a active part in getting up evidence, being required to go into court and submit to cross examination. If some public functionary were appointed to perform this duty, it would relieve those engaged in the trade from a very unpleasant duty, and he understood that this organization proposed to have an officer of this description. He had taken an active interest in the question of Civil Service Trading in Liverpool, and formed one of a deputation to their members of Parliament asking them to use their influence with the Government to prevent Civil Servants in the receipt of large salaries from engaging in trade, and he thought that was a principle which could not be objected to. He therefore suggested as an amendment that a reply should be sent to the latter to the effect that the question had been repeatedly before the Council, and would continue to receive its earnest attention.

Mr. Bottle thought it would be rather unwise to adopt Mr. Shaw's suggestion. It was much better to refer the matter to the Parliamentary Committee. It was within his knowledge, as an old member of the Committee, that this particular question had been before it and before the Council over and over again. They had taken opinions and advice, and had acted, as they considered, in the best interest of the Society. Some of their friends at Birmingham seemed to think that they had not done quite as much as they ought to have done, and as there were gentlemen now on the Council who were not present when these discussions took place, and the opinions were taken, he thought it would be well to afford an opportunity for them to understand the question in all its bearings, by having the matter thoroughly rediscussed in Committee. He would ask, therefore, that full time be allowed the Committee to consider the matter, and that all the information and opinions previously obtained should be laid before them.

Mr. Hanbury said it so happened that he was a member of the Council some years ago when this matter came before it. The Council then felt that it was necessary to proceed with extreme caution, and legal opinions were obtained which it was not thought desirable to publish, but an immense amount of time was devoted to the subject in which, naturally, they all felt deeply interested.

Mr. Mackay also bore witness to the great anxiety the Council had already shown with reference to this matter, and he was quite sure there was not a member of it who had not been actuated by the strongest desire to put down what they considered to be illegal trading, but when they were advised by their solicitor, backed by the highest legal opinion in the country, that they had better not meddle in the matter, he considered they had acted wisely in following the advice so given them. Therefore he quite agreed with the proposal to remit the matter again to the Committee, since it was really very much for the purpose of allowing their friends who had not been behind the scenes an opportunity of knowing what had been done. They must send a reply to their friends at Birmingham, and he was sure it would be so framed that it would convince them that they had been acting in the dark in passing the resolution they did, which was, he believed, considered by many as somewhat in the nature of a vote of censure.

The PRESIDENT, before putting the resolution, said he must express his opinion that it was a great pity that these gentlemen who were so eloquent at Birmingham did not come to the annual meeting of the Society and give them the benefit of their suggestions. The fact was that at the annual meetings, as a rule, there was a very limited attendance, hardly any one came up from the country, and they had the greatest difficulty in keeping up a discussion for half an hour on the last occasion. Why were not all these gentlemen present at the annual meeting? It would be a great advantage to the Council if they could meet their constituents once a year and take counsel with them, and he did hope that the result of this Birmingham conference and of the discussion it would create, would be to make their friends in the country take more interest in their proceedings, come to the annual meetings and give them the benefit of their criticisms if they thought fit.

Mr. OWEN said if they gave notice that this subject was to be discussed they would have a crowded meeting.

The PRESIDENT said the annual meeting was for the purpose of discussing any matters of the kind which were brought forward.

Mr. STACEY had been somewhat surprised at this resolution from Birmingham, because it appeared to him in some degree to be a vote of censure on the Council. He had been but a very short time a member of the Council, but as a member of the Law and Parliamentary Committee he should like to express how thoroughly convinced he was that the Council was probing to the very bottom the grievance which the Birmingham Conference, to a greater or less degree, had censured them for disregarding.

The resolution was then put and carried unanimously.

A communication was received from the Secretary of the Students' Association, thanking the Council for the use of rooms, gas, etc., for the purpose of holding the meetings of the Association during the past session.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING JULY, 1876.

	£	s.	d.
Allan, W., 90, High Street, Dumfries	0	10	6
Allwright, Isaac B., 1, Bath Place, Derby Road, Chesterfield	0	5	0
Ashley, W., Derby	0	10	6
Baxter, R., Huntingdon	0	10	6
Bell, Francis, 36, Tyrrel Street, Bradford	0	10	6
Bigg, Thomas, Great Dover Street, S.E.	1	1	0
Brelsford, James, 51, Greengate Street, Oldham	0	10	6
Brookes, Samuel, 62, Lisson Grove, N.W.	0	10	6
Brunt, Thomas H., Market Street, Hyde	0	10	6
Burgess, Willows, and Francis, 101, High Holborn, W.C.	1	1	0
Churchill, J. and A., 11, New Burlington Street	1	1	0
Clarke, C. J., Old Butter Market, Ipswich	0	5	0
Clay, Dod, and Case, 52, St. Anne Street, Liverpool	1	0	0
Cooper, John, 30, Meridian Place, Clifton, Bristol	0	5	0
Cooper, Mark, Church, near Accrington	0	5	0
Crook, Charles, Mirfield, Yorks	0	5	0
Cross, John T., 1, King Street, Dover	0	5	0
Davy, Yates, and Routledge, 64, Park Street, S.E.	2	2	0
Dobell, Dr. H., 84, Harley Street, W.	1	1	0
Elliot, E., Guidepost, Morpeth	1	1	0
Epps, James, 48, Threadneedle Street, E.C.	1	1	0
Farnworth, William, 49, King William Street, Blackburn	1	1	0
Foggon, G., Bedlington, Northumberland	0	5	0
Gerard, G. R., Great Bedwin, Wilts	0	10	6
Greenwell, R. H., Chester-le-Street	0	10	6
Groves, H. F., Lewisham	2	2	0
Hackforth, F., Leyland, Lancs.	0	10	6
Hackforth, M., Leyland, Lancs.	0	5	0
Hackney, William Francis, 332, Kentish Town Road, N.W.	1	1	0
Heath, Frederick D., 22, Hamilton Terrace, Highbury Park, N.	0	5	0
Hodgkinson, Stead and Treacher, 127, Aldersgate Street	2	2	0
James, James Thomas, 15, Princes Street, Hanover Square	0	10	6
Jenkins, Jabez, Llysyfran, Haverfordwest	0	5	6
Joce, J., Bideford	0	5	0
Jones, Alfred, Victoria Road, Scarborough	0	5	0
Jones, C. A., 7, Market Square, Hanley	0	2	6
Leare, James, Sunbury	0	10	6
Levick, G. A., Caistor	0	4	0
Longbotham, J., Chester-le-Street	0	5	0
Machon, H., Saffron Walden	0	15	0
Marks and Son, 61, Houndsditch, E.C.	0	10	6
Maw, C., 11, Aldersgate Street, E.C.	1	1	0
Maw, Son and Thompson, 11, Aldersgate Street, E.C.	2	2	0
Mayfield, J. T., Newcastle-on-Tyne	1	1	0
Moore, Thomas, Sheepshed, Leicestershire	0	5	0
Morson, Thomas, 31, Southampton Row, W.C.	1	1	0
Mott, J. C., 17, Bull Street, Birmingham	0	5	0
Noble, J., South Shields	0	5	0
Parker, W., King Street, Darlaston	0	10	6
Parker, W., 10, Cheapside, Lancaster	0	5	0
Parkes, J. P., Stoke Newington, (balance of £1 1s. 0d.)	0	1	0
Parkinson and Son, Southampton Row, W.C.	1	1	0
Powell, Thomas H., 7, Poultry, E.C.	0	10	6
Raffle, William, Green Street, South Shields	0	10	6
Robinson, E., Deritend, Birmingham	0	10	6
S. T., Ripon	0	5	6
Smith, Wilson and Co., Leith	1	1	0
Sowden, S., 262, Wakefield Road, Bowling, Bradford	0	5	0
Thompson, Edward, 1, King Street, Dover	0	5	0
Thompson, J., 11, Aldersgate Street, E.C.	1	1	0
Urwick, W. W., 60, St. George's Road, S.W.	1	1	0
Watts, John, Dudley Hill, Bradford	0	10	6
Weston, Charles, Ventnor	1	1	0
Wilkinson, B. J., 1, Middleton Road, Kingsland, E.	0	15	0
Williams, Evan, St. Clears	0	10	6
Williams, M., Oaklands, Builth	0	5	0
Woolley, Sons and Co., 69, Market Street, Manchester	1	1	0

DONATIONS.

	£	s.	d.
Buck, Thomas, Stamford Hill	105	0	0
Rogers, Dr. Nathaniel, 87, South Street, Exeter	10	10	0
"S. M."	2	0	0
Squire, William, Hanwell	1	1	0

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

DETERMINATION OF QUININE.—SUPPLEMENTARY NOTE.

Sir,—Mr. A. H. Allen, of Sheffield, referring to my paper on the Determination of Quinine (*Pharmaceutical Journal*, July 29), has done me the honour to inquire whether an alkalized solution of "Ferri et Quiniæ Citras" which (after having been shaken up once with ether in the way I described), is found to retain still a considerable quantity of the alkaloid, does not yield the greater part of the latter, at any rate when shaken up with a second quantity of ether. I shall be glad if you will permit me to say that this is in fact the case. An alkalized solution of 50 grains of "Ferri et Quiniæ Citras" in an ounce of water, after having been twice shaken with ether (of which in all 7 fluid drachms were used) and the aqueous layer carefully drawn off from the ethereal one, was found to retain only ·2 per cent. quinine; when 8 drachms of ether were used only ·14 per cent. were retained, and when 12 drachms, less than ·1 per cent.

But I by no means wished to intimate that "Ferri et Quiniæ Citras" could not be accurately estimated at all when ether was used as solvent, but only to show that it could not be accurately estimated by ether in a certain case, the circumstances of which case had been minutely described. I wished to point out that a mode of estimation by ether, which was found quite accurate when applied to simple solutions of quinine, was inapplicable to preparations of quinine containing much citrate of ammonium. When quinine is precipitated in a simple solution, ether takes up on the very first shaking all, or all but a trace of the quinine present. When precipitated in a solution of citrate of ammonium, however, ether does not at the first shaking remove nearly all the quinine, the agitation with ether, having, as we now see, to be sometimes twice repeated before this result is achieved. Chloroform, on the other hand, applied in the way described, can be absolutely relied on in presence not merely of citrate of ammonium, but of sugar and glycerine, for extracting the whole of the quinine contained in the sample under examination. There are two or three practical reasons which seem to make chloroform preferable to ether for estimating most quinine containing preparations, but especially "Ferri et Quiniæ

Citras." To these, or rather to some of these (for I do not wish unduly to extend this note), I will briefly refer. Ether, especially in hot weather, is a troublesome substance to work with: it is very volatile and very inflammable; it creeps up the sides of the vessel, and there are occasional mishaps which (if I may judge from my own experience) one is liable to in using it. Now I have had during the last twelve months or so a great number of determinations of quinine to make in all sorts of pharmaceutical preparations, and when I have effected these by chloroform, using the separating-vessel in the way described in my paper, I have got nearly always such constant and evidently accurate results, and got them so readily and unfailingly, that I can hardly conceive it possible, following this method, when ordinary care is taken, to have a mishap or to get results that cannot be depended upon. It is another case of course when the fluid under examination contains non-volatile substances, as colouring matter, etc., that are soluble in chloroform; but into this I cannot enter now.

ALFRED N. PALMER.

69, *Market Street, Manchester.*

BUTTER ANALYSIS

Sir,—We have read with much interest Mr. Bell's valuable paper on Butter Analysis, which was presented to Parliament, and subsequently published in your Journal, July 22, 1876.

As every chemist and food analyst is aware, and as Mr. Bell states in his paper, we have for some years past been much occupied in working on the same subject, and we were the first who succeeded in placing butter analysis, once considered a problem incapable of solution by chemical means, on an equal footing with other branches of food analysis, by giving a simple chemical method not only for the qualitative detection, but also for the quantitative determination of foreign fats in factitious butters. We should therefore, be much obliged, if you would grant us a little space in your valuable columns to discuss some of the points raised by Mr. Bell in the paper above referred to.

We demur to his statement that our method "met with little acceptance from analysts, so that the test for a time practically fell into abeyance." On the contrary it was eagerly taken up by a great number of the leading public analysts, and was discussed in every journal which had any pretension to deal with scientific subjects. We could name not a few of such analysts, who, from the very publication of our pamphlet in 1874, after having carefully and critically tested the method proposed by us, expressed their entire assent to the principle and to its practical value. The method has never for one moment fallen into "abeyance." The many prosecutions of dealers for selling adulterated butters which commenced to be instituted soon after the appearance of our pamphlet show clearly that the new way opened was actively pursued by many fellow labourers. To day we believe there is hardly one single public analyst's laboratory wherein the determination of the amount of insoluble fatty acids is not constantly used and relied upon to detect admixtures of foreign fats in butters.

There have been many modifications and important improvements made upon our method, but still the process itself was not altered. Our standard was soon recognized as somewhat too low, and was generally raised for about a percentage and a-half. We, however, even now again have reason to believe that that original standard was very near the truth and that still the many hundreds of figures subsequently obtained are too high. Experiments recently made by Dr. Turner and by Dr. Dupré, F.R.S., clearly point to such a conclusion.

Furthermore, this original standard was not, as Mr. Bell conceives it to have been, founded upon the analyses of samples obtained from "one part of the country only," for our list includes most kinds of butter to be procured in commerce coming from places widely distant, from the Isle of Wight, Sussex, Normandy, Jersey, Surrey, and Hertfordshire.

The specific gravity of the melted butter fat seems to Mr. Bell to fulfil every requirement of an easy and certain test to discover and determine adulteration of butter with foreign fats, but on the authority of Dr. Dupré, F.R.S, who more than any other food analyst has inquired into this subject, we may state that this test has only a limited application, and although valuable in many cases as corroborative evidence must not be relied upon when taken alone,—in many instances it seems to fail altogether. For further information upon this matter we must refer your readers to a paper by Dr. Dupré in the *Analyst* for July.

The sp. gr. test is doubtless easier and more quickly obtained than an estimation of the insoluble fatty acids, which indeed requires care and some manipulative skill, but we beg leave strongly to doubt, whether any chemist would prefer a specific gravity test to a tangible gravimetrical estimation; what we stand in need of in all analytical processes, is not a slight physical, but a real chemical difference. This desideratum cannot in all cases be obtained, but in butter analysis we contend that it has been.

Arguing from a general standpoint we urge that specific gravity tests are as a rule less reliable and more easily baffled than are chemical methods, and we suggest that if any analyst desire to certify upon one test only he will be safer with the chemical than with the specific gravity method, but that it is preferable to test the sample microscopically, chemically, and physically.

One impression which Mr. Bell's figures, if left without comment, would be sure to produce would be, that pure butter may sometimes yield, as in No. 115, "County Galway" 89·90 per cent. fixed fatty acids. We have personal reasons for perfect faith in Mr. Bell's skill and bona fides; at the same time we must take exception to the want of proof of the genuineness of his samples. No doubt, but that the officers deputed to collect would, in the main, do their duty with care, but in such a number it is not unlikely that some did not exercise the extreme pains needed to ascertain beyond any doubt the freedom of the sample from any kind of sophistication.

During the quarter ending Midsummer of this year we analysed eighty-four samples of salt or "tubbed" butter officially collected in the county of Hants; 25 per cent. of these were found to be adulterated in most cases with foreign fats. Forty-four samples of home-made fresh farm butter were also analysed, and all found to be pure. This tends to show that the admixture of foreign fats is done upon a large scale, and not by those who are small producers. If natural butter ever yields so high a percentage of insoluble fatty acids as 89·90, it is strange that in no instance out of forty-four samples did it reach anything like such high figures. If we take Mr. Bell's conception that there can be no question whatever as to the genuineness of the 117 samples of butter in Table II., then we admit that pure butter can often contain 20 per cent. of water or 15 per cent. of salt. We fail to perceive any difference between adding and intentionally leaving in large percentages of water, and the fact that large quantities of water are often found in the highest priced butter is easily understood when we reflect that such skilful manipulation of valuable products must yield great profits to the manufacturers. That No. 15, obtained from the dairy of a private gentleman, contained 16·99 per cent. of water proves at most that that gentleman had very careless servants, and as a matter of fact we know that in the private dairies of Hampshire no such quantity of water or butter milk would be left in. On the other hand we found in one or two instances tubbed butter containing abnormal quantities of water.

In conclusion we beg to state that we have the greatest possible regard for Mr. Bell's sincerity of intention, but although he speaks of our discovery in terms of acknowledgment, we have thought it necessary to trouble you with this communication in order to anticipate and correct erroneous impressions which Mr. Bell's paper would be likely to produce.

ARTHUR ANGELL and OTTO HEHNER,

Analysts for the County of Hants.

Prosenchyma.—(1) *Rubia peregrina;* (2) *Chlora perfoliata;* (3) *Vicia Cracca;* (4) *Equisetum arvense;* (5) Send a specimen in flower; (6) *Daucus Carota;* (7) *Lithospermum arvense;* (8) *Æthusa Cynapium.*

F. D. Lewis Weston, Chester.—(1) Send a better specimen with leaves; (2) *Epilobium hirsutum.*

Norwood is referred to the rule respecting communications.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Baildon, Iota, F. S. T., S. W., Acetum, Sixty-six, W. H. P. Bourne, W. Symonds, and V. D. Lewis.

NOTES ON THE DRUGS COLLECTED BY THE PRINCE OF WALES IN INDIA.

BY JOHN R. JACKSON, A.L.S.,

Curator of the Museums, Royal Gardens, Kew.

It was recently announced in the *Pharmaceutical Journal* that the Kew Museums had become possessed of the collection of vegetable products brought home by H.R.H. the Prince of Wales from India. This collection consists of about 180 specimens of seeds, fruits, barks, gums, etc., besides a fair collection of woods of more or less interest. The best portion of the collections are the produce of Southern India and were arranged and catalogued in Madras, the specimens being classified under distinct heads. The catalogues, however, though well printed, and the names for the most part accurate, are mere lists, no information being given as to the nature of the plants furnishing each product, or even of its uses.

Amongst spices and condiments several seeds occur that are equally as much used in medicine. The drugs are placed under a distinct head, foremost amongst which is the star anise (*Illicium anisatum*, Lour.). This tree which grows to a height of about twenty feet, is originally a native of South Western China, from whence European commerce is supplied, the well known stellate arrangement of the carpels giving the name star anise to the fruit. Besides the quantity sent to England, France, Germany, and Italy, for flavouring liqueurs or spirits and for the expression of an oil, the fruits form a large article of trade between various Asiatic nations. In India, China, and Japan, they are commonly used for flavouring food, and they are frequently chewed after meals with the double view of imparting a fragrance to the breath and of assisting digestion. They are also commonly used by the native practitioners as a stomachic and carminative. The form or variety which has been described as a distinct species under the name of *I. religiosum* is held sacred by the Japanese, who decorate their tombs with wreaths made from it and burn the bark as incense in their religious rites. It is said to burn slowly and evenly, and on this account is powdered and put into tubes, graduated on the outside, which being burnt during the night mark the time.

Under the name of tree turmeric are specimens of the young wood of *Coscinium fenestratum*, Colebr. This wood is of a bright greenish-yellow colour and has a bitter taste. Upon cutting a piece of the stem across it is seen to be very open in structure, without concentric rings, and the medullary rays very prominent. It is usually known under the name of false calumba, and though not officinal in India it is often used as a tonic; indeed it is reported that after extensive trials made at the Trevandrum Charity Hospital, this wood was recommended as a pure bitter tonic where calumba was not available, and as being "well worthy the attention of practitioners in the east as a cheap and efficient tonic." The form in which it is usually given is as a tincture or infusion. The specimens in the Prince's collection are small, not more than an inch in diameter, the specimens previously existing in the Museum being from 2 to 2½ inches across.

In *Toddalia aculeata*, Pers., a prickly, climbing rutaceous plant, we have also a stimulating tonic medicine, which has a place in the Indian Pharmacopœia. The part used is the bark of the root, which is of a yellowish corky nature, with a pungent aromatic taste. In a dry state it becomes of a yellowish brown colour but retains its pungency for a long time. It has been shown by Guibourt and confirmed by Hanbury in the 'Pharmacographia' that the root of this plant, together perhaps with other species of *Toddalia* and also of *Zanthoxylum*, furnished a drug which at one time had considerable reputation in Europe as a remedy in diarrhœa under the name of Lopez root. In India the root bark of *Toddalia aculeata* is administered either in the form of infusion or tincture. The plant is plentiful in jungles and hedge-rows in Malabar, Mysore, Coromandel, and other parts of the Madras Peninsula.

Cassia Absus, L., called the Black Gram, occurs not only in India but in Northern Africa. The seeds are small, black and shining, and are used both in India and in Egypt in ophthalmic cases, being reduced to a fine powder and introduced in minute quantities beneath the eyelid. They have a bitter aromatic taste, and are commonly seen in the Indian bazaars. The seeds also of *Cassia auriculata*, L., are sometimes used in diseases of the eye. The bark, however, of this species is alone represented in the collection just received at Kew; this is in small pieces of a reddish brown colour, and has a somewhat astringent taste. It has been employed in India for gargles instead of oak bark. In some parts the bark is bruised, mixed with molasses, and the whole allowed to ferment and a spirituous liquor prepared from it. On account of its astringency it is used by the native tanners for tanning leather, and also for dyeing a buff colour. Neither of these species of *Cassia* are officinal in India, though both are favourably spoken of by European practitioners.

Vernonia anthelmintica, Will., a composite plant, common in waste places throughout the East Indies, has small black seeds, which are commonly to be seen in most of the bazaars. They are used, as the specific name indicates, as an anthelmintic. A notice, however, of their uses appeared in the *Pharmaceutical Journal* for December 12, 1875, vol. vi., 3rd series, p. 463.

The specimen belonging to the Prince of Wales's collection is called Purple Fleabane. In the natural order Scrophulariaceæ is another non-officinal substance, namely the roots of *Picrorrdiza Kurroa*, Royle, a plant growing in Kumaon and other parts of the Himalaya. These roots, which are found in the bazaars in short, irregular pieces about as thick as a quill, somewhat tapering and partly covered with rootlets, are of a dark colour and have a strong bitter taste. It is extensively used by the natives as a tonic.*

In the Graminaceæ, *Bambusa arundinacea* claims the first attention, more, perhaps, on account of the multitudinous uses to which the bamboo is put generally than of any real medicinal properties contained in any part of the plant; nevertheless, it has a reputation amongst the natives for the cure of various diseases. Thus, for instance, the leaves are considered emmenagogue and anthelmintic, the bark as a specific in eruptions and the root as a diluent. It is, however, for the peculiar siliceous concretion called *Tabasheer*, that the bamboo is most valued in native medicine. This is found in the hollow stems near the joints or

* See *Pharm. Journ.*, vol. iv., 3rd series, p. 1034.]

articulations; it is considered by the natives a certain cure for paralysis, flatulence, etc., but from careful researches it would seem that as a medicine it has no power whatever. The plant is not officinal in India. The specimen received at Kew consists of the seeds or grains which are called bamboo rice. Why they are included under the head of drugs we cannot say. The other products under the head are so well known that we merely give their names, *Strychnos Nux vomica* and *S. potatorum* seeds, *Hyoscyamus niger* seeds, *Cubeba officinalis* fruits, and others of a similar nature. There are also the young miniature fruits just formed of *Eriodendron anfractuosum*, D C., but we do not know to what use these are put in India. The uses of the gum yielded by the tree, as well as of the cotton which fills the ripe fruit, are of course well known, but these young fruits are new to the museum and their uses are quite unknown to us.

Amongst gums and resins there are none that call for special remark. They are of the usual character such as those from *Feronia elephantum*, Corr., *Garcinia pictoria*, Roxb., *Azadirachta indica*, Juss., *Styrax Benzoin*, etc.

THE OIL OF ORRIS ROOT.*

BY PROFESSOR F. A. FLUCKIGER.

Orris root owes its use during more than two thousand years chiefly to its fragrance, which curiously enough, does not belong to the living root. Its slight and by no means aromatic smell is first developed into the agreeable perfume after drying, without doubt in consequence of changes of a chemical nature, concerning which at present our knowledge is deficient. When the dried root stock is submitted to distillation with water eventually there appears upon the water a crystalline odorous matter which is justly prized in perfumery and is specially prepared by some of the larger distillers. But the yield is very small, only about 1 part per 1000 of the orris root used. The product is of a yellowish-brown colour, of the consistency of a firm ointment, and possesses the characteristic odour of orris root.

H. A. Vogel was probably the first chemist who occupied himself with oil of orris or orris stearoptene, though the details given by him are quite unimportant. In 1835, Dumas made the following communication to the French Academy:—

"Orris root of Florence, submitted to distillation with water gives a nacreous crystalline lamellar product, insoluble in water and capable of being collected by filtering the distilled water. The product contains—

$$\left.\begin{array}{lr} \text{Carbon} \ldots & 67{\cdot}2 \\ \text{Hydrogen} \ldots & 11{\cdot}5 \\ \text{Oxygen} \ldots & 21{\cdot}3 \end{array}\right\} \text{Formula } C_8H_8O.$$

"The formula of this body is very remarkable. It will be remembered that in essence of roses there exists a crystalline product, the formula of which is that of bicarbonated hydrogen. It may be that the substance from the Florentine iris is an oxide of the substance from essence of roses; but the small quantity I have had at my disposal has not allowed any experiment for the verification of this conjecture."

By repeated recrystallizations from alcohol of a specimen of oil of orris prepared by Messrs. Herring and Co., the author obtained it, with the help of animal charcoal, in colourless crystalline scales, the form of which could not be decided. By this purification of the oil, or presumed stearoptene, the odour was concentrated in the mother-liquor, the crystals becoming more and more odourless, until finally they perfectly lost all aroma. An alcoholic solution of the crystals possessed no rotatory power, and energetically reddened litmus paper moistened with alcohol. After repeated recrystallizations the melting point reached 52° C.; a less pure preparation melted at some degrees lower temperature. Carbon bisulphide appears to be be unsuitable for the removal of the perfume from orris root; the quantity of essential oil is exceedingly small, and this solvent removes with it a very soft resin, tannin, and probably also fatty matter.

Elementary analysis of the crystals gave—

	I.	II.	III.
C	75·54	73·29	74·05
H	12·31	12·78	11·69

These figures taken in conjunction with the previous observations leave no doubt as to the nature of the presumed orris stearoptene; it is myristic acid, $C_{14}H_{28}O_2$. This formula requires—

			Mean of the Analyses.
14 C	168	73·69	73·96
28 H	28	12·28	12·26
2 O	32	14·03	

After this point had been established it was easy to remove the fat acid from the crude product by digesting the alcoholic solution with anhydrous sodium carbonate or bicarbonate, to obtain a soap solution from which the myristic acid is precipitated upon addition of a stronger acid and dilution with water. Upon heating the liquid to 60° C. it rises as an oily layer, which solidifies in a crystalline form at a temperature some degrees below 50° C. By repetition of this treatment the product may be easily brought to approximate and finally to attain the melting point of pure myristic acid, 54° C. The effect of the presence of the smallest quantity of the obstinately adhering volatile oil, or of a trace of lauric acid ($C_{12}H_{24}O_2$), melting at about 44° C., which may easily accompany the myristic acid, must be to lower the melting point.

The above observations upon the London oil were so far repeated with a sample of oil from Messrs. Schimmel and Co., of Leipzig, as was necessary to show the identity of the perfumes.

After these experiments upon the perfectly odourless myristic acid the preparation remains saturated with a somewhat volatile oil. Upon digesting the crude product in a closed flask with lead oxide, the oil separates as a rather thick brownish fluid, which remains fluid at −10° C.

As the oil containing myristic acid is only obtained by the most careful distillation, in the proportion of about 1 in 1000, the quantity occurring in the root itself may be estimated as being much smaller still, possibly not amounting to 1 in 10,000. It may probably be included in the as yet uninvestigated class of so-called ferment oils, in that so far as is indicated by the smell it does not occur in the living root.

The question arises, how the myristic acid, which can only with difficulty be distilled without decomposition, passes over with the oil. The explanation

* Abstract of paper in the *Archiv der Pharmacie*, for June, 1876.

of this is to be sought in the phenomenon of diffusion. Rose oil is similarly accompanied by a stearoptene that it is difficult to volatilize by itself.

The occurrence of myristic acid in oil of orris is probably to be attributed to a fat which is present in the root and is split up by the vapour of water. The quantity of this fat must be very small, since 300 grams of orris root powder exhausted with carbon bisulphide gave a soft perfumed resin, but neither free myristic acid nor neutral fat could be detected. The author also sought to ascertain whether free myristic acid was already present in the root. The carbon bisulphide extract was digested with sodium carbonate and alcohol in order to obtain a solution of sodium resinate and myristate, from which the acid sought could be precipitated by acetic acid. If myristic acid were present it would on prolonged digestion of the turbid acid liquid, gradually rise to the top as an oily layer. This, however, did not take place even after several days; the brown resinate slowly sank to the bottom as a pulverulent mass, and the liquid became clear without yielding any oily layer.

THE COMPOSITION AND ANALYSIS OF BUTTER FAT.*

BY A. DUPRÉ, PH.D., F.R.S.,

Lecturer on Chemistry at the Westminster Hospital.

Up to the year 1874 butter fat was regarded as consisting, like other fats, of a mixture of tri-stearate, palmitate, oleate, etc., etc., and with only a trace, 2 per cent. at most, of butyrine. On the strength of this assumption no attempts were made to distinguish butter fat chemically from other fats, as it was felt that a maximum difference of 2 per cent. gave far too small a margin for safe conclusions to be drawn.

In July, 1874, however, Messrs. Hehner and Angell published a small pamphlet in which they showed that butter fat yielded only about 86 per cent. of fatty acids insoluble in water, whereas, on the above assumption, it should yield, like most other animal fats, about 95 per cent. Here, then, was a difference, apparently, at once constant and of sufficient magnitude, to be available for the detection of adulteration of butter fat with at least such fats as are more commonly used for this purpose. The value of this alleged fact, for the purpose of detecting adulteration, depends chiefly on the constancy of the alleged proportion of insoluble fatty acids; and is independent of the nature of the substance making up the remainder. Nevertheless, it is of advantage to know the nature of this remainder, if for no other reason than to demonstrate why the insoluble acids should be as low as alleged. Messrs. Hehner and Angell accordingly made some attempts to supply this deficiency, and came to the conclusion that it consisted, besides, of course, the necessary glycerine residue, of fatty acids soluble in water, butyric acid chiefly The method by means of which they endeavoured to show this was, however, open to objection and their explanation was therefore not generally accepted.

In the summer of 1875, I in consequence undertook a series of experiments, in order, if possible, to clear up this point, which seemed to me of considerable interest. The work was frequently interrupted and therefore progressed but slowly. At our meeting in January, 1876, I gave, however, a short description of some of these experiments, which seemed to me to demonstrate that butter fat really did contain a considerable proportion of fatty acids soluble in water, as Messrs. Hehner and Angell had alleged. The experiments, it may be recollected, consisting in heating butter fat either with water alone, or with water and a known amount of alkali in closed tubes to a temperature of 500° F. In the first case the fat splits up into soluble and insoluble fatty acids and into glycerine, in the second case the soap produced may be decomposed by means of a known amount of acid, the insoluble fatty acids collected as usual, while the soluble fatty acids are estimated in the filtrate by standard alkali. None of the experiments then recorded were, however, quite satisfactory, as owing to constant leakage of the tubes, some loss had taken place in each case. Since then I have overcome this difficulty and now beg to lay the results of these later experiments before you.

Heating with water only.—About five grammes of the dry filtered butter fat were enclosed in a silver tube, with about 80 cub. cent. of water, and heated to a temperature of from 500 to 550° F. for a period of four to five hours. After cooling, the tube was opened and the contents washed into a beaker, or latterly a flask, as recommended by Dr. Muter, and the insoluble fatty acids thoroughly washed, dried, and weighed without removing them from the flask or beaker. The silver tube was washed out with ether, and the amount of fatty acids thus obtained, added to that found as above. The aqueous filtrate containing the soluble fatty acids and glycerine was neutralized with barium carbonate, boiled, filtered and evaporated, at first on a water-bath, finally in vacuo over oil of vitriol. The residue obtained was then weighed and the glycerine present extracted with alcohol, or expelled by prolonged heating to a temperature of 130° C., and the rest again weighed, the loss being taken as glycerine. Finally the residual barium salt was converted into sulphate, from which the amount of soluble acids present could be calculated. Neither of these processes is, however, quite satisfactory; in the first some barium salt is dissolved by the alcohol, in the second the glycerine cannot be all expelled without danger of decomposing some of the barium salt. (Owing to this I have not as yet been able to estimate the exact equivalent of the soluble acids present, but I believe that it is very near to that of pure butyric acid. I am now engaged in some experiments to settle this point more conclusively.) In some of the experiments I therefore weighed the mixed residue of glycerine and barium salts, added sulphuric acid, evaporated, ignited, and weighed again. On the assumption that the soluble acid present is butyric acid, we are then able to calculate both the acid and the glycerine contained in the residue. The general results of the experiments I have already stated, viz.:—that they show the presence of a notable proportion of soluble fatty acids. I may, however, give one experiment in full.—

Dry filtered butter fat taken .	4·800	grammes.
Insoluble fatty acids obtained .	4·202	"
Mixed glycerine and barium salt	1·059	"
Sulphate of barium	0·3395	"

This gives the composition of the fat as follows:—

Insoluble fatty acids	87·54	grammes.
Soluble " "	5·33	"
Glycerine	12·62	"

This still leaves a deficiency, due in part, I have no doubt, to an under estimation of the insoluble fatty acids, owing to difficulties of manipulation, in part to the fact that the soluble acid is not, as assumed, pure butyric acid. In three other experiments, each made with a different sample of butter, I obtained soluble fatty acids, 5·3, 6·4, and 5·8 per cent., mean of the four 5·70 per cent., and glycerine 10·86, 11·5, and 11·8 per cent., mean of the four experiments 11·69 per cent.

Heating with standard aqueous alkali.—The same amount of butter fat as previously given was heated with 25 cub. cent. of normal soda solution, generally with the addition of some water, in the closed tube as before, to a temperature of 500° F. for four hours. The resulting soap wa

* Read before the Society of Public Analysts, June 14, 1876.

decomposed by 25 cub. cent. standard acid, slightly stronger than the alkali used, and the insoluble fatty acids washed, dried and weighed as usual. In the filtrate the acidity was estimated by a decinormal soda solution, and after subtracting the excess of acid added the rest was calculated as butyric acid. Some of the results obtained were very good, but as I found that unless the soda solution used for saponification was very much stronger than that given above, which, of course, is very objectionable on other grounds, nothing was gained by substituting soda solution for pure water, except, perhaps, that the experiments could now be performed in an iron instead of in a silver tube. In either case I had to heat to at least 500° F. for not less than four hours to ensure decomposition. I therefore abandoned this method also, but will give two experiments performed in this manner.

Twenty-five cub. cent. of the standard acid added to 25 cub. cent. of the standard soda required 3·8 cub. cent. decinormal soda to produce exact regularity.

	1st Exp. Grammes.	2nd Exp.* Grammes.
Butter fat taken	4·041	3·599
Insoluble acids obtained . .	3·519	3·166
Cubic cent. decinormal soda used	28·5	25·8

From this we have—

Insoluble fatty acids . . .	87·08	87·96
Soluble „ „ . . .	5·37	5·38

Finally, I have adopted the following method, which, I believe, leaves nothing to be desired on the score, either of facility of execution or of accuracy. Abou 5 grammes of the dry filtered butter fat are weighed into a small strong flask (I always use one of the small assay flasks), 25 cub. cent. of a normal alcoholic soda solution are added; the flask is closed by means of a well fitting caoutchouc stopper, firmly secured by a piece of canvass and string, and heated in a water-bath for about one hour. I think a much shorter time would be sufficient, but hitherto I have always heated for one hour. When cool the flask is opened, the contents—which are semi-solid—carefully liquefied by heat and washed into a flask with hot water. This flask is now heated for some time on a water-bath to expel the alcohol, some more hot water is added and 25 cub. cent. of diluted sulphuric acid, somewhat stronger than the alkali used, are run in. The contents are now allowed to cool and the acid aqueous solution below the cake of fatty acids is passed through a filter. The fatty acids in the flask are washed by hot water in the manner recommended by Dr. Muter—*i.e.*, each time allowed to cool; all the washings are passed through a filter. I use no cambric, but pass everything through paper. With care scarcely any of the fatty acid will find its way into the filter. At first I used to dry the fatty acids in the flask and on the filter paper separately, making use of a counterpoised filter. I found, however, that the fatty acids evaporate from the filter paper even at a temperature of 105°C., and I now, after the washing with water is completed and the flask drained, wash any fatty acid that may be on the filter into the flask by means of a mixture of alcohol and ether, boil off the alcohol and ether on a water-bath, and finally dry the fatty acids in the flask at a temperature of 105°C. The drying can be done readily if the melted fat is now and then shaken briskly, so as to subdivide the water as much as possible. In this way the acids, when once in the flask, are not taken out until their weight has been taken, thus reducing the risk of loss to a minimum. Meanwhile the acidity of the aqueous filtrate and washings is estimated by decinormal soda solution. Subtracting from the amount required the proportion necessary to neutralize the excess of acid added in decomposing the soap, the rest represents the soluble fatty acids contained in the butter taken, and on the assumption of its being butyric acid, we can, of course, calculate the amount of this acid present. When once the equivalent of the soluble acids present in butter is fairly determined, this, of course, will have to be substituted for that of butyric acid. The results thus obtained are, I believe, very accurate, and the process is very simple in execution. I have satisfied myself by repeated experiments that the alkalinity of the alcoholic soda solution by itself is not altered by the process. At one time I had hoped that the process might be conducted in open flasks, but the following experiments will show that a loss of soluble acid is thus occasioned, which renders it necessary to use a closed flask. When once the decomposition of the fat is complete the alcohol may be boiled off without loss. This boiling off of the alcohol is not, I believe, absolutely necessary, for, if we add a sufficient amount of water before adding the sulphuric acid, the fatty acids separated are practically insoluble in the very diluted spirit. As, however, the boiling off is, as far as I can see at present, no disadvantage, it may be as well to do it.

Five portions of the same sample of dry filtered butter fat were treated each with 25 cub. cent. alcoholic soda solution; the first three, contained in open flasks, were heated on a water-bath for a quarter of an hour, half an hour, and one hour respectively, the last two were heated in closed flasks for one hour in a water-bath. In one of the latter experiments, No. 4, the alcohol was allowed to remain; in the other, No. 5, the alcohol was boiled off previous to the addition of the acid. The following are the results:—

	Per Cent.
Exp. 1—¼ hours' heating, soluble acid found .	5·38
„ 2—½ „ „ „ „ „ .	4·90
„ 3—1 „ „ „ „ „ .	4·86
„ 4—1 „ „ „ „ „ .	5·49
„ 5—1 „ „ „ „ „ .	5·50

The series clearly shows that prolonged heating in an open flask occasions a serious loss of soluble acid. It may perhaps be useful to give one of the above experiments in full. I will give No. 5.

Twenty-five cub. cent. of the acid added to 25 cub. cent. of the alcoholic soda required 29·1 per cent. decinormal soda solution to produce perfect neutrality.

Dry butter fat taken . . .	4·380 grammes.
Insoluble acids obtained . .	3·885 „
Decinormal soda required .	56·5 cub. cent.

56·5 – 29·1 leave 3 27·4 decinormal soda neutralized by the soluble fatty acids present. From this we obtain:—

Insoluble acids	88·69 per cent.
Soluble acids	5·50 „

The same butter fat had previously been examined in the usual manner for insoluble fatty acids only, when 88·56 per cent. had been found.

As a further illustration of the process I will give the analysis of the butter used in the above experiments, and those of the last six samples of butter received in my district, and will add for comparison the specific gravity of the melted fat taken at a temperature of 100° F. compared to water at the same temperature.

	Sp. Gr. at 100° F.	Insoluble Fatty Acids.	Soluble Fatty Acids.
My own butter . .	912·4	88·69	5·50
District butter, No. 1	912·3	87·83	5·40
„ „ „ 2	912·6	87·61	5·73
„ „ „ 3	913·1	87·31	5·66
„ „ „ 4	913·0	87·40	5·51
„ „ „ 5	912·3	88·10	5·25
„ „ „ 6	912·3	88·03	4·92

Calculating the amount of glycerine residue in each of the above cases, and adding it to the sum of acids found,

* This was a different sample of butter.

we do not in any case come up to 100. This is, as before observed, no doubt due in part to the fact that the soluble fatty acid is calculated as butyric acid, whereas some higher acids are also present, in part, however, also to the fact that butter fat, as obtained by simple drying and filtering, does not consist of pure glycerides.

The results given in the foregoing show, I think conclusively, that butter fat really does contain from 5 to 6 per cent. of soluble fatty acids. It will be seen that the fat, whether decomposed with water only at a temperature of 500° F., or with diluted alkali at the same temperature, or with alcoholic soda in an open flask at a temperature not exceeding 176° F., or finally, with alcoholic soda, in a closed flask at a temperature of 212° F., yields substantially the same products. The amount of glycerine found also agrees with this assumption, although but little stress can be laid upon that, as the glycerine cannot be estimated with sufficient accuracy. I am inclined to put more stress on the fact that the amount of glycerine residue calculated, added to the amount of acid found, falls short of 100. In what exact state of combination this soluble acid is contained in butter fat must be decided by future experiments.

In conclusion, a few words in regard to a process (the spec. gr. of the fat taken at 100°F.) first employed by Mr. Bell, and since then strongly recommended by Dr. Muter, who even thinks, going in this somewhat beyond Mr. Bell, that a reputed sample of butter may safely be passed over as good if it shows a spec. gr. above 911. Now, I am sorry to say, I cannot endorse this last statement. I believe that the spec. gr. of the fat is, as one of several factors, of great value in judging of the genuineness of a given sample of butter, but it cannot safely be taken as the sole guide. Within the last week or so, I took the spec. gr. of a sample of mutton dripping, obtained about nine months ago out of my own kitchen, and since kept in my laboratory, and found it to be 917·3. The spec. gr. was taken several times, and otherwise checked, and there can be no doubt of its correctness. On my mentioning this fact to Mr. Bell, he suggested to me that the dripping had probably been strongly heated. I accordingly procured a fresh sample of mutton dripping from my kitchen, and this time found the spec. gr. to be 904·8, when, however, this same sample was heated in a flat porcelain dish, for some time to a temperature of about 300°C., the spec. gr. was raised to 914·4, thus confirming Mr. Bell's suspicion so far. I think it very probable that prolonged exposure to the action of the air, even at ordinary temperature, may have a similar effect. This clearly shows that taken by itself, spec. gr. cannot be absolutely relied on as showing the genuineness of a sample of reputed butter. On the other hand, I think it will be found that whenever a sample of reputed butter shows a spec. gr. below 911 it may safely be pronounced adulterated. I must express my strong conviction that, as far as I can see at present, no single property of butter fat, taken by itself, is of absolute value as a guide for judging of the genuineness of a given sample of butter, and I would, therefore, advise every one to submit each sample that comes before him to as many tests as possible before he pronounces an opinion.

Addendum. Since the foregoing paper was written, I have effected the saponification, decomposition of the soap, and the washing and drying of the fatty acids, at ordinary temperature, thus still further reducing the risk of breaking up the higher into lower acids. The saponification is readily effected by using a sufficiency of alcoholic soda. Between four and five grammes of the dry butter fat were shaken up, for several minutes, with 100 cub. cent. of normal alcoholic soda. The butter soon dissolves, but after a time the solution gelatinizes to a clear transparent jelly. (The temperature of the laboratory at the time of these experiments ranged between 22° and 25°.) This jelly is now allowed to stand over night, during which time the smell of butyric ether, very strong at first, entirely disappears. In one of the experiments the alcohol was allowed to evaporate spontaneously, before the acid was added; in the other (made with a different sample of butter), the soap was dissolved in about half-litre of water, and at once decomposed by the addition of hydrochloric acid. The fatty acids, which separated in white curdy masses, were thoroughly washed on a filter, with cold water, about four litres, dried in vacuo over oil of vitriol and weighed. The following are the results :—

1st Exp. Butter fat taken 4,545 gaammes, insoluble fatty acids obtained 3,888 grammes.

2nd Exp. Butter fat taken 4,982 grammes, insoluble fatty acids obtained 4,299 grammes.

Percentage of insoluble fatty acids found 1st Exp. 85·5 per cent.

Percentage of insoluble fatty acids found 2nd Exp. 86·3 per cent.

Butter fat, therefore, yields the same proportion of insoluble fatty acids, whether saponified with or without the aid of heat.

For the sake of completeness, I give the analyses of the samples of mutton dripping referred to in the paper

	Spec. Gr. at 100° F.	Insoluble Fatty Acids.	Soluble Fatty Acids.
1st Sample	917·3	92·43	1·69
2nd Sample, before heating	904·8	95·44	0·09
2nd Sample, after heating	914·4	93·64	0·78

It has been suggested, that the addition of alcohol or ether to the fatty acids, and the subsequent drying, might give either too high a result by the formation of non-volatile ethers, or too low a result by the production of volatile ethers. I find, however, that such is not the case. The fatty acids, when alcohol or ether have been added, certainly require a longer time of heating before the weight becomes constant than is necessary when no such addition has been made, the ultimate amount found is, however, the same in either case.

A report on "Butter Analysis," by Mr. J. Bell, dated May 31, 1876, has just been presented to the House of Commons, which contains some useful details, and I hope to return to it at some future time. Meanwhile, I would take this earliest opportunity to refer to two points in this report. Firstly, Mr. Bell is under a great misapprehension in supposing that Messrs. Hehner and Angell s process ever fell practically into abeyance. On the contrary, it was at once taken up by a number of public analysts, and at the time of the report was, I believe, adopted by every public analyst, who had at all worked on the subject of butter. As evidence of the interest taken in this question, I need only refer to Dr. Muter's paper, published with the discussion in the *Analyst* for March; and my short note read at the meeting of public analysts, in January. Secondly, I should like to ask Mr. Bell, if the percentages of fixed fatty acids given in Table III., and from which it is inferred that this percentage increases with the age of the butter, are in each case the results of two or more concordant analyses, or represent a single analysis only? If the latter is the case, the table is I fear of little or no practical value, since the results are then, in four at least out of the six cases given, within the limits of experimental error.

DR. SIEVEKING ON MEDICAL TEACHING IN ENGLAND.

At the meeting of the British Medical Association, which was held at Sheffield on the first four days of the present month, the address in Medicine was delivered by Dr. E. H. Sieveking. Amongst the topics referred to was the increase in the facilities for obtaining a medical education which has come into existence in this country during the present century This subject was discussed in the following passage:—

"At the commencement of the nineteenth century, the medical profession was still in a chaotic state in Great Britain and Ireland. Its detractors denied that it occupied a scientific status; and in spite of the eminence of some of the heroes of our calling, we could scarcely ignore the trade mark which was conspicuous on its documents. In vain have I sought for any evidence of corporate professional feeling in the earlier history of British medicine. Great names—aye, and greater than Italy, Germany, or France can boast of—illumine our roll of distinguished citizens; but how many of them had to lay the foundation of their medical knowledge in foreign schools, because the means were wanting at home to acquire the alphabet of their profession?

"Linacre, the founder of the Royal College of Physicians, studied at Bologna and Padua, where he took his degree of Doctor of Medicine; Caius studied physic under Montanus, and dissected with Vesalius, at Padua, where he graduated; Harvey, to whom the whole world bows in reverent admiration, learned his profession under Fabricius ab Aquapendente, Minadous, and Casserius, and took his degree at the same university. Leyden, Heidelberg, Avignon, Paris, Montpelier, are some of the many foreign universities, which, as we learn from Dr. Monk's erudite 'Roll of the College of Physicians,' claim as their alumni most of the eminent medical men belonging to the sixteenth, seventeenth, and even far into the eighteenth centuries. These men did not, as is well and wisely done by physicians and surgeons of the present day, go abroad to compare foreign with home experiences, and to perfect a professional education of which the foundation had been laid in their own schools and universities, but they undertook the risk and fatigue of travel, which in their days was no slight matter, to acquire knowledge which was unattainable in their own country.

"I have in vain sought for early evidences of medical teaching in England, or especially in the English universities, before the beginning of the sixteenth century. Nicolas of Farnham, and John of Gaddesden, who treated Edward III., when he had the small-pox, by wrapping him up in a scarlet cloth, and discovered the method of distilling fresh from salt water, appear to have been the first exceptions to the rule that our princes brought over their medical attendants from abroad. Nicolas de Farnham (as we are told by Matthew of Paris),* who was elected in 1241 to the see of Durham, had been rector in arts at Paris, and afterwards practised medicine at Bologna. He became pre-eminently distinguished in, and obtained great favour by his skill. The king and queen, Henry III. and his consort, by the advice of some learned men, and expressly at the instance of Otto, the legate, the Bishop of Carlisle, and some other of the king's secret advisers, summoned Nicolas to take charge of their souls and bodies, and to be their familiar counsellor; in which office he conducted himself well and prudently till he was elected to the said episcopal dignity.

"The first medical lectures of which I can find any record were delivered in Oxford by a foreigner of the name of Andrew Alazard,† who had graduated at Montpelier, and was appointed by the chancellor and proctors to lecture on medicine, and to explain, from tables of his own, *Avicenna de Pulsibus*.

"So little, however, was the science of medicine appreciated in Oxford during the sixteenth century, that the university admitted, about 1550, Simon Ludford, originally a Franciscan Friar, and subsequently an apothecary in London; and afterwards David Langston, a coppersmith, two ignorant, unlettered, and incompetent persons, to the honours of a baccalaureate in medicine. The visitors of the university, on being applied to by the College of Physicians (*Caio Præsidente*), interdicted the university from a repetition of their licence, and provided that a certain course of study should be followed by each

* Bohn's edition, vol. i., p. 231.

† See art. A. Wood, 'Hist. and Antiq Oxon.,' vol. i., p. 239.

candidate previously to his incorporation.* The utter neglect of medicine by the highest educational bodies in the realm was not redeemed by any supplementary efforts on the part of others. The barber-surgeons, who were incorporated by letters patent from Edward IV., in 1461,† and whose functions were of the most limited nature, were the only representatives of the general practitioner of the present day, until the corporation of barber-surgeons was dissolved in the 18th of George II. At this date, the surgeons, who seceded from the barbers, were incorporated, but they were not endowed with a charter till the beginning of the present century. The apothecaries, as a mere trading company, were founded in 1606, by James I., but they exercised no influence on the profession of medicine till Parliament, in 1815, conferred upon them powers which they have since wisely exercised and developed."

A DOMINANT LANGUAGE FOR SCIENCE.

BY ALPHONSE DE CANDOLLE.‡

At the period of the Renaissance, Latin was the language employed by all the learned men of Europe. It had been carefully preserved by the Romish Church; and not one of the modern languages presented, at that time, a sufficiently rich literature to become its rival. But at a later period the Reformation disturbed the unity of the Romish influence. Italian, Spanish, French, and English gained successively regular idioms, and became rich in literary productions of every kind; and at last, eighty or one hundred years ago at most, the progress of science caused the inconvenience of the use of Latin to be felt. It was a dead language, and, in addition to that, was wanting in clearness, owing to its inversions, to its abbreviated words, and to the absence of articles. There existed at that time a general desire to describe the numerous discoveries that were being made, and to explain and discuss them without the necessity of seeking for words. The almost universal pressure of these causes was the reason for the adoption of modern languages in most sciences, natural history being the only exception. For this, Latin is still employed, but only in descriptions—a special and technical part, where the number of words is limited and the construction very regular. Speaking truly, what naturalists have preserved is the Latin of Linnæus, a language in which every word is precise in meaning, every sentence arranged logically, clearly, and in a way employed by no Roman author. Linnæus was not a linguist. He knew but little even of modern languages, and it is evident that he struggled against many difficulties when he wrote in Latin. With a very limited vocabulary and a turn of mind which revolted equally from the periods of Cicero and the reticence of Tacitus, he knew how to create a language precise in its terms, appropriate to the description of forms, and intelligible to students. He never made use of a term without first defining it. To renounce this special language of the learned Swede would be to render descriptions less clear and less accessible to the *savants* of all nations. If we attempt to translate into the Latin of Linnæus certain sentences in modern floras, written in English or German, we quickly perceive a want of clearness. In English the word *smooth* applies equally to *glaber* and *lævis*.§ In Germany, the

* Dr. Monk's 'Roll of the College of Physicians.'

† Maitland's 'History of London,' 1775.

‡ The fifth chapter of the 'Histoire des sciences et des savants depuis deux siècles,' 8vo., Genève, 1873. London, Dulau. Translated by Miss Miers, by permission of the Author. 'Ann. and Mag. N. Hist.,' ser. 4, vol. xi. From the 'Smithsonian Report for 1875.'

§ The word *glaber*, in botany, means bald or not hairy, which is applied to other parts as well as the head; and *lævis*, smooth, not rough; but I know they have both been carelessly translated "smooth," as M. de Candolle implies.—J. E. G.

construction of sentences indicating generic or other characters is sometimes so obscure that I have found it impossible, in certain cases, to have them put into Latin by a German, a good botanist, who was better acquainted than myself with both languages. It would be still worse if authors had not introduced many words purely Latin into their language. But, exclusive of paragraphs relative to characters, and wherever successive phenomena or theories are in question, the superiority of modern languages is unquestionable. It is on this account that, even in natural history, Latin is every day less employed.

The loss, however, of the link formerly established between scientific men of all countries has made itself felt. From this has arisen a very chimerical proposal to form some artificial language which should be to all nations what writing is to the Chinese. It was to be based on ideas—not words. The problem has remained quite devoid of solution; and even were it possible, it would be so complicated an affair—so impracticable and inflexible—that it would quickly drop into disuse.

The wants and the circumstances of each epoch have brought about a preference for one or other of the principal European languages as a means of communication between enlightened men of all countries. French rendered this service during two centuries. At present various causes have modified the use of this language in other countries and the habit has been almost everywhere introduced that each nation should employ its own tongue. We have, therefore, entered upon a period of confusion. What is thought to be new in one country is not so to those who read books in other languages. It is vain to study living languages more and more; you are always behindhand in the complete knowledge of what is being published in other countries Few persons are acquainted with more than two languages; and if we try to pass beyond a certain limit in this respect, we rob ourselves of time for other things; for there is a point at which the study of the means of knowledge hinders our learning. Polyglot discussions and conversations do not answer the intentions of those who attempt them. I am persuaded that the inconvenience of such a state of things will be more and more felt. I also believe, judging by the example of Greek as used by the Romans and French in modern times, that the need of a prevailing language is almost always recognized; it is returned to from necessity after each period of anarchy. To understand this we must consider the causes which make a language preferable, and those which spread its employment in spite of any defects it may possess.

Thus, in the seventeenth and eighteenth centuries, motives existed for the employment of French in preference to Latin throughout Europe. It was a language spoken by the greater part of the educated men of the period—a language tolerably simple and very clear. It had an advantage in its resemblance to Latin, which was then widely known. An Englishman, a German, was already half acquainted with French through his knowledge of Latin; a Spaniard, an Italian, was three parts advanced in his study of the language. If a discussion were sustained in French, if books were written or trans lation made in this language, all the world understood.

In the present century, civilization has much extended north of France, and population has increased there more than to the south. The use of the English tongue has been doubled by its extension into America. The sciences are more and more cultivated in Germany, in England, in the Scandinavian countries, and Russia. The scientific centre of gravity has advanced from the south towards the north.

Under the influence of these new conditions, a language can only become predominant by presenting two characters: first, it must possess sufficient German and Latin words or forms to be within reach at once of the Germans and of the people who make use of Latin tongues; secondly, it must be spoken by a considerable majority of civilized people. In addition to these two essential conditions, it would be well for the definitive success of a language that it should also possess the qualities of grammatical simplicity, of conciseness, and clearness.

English is the only language which may, in fifty or a hundred years, offer all these conditions united.

The language is half German and half Latin. It possesses German words, German forms, and also French words, and a French method of constructing sentences. It is a transition between the principal languages used at present in science, as French was formerly between Latin and several of the modern languages.

The future extension of the Anglo-American tongue is evident. It will be rendered inevitable by the movement of the population in the two hemispheres. Here is a proof, which it is easy to give in a few words and a few figures.

At the present time the population stands thus ('Almanach de Gotha,' 1871):*

English-speaking peoples in England, 31,000,000; in the United States, 40,000,000; in Canada, etc., 4,000,000; in Australia and New Zealand, 2,000,000; total, 77,000,000.

German-speaking peoples in Germany and a portion of Austria, 60,000,000; in Switzerland (German cantons), 2,000,000; total, 62,000,000.

French-speaking peoples in France, 36,500,000; in Belgium (French portion), 2,500,000; in Switzerland (French cantons), 500,000; in Algeria and the colonies, 1,000,000; total, 40,500,000.

New, judging by the increase that has taken place in the present century, we may estimate the probable growth of population as follows:†

In England it doubles in fifty years; therefore, in a century (in 1970) it will be 124,000,000. In the United States, in Canada, in Australia, it doubles in twenty-five; therefore it will be 736,000,000. Probable total of the English-speaking race in 1970, 860,000,000.

In Germany the northern population doubles in fifty-six to sixty years; that of the south in one hundred and sixty-seven years. Let us suppose one hundred years for the average. It will probably be, in 1970, for the countries of German speech, about 124,000,000.

In the French-speaking countries the population doubles in about one hundred and forty years. In 1970, therefore, it will probably amount to 69,500,000.

Thus the three principal languages spoken at the present time will be spoken a century hence with the following progression:

The English tongue will have increased from 77 to 860 millions.

The German tongue will have increased from 62 to 124 millions.

The French tongue will have increased from 40½ to 60½ millions.

The individuals speaking German will form a seventh part, and those speaking French a twelfth or thirteenth part of those of English tongue; and both together will not form a quarter of the individuals speaking English. The German or French countries will then stand toward those of English speech as Holland or Sweden do at present with regard to themselves. I am far from having exaggerated the growth of the Anglo-Australian-American populations. Judging by the surface of the countries they occupy, they will long continue to multiply in large proportion. The English language is, besides, more diffused than any other throughout Africa and Southern Asia.

America and Australia are not, I confess, countries in which the culture of letters and sciences is so much advanced as in Europe; and it is probable that, for a length of time, agriculture, commerce, and industry will absorb all the most active energies. I acknowledge this. But it is no less a fact that so considerable a mass of intelligent

* No notice is here taken of the English-speaking people in India and the East.—J. E. G.

† 'Almanach de Gotha,' 1870, p. 1039.

and educated men will weigh decisively on the world in general. These new peoples, English in origin, are mingled with a German element, which, with regard to intellectual inclinations, counterbalances the Irish. They have generally a great eagerness for learning and for the application of discoveries. They read much. Works written in English or translated into that tongue would, in a vast population, have a very large sale. This would be an encouragement for authors and translators that is offered by neither the French nor the German language. We know in Europe to what degree difficulties exist in the publication of books on serious subjects; but open an immense mart to publishers, and works on the most special subjects will have a sale. When translations are read by ten times as many people as at present, it is evident that a greater number of books will be translated; and this will contribute in no small degree toward the preponderance of the English language. Many French people already buy English translations of German books, just as Italians buy translations in French. If English or American publishers would adopt the idea of having translations made into their language of the best works that appear in Russian, Swedish, Danish, Dutch, etc., they would satisfy a public dispersed over the whole world, and particularly the numerous Germans who understand English. Yet we are but at the beginning of the numerical preponderance of the English-speaking populations.

The nature of a language does not, at first sight, appear to have very great influence on its diffusion. French was preferred for two centuries; and yet Italian was quite as clear, more elegant, more harmonious, had more affinity with Latin, and, for a length of time, had possessed a remarkable literature. The number, the activity of the French, and the geographical position of their country were the causes of their preponderance. Yet the qualities of a language, especially those preferred by the moderns, are not without their influence. At the present time briefness, clearness, grammatical simplicity are admired. Nations, at least those of our Indo-European race, began by speaking in an obscure, complicated manner; in advancing they have simplified and made their language more precise. Sanscrit and Basque, two very ancient languages, are exceedingly complicated. Greek and Latin are so in less degree. The languages derived from Latin are clothed in clearer and simpler forms. I do not know how philosophers explain the phenomenon of the complication of language at an ancient period; but it is unquestionable. It is more easy to understand the subsequent simplifications. When a more easy and convenient method of acting or speaking has been arrived at, it is naturally preferred. Besides, civilization encourages individual activity; and this necessitates short words and short sentences. The progress of the sciences, the frequent contact of persons speaking different languages, and who find a difficulty in understanding each other, lead to a more and more imperious need for clearness. You must have received a classical education to avoid the perception of absurdity in the construction of an ode of Horace. Translate it literally to an uneducated workman, keeping each word in its place, and it will have to him the effect of a building the entrance-door of which is on the third story. It is no longer a possible language, even in poetry.

Modern languages have not all, to the same degree, the advantages now demanded, of clearness, simplicity, and briefness.

The French language has shorter words and less complicated verbs than the Italian; this in all probability has contributed to its success. The German has not undergone the modern revolution by which each sentence or portion of a sentence begins with the principal word. Words are also cut in two, and the fragments dispersed. It has three genders, whereas French and Italian have but two. The conjugations of many verbs are rather complicated. Nevertheless, modern tendencies weigh with the Germans, and it is evident that their language is becoming a little modified. Scientific authors especially exert themselves to attempt the direct modes of expression and the short phrases of other countries in the same way that they have abandoned the Gothic printed letters. Should they correspond with strangers, they often have the politeness to write in Latin characters. They willingly introduce in their publications terms taken from foreign languages, modifications sometimes merely of form, occasionally fundamental. These attest the modern spirit and the enlightened judgment of the learned men so numerous in Germany. Unhappily, the modifications of form have no great importance, and the fundamental changes take place very slowly.

The more practical English language shortens sentences and words. It willingly takes possession of foreign words, as German does; but of *cabriolet* it makes *cab*; of *memorandum* it makes *mem.* It makes use only of indispensable and natural tenses—the present, the past, the future, and the conditional. There is no arbitrary distinction of genders; animated objects are masculine or feminine; the others are neuter. The ordinary construction is so sure to begin with the principal idea, that in conversation you may often dispense with the necessity of finishing your sentences.

The chief fault of the English language, its inferiority in comparison with German or Italian, consists in an orthography absolutely irregular, and so absurd that children take a whole year in learning to read.* The pronunciation is not well articulated, not well defined. I shall not go as far as Madame Sand in her amusing imprecations on this point; but there is truth in what she says. The vowels are not distinct enough. But, in spite of these faults, English, according to the same clever writer, is a well-expressed language, quite as clear as any other, at least when English people choose to revise their MSS., which they will not always do, they are in such a hurry!

English terms are adapted to modern wants. Do you wish to hail a vessel, to cry "stop" to a train, to explain a machine, to demonstrate an experiment in physics, to speak in few words to busy and practical people, it is the language *par excellence.* In comparison with Italian, with French, and, above all, with German, English has the effect, to those who speak several languages, of offering the shortest cut from one point to another. I have observed this in families where two languages are equally well known, which often occurs in Switzerland. When the two languages are German and French, the latter almost always carries the day. "Why?" I asked of a German-Swiss established in Geneva. "I can scarcely tell you," he replied; "at home we speak German to exercise my son in the languages, but he always falls back into the French of his comrades. French is shorter—more convenient." Before the events of 1870, a great Alsatian manufacturer sent his son to study at Zurich. I was curious to know the reason why. "We cannot," he said, "induce our children to speak German, with which they are quite as familiar as with French. I have sent my son to a town where nothing but German is spoken, in order that he may be forced to speak it." In such preferences you must not look for the causes in sentiment or fancy. When a man has choice of two roads—one straight and open, the other crooked and difficult to find—he is sure to take, almost without reflection, the shorter and more convenient one. I have also observed families where the two languages known in the same degree were English and French. In this case the English maintained supremacy, even in a French-speaking land. It is handed down from one generation to another. It is employed by those who are in haste, or who want to say something in as few words as possible. The tenacity of

* Surprised, on one occasion, by the slowness with which intelligent English children learned reading, I inquired the reason. Each letter has several sounds, or you may say that each sound is written in several ways. It is therefore necessary to learn reading word for word. It is an affair of memory.

French or English families established in Germany in speaking their own language, and the rapid disappearance of German in the German families established in French or English countries, may be explained by the nature of the languages rather than by the influence of fashion or education.

The general rule is this: In the conflict of two languages, everything else being equal, it is the most concise and the most simple that conquers. French beats Italian and German. English beats the other languages. In short, it need only be said that the more simple the language is, the more easy it is to be learned, and the more quickly can it be made available for profitable employment.

The English language has another advantage in family use—its literature is the one most suitable to feminine tastes; and every one knows how great is the influence of mothers on the language of children. Not only do they teach what is called "the mother tongue," but often, when well educated, they feel pleasure in speaking a foreign language to their children. They do so gaily, gracefully. The young lad who finds his language-master heavy, his grammar tiresome, thinks very differently when his mother, his sister, or his sister's friend addresses herself to him in some foreign tongue. This will often be English, and for the best of reasons: there is no language so rich in works (written in a spirit of true morality) upon subjects which are interesting to women—religion, education, fiction, biography, poetry, etc.

The future preponderance of the language spoken by English, Australians and Americans thus appears to me assured. The force of circumstances leads to this result; and the nature of the language itself must accelerate the movement.

The nations who speak the English tongue are thus burdened with a responsibility which it is well they should recognize at once. It is a moral responsibility toward the civilized world of the coming centuries. Their duty, as it is also their interest, is to maintain the present unity of the language, at the same time admitting the necessary or convenient modifications which may arise under the influence of eminent writers, or be arranged by common consent. The danger to be feared is that the English language may, before another century has passed, be broken up into three languages, which would be in the same relation to each other as are Italian, Spanish, and Portuguese, or as Swedish and Danish.

Some English authors have a mania for making new words. Dickens has invented several. Yet the English language already possesses many more words than the French, and the history of its literature shows that there is greater need to suppress than to add to the vocabulary. No writer for three centuries past has employed nearly so many different words as Shakspere; therefore there must have been many unnecessary ones. Probably every idea and every object had formerly a term of Saxon origin, and one of Latin or French origin, without counting Celtic or Danish words. The very logical operation of time has been to suppress the double or triple words. Why re-establish them? A people so economical in its use of words does not require more than one term for each thing.*

The Americans, on the other hand, make innovations of accent or orthography (they almost always spell *labour* "labor," and *harbour* "harbor"). The Australians will do the same if they do not take care. Why should not all possess the noble ambition of giving to the world one uniform concise language, supported by an immense literature, and spoken in the next century by eight hundred or one thousand million of civilized men? To other languages it would be as a vast mirror, in which each would become reflected, thanks to newspapers and translations, and all the friends of intellectual culture would have a convenient medium for the interchange of ideas. It would be rendering an immense service to future races, and at the same time the authors and men of science of English-speaking race would give a strong impulsion to their own ideas. The Americans, above all, are interested in this stability, since their country is to be the most important of those of English tongue. How can they acquire a greater influence over Old England than by speaking her language with exactness?

The liberty of action permitted among people of English race adds to the danger of a division in the language. Happily, however, certain causes which broke up the Latin language do not exist for English nations. The Romans conquered nations the idioms of which were maintained or re-appeared here and there in spite of administrative unity. The Americans and Australians, on the contrary, have before them only savages, who disappear without leaving any trace. The Romans were conquered and dismembered in their turn by the barbarians. Of their ancient civilization no evidence of unity remained, unless it was in the Church, which has itself felt the influence of the universal decline. The Americans and Australians possess many flourishing schools; they have the literature of England as well as their own. If they choose, they can wield their influence by means of maintaining the unity of the language. Certain circumstances make it possible for them to do so; thus the teachers and professors mostly come from the States of New England. If these influential men truly comprehend the destiny of their country, they will use every effort to transmit the language in its purity; they will follow classic authors, and discard local innovations and expressions. In this question of language, real patriotism (or, if you will, the patriotism of Americans really ambitious for their country) ought to be, to speak the English of Old England, to imitate the pronunciation of the English, and to follow their whimsical orthography until changed by themselves. Should they obtain this of their countrymen, they would render to all nations and to their own an unquestionable benefit for futurity.

The example of England proves the influence of education upon the unity of a language. It is the habitual contact of educated people and the perusal of the same books which, little by little, is causing the disappearance of Scotch words and accent. A few years more, and the language will be uniform throughout Great Britain. The principal newspapers, edited by able men, also exercise a happly influence in preserving unity. Whole columns of the *Times* are written in the language of Macaulay and Bulwer, and are read by millions of people. The result is an impression which maintains the public mind in a proper literary attitude.

In America the newspaper articles are not so well written; but the schools are accessible to all classes, and the universities count among their professors men especially accomplished in their use of the English tongue. If ever there should arise a doubt in the opinions of the two countries as to the advisability of modifying the orthography, or even making changes in the language, it would be an excellent plan to organize a meeting of delegates from the principal universities of the Three Kingdoms, of America, and Australia, to propose and discuss such changes. Doubtless they would have the good sense to make as few innovations as possible; and, thanks to common consent, the advice would probably be followed. A few modifications in the orthography alone would render the English language more easy to strangers, and would contribute toward the maintenance of unity in pronunciation throughout Anglo-American countries.

* A clever English writer has just published a volume on the institutions of the people called *Swiss* in English. He names them *Switzers*. For what reason? Will there soon be *Deutschers?*

MEDIÆVAL ENGLISH GARDENS.*

The fickle tide of fashion may soon demand the native and early plants of England in place of the exotics now imported, lovely though they are; and in the practice of gardening the plants of our own land may surely claim a passing notice, even amid the press and hurry of rapid progress. The date, too, of the introduction of many plants to England is often the topic of discussion, so that a brief review of English gardening from early times may not be wholly unacceptable.

The Rose, our English emblem, finds a first place in the "noble garden" described by Alexander Necham, the invaluable authority on early horticultural matters. His garden should be arrayed with roses, lilies, sunflowers, violets and poppies, and narcissus (?). Roses and lilies were among the plants bought for the royal garden at Westminster in 1276, and a wreath of these flowers was sent by King John to his lady at Ditton, so that the rose tree can boast of a very early introduction to this country. In the fourteenth and sixteenth centuries several varieties both of red and white roses are enumerated by Lawson. The Provence rose was probably first imported in the fifteenth century, at the time of the marriage of Margaret of Anjou with Henry VI. A common reserve or quit-rent was the yearly tender of a rose or bunch of roses. The part the rose has subsequently played is familiar to the most casual reader of English history.

The commonest flower was the gillyflower, or clove pink (*Dianthus Caryophyllus*), the *Clove de Giroflée* of the Normans. Loudon states that the cruelties of the Duke of Alba in 1567 were the occasion of our receiving through the Flemish weavers who flocked to our shores gillyflowers, carnations, and Provence roses, but, as recently pointed out by an eminent writer, the gillyflower had been known and prized in England centuries before. The flower frequently served the same purpose with the rose as a tender for land. This has been frequently mistaken for the clove of commerce, the similar use of the peppercorn and the term peppercorn rent favouring the theory; but in old documents the term *unius clavi gariofili* is obviously the clove pink; cloves also were not introduced in the twelfth and thirteenth centuries, when this kind of reserved rent was most common.

The periwinkle or pervinke was also a common flower. As it flourishes in shady situations, its bright, fresh green appearance made it a favourite in the sombre convent grounds. Chaucer, whose eye for beauty was not likely to pass the least "flowre" by, does not forget it:—

"There sprang fresh Violet all newe,
And fresh Pervinke rich of hue;
And flouris yellow, white and rede,
Such plente grew there nor in the mede."

The number of bees which were kept, and the frequent mention of the various uses of honey at an early date, also render it extremely probable that the list of flowers was more varied than we can find actual mention of. In the days of the Plantagenets flowers were a passion with our forefathers. They were on festal occasions strewn with the rushes, which formed the simple but beautiful carpet of those days. When "Merrie June" arrived—

"Maydens gin strewe their boweres
With the red Rose and Lily flowers."

Froissart relates that the Count de St. Foix went to his "chamber, which he found ready strewed with rushes, green leaves, and the walls hung with boughs newly cut for perfume." Sir Thomas More (1483) describes Elizabeth, the widowed Queen of Edward IV., when in the sanctuary at Westminster, as "sitting alone amongst the rushes in her grief and distress." Bradshaw, in St. Werburg (1500), writes—

"All herbes and floures fragrant, fayre, and sweete,
Were strewed in halls and layed under their feete."

In the laying out of gardens little art appears to have been shown before the fifteenth century. No resemblance to modern flower beds is traced earlier than the fourteenth century. When they are occasionally seen the beds appear surrounded with a wattled fence. In the 'Romaunt de la Rose' occurs a representation of a garden of the fourteenth century, which shows the "erbour" and the construction of the seats and banks of "camamile" and other flowers. This trellis-arbour might almost be a construction of to-day, so nearly does it approach to the common design now in use, and so faithfully has the old penman depicted it. Later, we have an introduction of Flemish origin, the mound or "mount," no doubt borrowed from the mound, thrown up within the bailey of a Norman fortalice to enable the archers to see over. This still later was more elaborately constructed of stone or wood, "curiously wrought within and without, or of earth," covered with fruit trees, and were ascended by "stares of precious workmanship." Hampton Court in the time of Henry VIII. had much of the "anticke" work, and many decorated mounts therein. The greensward of the garden was doubtless the scene of many a pleasant diversion in mediæval days; bowling alleys and butts for the practice of archery were commonly erected in them, and we can imagine the maiden while occupied with her distaff or needle looking out from the flower-decked window of her bower at the rough sports of the men.

The simples of the kitchen garden are now despised, but they were in their turn the safest and most effectual medicines known in England. The garden of the fifteenth century was the storehouse of the medicines of the good village dame or lady, to be by her dispensed for the cure of all the ailments of her neighbours. Tusser tells of forty-two herbs for the kitchen, fourteen for salads, eleven to boil, a number for windows and pots, seventeen to still in summer, and twenty-five necessary herbs to grow in the garden for physic. We have passed thus abruptly into a comparatively late period in our mention of the kitchen garden, for little can be said with certainty respecting the culinary vegetables grown in England previous to the fifteenth century. The cabbage tribe was, no doubt, early introduced and generally cultivated in the middle ages. The pea and bean were grown in the thirteenth century. Necham mentions beet, which was probably the chief esculent root. Of salads, the lettuce, rocket, mustard, water-cress, and hop were known. Onions, garlic, and leeks were in use before the year 1400. The kitchen garden was evidently the delight and care of the dame, and furnished the many herbs related in the rather doggrel rhyme of Tusser, with

"Conserves of Barberry, Quinces, and such,
With syrups that easeth the sickly so much."

Burton in the 'Anatomy of Melancholy' alludes to the medical skill of the country ladies—"Laurel and asarabecca," which every gentlewoman in the country knows how to give. A knowledge of the mysteries of stilling was one of the qualifications of the good housewife—

"The knowledge of stilling is one pretty feat,
The waters are wholesome, the charges not great."

The preparations of the dame famous in this art rendered her a welcome guest at every manor house around, and from distant parishes many would come to partake of the cordial waters. The still-room was an institution, the name of which only lingers amongst us. The practice of stilling now is in the hands of trade and commerce, and but here and there can be found one with leisure and patience enough to practise the difficult art of extracting the essence of the "vertuous herbe."

* Extracted from an article in the *Gardeners' Chronicle*.

The Pharmaceutical Journal.

SATURDAY, AUGUST 12, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE CONFERENCE MEETING.

WITHIN a month from the present time many of the pharmaceutical brotherhood will be travelling northwards from all parts of the country to the Conference in Glasgow, and in conformity with our usual custom we now place before our readers some details of the attractions which the city and its neighbourhood present to tourists, as well as the arrangements made in reference to the Conference Meeting and the simultaneous meeting of the British Association.

Though it is only five years ago that the British Pharmaceutical Conference, following the path chosen by the British Association, held a meeting in North Britain, we do not doubt but that the recollections of the time passed either in Edinburgh itself, or in excursions to other parts of Scotland, will be sufficiently pleasant to induce many to take advantage of the present opportunity to visit Glasgow.

The arrangements for the Pharmaceutical Conference meetings and for the accommodation of visitors will this year be unusually convenient, for not only has the Local Committee succeeded in securing the reserve of a considerable number of rooms in one hotel, so that those who apply for rooms soon enough can be located together in the same house, instead of being distributed through the city, but the hotel where this accommodation has been secured is the place where the general meetings of the Conference will be held. The Royal Hotel in George Square, the very centre of Glasgow, will, therefore, be not only the head quarters where visitors may enjoy the society of their friends, but also the place of transacting the business which gathers them together. It is to be hoped that this convenient arrangement secured by the exertions of the Local Committee will be largely taken advantage of, and those who desire to take this course should at once communicate their intention to Mr. KINNINMONT, the Local Secretary, and request him to secure rooms for them.

As a further inducement for doing so we are glad to state that the disgraceful system of extortion practised on some occasions will not be followed this year, but the charges at the hotels will be the same as on ordinary occasions—bedrooms ranging from *3s.* to *5s.* a night. There will also be a *table d'hôte* each day in a separate room for members of the Conference.

The General Conference meetings will as usual be held on two days, and the proceedings will commence at ten o'clock on Tuesday, the 5th of September, and be continued during the Wednesday following. On the Thursday it is intended that there shall be an excursion to the western coast, for which the Local Committee and their friends have engaged a special steamer known as one of the best and swiftest on the river Clyde. It is intended to to visit the Gareloch, Loch Long, Loch Goil, Holy Loch, Loch Striven, to sail through the Kyles of Bute to Loch Ridden, thence round the Isle of Bute, passing the entrance to Loch Fyne, and getting a near view of the Island of Arran with its lofty peaks; returning in ample time to allow of the Members being present at either of the Conversaziones to be held on the same evening by the British Association in the Crystal Palace, and by the Philosophical Society in the Corporation Galleries. All desiring to accept the invitation to join this excursion are requested to intimate their intention to Mr. KINNINMONT

The special attractions of Glasgow and its immediate vicinity are sufficiently distinct from those of Edinburgh to admit of any fear that on account of the last meeting in Scotland having been only five years ago there will be any falling off in the number of visitors to the western city. In place of the more exclusively historical associations connected with Edinburgh, we have the fact that Glasgow is the seat of some of the most important branches of trade and manufacturing industry; that it is the birthplace of several chemical arts, as well as the place where the invention of JAMES WATT was practically worked out, and where BLACK laid the foundation of our modern chemistry.

The manufacture of iron and cotton, of paraffin and hydrocarbon oil, chemical preparations, paper, etc., as well as dyeing, sugar refining, and the construction of machinery, shipbuilding, etc., are carried on upon a vast scale, either in Glasgow or its neighbourhood, and the attention given to these and other industrial pursuits has led to the increase of the population to upwards of half a million, or nearly double what it was when the British Association last held its meeting there twenty-one years ago, under the presidency of the Duke of ARGYLL.

For those who can spare time for excursions, Glasgow is a point offering unusual facilities of access to some of the most beautiful scenery in the world. Loch Lomond, the Queen of the Scottish Lakes, Loch Katrine and the Trossachs, and the classic land of BURNS, can be reached in two or three hours. The mouth of the Clyde and the Western Islands can be visited by means of steamers which are superior in accommodation to those in any part of the Kingdom, and these islands offer a wide field of attraction to the botanist, geologist, or antiquarian, in addition to the peculiar charm of their scenery.

In the city itself is an ancient cathedral and one of the oldest universities of the country, located in modern buildings of great elegance and convenience, besides a number of other features of interest to the most varied tastes. A new Guide Book to Glasgow and its neighbourhood is to be ready before the time of meetings, which will include full information respecting the industrial, educational, and historical objects of interest.

Altogether the attractions of the locality as well as the preparations and arrangements made for the reception of visitors are such that we may anticipate the meetings both of the British Association and of the Pharmaceutical Conference will be very largely attended, and those who have had any experience of Glasgow hospitality will know that there will be no lack of effort on the part of its inhabitants to accord a hearty welcome to all comers.

CONCENTRATED MEDICINES.

The practice of prescribing concentrated medicines is one involving such great risks that no excuse is needed for giving extra publicity to a fresh illustration of its dangers. Mr. Charles Gross, of Guy's Hospital, writing to the *Lancet*, states that on several occasions he had given a personal friend an ounce bottle containing six drachms of tincture of perchloride of iron and two drachms of solution of strychnia, with instructions to put the mixture into an ordinary quart wine-bottle, fill this up with water, and take half a wineglassful two or three times a day. This his friend had been in the habit of doing; on one occasion, however, he put the concentrated mixture into the quart bottle, but having no water at hand did not fill it up. Two days after, forgetting this omission, and apparently forgetful also of the dose, he went after a hearty breakfast and drank the whole of the mixture at a gulp. He experienced a sense of burning and constriction of the throat, but even then it did not occur to him that the medicine was undiluted. About an hour after he was seized with a tetanic convulsion, a very natural result from swallowing a grain of strychnia, and was conveyed to Guy's Hospital, where, being treated with belladonna and iodine he recovered. Mr. Gross speculates upon the probability that if the case had terminated fatally he would have been charged with poisoning his friend with an overdose of strychnia, as no one would imagine that an intelligent man would drink off such a dose of a strong medicine without remembering that he had omitted to dilute it. Mr. Gross has come to the very sensible determination that he will not prescribe concentrated medicine again in a hurry.

TARTAR EMETIC.

Even poisons may have their seasons of popularity, and just now the very name of tartar emetic is sure to attract the public eye. A statement in the *Pall Mall Gazette* that a grocer, living at Ballina, County Mayo, has been remanded on a charge of selling tartar emetic for cream of tartar, evokes from *Mr. Punch* the question, Is it lawful for a grocer to sell tartar emetic at all? We reply that in Great Britain it is not; but as to Ireland, we recommend him to address his question to Sir Michael Hicks Beach,—it might have the effect of dispersing some doubts that appear to exist on the subject. Our contemporary suggests that, if it is lawful, the sooner it ceases to be so the better, unless the grocer shows his qualification by submitting to a proper examination. Even then, he suggests an extended inscription should go over the grocer's shop door, describing him as being "Licensed to deal in tea, coffee, snuff, arsenic, corrosive sublimate, prussic acid, oil of vitriol, tartar emetic, vinegar, pepper, and poisons generally."

A correspondent writing to the *Times*, relates that going to a cupboard where medicines were kept, for the purpose of taking a seidlitz draught, the ingredients of which were kept in two bottles, he took down the tartar emetic instead of the tartaric acid bottle, stirred in a spoonful, and drank without noticing the absence of effervescence or difference in taste. In five minutes he vomited violently, and in ten or fifteen minutes was violently purged. The quantity taken was estimated at sixty grains, and the doctors attributed his escape from death to the largeness of the dose.

A NEW POISONS BILL THREATENED.

On Monday last, in the House of Commons, Sir W. Frazer gave notice that he would, early in next session, move for leave to bring in a Bill to amend the law relating to the sale of poisons and poisonous drugs. The *Globe* is of opinion that it is a question of growing importance whether the sale of poisons has not been granted too much freedom. It considers that in some cases the regulation providing for the inscription of purchasers' names in a book is quite inoperative as a public safeguard.

POISONING BY PELLITORY.

In the *Practitioner* for the present month, Mr. H. Langley Brown reports the case of a child, three and a half years old, who swallowed about fifty minims of tinctura pyrethri, left in a bottle that had been in use for toothache. No emetic was administered by the parent, who is a chemist, the drug being looked upon as harmless. Profuse perspiration and restlessness ensued, followed by an exhausting and painful diarrhœa, then by stupor, rapid and weak pulse, and twitchings of the limbs. Fourteen hours after the poison was swallowed the twitchings increased to violent convulsions lasting for an hour and leaving the child apparently moribund, after which he gradually improved, but for some time there were occasional convulsive movements. The irritation of the bowels and twitching subsided after about thirty-six hours, but the pulse continued rapid (120 to 130) during four days. The treatment consisted in enemata of starch with five drops of tincture of opium, port wine and coffee, with ice to the forehead and spine. A farinaceous diet was continued during three deys.

Proceedings of Scientific Societies.

ROYAL SOCIETY.

The Polarization of Light by Crystals of Iodine.*

BY SIR JOHN CONROY, BART., M.A.

On examining by means of a Nicol prism the light reflected from the surface of a layer of iodine, obtained by heating a fragment of that substance and then squeezing it between two plates of glass, I found that the film did not appear of uniform brightness, and that when the Nicol was rotated the relative brilliancy of different parts of the film changed—a portion that had appeared dark when the principal section of the Nicol was vertical, became bright when it was horizontal, and *vice versâ*; and, also if instead of altering the position of the Nicol, the film of iodine was rotated horizontally, the Nicol remaining at rest, the same changes in brilliancy occurred.

Removing the upper glass made no difference, except that the surface of the film of iodine tarnished rapidly, and then the amount of light reflected by it became considerably less.

The light incident upon the surface of the iodine was either ordinary diffused daylight or the light of a paraffin lamp; and in neither case did it show more than the merest trace of polarization, and generally not even that, when examined by means of a double-image prism and a plate of selenite.

It therefore appears that the light reflected from the surface of a layer of iodine is polarized, and that the position of the plane of polarization is not, of necessity, either parallel or perpendicular to the plane of incidence, but bears a definite relation to some direction within the crystals composing the film.

I also found that when these films were sufficiently thin to be transparent the light they transmitted was polarized, and that the plane of polarization of the transmitted light was perpendicular to the plane of the light which was polarized by reflection from the same portion of the film.

After making these observations I ascertained that W. Haidinger had announced, upwards of twenty years ago (Pogg. Ann. clxxi. p. 321, 1847), that the surface-colours which certain substances show by reflected light, in the case of some of the platino-cyanides, namely, those of potassium, barium, and magnesium, consist partially of light polarized in a plane which bears a definite relation to the axis of the crystal; and in a subsequent paper (Sitzungsberichte der kaiserlichen Akademie der Wissenschaften, viii. p. 97, 1852) he states that certain other substances have the same property. He mentions iodine in this latter paper as showing these "surface-colours," but does not appear to have noticed that the plane of polarization of the light reflected from its surface bore any relation to some fixed direction within the substance.

I arranged a form of polariscope by means of which these observations could be repeated with a greater degree of accuracy. The instrument used consisted of a divided brass circle fixed vertically to a firm support; a Nicol furnished with a graduated circle was carried by an arm moving round the centre of the circle, and the slip of glass with the layer of iodine rested horizontally on a stage at the top of a tube, the height of which could be adjusted so that the surface of the iodine was level with the centre of the graduated brass circle. Both the stage and the tube revolved horizontally, and could be rotated independently of each other; and the latter had an index moving over a divided circle attached to it, and a diaphragm with an opening about 6 mm. wide fixed in it. By altering the position of the arm moving over the vertical circle the light reflected from the surface of the iodine at different angles could be examined; and by reflecting light along the axis of the tube, by a mirror placed below it, and clamping the arm in such a position that the axis of the tube and Nicol were in the same straight line, the polarization of the light transmitted by the iodine could also be observed. A second or polarizing Nicol was so arranged that it could either be brought below the tube or placed between the surface of the iodine and the source of light, so that the behaviour of the film, when the incident light was polarized, could be studied.

On repeating the before-mentioned observations with reflected light, I found that occasionally portions of the film of iodine appeared quite black in certain positions of the film and Nicol, and that these same portions, when examined by transmitted light, did not merely alter in colour as the film or Nicol was rotated, as the remainder did, but in certain positions transmitted no light at all—or, in other words, that they behaved in a similar manner to what a plate of tourmaline would have done; and when seen by ordinary light and the naked eye, although they appeared to be of the same thickness as the remainder of the film, by which they were wholly or partially surrounded, they were of a much paler colour; usually, moreover, they reflected rather less light than the rest.

The change in the appearance of these portions of the film when seen through a Nicol was very striking in the case of some of the larger ones, as in certain positions they appeared perfectly transparent and of a pale yellow colour, and objects situated behind them could be clearly seen; but on turning either the film or the Nicol they became perfectly opaque, and resembled highly polished metallic surfaces.

On examining one of these films of iodine with a microscope with a ⅔ object-glass I found that those portions of the film which polarized light most strongly differed considerably in appearance from the remainder, and that they appeared to consist of long crystals about ·003 inch wide adhering together side by side, whilst the rest of the film seemed to consist of thin plates of iodine overlaying one another, these also being long in proportion to their width.

A Nicol prism was placed over the eyepiece, and I then found that when the principal section of the Nicol was perpendicular to the long axes of the crystals, the maximum amount of light was transmitted, and when the principal section was parallel with the long axes of the crystals, they either appeared perfectly opaque or transmitted the minimum amount of light, according as the crystals in the field of view belonged to one or other class.

Other specimens of iodine showed this crystalline arrangement with different degrees of distinctness; but in all, or nearly all, some trace of it could be seen. In some cases, however, the minimum amount of light was transmitted when the principal section of the Nicol was not parallel with what appeared at first sight to be the long axes of the crystals; but a more careful examination usually showed some traces of crystalline structure in a direction parallel with the principal section of the Nicol.

I shall refer to these two forms of iodine as iodine α and iodine β, calling those portions of the film α which are of a darker colour and polarize the light imperfectly, and the light-coloured strongly polarizing parts β.

From the appearance of the film, when seen under the microscope, it appears probable that this difference depends merely on the arrangement of the crystals, and that when they are regularly disposed in a single layer the film is one of those which I have called iodine β; whilst iodine α consists of several layers of thin crystals lying in various directions, or it may be due to different faces of the crystals of iodine being in contact with the glass, and to the light passing through the crystals in a different direction.

The difference between the action of the crystalline

* Paper read before the Royal Society.

film on the transmitted light is one of degree only; for I obtained two specimens of iodine β in which the film was of unequal thickness; and in this case, when the principal section of the Nicol was parallel with the long axes of these crystals, the thick portion of them appeared opaque. but a considerable amount of light was transmitted by the thinner portions of the very same crystals. Moreover several specimens of iodine β which appeared perfectly opaque in certain positions of the Nicol when seen by ordinary daylight, were of a deep red colour when examined by direct sunlight; and I have recently succeeded in preparing several films of iodine β so thin that they were only opaque when seen through a Nicol, whose principal section was parallel with the length of the crystals, with very weak light; by ordinary daylight they appeared of a deep red colour under these circumstances.

Iodine α.—Films of iodine α between two slips of glass were laid on the stage of the polariscope, and the light they transmitted examined with the analysing Nicol; on turning either the stage or the Nicol, the colours of the film varied, according to their thickness and the relative positions of the film of iodine and the Nicol, from a kind of brownish yellow to a deep red, the colours being similar to those of solutions of iodine in alcohol of various strengths.

When the incident light was polarized, and the film of iodine placed so as to transmit the minimum amount of light, or at right angles to this position, the field was dark when the Nicols were crossed and light when they were parallel. When, however, the film of iodine was in an intermediate position, the field was no longer dark in any position of the analyser, the colour and intensity of the light varying slightly as it was turned.

Iodine β.—A film of iodine β of a yellowish brown colour was examined by transmitted light; the field appeared perfectly dark in two positions of the film and Nicol. With polarized light, when the film was placed at right angles to the position in which it transmitted no light, the field was dark when the Nicols were crossed and light when they were parallel. When, however, the iodine film was placed in an intermediate position, the field was no longer dark when the Nicols were crossed, though it was so in two positions of the analyser 180° apart.

In order to simplify the description of the experiments, I shall speak of the direction in the film which, when placed parallel with the principal section of the Nicol, caused the field to appear dark, or in the case of iodine α to be least bright, as the axis of the crystal.

Very thin films of iodine β, as I have mentioned before, are not opaque when the principal section of the Nicol is parallel with the length of the crystals, and, when examined with the polariscope, appear of a deep red colour, when, under similar circumstances, a thicker film would transmit no light at all.

Hence it would appear that iodine belongs to the class of double refracting substances in which the coefficient of absorption differs according to the direction in which the light passes through the crystal, and, further, that the ray whose plane of polarization is perpendicular to the axis of the crystal is most energetically absorbed.

This is the case with both forms of the crystalline layer of iodine; but the two rays are much more unequally absorbed by iodine β than by iodine α—so much so that whilst the latter only appears absolutely opaque when the principal section of the Nicol and the axis of the crystal are parallel, when the film is so thick that but little light can pass through under any circumstances, the former absorb the one ray so energetically that a layer which appears light yellow when the Nicol is in one position is absolutely opaque when it is turned through an angle of 90°.

When a thin film of iodine β is seen through a Nicol whose principal section is so placed that the minimum amount of light is transmitted, the light usually appears of the same colour and brightness as that which has passed through the adjacent portions of the film consisting of iodine β; and it is impossible to see where one form of the film ends and the other begins. From this it would appear as if both forms of the crystalline layer absorbed light polarized in a plane perpendicular to the axis of the crystals with equal intensity, but that they differ greatly in their absorptive powers for light polarized in a plane at right angles to this.

I have shown, in the preceding paper, that solutions of iodine in alcohol, when seen by transmitted light, vary in colour, from a pale yellow to a deep red, according to the strength of the solution and the thickness of the layer through which the light has to pass. In a similar manner, in proportion as the thickness of the films of iodine increases, the light becomes more and more red; and four films of iodine β, which when seen separately were of a pale yellow, appeared of a deep red when superimposed, and so placed with respect to each other that they transmitted the maximum amount of light.

The light of a paraffin lamp reflected from the surface of a film, consisting partly of iodine α and partly of iodine β between two slips of glass, was examined by means of the Nicol, the angle of incidence being about 60°.

When the principal section of the Nicol was in the plane of incidence, and when consequently but little of the light reflected from the surface of the glass was transmitted, portions of the film of iodine appeared of different degrees of brightness; and on rotating either the Nicol or the stand, the relative brilliancy of different portions of the film changed, those portions which consisted of iodine β appearing perfectly black in certain relative positions of the film and Nicol, whilst the remainder of the film merely became more or less bright.

The film of iodine was then placed so that the portion consisting of iodine β appeared perfectly black when the principal section of the Nicol was in the plane of incidence. On rotating the stand, light reflected from the surface of the iodine was transmitted by the Nicol, and increased in quantity till the stand had been turned through 90°, when the surface of the iodine had a brilliant metallic lustre. On continuing the rotation, the surface gradually lost its brilliancy, and when the stage had been turned through 180° appeared perfectly black again.

On rotating the Nicol the same changes took place; but the light reflected from the surface of the glass marked the effect to a considerable extent when the principal section of the Nicol was no longer in the plane of incidence.

The light incident upon the surface of the glass showed no signs of polarization when examined by a double-image prism and plate of selenite, and only the faintest trace of it after passing through, at an angle of about 60°, a slip of glass similar to those used for covering the layers of iodine; consequently the polarization of the light must be due to the film of iodine.

From this it appears that the light reflected from the surface of a film of iodine β is polarized; and by examining the light transmitted by the same portion of the film, it was ascertained that the plane of polarization of the reflected light is perpendicular to that of the ray which is most freely transmitted, and consequently that the reflected light is polarized in a plane at right angles to the axis of the crystals.

When the incident light was polarized, it was found that it was reflected from the surface of the iodine when the plane of polarization of the light was perpendicular to the axis of the crystals, and extinguished when parallel.

As has been stated before, when a film of iodine α is seen through a Nicol, it does not appear black in any position; but the brilliancy of the surface alters as the Nicol or iodine is rotated.

Experiments similar to those just described show that when a ray of plane polarized light is incident upon such a surface of iodine, it is never completely extinguished, as is the case with iodine β; but the intensity of the reflected light depends on the relative position of the plane of polarization and the axis of the crystals, being least when they are parallel.

When the slips of glass between which the iodine has been melted are carefully separated, the film usually remains attached to one of them in a sufficiently perfect condition to be examined. At first it is extremely brilliant, and shows exactly the same appearances as have already been described as occurring with film of iodine under glass. The surface, however, not only tarnishes rapidly, but even at a low temperature (10°) the film quickly evaporates, and consequently the uncovered films are somewhat difficult to examine.

They, however, permit some additional facts to be observed, which either are seen with difficulty or not seen at all when the iodine is covered with a plate of glass; and chief amongst these is the "surface-colour" which iodine shows when light is incident upon it at a high angle.

When a film of either iodine α or β is placed on the stage of the polariscope with its axis parallel with the plane of incidence and the principal section of the Nicol in the same plane, the surface of the iodine appears bright and metallic when light is incident on it at an angle of about 60°. As the angle of incidence increases, the colour of the reflected light changes; at about 70° the surface appears blue, and is still bright, but has lost its metallic appearance to a considerable extent, and at about 72° the colour is most intense; but as, in addition to the difficulties which are inseparable from determinations of this kind, the instrument which I have used for these experiments does not allow of any very accurate measurements being made with it, the value of these angles can only be regarded as approximate.

On rotating the stand the amount of reflected light diminishes rapidly, and the iodine appears dark or nearly so when the axes of the crystals are perpendicular to the plane of incidence.

On rotating the Nicol, the axes of the crystals of iodine remaining parallel with the plane of incidence, the surface of the iodine becomes bright and metallic, the maximum amount of light being transmitted when the principal section of the Nicol is perpendicular to the plane of incidence.

When the incident light is polarized in the plane of incidence the surface of the iodine appears brilliant and metallic in all positions, and when seen through the analyser the amount of light reflected by the film alters as the former is rotated, but there is no trace of colour.

When, however, the light is polarized perpendicularly to the plane of incidence the reflection from the surface of the iodine is a coloured one when the axes of the crystals are parallel with the plane of incidence; consequently the appearance of the film is exactly the same when unpolarized light falls on its surface and it is seen through a Nicol whose principal section is vertical, and when the incident light is polarized perpendicularly to the plane of incidence and it is seen directly.

These experiments show that when light falls upon the surface of a film of iodine at an angle of about 72° a portion of the light is polarized by reflection in the plane of incidence, and this independently of the position of the crystals composing the film, and that another portion of the light, which is coloured by reflection, and to which the surface-colour is due, is polarized in a plane whose direction depends on that of the crystals composing the film, and, further, that this light is polarized perpendicularly to the axis of the crystals.

The surface-colour can only be seen when the angle of incidence which the light makes with the surface of the iodine is a large one; and the reason that, in the case of iodine covered with glass, it is not visible, apparently is, that with a large angle of incidence nearly the whole of the light is reflected from the surface of the glass. I succeeded in seeing the blue colour in the case of a fragment of iodine which had been melted between a slip of glass and one of the sides of a small crown-glass prism of an equilateral section, and also when such a prism was placed on the surface of one of the glass slips covering the iodine, a drop of carbon tetrachloride (the index of refraction of this liquid being nearly the same as that of the glass) being placed between the slip and the prism, as under these circumstances light can reach the surface of the iodine at a greater angle than is possible when it is covered by a flat piece of glass; but in neither case was the surface-colour so well seen as when the iodine was uncovered.

Haidinger has remarked (Sitzungsberichte der kaiserlichen Akademie der Wissenschaften, Band viii. p. 97) that the surface-colours are complementary to the colour of the light transmitted by the same substance; and this also appears to be the case with iodine, as in the solid and liquid condition, and also when dissolved in certain liquids, it absorbs most readily the blue rays; but at the same time, as Professor Stokes has pointed out, the surface-colour and the colour of the transmitted light can only be said to be complementary within very narrow limits, as the colour of the transmitted light varies with the thickness of the layer of substance through which it passes.

Films of iodine α and β, when the light was incident on their surface at a considerable angle, were found to polarize the light elliptically in certain positions of the film, as was shown by the black cross being distorted when a plate of Iceland spar, cut perpendicularly to the axis of the crystal, and a plano-convex lens of about 40 mm. focal length were placed between the surface of the iodine and the analysing Nicol. The amount of distortion, which was never very considerable, increased with the angle of incidence, and appeared to attain its maximum when the angle was about 72°.

When a film of either iodine α or β is placed on the stage with its axis perpendicular to the plane of incidence and the principal section of the analyser parallel with the latter plane, the black cross is perfect; but on turning the film till its axis is parallel with the plane of incidence, the cross becomes slightly distorted, and the centre appears bluish. When the light falling on the surface of the film is polarized in a plane forming an angle of 45° with the plane of incidence, the principal section of the analysing Nicol still remaining in that plane, the black cross is perfect as long as the axis of the iodine is perpendicular to the plane of incidence, and distorted when it is parallel.

Iodine β only shows the black cross very faintly with unpolarized light when its axis is perpendicular to the plane of incidence.

The distortion when the incident light is polarized is far greater than that produced by the reflection of a ray of light, polarized at an angle of 45° with the plane of incidence, from the surface of a piece of glass, and quite comparable in amount with the effect produced when the light falls on a metallic surface.

I selected from a large quantity of freshly sublimed iodine a few pieces bearing a more regular crystalline form than the rest, and amongst these there were two nearly triangular plates, about 10 mm. long and 8 mm. broad.

One of these was arranged on the stage of the polariscope, and the light reflected from the surface observed in the way that has already been described in the case of the films of iodine.

The light was most completely polarized when the angle of incidence was about 72°; when the length of the crystal was perpendicular to the principal section of the analyzer it appeared darkest, and when parallel with it lightest.

The surface-colour and the distortion of the black cross were as clearly seen as with the film of iodine.

After several unsuccessful attempts I succeeded in preparing some well-defined crystals of iodine by carefully heating on a sand bath a small quantity of that substance in a wide-mouth stoppered bottle, when some perfect rhomboidal plates of iodine about 1 mm. long were deposited on the cool part of the bottle. When these were examined with the polariscope, the principal section of the Nicol being in the plane of incidence, they appeared brightest when their long axis was parallel with, and darkest when it was perpendicular to, the plane of incidence.

Hence it appears that when the long axes of these crystals are parallel with or perpendicular to the plane of incidence, part of the light reflected from their surface is polarized in the plane of incidence, and part in a plane at right angles to their long axes, and consequently that the long axes of these rhomboidal plates correspond with that direction within the film of iodine which has been spoken of as the axis of the crystal: and as iodine belongs to the trimetic system, this may be considered the principal axis, as being the one in the direction of which the crystals are prismatically developed to the greatest extent; and it also appears that when a ray of light passes normally through such a crystal it is divided into two rays polarized respectively parallel with and perpendicular to the same axis; and the one whose plane of polarization is parallel with the principal axis suffers the least absorption.

ANN ARBOR SCIENTIFIC ASSOCIATION.*

The Aromatic Group in the Chemistry of Plants.

BY PROFESSOR PRESCOTT.

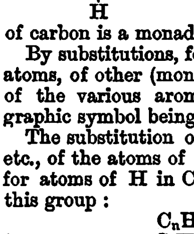
The term Aromatic Group was first given to the benzoic series of compounds, as classified around the common nucleus benzoyl, by Leibig and Wöhler in 1833. Benzoyl, C_7H_5O, was the first compound radical recognized in complex vegetable products, and its discovery at once opened new ways of investigation in the field of organic chemistry. From time to time other chemical nuclei have been defined, in the construction of other groups of carbon compounds, until, now, it may be said, there are as many series of these bodies as most persons care to number among their scientific acquaintances. But there has been no greater activity or keener enthusiasm or richer reward, in all the labours of the forty years of organic chemistry, than in the work devoted to the aromatic group. The place which this group holds in organic chemistry is similar, in certain respects, to the position which organic chemistry itself occupies in general chemical science.

Among the valuable results of the labour devoted to this group we must accept, first, a clearer insight into the constitution of molecules, throwing better light upon the chemistry of all bodies. That phase of "the new chemistry" which finds expression in graphic formulæ—the theorizing as to the relations of atoms to each other within the molecule, with whatever of well-grounded philosophy or of fallacious hypothesis appertains—has, in no small share, been due to work which has been sceptically designated as that of "those German chemists running crazy with what they call their aromatic group." It is not to be supposed that the expenditure of this labour, or of any pioneer labour in science, has been without waste. But the evidence of its substantial success is before the chemical world in the long list of well-defined aromatic bodies now as truly under the control of the chemist, in analysis and synthesis, as are the metallic salts. And this evidence is not addressed to the chemical world alone. The world of factories and ships, the world seeking a sign as to the truth and use of all and any science, has received from the chemistry of the aromatic group a good number of palpable demonstrations of the power of chemical knowledge. There have been produced, under chemical direction, from the waste of coal-gas manufacture alone, aromatic substances as follows: since 1856, anilin dyes, now sold at ten millions of dollars yearly, to colour stuffs in the tints of the rainbow for every household; since 1870, madder dye, amounting in 1873 to 1000 tons, valued at over four millions of dollars; and, this year, the acid of wintergreen oil, promising to be the most useful of the antiseptics, being applicable to foods and drinks,—beside a considerable number of other products, in themselves of no slight importance in commerce and the arts. Assuredly, the aromatic bodies have been found valuable material both in physical science and in industrial economy.

As regards their significance in biological science, the question will arise: how far may an insight into the constitution of molecules formed in plants help the chemist toward an understanding of the *formative steps* in plant chemistry? Before we can reach this final question in our subject, we must consider, first, what the aromatic group is, and where in the vegetable kingdom it extends, and, next, by what steps the molecules of this group are formed outside of living bodies, under conditions arranged by the chemist.

The aromatic group, when this term was first adopted, consisted of benzoic acid, bitter almond oil, amygdalin, cinnamic acid, cinnamon oil, cuminic acid and cummin oil, with a considerable number of artificial derivatives from these bodies,—nearly all having penetrating aromatic odours. The possession of aromatic odours, however, is not especially characteristic of the very great number of bodies now classified in this group. The present definition of the aromatic group, is, in briefest terms, *the series of bodies built upon benzene.*

Benzene (also termed benzole), containing $\frac{72}{78}$ carbon and $\frac{6}{78}$ hydrogen, may be formulated as C_6H_6: being in vapour 39 times heavier than its volume of hydrogen, its molecular weight is 78 and it must be formulated as C_6H_6. Carbon, here as almost everywhere, is a tetrad, and the six tetrad atoms of carbon have twenty-four bonds of chemical union. As only six of these are occupied by the six monad atoms of hydrogen, eighteen bonds must (it is believed) connect carbon with carbon,—forming nine lines (or movements?*) of union between carbon atoms. As it is found in certain compounds that each one of the six carbon atoms behaves alike, it appears that each must hold the same relations to its fellows, and they must be disposed in a ring, as first proposed by Kekule, in 1865.



The nine lines of union between the six atoms of carbon (if not connecting alternate or opposite atoms, *i.e.*, if disposed in the ring) require the alternate unions to be made by double lines. Then each atom of carbon in the ring has one bond of union free to be held by atoms (or semi-molecules) outside of the carbon ring: so that as regards other elements each atom of carbon is a monad.

By substitutions, for one or more of the six hydrogen atoms, of other (monad) atoms or radicals, the formulæ of the various aromatic compounds are obtained: the graphic symbol being always a hexagon.

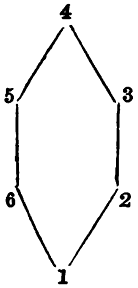
The substitution of methyl, CH_3, for one, two, three, etc., of the atoms of H (around the hexagon)—and also for atoms of H in CH_3—constructs *the hydrocarbons* of this group:

	C_nH_{2n-6}	*Number of possible Isomers.*
1.	C_6H_6	Benzene.
2.	$C_6H_5(CH_3)=C_7H_8$	Toluene.

* Reprinted from the 'Proceedings' for 1875-6.

* Kekule, *Ann Chem. u. Pharm.*, clxii, 77. Ladenburg, *Deut. Chem. Ges. Ber.*, v., 322. 'Watts' Dictionary of Chem.' 2nd Supplement, 132.

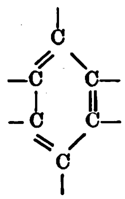
3. $C_6H_4(CH_3)_2 = C_8H_{10}$ Xylene. Three (1, 2: 1, 3: 1, 4).
4. $C_6H_3(CH_3)_3 = C_9H_{12}$ Cumene. Three (1, 2, 3 : 1, 2, 4 : 1, 3, 5).
5. $C_6H_2(CH_3)_4 = C_{10}H_{14}$ Cymene. Three (1, 2, 3, 4 : 1, 2, 4, 5 : 1, 3, 4, 5).
6. $C_6H(CH_3)_5 = C_{11}H_{16}$ Amylbenzene. One (1, 2, 3, 4, 5).
7. $C_6\ (CH_3)_6 = C_{12}H_{18}$ Amylmethylbezene, etc.



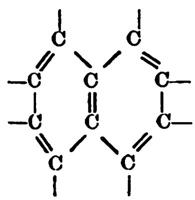
The hydrocarbon having two of the original hydrogen atoms displaced (No. 3) may evidently have contiguous or alternate or opposite atoms displaced, thus presenting three different kinds of molecules,—and the number of variations mathematically possible is given above as a theoretical number of possible isomers. The full number of possible isomers, on this theory, has been actually produced in most instances, though not in all, and perhaps has not been exceeded in any instance. Thus, there are known three compounds having the ultimate composition and molecular weight of xylene, differing in certain properties: orthoxylene (having parts 1 and 2 of the hexagon occupied by methyl), isoxylene (having 1 and 3) and metaxylene (having 1 and 4 occupied by methyl). This correspondence between fact and theory in the number of isomers strengthens the evidence that the hexagonal figure represents the *actual relations* of the atoms in the molecule. But it must be borne in mind that, while figures are placed upon paper to represent certain ascertained *relations* of atoms to each other, nothing has been ascertained as to the *places* of atoms in molecules. Other relations than those of place may be represented geometrically, with advantage.

The aromatic hydrocarbons, together, are known as the benzoles—the chief liquid distillates from coal tar—coal tar naphtha. Among the distillates from coal tar are two other hydrocarbons, which are solid, and are of unusual importance in industry, namely: naphthalene and anthracene. These are not homologous with benzene, as members of the same series (C_nH_{2n-6}), but belong each in another series related progressively to the benzene series, with mathematical harmony, as follows:

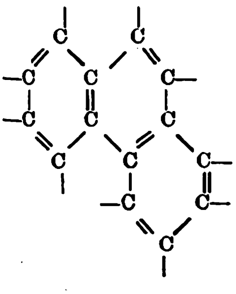
Benzene——C_6H_6 or C_nH_{2n-6}——Single Hexagon——



Naphthalene—$C_{10}H_8$ or $C_nH_{2n-2\times6}$ —— Double Hexagon—



Anthracene—$C_{14}H_{10}$ or $C_n\,H_{2n-3\times6}$—Triple Hexagon—



From these hydrocarbons (*i.e.*, from the hexagon, single, double or triple) all the aromatic bodies are extended. *Displacing* (one or more atoms of)

H by OH, phenols are formed (as in carbolic acid).

H by $C\left\{\begin{matrix}O\\OH,\end{matrix}\right.$ acids „ „ (as benzoic acid).

$\left.\begin{matrix}H\\H\end{matrix}\right\}$ by $\left\{\begin{matrix}OH\\C\left\{\begin{matrix}O\\OH\end{matrix}\right.\end{matrix}\right.$, acids „ „ (as salicylic acid).

H by $N\left\{\begin{matrix}H\\H,\end{matrix}\right.$ amines „ „ (as anilin).

$\left.\begin{matrix}H\\H\end{matrix}\right\}$ by $\left\{\begin{matrix}O\\|\\O,\end{matrix}\right.$ quinones „ „ (as anthraquinone).

The aromatic hydrocarbons have been looked upon as bodies of too simple chemical construction to exist in plants, and this is certainly true of the lighter portion of them. The first three members of the benzene series are not found in the vegetable kingdom, and the fourth, cumene, or trimethylbenzene, has been reported found only in Roman cummin oil. But the fifth member of the series, cymene, or tetramethylbenzene—a body having the molecular weight 134 and hence in vapour 67 times heavier than its bulk of hydrogen—a liquid closely approaching both in composition and in properties to turpentine oil—is, in its various isomers, distributed among plants to an extent not fully understood. It has generally been put down as more especially an educt of three plants, *Cuminium cyminium* (cummin) and *Cicuta virosa* (water hemlock), of the umbelliferæ, and *Thymus vulgaris**, of the mint family; also sometimes of a fourth, *Ammi Copticum*. But a large number of the volatile oils of plants contain hydrocarbons of the composition $C_{10}H_{14}$, more and more of which are found by chemical treatment to yield aromatic products and almost certainly to be built upon the benzene nucleus and to fulfil the character of "cymenes." *Eucalyptus globulus*, the Australian fever tree, which has received much attention of late years, contains a cymene as well as a terpene.

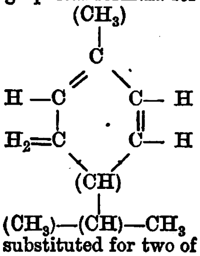
Now there appears to be only a short step in composition between cymene $C_{10}H_{14}$, and *oil of turpentine*, $C_{10}H_{16}$, which is found in the coniferous trees, but this short step suffices to throw oil of turpentine out of the homologous series of aromatic hydrocarbons. Now isomeric with turpentine oil proper are "the terpenes" generally, including the essential oils of apricot, bergamot, birch, camomile, caraway, cloves, cubeb, elemi, hop, juniper, lavender, lemon, orange, parsley, pepper, savin, spike, tolu, thyme, and an indefinite number not named or not brought to notice. In fact, a large proportion, probably a majority, of essential oils contain terpenes, generally with other essential oil constituents. To present some approximate indication of the extent of distribution of the volatile oils altogether, a count has been made of the number of plants reported to contain volatile oils in the tabular summary of plant constituents given as the Second Part of Wittstein's 'Chemischen Analyse von Pflanzen und Pflanzentheilen' (1867). This summary includes 576 plants in 114 natural orders. Among these, essential oils are reported in 156 or 27 per cent. of the plants, and in 45 or 39 per cent. of the families.†

Oil of turpentine and its numerous isomers have mostly been placed, unclassified, among "the vegetable substances little known," but there is a beginning that promises to draw them into the aromatic group and assign them

* C. R. A. Wright, *Jour. Chem. Soc.*, 1873, 686.

† Of the natural orders, the Labiatæ had the largest number of plants containing volatile oils (13 p.c. of all); the Umbelliferæ the next largest number; the Synantheriæ next, and the Myristiceæ next (6 p.c. of all).

Rolls, however, in his judgment, expressly declares 'that graphical formulæ of the hexagonal type. In 1872, A. Oppenheim reported to the German Chemical Society an investigation at the Berlin Laboratory* on the production of a cymene from oil of turpentine by abstraction of hydrogen (cymene dibromide being heated with anilin). As a result of his research the investigator gives this graphical formula for turpentine oil:



Here one of the carbon atoms of the ring has been loosened and displaced by the triad CH, giving the adjacent carbon atom only one line of connection in the ring and two outside bonds, so that four carbon atoms carry five of hydrogen. The remaining two points of the hexagon have taken methyl (CH_3) instead of hydrogen and one of these methyl molecules has methyl again substituted for two of its hydrogen atoms. Later, Oppenheim reports the formation of cymene from the terpene of cummin oil† and offers other confirmations. Kekule has since traced relations between cymene and camphor (the immediate oxidate of a terpene), $C_{10}H_{16}O$, from which he presents a graphical formula. Kekule confirms the relationship between cymene and the terpenes, using iodine instead of bromine, and accepts Oppenheim's conclusions.‡

Graebe has dissented from the view that turpentine oil is of the aromatic type, although he finds a relation between the terpene in wormseed oil and cymene. § The conclusions of Oppenheim are mostly confirmed and extended by the labours of C. R. A. Wright with oils of lemon, orange and nutmeg, reported to the London Chemical Society, in 1873. ‖ It seems, then, strongly probable, if not yet fully established, that the terpenes, extending as they do widely through the vegetable kingdom, are all built upon the benzene nucleus, being, however, somewhat complex extensions of that nucleus.

From this standpoint, too recent to be secure, no small share of the most simple carbon compounds which plants contain—those destitute of oxygen and nitrogen—belong to the aromatic group. It has long been well known that plants contain *oxidized* aromatic compounds very closely related to hydrocarbons, so that the latter are easily *obtained from plant constituents*. Benzene itself took its name from the abundant educt benzoic acid, from which Mitscherlich first obtained it in 1834, by heating with lime or by stronger heat with iron. It is obtained by dry distillation or by more gentle treatment from the most of the aromatic compounds, and by harsher methods from bodies not built upon it; having been discovered by Faraday in 1825 among the vapours distilled at a high temperature from fats. Toluene was obtained by Deville, who first examined it and named it, by distilling Tolu balsam; and it is obtained with especial ease by the moderate action of heat upon a large number of resins—this being one of the many indications that most resins contain the aromatic nucleus. Xylene is also easily obtained from resins. The reverse of these transformations, the constant production of resins from terpenes by atmospheric oxidation in balsams and turpentines, will require mention further on. And the manufacture of aromatic hydrocarbons, on the large scale, from coal, will be noticed with the methods of production from inorganic sources.

(*To be continued.*)

* *Berichte der deutschen chemischen Gesellschaft*, v., 94.
† *Berichte der deutschen chemischen Gessellschaft*. v. 628; vi., 915.
‡ *Berichte der deutschen chemischen Gessellschaft*, vi., 437; *Journal Chemical Society*, 1873, 889.
§ *Deut. chem. Ges. Ber.*, v., 677.
‖ *Jour. Chem. Soc.*, xi., 686—701.

Parliamentary and Law Proceedings.

IMPORTANT DECISIONS UNDER THE REGISTRATION OF TRADE MARKS ACT,

In the Chancery Division of the High Court of Justice, on Friday, July 28, an application *ex parte Stephens* was made before the Master of the Rolls, which was of some importance under the Trade Marks Registration Act, 1875.

The applicant, Henry Charles Stephens, recently applied to the Registrar under the Act to be registered as the proprietor of a trade mark, and sent in a statement stating that the trade mark was composed of certain letters in the following distinctive combination:—AEILYTON, which he alleged that he used as a distinctive device for certain inks manufactured by him, and upon his invoices, cards, etc., to describe and distinguish the said inks. The Registrar having refused to register the trade mark in question, on the ground that it was a mere word, and therefore, not within the Act, as it had not been used as a trade mark before the passing of the Act, Mr. Stephens now applied that the register might be rectified by inserting his name as proprietor of this trade mark.

Mr. Chitty, Q.C., and Mr. W. C. Fooks, in support of the motion, contended that the word was a "device" within the meaning of section 10, and, as such, capable of registration, quoting, amid some laughter the authority of Longfellow for the word "Excelsior" being "a strange device;" but

The Master of the Rolls said that the Registrar was quite right. The Act defined a trade mark, for the purposes of the Act, to be either the name of an individual or firm printed, impressed or woven in some particular and distinctive manner, or a written signature or copy of a written signature of an individual or firm, or a distinctive device, mark, heading, label, or ticket. And there was a proviso that there might be added to any one or more of these particulars any letters, words, or figures, or combination of letters, words, or figures. It was his Lordship's opinion that the Act did not enable a mere word to be registered unless it had been used as a trade mark before the passing of the Act, which this word had not been. He therefore refused the motion, with costs.

Respecting this decision Mr. Stephens, has written to the *Times* as follows:—"The decision on the 28th of July of the Master of the Rolls (the first judicial decision under the above Act) upon my right to have the word 'Aeilyton,' as applied to a new discovery of mine registered under such Act, is of wide commercial importance. Until the Act was passed the Courts of Law and Equity recognized a right of trade mark in a distinctive word or name as applied to any particular manufacture, and protected the owner of such trade mark in its exclusive user as applied to such manufacture. Without multiplying instances I may mention the well known words 'Eureka,' as applied to shirts; 'Excelsior,' as applied to soap; 'Anatolia,' as applied to balm; and 'Glenfield,' as applied to starch. The commercial world will learn with surprise that the law, according to the Master of the Rolls, will not for the future recognize a right of trade mark in any distinctive word unless such word was in use before the passing of the Act. I, in common with a large proportion of my manufacturing and commercial brethren, never imagined, and do not now believe, that it was the intention of the Legislature in defining a trade mark to consist, among other things, 'of a distinctive device, mark, heading, label, or ticket,' to reverse the previous law on the subject and to exclude from right to registration any new and distinctive word specially devised for employment as a title, heading, or label for any particular class of manufacture. The Master of the

the power to register as a trade mark a distinctive word used before the passing of the Act clearly negatives the conclusion that a distinctive word can be used as a trade mark after the passing of the Act.' Now, Sir, can it be supposed that it was the intention of the legislature by an enactment purporting to further the interests of commerce to reverse the previous law on the subject by implication merely? Surely the Legislature would have expressed any such intention by direct and positive enactment; and if the law be such as from the decision of the Master of the Rolls, it would seem to be, the attention of the commercial world cannot be too earnestly directed to the matter with a view of procuring another amendment of the Act."

In the High Court of Justice, Chancery Division, on Monday last, before Vice-Chancellor Sir C. Hall, an application was made by Mr. James Meikle, a tea merchant, to have his name inserted on the register of trade marks, as the proprietor of a device used by him in his business. The device bore the word "registered," and the question was whether under the recent Trade Marks Registration Act, 1875, this word could be retained. In March, 1874, Mr. Meikle had had his device registered under the Copyright of Designs Act, 1862, and thenceforward adopted the word "registered" on his wrappers; but, in consequence of the new Act, he applied to the Commissioners of Patents for registration under such Act. It appeared, however, that the Registrar, acting under the direction of the Commissioners, refused to entertain the application unless the word "registered" was struck out, and Mr. Meikle now applied by summons under Section 5 of the Act of 1875, to have the register "rectified" by having the design registered in its integrity. Under the Act and the rules of the Commissioners a design must be published or advertised in the *Official Trade Marks Journal* for three months prior to registration; but in Mr. Meikle's case, this had not been done in consequence of the Registrar's direction that the word "registered" should not appear in the journal. By the Act, the Commissioners have power to frame rules and give directions for the direction of the Registrar.

The Vice-Chancellor said he was unable to make the order asked for. In the first place, no advertisement of the design had been made as required by the Act. The object of the Act in requiring advertisements was to give any member of the public an opportunity of objecting to the intended registration. In the next place, the Registrar was the officer of the Commissioners, and was bound to act in accordance with their directions, and they had directed him not to place the word "registered" on the register. If his Lordship were now to give directions that this should be done he would be directing the Registrar to act in complete opposition to the orders of the Commissioners, and such a direction he could not give to a subordinate officer, and the Registrar could not act upon such a direction. He was, therefore, of opinion that although the Court had jurisdiction in a proper case to rectify the register, yet, looking at the position of this officer, he could not control and direct him by making the order asked for. The applicant must, therefore, take such other course as he should think fit.

Leave was then asked to amend the summons by giving directions for the insertion of the proper advertisements of the design, with a view to registration, and

His Lordship gave leave accordingly.—*Times.*

Poisoning by Cyanide of Potassium.

At an inquest held in Cork, respecting the death of Henry Hunter, it appeared that the deceased, who had been for some time mentally affected, had died from the effects of swallowing about 20 grains of cyanide of potassium.

Obituary.

Notice has been received of the death of the following:—

On the 9th of July, 1876, Mr. James Graham, Chemist and Druggist, of Glasgow.

On the 14th of July, 1876, Mr. Walter Fisher, Chemist and Druggist, Horwich. Aged 33 years.

On the 25th of July, 1876, Mr. Joseph D. Blacklock, Pharmaceutical Chemist, Old Steine, Brighton. Aged 63 years. Mr. Blacklock had been a Member of the Pharmaceutical Society since 1841.

On the 25th of July, 1876, Mr. George John Atterbury, Chemist and Druggist, Sutton-on-Trent. Aged 70 years.

On the 29th of July, 1876, Mr. Michael Henry Ainlie, Chemist and Druggist, Peckham. Aged 50 years.

On the 25th of July, 1876, Mr. Robert Durno Mitchell, Pharmaceutical Chemist, Berkeley. Aged 33 years. Mr. Mitchell had been a Member of the Pharmaceutical Society since 1867.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Birmingham Trade Conference.

Sir,—Just a word on the effect which the Birmingham Trade Conference had upon the equanimity of some of our representatives at the late Council meeting.

When the President expressed his regrets "that these gentlemen who were so eloquent at Birmingham did not come to the Annual Meeting of the Society," he must have forgotten that the Pharmaceutical Society only includes 20 per cent. of the registered members of the trade, and if his invitation should be accepted he may be requested to defray the return travelling expenses of those whom he could not admit to the annual meeting. Surely, the trade may meet in Birmingham, if they wish it, without first asking permission from Bloomsbury Square. Let me remark that the meeting was directly representative of 1200 chemists, a number larger than that of the voters who have conferred his office upon Mr. Williams. On the charge of eloquence made against our speakers, please extenuate this fault of my friends, Mr. Editor. I do not feel that it would be right to retort *tu quoque.*

That the Conference has already had a rousing effect at Bloomsbury Square is thoroughly satisfactory. It is the perpetual cry of "all's well" that we want to get rid of. I will give one fact that should upset a great many of the optimist assertions about the Pharmaceutical Society doing all that it possibly can for the trade. About a year since, a chemist at Leeds was prosecuted for the sale of Milk of Sulphur, and, as is well known to your readers, after an adjourned hearing, the stipendiary dismissed the case. In this interval, in my capacity of local secretary, I applied to the Secretary of the Pharmaceutical Society that if the decision should be against the chemist, we should be authorized to apply for a case for a higher court. I received a refusal, with some compliments upon our powers of self-preservation. Fortunately, the necessity for appeal did not occur.

But, as remarked before, the effect of the Conference has been excellent, and it will probably be but a few years, when the Council in omitting its September meeting will bracket the gathering of the Chemists and Druggists' Trade Association with that of the British Pharmaceutical Conference as the reason.

Richard Reynolds.

13, Briggate, Leeds,
August, 8, 1876.

SULPHUR PRÆCIPITATUM.

Sir,—At the June meeting of the Society of Public Analysts, the President, Professor Redwood, in the course of his remarks on Dr. Hill's paper, is reported to have said —"It would be found, if the two preparations were properly examined, that the sulphur existed in milk of sulphur in a more pure and less nauseous state than that in which it existed in precipitated sulphur. The method usually adopted in examining these preparations afforded a very imperfect insight into their respective natures. By the application of heat one was volatilized entirely, and the other left a residue of sulphate of lime; from which it was inferred that the one was pure sulphur and the other was not. If examined in another way, however, a different conclusion might be arrived at. Let each powder be treated with bisulphide of carbon, by which the sulphur would be dissolved, leaving in one case a dark-coloured oily residue of persulphide of hydrogen, and in the other case pure silky crystals of hydrated calcic sulphate."

This statement seemed to me so remarkable, that I was induced to test its truth by experiment; and a short account of the results may not be without interest. A good sample of precipitated sulphur was treated with carbon disulphide, and there remained a dark coloured residue—not oily, however, but pulverulent. This was placed on a small filter, and washed with carbon disulphide, and as soon as it had become dry, a minute portion was put on a glass slide with a drop of water, and viewed under the microscope, when it appeared as a fine amorphous powder. The remainder was examined chemically, and found to consist chiefly of calcium, iron, chlorine, and sulphur.

Several other commercial samples were examined in the same way, and with similar results. All contained a little iron, and all gave dark brown residues.

A small quantity of precipitated sulphur was made in accordance with the directions of the British Pharmacopœia. This specimen was of a pale yellow colour, without any tinge of grey, and on treatment with carbon disulphide left a light yellow residuum of insoluble sulphur.

I next prepared some hydrogen persulphide by pouring a solution of calcium disulphide into an excess of hydrochloric acid. When the yellow oily liquid was dropped into carbon disulphide, it quickly dissolved.

It is evident, then, that the method employed by Professor Redwood to prove the presence of hydrogen persulphide in precipitated sulphur is based on "scientific use of the imagination."

JOHN T. MILLER.

Sheffield, August 7, 1876.

THE EFFECT OF AGE ON RHAMNUS FRANGULA BARK.

Since my first introduction of this bark at the Pharmaceutical Conference held in Edinburgh, in 1871, I have probably had more pass through my hands and sent out more of the concentrated decoction than any other person, and fortunately the bark that I have made use of has always been of considerable age. The first supply which I received from Holland was certainly one or two years old before it was used, and as I have always taken care to have a good supply on hand, the bark must in all cases have been kept a year or two. This must be held to account for the fact that in no one instance have I known or heard of the action of this drug to be other than a pure mild aperient, or as Mr. Giles put it, perhaps the only true aperient that we have. It is, therefore, very desirable that no new bark should be used, and as I hope to see it introduced into the next edition of the British Pharmacopœia, stress should be laid upon its being old. The experience of the last five years has added to my conviction that Rhamnus Frangula is a most valuable medicine, and Dr. De Vrij's testimony to the estimation in which it is held in Holland should induce medical men in this country to make trial of it to a still greater extent than they have yet done—especially in hospital practice.

H. C. BAILDON.

CAMPHOR AND IODINE.

Sir,—While reading over the paper on the liquefaction occurring in the admixture of camphor and chloral hydrate, contributed by Mr. Saunders (of Canada), it struck me that he or some other investigator might be able to explain the cause of an apparently similar phenomenon which takes place on rubbing together camphor and iodine with iodide of potassium.

I do not know whether any of your readers have observed the effect, but I first noticed it some time ago while preparing linimentum iodi, some of which I required, but it had run out of stock. Accordingly I proceeded to make the quantity ordered in the official formula, so having triturated the dry ingredients in a wedgwood mortar for a few minutes and continued the same while I reviewed the proportions I had used of the requisite constituents previous to adding the spirit, I observed the mixture had become quite moist and pasty. I, therefore, carried on the rubbing a little further when the mass assumed the form of a thick blackish looking semifluid of a tarry consistence, ultimately being converted into a dark reddish coloured mobile liquid (not unlike bromine in appearance), which occupied a bulk of six fluid drachms, and on dilution with ℥vj of S.V.R., it measured exactly ℥iss.

On that occasion I had not time for contemplation but simply attributed the cause of these physical changes to some unaccountable property, probably akin to the remarkable union of chloral and camphor—owing (as I considered) to the analogy of chlorine with iodine. However, I thought no more of the subject until the article alluded to published in the issue of July 29, brought the circumstance to my recollection and led me to think this time a suitable opportunity of eliciting (through the medium of the Journal) the opinion of some competent authority, which is always more satisfactory than mere speculation.

Since writing the above I repeated the process by way of experiment, excluding the potassic iodide, when the result attained was quite different, so that my rashly formed conclusions were erroneous. The questions which now present themselves to my mind are:—Has the iodide anything to do in the matter? Is it the sole cause of the change? Would any other salt exercise the some influence? Is it a chemical combination or merely a mechanical mixture? But I am not in a position to answer these problems. Possibly the effect produced may depend on the humidity of the atmosphere, the moisture being attracted by the mineral salt. Still I scarcely imagine that the absorption of water from the air could have been so rapid, and I doubt whether the deliquescent property of the iodide of potassium be great enough to justify the acceptance of that assumption as a sufficient explanation, so I wait until the difficulty be solved by some one capable of handling the subject.

JAMES B. L. MACKAY.

Newcastle-on-Tyne, August 8, 1876.

C. Crook.—*Arnica Cerate.*—The formula is as follows—

"Spermaceti	. . . . .	3 ozs,
White Wax	. . . .	6 „
Olive Oil	. . . . .	14 „

"Add 1 drachm of medicated tincture to every 9 drachms of cerate, and stir briskly until cold."

"*Nostrum.*"—Wittstein's 'Pocket Book of Nostrums' could probably be obtained through Messrs. Williams and Norgate, or any foreign bookseller. It is written in German.

"*An Old Student.*"—You are recommended to address your question to the Secretary.

"*Aqua.*"—(1) It probably would do so. (2) You will find an account of the mode of procedure in any elementary work on analysis.

A. C.—The substance is bitartrate of soda.

F. S. T.—See an article on the Preservation of Plants for Herbaria, in vol. iv. (1874), p. 754.

W. R. Fowler.—The Act may be obtained from Her Majesty's printers, Messrs. Eyre and Spottiswoode.

In reply to several correspondents who have sent specimens of plants, we regret being unable at present to furnish the information they require, since our Botanist is "over the hills and far away."

F. J. Barrett.—(1) We know of nothing of the kind. If you refer to Watts's 'Dictionary' you will find the coefficient of expansion from which you can calculate what you want to know. (2) Bolley and Paul's 'Handbook of Technical Analysis' (Bohn's Scientific Series).

R. J. Atkinson.—The crystals are selenite, or hydrated calcium sulphate.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Peters, Mr. Annacker. Mr. Edward, Mr. Lewis, Mr. Fowler, S. W.

AVA, OR KAVA-KAVA.

The root known under the name of Kavà-Kava has lately attracted some attention in France as a remedy for gonorrhœa, and will probably be tried in this country.

Although the plant which yields it (*Piper methysticum*, Miq.) has been known since the time of Captain Cook, and although papers have more than once appeared in the *Pharmaceutical Journal* concerning it, yet a full description of the root and leaf for the purposes of pharmacognosy does not appear to have been given in either of the papers alluded to. A figure of the plant and of portions of the root were supplied with Mr. Morson's paper in

Fig. 1.—*Piper methysticum*, Miq.

1844,* but since many of our readers may have some difficulty in referring so far back, Mr. Morson's figure of the plant is here reproduced, and a fresh figure of the root structure is added. We are led to believe that these wood-cuts, together with a description of the root and leaf, will be useful to some of our readers, from the fact that we have lately received from Paris, under the name of Kava-Kava, some leaves and fruit, which consist of matico leaves mixed with the fruit of the arnatto plant!

The Kava-Kava plant is known by different names in different islands: thus in Viti it is known as "Yaquona," in Tahiti as "Ava-Ava," in Hawaii as "Kawa,"* and in the Marquesas Islands as Kava, or Kava-Kava.†

In New Zealand a species of pepper (*Piper excelsum*, Forst.) very similar in appearance to *Piper methysticum*, Miq., is known under the name of Kawa-Kawa. This plant, however, does not appear to possess the intoxicating properties generally ascribed to the root of *Piper methysticum*, but is only used as a tea and for toothache.‡ Its leaves, are generally only about half the size of those of *Piper methysticum*, and have only 5—7 veins radiating from the top of the leaf-stalk.

The Ava, or Kava-Kava plant, is cultivated in Viti, Tahiti, Hawaii, the Society and Tongan islands. Several varieties of the plant are distinguished by the natives. Those which grow on dry soil are said to produce the most active roots.

The *Piper methysticum* is a shrub about six feet high, with stems varying from 1 to 1½ inch in thickness. The leaves are rather large, varying in size from 4—8 inches in length, and being nearly as broad as they are long. In shape they are cordate, tapering above somewhat suddenly into a very short acute apex. The leaves are stalked, the petiole being usually from 1 to 1½ inch long, and dilated towards its base. To the naked eye the leaves appear smooth, although with the aid of a lens they are seen to have the veins covered with minute hairs, while the rest of the leaf has short hairs thinly scattered over it. The principal veins of the leaf, of which there are usually ten to twelve, radiate from the top of the petiole, the three central veins being very close together for about half-an-inch upwards from the base of the leaf.

The root is large and fibrous, but rather light and spongy in texture. When fresh it is said to weigh usually from 2 to 4 lbs., although it sometimes attains as much as 20 lbs. in weight, or even more. In drying, however, it loses rather more than half its weight. Externally the root is of a greyish-brown colour, and has a very thin bark, which when sliced off shows a complete network of woody tissue (Fig. 2), some of the interstices of which are filled with soft yellowish-white cellular matter, whilst others are quite empty. Internally the root is of a yellowish-white colour (In a variety of the plant known as "Marea" it is citron-yellow internally, and in another variety known under the name of "Avini-Ute" it is of a pinkish colour.) A transverse section (Fig. 3) shows a number of narrow lines (woody

* *Pharm. Journ.* [1], vol. iii., p. 474.

* Seemann, 'Fl. Vitiensis,' p. 260.

† *Pharm. Journ.* [2], vol. iv., p. 85.

‡ Hooker, 'Flora of New Zealand,' Part I., p. 228.

bundles) radiating from near the centre to the circumference, the portions of the soft cellular tissue by which

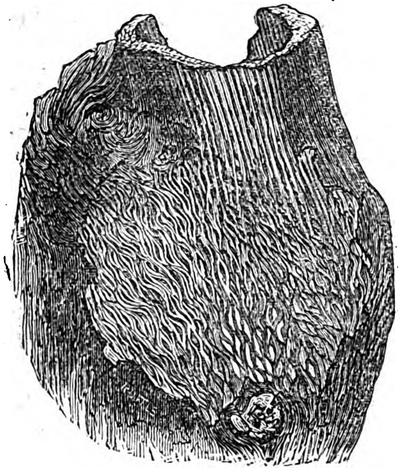


Fig. 2.—Section exposing the network of woody tissue below the thin root bark.

the lines are separated from each other being much wider than the lines themselves. The central portion of the root is soft and cellular, with a few woody bundles anastomosing with each other and proceeding at right angles to the radiating bundles, so

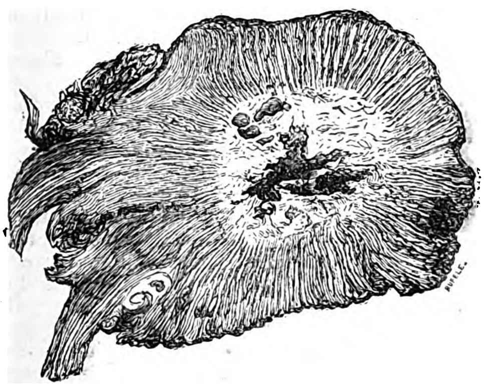


Fig. 3.—Transverse section of the root.

that they form a network in the centre of the transverse section. The root has a pleasant odour, recalling that of the lilac (*Syringa vulgaris*, L.), or meadowsweet (*Spiræa Ulmaria*, L.). It has a slightly pungent taste, and causes an increase in the flow of saliva, with a slightly astringent sensation in the mouth; and a scarcely perceptible bitterness.

The root and extreme base of the stem are the parts generally used.

The form in which it has been used for medicinal purposes is an infusion made by macerating about one drachm of the scraped root in a quart of water for five minutes. Unlike most other remedies for gonorrhœa, the taste of the infusion is pleasant, while its bitterness improves the appetite and does not produce nausea. The root contains, according to M. Cuzent, an essential oil of a pale yellow colour, 2 per cent. of an acrid resin, and about 1 per cent. of a neutral crystalline principle called Kavahin or Methysticin, which is obtained in acicular crystals by crystallization from a concentrated tincture. Kavahin differs from piperine and cubebin in being coloured red by hydrochloric acid, the red colour fading on exposure to air into a bright yellow, and in being coloured by strong sulphuric acid a purplish violet colour, which passes into green. The root contains also nearly half its weight of starch.

The action of Kava root appears to vary with the amount taken. In small doses it is generally stated to act as a stimulant and tonic, but when taken in large doses it produces an intoxication which differs from that caused by alcohol in being of a silent and drowsy nature, accompanied by incoherent dreams, the drinker not being quarrelsome or excited.

The roots grown in damp soil, however, produce a slightly different effect, the drunken person becoming irritated by the least noise. For an interesting account of the way in which the intoxicating beverage is made the reader is referred to former papers in this Journal.*

It appears probable that the medicinal properties of the plant are due neither to Kavahin nor to the resin, since a watery infusion produces the characteristic effects of the drug, and neither Kavahin nor the resin are soluble in water. The therapeutical properties of the different chemical constituents of the root, therefore, still require more accurate investigation.

The root is stated to have been used with success in erysipelatous eruptions,† which is rather remarkable since when taken in excess as an intoxicating beverage it produces a peculiar kind of skin disease, called in Tahiti "arevarea." In old drinkers the vision becomes obscure, and the skin, especially in parts where it is thick, becomes dry, scaly, cracked and ulcerated. In Nukahivi the natives use Kava for phthisis and in bronchitis, a small dose being taken at bedtime. It has also been recommended to be used internally and locally for gout.‡

It was first recommended for gonorrhœa in 1857.§

COMPARATIVE ANALYSES OF RADIX FILICIS MARIS.‖

BY PROVISOR KRUSE.

In the Baltic provinces and many other districts in Russia the rhizome of the male fern collected at Wolmar is preferred as a remedy against tapeworm before all others. The author therefore thought it would be useful to undertake an analysis of this drug and especially to note the variations in composition which the rhizome might undergo at different seasons of the year.

In the neighbourhood of Wolmar the male fern is dug up in forests; but that collected in the dry forests of broad-leaved trees (*Laubwäldern*) is preferred, because it is less decayed and yields a rhizome that can be more easily cleaned. The rhizome having been freed from the frond and the decayed portions of the root is washed and quickly dried with a moderate heat. After drying the rhizomes

* *Pharm. Journ.* [1], vol. iii., p. 474; [2], vol. iv., p. 86.
† *Pharm. Journ.* [1], ix. p. 218.
‡ *Medical Times and Gazette*, Dec. 1854, p. 591.
§ *Annal. de Therap.*, 1857, p. 61.
‖ Abstract of a communication from the Pharmaceutical Institute in the University of Dorpat (*Archiv der Pharmacie* for July, p. 24.)

they are examined separately, and perforated pieces and those that have become somewhat brown in drying are thrown away. Admixture of the rhizome of *Filix mas* with that of *Filix fœmina* can seldom occur, as the latter but seldom occurs in this district. But the area in which the true male fern grows is year by year taken up by the destruction of the forests, so that probably it will not be collected much longer in the neighbourhood of Wolmar.

The author used for his experiments a sifted powder prepared from picked rhizomes possessing the peculiar beautiful green colour and strong smell. The rhizomes collected in April and October possessed greater intensity of colour than those collected in July of the same year (1874). In order to see how great the variation might be in different years, the author also analysed some rhizomes dug up in the autumn of the following year (1875).

Percentage estimation of the Moisture, Hygroscopicity, and amount of Ash.

	April.	July.	Oct.
Air-dried rhizome further dried at 110° C. gave off moisture	15·7	13·4	13·5
Powder kept two days in air saturated with steam at 15°C. gave off in moisture when dried at 110°C.	24·5	23·7	28·1
Amount of ash from the air-dried rhizome	1·9	2·2	2·1
Amount of ash from the rhizome dried at 110°C.	2·2	2·5	2·5

The ash consisted of—

	1874			1875
	April.	July.	Oct.	Sept.
Manganese (MnO)	5·0	5·5	3·2	3·0
Ferric Oxide (F_2O_3)	—	—	1·8	1·75
Magnesia (MgO)	?	?	19·3	19·4
Lime (CaO)	15·3	12·8	16·4	16·5
Potash (K_2O)	17·7	16·1	17·6	17·3
Soda (Na_2O)	1·9	2·3	1·9	2·1
Carbonic Acid	2·6	3·7	3·9	3·5
Silicic Acid (SiO_2) and Sand	10·8	11·0	10·3	10·0
Phosphoric Acid (P_2O_5)	20·2	20·1	19·0	19·6
Sulphuric Acid (SO_3)	5·4	5·3	5·6	5·8
Chlorine	0·59	0·69	0·61	0·61

The quantitative examination of the ash was made with two portions. With one the carbonic acid was estimated in a Geissler's apparatus by means of nitric acid, and the chlorine by titrating the neutral solution with silver nitrate, using neutral chromate of potash as an indicator. The second portion was heated to dryness with concentrated hydrochloric acid, redissolved by the aid of dilute hydrochloric acid and the undissolved silicic acid filtered off. The filtrate was divided into two parts. In one (A) the sulphuric acid was estimated with chloride of barium, the phosphoric acid was separated with sesquichloride of iron and acetate of ammonia, the manganese was precipitated as sulphide; after the removal of the alkaline earths the potash and soda were estimated together as chlorides and then the potash alone as platino-chloride. B was neutralized with ammonia, redissolved in acetic acid, acetate of ammonia added and the iron precipitated by boiling as ferric phosphate. The filtrate was again divided into two parts: in one (A) the phosphoric acid was estimated volumetrically with acetate of uranium; in B, after removal of the phosphoric acid with ferric chloride, etc., the lime was estimated by means of oxalate of ammonia and ammonia in the presence of ammonium chloride, as oxalate and afterwards converted into caustic lime by incineration. Finally the magnesia was precipitated with ammonia and phosphate of soda.

Extraction with Water, Alcohol, Ether, Petroleum Spirit, etc.

A. The rhizome was exhausted with water at the ordinary temperature after macerating 24 hours, the product filtered under atmospheric pressure, and the filtrate at once evaporated to dryness. The extract was dried until two succeeding weighings gave the same result. The remaining powder was then exhausted with 85 per cent. alcohol.

	1874			1875
	April p. cent.	July p. cent.	Oct. p. cent.	Sept. p. cent.
The dried aqueous extract amounted to	36·4	25·4	35·1 36·6	35·5
The alcoholic extract amounted to	21·6	22·8	8·5 8·7	8·5

The rhizome after exhaustion with water and alcohol yielded to ether only a small quantity of fat, the greater part of the fat and the filicin must have already been taken up by the alcohol.

B. A fresh portion of the root was now extracted first with alcohol, and the extract was evaporated to dryness as above. The root was then treated with water. As the results obtained in these experiments showed a great difference from those obtained in the previous set, a controlling experiment was made, but with almost exactly the same results:—

	1874			1875
	April p. cent.	July p. cent.	Oct. p. cent.	Sept. p. cent.
The dried alcoholic residue amounted to	27·3	26·1	39·5	39·0
The aqueous extract to	14·7	17·0	10·7	10·1

In comparing the results of these two series of experiments a difference is observable, which at first is difficult to explain. We find that the sum of the constituents soluble in water and alcohol differs with the order in which the solvents are used, and that the yield from the April and July rhizomes is greater, and from the October rhizomes smaller, when treated first with water and then with alcohol. The different result with the April and July rhizomes can be explained by the assumption that previous to and during the period of vegetation, the rhizomes contain albumen coagulable by alcohol. It can also be accepted that certain bodies insoluble in water are carried into solution by the tannin then present. But these circumstances are probably insufficient perfectly to explain the difference.

C. A portion was next exhausted with ether, and the extract dried at 100° to 110° C. The portion insoluble in ether was then extracted with alcohol, and the extract dried. The portion soluble in alcohol was soluble in water also. The residue insoluble in ether and alcohol still yielded a further quantity of extract to water.

	April p. cent.	July p. cent.	October p. cent.
1. Ethereal extract	10·3	12·4	11·5
2. Alcoholic extract	17·8	16·7	24·5
3. Aqueous extract	12·8	6·9	14·8

Ether dissolves fat, chlorophyll and filicin, of which, as shown by experiment A, the greater part is taken up by alcohol also. Accordingly the total quantity soluble in ether and alcohol in C should be precisely equal to the quantity of substance soluble in alcohol in B. With the April and July rhizomes this proved to be nearly the case, but not with the October. The portion in C insoluble in ether and soluble in alcohol must be referred for the greater part to tannic acid and sugar. The portion in C insoluble in ether and alcohol and soluble in water consists of mucus, salts, and substances of unknown composition.

D. A fresh quantity of the rhizome was extracted with a petroleum spirit having a low boiling point, and the extract dried at 100° to 110° C. It was afterwards exhausted with alcohol and gave an extract that was soluble in water also.

	April p. cent.	July p. cent.	October p. cent.
1 Petroleum ether extract	9·3	8·4	9·1
2. Alcoholic extract, soluble also in water . . .	16·9	15·2	19·4

The October rhizome, after treatment with petroleum spirit gave with alcohol a beautifully green coloured extract (probably chlorophyll which had retreated to the rhizome in the autumn), whilst the extracts from the April and July rhizomes were yellow.

The petroleum spirit extract is free from resinous substances and chlorophyll, and so far may be taken as a more exact expression of the quantity of fat than the ether extract in C. It is possible that it does not contain the whole of the filicin, but the greater part is certainly present in the extract.

E. Another quantity of the rhizome was treated with doubly rectified petroleum, and yielded a thick fluid dark green extract. The remaining powder was then treated with acetic ether.

	April. p. cent.	July p. cent.	October. p. cent.
1. Petroleum extract . . .	14·0	11·4	17·2
2. Acetic ether extract . .	4·9	5·1	4·9

A portion of the fat of the rhizome is insoluble in petroleum as well as in the less volatile portion of the petroleum spirit.

Estimation of the Starch.—In order to estimate quantitatively the amount of starch the rhizome was digested 48 hours in a steam bath with a 4 per cent. alcoholic potash solution, and then washed with alcohol and water until it showed no alkaline reaction. The impure starch remaining upon the filter was boiled with dilute sulphuric acid until no more dextrine was precipitated by alcohol, and the liquid was filtered, neutralized, and titrated with Fehling's solution. The starch in the April rhizome amounted to 28·2 per cent., in the July to 22·7 per cent., and in the October to 15·4.

Estimation of Sugar.—The rhizome was extracted with equal parts of alcohol and water, the product filtered, the alcohol distilled off, and the tannic acid precipitated with acetate of lead. The precipitate was filtered off, excess of lead removed from the filtrate by sulphuric acid, the liquor filtered, then neutralized with soda solution, and titrated with Fehling's liquor. The sugar amounted in the April rhizome to 1 per cent., in the July to 1·4 per cent., and in the October to 2·8 per cent.

Estimation of Tannic Acid.—The rhizome was exhausted with hot water and the product filtered under pressure. The filtrate was decomposed with acetate of copper and the precipitate of tannate of copper washed, dried at 110° C. and weighed. It was then decomposed by moistening with fuming nitric acid and the oxide of copper thus obtained subtracted from the tannate of copper gave the amount of tannic acid precipitable by copper. This amounted in the April rhizome to 4·6 per cent., in the July to 6·9 per cent., and in the October to 5·9 per cent.

A second quantity was treated similarly with acetate of lead. This gave, however, for the April rhizome 9·2 per cent. of tannic acid, July 9·8 per cent., and October 11·7 per cent.

The tannic acid of the fern blackened solutions of ferroso-ferric oxide, and precipitated gelatine solution but not solution of tartarated antimony.

Estimation of Filix Red.—The ammoniacal aqueous extract of the root exhausted with water was evaporated with dilute sulphuric acid to dryness, the residue dissolved in water, the filix red collected upon a filter and washed with water until it showed only a weakly acid reaction. The filix red from the April rhizome amounted to 5·2 per cent., the July to 6·9 per cent., and the October to 7·8 per cent.

Estimation of Mucus and Albumen.—Two portions of each of the three samples were exhausted with water, the aqueous extract evaporated to a syrupy consistence, and alcohol added. The precipitate was separated by filtration, washed, dried at 110° C., and weighed. From the weight found the weight of ash was deducted and the difference was taken as the amount of mucus and albumen. It amounted in the April rhizome to 5·1 and 5·4 per cent., in the July rhizome to 2·2 and 2·5 per cent., and in the October rhizome to 2·1 and 2·15.

The Estimation of Filicic Acid was unfortunately without result. The fat oil was removed from the rhizome by means of twice rectified petroleum, and an attempt was made but unsuccessfully to obtain the filicic acid by means of acetic ether. The petroleum could not be driven off from the root without a very strong heat, by which the filicic acid was decomposed. Further, a portion of the tannic acid always dissolved in the acetic ether. An experiment was also made by boiling the rhizome with carbonate of soda, dissolving with alcohol the compounds of soda with the fatty acid and filicic acid, and separating by addition of an acid. But the precipitated filicic acid dissolved in the fat oil. An attempt to separate the filicic acid from the fat oils by dissolving in acetone also failed, the filicic acid and the fatty oils always dissolving together. Neither could the methods given by Dr. Luck for the preparation of filicic acid be used for its quantitative estimation as the yield was much too small and the fatty oil separated always carried with it a part of the filicic acid.

METHODS OF CHEMICAL DECOMPOSITION AS ILLUSTRATED BY WATER.*

BY PROFESSOR J. H. GLADSTONE, PH.D., F.R.S.

Among the most venerable of the Chinese classics is the 'Shoo King,' a collection of ancient historical records; and one of these records, the fourth book of Chow, contains a still more ancient document, 'The Great Plan with its Nine Divisions,' which purports to date from the early part of the Han dynasty—according to Dr. Legge, about 2000 B.C. This remarkable treatise bears

* A lecture delivered at the Royal Institution of Great Britain, Friday, May 5, 1876. From the *Chemical News*, August 4, 1876.

on physical as well as ethical philosophy, and commences with an account of the five elements, viz., water, fire, wood, metal, and earth. The first element, water, is said to "soak and descend," and also to "become salt."

This seems to be the earliest known record of that doctrine of elements which spread widely over the ancient world. In the 'Institutes of Manu,' we read of the elements also as five, but they are earth, fire, water, air, and ether; and according to the cosmogony of the Hindoo legislator, light or fire produced water, and water produced earth. There was, however, at least as late as two centuries ago, a sect in India who held it as a religious tenet that water was the prime and original element.

Similar opinions found their way to Europe. Thus Thales, of Miletus, who flourished in the sixth century B.C., taught that water was the origin of all things. The Greek philosophers generally adopted the theory of several elements, but reduced the number to four—fire, air, earth, and water.

It is hard to say what was the precise meaning attached by the ancients to the term "element." It no doubt did not always convey the same idea. Water also, at least in the Aristotelian philosophy, was a generic expression for many bodies in a fluid condition, and signified not so much a special material substance as an inherent quality of things. Thus it was said to be cold and moist, and the opposite of fire which was hot and dry. In the philosophy of the middle ages we find the same views prevailing, and the early chemists still looked upon water in the same light. Thus Becker enumerated five elements—air, water, and inflammable, mercurial, and infusible earth; while Stahl adopted four—water, acid, earth, and phlogiston. The ancient theory maintained its hold till the experimental philosophers at the latter part of the eighteenth century gave a definite meaning to the term element, and showed that water, air, and earth are compound bodies. Yet the idea of the elementary character of water was not easily abandoned.

In 1781 Cavendish found that when a mixture of what were then called "inflammable air" and "dephlogisticated air" is exploded by a spark in such proportions that the burnt air is almost entirely phlogisticated, pure water condenses on the sides of the vessel, and is equal in weight to the weight of the two airs. His theory was that water consists of "dephlogisticated air united to phlogiston," and that "inflammable air is water united to phlogiston." At the time of explosion, according to him, the excess of phlogiston was transferred from the inflammable to the phlogisticated air, and thus both airs "turned into water." Cavendish also explained Priestley's production of inflammable air on heating iron filings strongly, by contending that the phlogiston of iron united with the moisture from which they had not been freed. Lavoisier gave a different explanation of these phenomena. He held that "dephlogisticated air" is an elementary substance—oxygen—united with imponderable caloric, and that "inflammable" air, or hydrogen, is capable of taking the oxygen from the caloric, thus producing water and heat. "Water is not a simple substance, but is composed, weight for weight, of inflammable and vital air." Thus water was at length deposed from its rank as an element.

In the first year of this century, when the news of Volta's great discovery of the pile was made known in England, Messrs. Nicholson and Carlisle made various experiments with a series of half-crowns, zinc plates, and pasteboard soaked in salt. Knowing that water conducted electricity, they inserted brass wires through corks at the two ends of a tube filled with water, which they are careful to tell us came from the New River. They were surprised to see a stream of minute bubbles rising from one pole while the other was corroded, and that this decomposition took place at each pole, though they were nearly 2 inches apart. They enlarged the distance, and found that 36 inches of water was too much for their force to traverse. Substituting flattened platinum for their brass wires, they found that the water was decomposed with the production of hydrogen at one end and oxygen at the other.

The old notion that water, by continuous boiling, was turned into stone had been previously dispelled by Lavoisier, but Davy found that some salts and earths remained behind when water was electrolysed, and that when the experiment was conducted in two cells communicating with one another, the liquid in the one cell became acid and the other alkaline. He traced the origin of this in a masterly research, which formed the Bakerian lecture for 1806.* He found that the earthy substances were original impurities in the water, or came from the vessels employed; and using gold cones filled with distilled water and united together by asbestos, he convinced himself that nitric acid was produced at the positive pole and ammonia at the negative. Suspecting that these were produced from the small quantities of nitrogen dissolved in the water combining with the liberated oxygen and hydrogen respectively, he took extraordinary precautions. Making use of water which he had carefully distilled in a silver still at 140° F., and performing the experiment *in vacuo*, or rather in a space which he had twice filled with hydrogen and exhausted as thoroughly as the means at his disposal would permit, he then found that the water was decomposed without the least production of either acid or alkali. "It seems evident then," wrote Davy, "that water, chemically pure, is decomposed by electricity into gaseous matter alone, into oxygene and hydrogene."

In the following year Davy discovered the metals of the alkaline earths, potassium and sodium, and found that when these bodies are thrown upon water they decompose it, appropriating its oxygen and setting free its hydrogen. This is due to the superior chemical power or "affinity" of the alkaline metals.

In 1846, Mr., now Sir William, Grove observed that when steam was subjected to something like a white heat, small quantities of mixed oxygen and hydrogen gas were always produced.† It has since been shown that the gases are actually dissociated in one part of the flame of the oxy-hydrogen blowpipe, after their first combination.

It thus appears that there are three distinct ways in which water may be decomposed:—By an electric current;‡ by some substance which has a superior attraction for one of its elements; or by heat alone.

It will readily be understood that the power of any one of these agents will be augmented by the co-operation of either of the others. Thus, the action of chemical affinity is usually augmented by heat; for instance, if a pellet of sodium be thrown upon cold water it melts, on account of the chemical action at once set up, but if upon boiling water it not only melts but bursts into flame through the greater violence of the action. This is the reason why, in Priestley's experiment, iron at a red heat decomposed steam, though it will not do so at ordinary temperatures.

Similarly the electrolysis of water is much facilitated if there is some chemical affinity between the oxygen and the metallic conductors. It is generally said that it requires two cells to decompose water electrolytically. Now, it is true that if platinum poles are employed there is no visible disengagement of gas when one cell only is used; but with zinc poles a single cell of Bunsen or Grove is amply sufficient. Zinc alone without the voltaic current is incapable of displacing the hydrogen in water; but it must be borne in mind that the tendency to com-

* *Phil. Trans.*, 1807, p. 1.

† *Ibid*, 1847, p. 1.

‡ Though volatile electricity alone is referred to in this discourse, it is well known that other forms of the same agent will effect chemical decompositions. Thus Professor Andrews has resolved pure water into its constituent gases by frictional electricity, and by that derived from the atmosphere.

bine with oxygen is a constant property of this metal and is easily brought into activity by the co-operation of the feeble voltaic current. The increased effect upon electrolysis which is due to the nature of the poles is in proportion to the electromotive force of the different metals. For pure water the order is — zinc, lead, iron, copper, silver, platinum, as tested by a galvanometer. This difference of result according to the nature of the metals employed in the electrolytic cell appears generally to have been overlooked, and it is the feeblest metal—platinum—which is usually employed for experimental purposes, doubtless because it is incapable of oxidation—the very reason of its feebleness.

When the other metals of the above list are used, not only does the positive pole oxidize, but the oxide, or rather hydrate, dissolves more or less in the pure water, and becomes itself an electrolyte. The consequence of this is that the positive electrode gradually wears away, while the metal is transferred to the negative electrode, and is deposited upon it in crystalline fringes or filaments. With silver these are particularly beautiful, as they assume arborescent forms, especially when able to spread over the surface of the containing vessel.

The temperature also of the liquid subjected to electrolysis has a great influence upon the result. Thus in an experiment where zinc poles and pure water were employed, the deflection of a galvanometer was found to increase about fourfold between 5° C. and 80° C., and the action augmented nearly *pari passu* with the temperature.

A similar result occurs, as might be expected, when two dissimilar metals, such as zinc and copper, are placed in cold water in connection with one another, and the water is heated. The deflection was found to double between about 30° and 80° C., but the difference for every 5° at the higher temperatures was several times greater than at the lower ones.

Another very important point in the electrolysis of water is to reduce to a minimum the very great resistance offered by the water itself. This is effected by bringing the electrodes as near to one another as possible; and for the same reason, if the force be generated by the action of two dissimilar metals upon water, they should be brought into the closest proximity.

A still more powerful means of decomposing water would evidently be a combination, not of two, but of all three agents, chemical affinity, heat, and voltaic force acting at an insensible distance. Thus zinc has a strong affinity for oxygen, but is unable of itself to displace the hydrogen of water; when united, however, with a more negative metal, such as copper, its power is enhanced to such a degree that a separation of the constituents does take place; but in the ordinary arrangement of a voltaic cell the action is so slight that no evolution of gas is perceptible. To produce a visible effect, the metals must not only be close together, but ought to touch one another at a myriad of points. This may be brought about by depositing the copper upon the zinc in a spongy condition; then the zinc will be oxidized, and bubbles of hydrogen will appear among the branches of the copper, even at the ordinary temperature, but the effect is greatly increased by the application of heat.

The arrangement just described is the "copper zinc couple," which has been employed by Mr. Tribe and the speaker, and more recently by others, to effect a variety of chemical decompositions. Zinc foil is immersed in a solution of sulphate of copper until a black velvety deposit of the metal is produced; the soluble salts are then washed away, and the couple after being dried is ready to be placed in any liquid it is desired to decompose. Water was the first body experimented upon, and it was found that the action would go on as long as there was any metallic zinc left in union with the copper, the amount of hydrogen evolved gradually diminishing, though varying somewhat with the temperature of the day. The great influence exerted by heat is, however, better shown in the subjoined table, which gives the results of an experiment reduced to the unit of an hour's work.

At 2·2° C.	1·1 c.c. of hydrogen produced.	
22·2	5·5	„
34·4	13·9	„
55·0	62·0	„
74·4	174·6	„
93·0	528·0	„

These figures strikingly exhibit the rapid acceleration of the action at the higher temperatures.

A greater effect may be produced by substituting for the copper a still more negative metal. Thus a zinc platinum couple acts with much greater energy upon water. Gold zinc couples, and many others also, have been tried, but gold has the practical disadvantage that the precipitated metal does not adhere well to the zinc. Aluminium alone does not decompose water, not even according to Deville, at a red heat; but an aluminium copper couple decomposes it slowly, and an aluminium platinum couple more rapidly, even in the cold. One of the most recent discoveries is that aluminium when amalgamated with mercury is converted into hydrate, even by the moisture of the air. The most powerful combination, however, might be expected to be that of the most positive and the most negative metal which can be conveniently brought together. These are magnesium and platinum; and in fact, if strips of magnesium foil be coated with finely-divided platinum by immersing them in platinic chloride, and the resulting salts be washed away, a couple may be obtained which produces a most vigorous evolution of hydrogen when it is placed even in cold water.*

The decomposition of water by the copper zinc couple was of course a matter of little practical importance; it does, however, yield hydrogen in a state of purity, even though the zinc be largely contaminated with such a substance as arsenic—a fact which may prove of great consequence in medico-legal inquiries. These observations on water led to a long series of experiments on other bodies, especially organic compounds. The action of the two metals in conjunction frequently effects not only the splitting up of a compound, but a re-distribution of its elements; and this has resulted not only in the discovery of a simple means of producing various substances previously known, but the formation of several others hitherto unknown. Thus the first trials were made on iodide of ethyl in the hope that Professor Frankland's beautiful process for making zinc ethyl might be simplified; and not only was a better result obtained in a shorter time, but when the experiment was performed in the presence of alcohol it was found that pure hydride of ethyl was given off, and a new substance, the iodoethylate of zinc, remained in the flask.

Among the bodies which may be prepared more easily or in greater purity by the copper zinc couple are the following:—

Hydrogen.	Olefiant gas.	Diallyl.
Methyl hydride.	Acetylen.	Zinc ethiodide.
Ethyl hydride.	Propylen.	Zinc ethyl.
Propyl hydride.	Diamyl.	Zinc-amyl.
Amyl hydride.		

The substances that have been discovered by this agency are the following:—

Zinc propiodide	$Zn(C_3H_7)I$.
„ propyl	$Zn(C_3H_7)_2$.
„ isopropyl	$Zn(C_3H_7)_2$.
„ ethylobromide	$Zn(C_2H_5)Br$.
„ iodoethylate	$Zn(C_2H_5O)I$.
„ bromethylate	$Zn(C_2H_5O)Br$.
„ chlorethylate	$Zn(C_2H_5O)Cl$.

* Phenomena resulting from different metals in combination have frequently been observed by several experimenters, and some of them are described by Mr. W. N. Hartley in the *Chemical News* (vol. xiv., p. 73); but it does not appear that the metals have ever been freed from concomitant salts, or their action understood or appreciated.

Zinc propyl is a volatile liquid body, of sp. gr. 1·098, which takes fire spontaneously in the air, burning with a bluish white flame. The haloid ethylates are a new class of bodies which have been prepared from both ethyl iodide and iodoform, and their corresponding bromine and chlorine compounds.

The couple has also thrown some light upon the chemical structure of some of these organic bodies—as, for instance, by its different behaviour with the two isomeric bodies, chloride of ethylen and chloride of ethylidin. This is a direction in which future investigation is likely to be rewarded.*

This method of quietly bringing about a chemical change has found a practical application in the hands of Professor Thorpe for determining the amount of nitrates in samples of water—a question of great importance, which has hitherto been also one of great difficulty. The nitric acid is reduced by the couple to the condition of ammonia. In a similar way chlorates are reduced to chlorides.†

The progress of research by means of the copper zinc couple was interrupted by the discovery of a curious reaction, by which also water and other substances may be decomposed. Metallic aluminium does not attack water by itself, neither does iodine; but if the three are brought into contact, oxide of aluminium is formed and hydrogen gas is evolved; and not only this, but the solution so produced will cause the oxidation of any excess of aluminium with the formation of an equivalent amount of hydrogen. It is not even necessary that free iodine should be employed, for iodide of aluminium itself will determine the oxidation of any amount of metal. This action is greatly quickened by coupling platinum with the aluminium. By employing alcohol instead of water a similar action is set up, and this has led to the discovery of aluminium ethylate, $Al_2(C_2H_5O)_6$, alcohol in which the replaceable hydrogen is substituted by aluminium. It is a solid body at the ordinary temperature, but easily melts, and is capable of being sublimed unchanged, its vapour burning with a luminous flame and white smoke of the oxide of metal. Other compounds prepared by this singular reaction, and the nature of the chemical changes which occur, are at present the subject of study.‡

THE THERAPEUTIC VALUE OF THE CRYSTALLINE PRINCIPLES OF ALOES.§

BY NELSON C. DOBSON, F.R.C.S., AND WILLIAM A. TILDEN, D.SC. LOND., F.C.S.

Medical practice in this country recognizes commonly only two kinds of aloes—the one obtained from Socrotra, the other from Barbadoes,—both of which are directed to be employed in the preparations of the British Pharmacopœia. As is well known, all varieties of the drug consist of the dried inspissated juice, which, after cutting, exudes from peculiar vessels resident in the leaf of the plant.

Socotrine aloes is obtained from a plant (*Aloë Socotrina*) which grows or is cultivated in the island of Socotra in the Indian Ocean. The drug as it appears in commerce varies somewhat in character. It is imported chiefly in boxes from Bombay, and generally exhibits a reddish-brown colour. It is translucent when in thin fragments, and possesses an odour peculiar but not altogether disagreeable. When moistened with spirit of wine it exhibits under the microscope many small prismatic crystals. It is sometimes opaque and liver-coloured (hepatic), probably from the presence of feculent matter.

From certain highly crystalline varieties of Socotrine aloes imported into this country by way of Zanzibar, and first examined by the late Daniel Hanbury, F.R.S., it has been found possible to extract the crystalline constituent in a state of purity. The aloin obtained from this source is not identical with the aloin of Barbadoes and other varieties of aloes. It crystallizes in small pale-yellow prisms. which are soluble in water and in spirit of wine, and contain about 14 per cent. of water of crystallization. For sake of distinction it is called *zanaloin* or *socaloin*.

Barbadoes aloes is brought in gourds or boxes. It is obtained from the leaves of *Aloë vulgaris*, which is cultivated in Barbadoes. It occurs in masses of dark-brown colour, having a conchoidal fracture, which exhibits a peculiar dull, waxy surface, and emits, especially when breathed upon, a disagreeable alliaceous odour. Moistened with spirit, it displays abundance of crystals, and its crystalline constituent is easily obtained in large quantity from good samples. This crystalline constituent has long been known as "aloin," but now that there is abundant proof that each kind of aloes contains a crystalline principle peculiar to itself, it is desirable to distinguish this substance from the rest by the name *barbaloin*. It forms yellow prismatic crystals, soluble both in water and in spirit of wine. These crystals contain about five per cent. of water of crystallization.

Since 1869 a considerable quantity of a new variety of aloes has been imported into this country from Natal. The plant from which it is prepared has not yet been identified. It is of a character quite peculiar and distinct from both Socotrine and Barbadoes aloes, as well as from ordinary Cape aloes. Natal aloes is dull-yellow, very opaque, and possesses but little odour. It contains a large quantity of a crystalline substance (*nataloin*), which is altogether different from the corresponding substances obtained from other kinds of aloes. It forms thin, rectangular, pale-yellow scales, which are but slightly soluble in water, and far less soluble in rectified spirit than barbaloin or socaloin. These crystals contain no water.

Socaloin has the formula $C_{16}H_{18}O_7.3H_2O$. It yields substitution-compounds with chlorine and bromine, having the formulæ $C_{16}H_{15}Cl_3O_7$ and $C_{16}H_{15}Br_3O_7$ respectively. When boiled with nitric acid, chrysammic acid is the characteristic product.

Crystallized barbaloin has the formula $C_{16}H_{18}O_7H_2O$. It yields bromo- and chloro- derivatives corresponding with those of socaloin, and it also yields chrysammic acid under the influence of nitric acid.

Nataloin is believed to have the formula $C_{16}H_{18}O_7$. It is distinguished by inferior solubility, by its peculiar crystalline form by yielding no substitution-compounds like those of barbaloin and socaloin, and, lastly, by giving no chrysammic acid, but only oxalic and picric acids, when boiled with nitric acid.

It will be observed, upon examination of these formulæ, that in the anhydrous state these three crystalline substances, albeit exhibiting well-marked differences of properties, and possessing, it must be supposed, different chemical constitution, have the same composition. They are, in short, isomeric.

An easy test by which the three substances are detected and distinguished from one another is as follows:—Cold nitric acid dropped upon socaloin produces very little

---

* Further particulars respecting the decomposition of water by this special kind of electrolysis may be found in *Proc. Royal Soc.*, 1872, p. 218; 'Report Brit. Assoc.,' 1872, Abstracts, p. 75; *Journal Chem. Soc.*, 1873, p. 452; *Phil. Mag.*, 1875, pp. 284, 285. The account of 'Researches on the Action of the Copper Zinc Couple on Organic Bodies' is given in the *Journ. Chem. Soc.*, 1873, pp. 445, 678, 961; 1874, pp. 208, 406, 410, 615; 1875, p. 508. See also vol. vii. of *Proc. Royal Inst. of Great Britain*, p. 521.

† *Journ. Chem. Soc.*, 1873, p. 541.

‡ Since this discourse was delivered, this peculiar reaction has been elucidated in a paper read before the Chemical Society, on "The Simultaneous Action of Iodine and Aluminium on Ether and Compound Ethers." An intermediate body, the aluminium iodoethylate, $Al_2(C_2H_5O)_3I_3$, is there described.

§ From the *Medical Times and Gazette*, August 12, 1876.

change of colour; with barbaloin an intense, but quickly fading, crimson coloration is produced; and with nataloin a blood-red coloration, which does not fade unless heat be applied.

Barbaloin has long been an article of commerce, and has been represented as possessing great activity as a purgative. Some difference of opinion upon this question has, however, existed, and it seemed to us desirable to determine the question of its activity by systematic experiment. It also seemed to us worth inquiry whether the crystalline principles of Socotrine and Barbadoes aloes which are constantly prescribed indiscriminately, were possessed of equal purgative power, or whether any marked difference in this respect could be observed between them. To the results obtained we have added a number of similar observations upon the purgative action of nataloin.

The crystalline principle of Barbadoes aloes has had numerous trials as to its efficacy, and especially as regards its purgative action; and the most widely different results have been obtained by various observers. We shall not attempt to account for this difference of opinion, but content ourselves with the record of our own conclusions based upon the observations we have made in fifty cases. But that this question is not already finally and satisfactorily settled would appear from the following extract taken from one of the most recent works on Therapeutics (Wood's):—"Aloin was formerly believed to be the active principle of aloes, but at present evidence is decidedly against this view. According to Messrs. T. and H. Smith, in doses of one or two grains it is almost a drastic purge; on the other hand, Robinquet took fifteen grains of it without effect, and affirms that it is a simple bitter." Dr. Craig, in the *Edinburgh Medical Journal*, says aloin is the only active principle found in aloes, and he says further that its "uniformity of strength, the smallness of its dose, and the certainty of its action, should commend it to the favourable consideration of all medical practitioners." So far as our observations go, they do not fully agree with the experience of Robinquet or Dr. Craig, We have generally found that when either barbaloin. zanaloin, or nataloin has been administered in doses of two grains or upwards there has been, in the majority of cases, some action of the bowels; but most certainly we have never once found doses of one or two grains to be "almost a drastic purge," as asserted by Messrs. Smith.

The before-named crystalline principles were prepared by Dr. Tilden, who assumes the responsibility of their chemical purity. The dose was given in the form of a pill, made by mixing the crystals with conserve of roses (except in twelve cases, in which barbaloin was mixed with hard soap). The observations made had reference only to the aperient action, or otherwise, of the substances under consideration. The persons to whom they were administered were, in most cases, adult males.

The general conclusions at which we arrived were that neither zanaloin, nataloin or barbaloin were altogether inert, but that each of them, when given in doses of two grains or upwards, produced more or less action on the bowels. Barbaloin in doses under two grains frequently produced some slight laxative action; but with none of the substances, even when large doses were given, did the effect produced approach anything like a drastic purge. Barbaloin appeared to be rather more active than either of the other two. In our observations we did not give more than two-grain doses of this substance. Between the zanaloin and the nataloin there was not much difference in purgative action; the former was frequently given in doses of four grains without producing more than two slight motions. Nataloin in similar doses sometimes produced two, three, and even four motions; and sometimes there was no action following the dose. In one case four grains, given to a convalescent nigger produced no result; and six grains, given three days afterwards, also failed to act. In another case, a delicate girl took two grains with no effect; and six grains given the next day acted three times.

To summarize the general result of our observations: It appears that barbaloin, zanaloin, and nataloin, in doses of two grains, are each of them more or less aperient; barbaloin, apparently, rather more active in combination with hard soap than with conserve of roses. They are each of them decidedly uncertain and variable in their action. In those cases in which we have a record, the time which elapsed after the administration before there was any perceptible action varied from two and a half to fifteen hours. It did not appear to us that the crystalline principle was more potent than a similar dose of aloes; nor did we discover any advantages it possesses over an equal dose of aloes—except, perhaps, that griping was rather less common than when aloes alone was given.

HELENIN AND INULA CAMPHOR.*

BY J. KALLEN.

A previous paper by the author on this subject appeared in abstract in the *Journal of the Chemical Society* (1874, 352). Further research has shown that when elecampane root is exhausted with alcohol, and the extract is precipitated with water, the crystals thereby obtained contain, besides helenin, two other bodies. One of these has not yet been obtained pure, but it is without doubt isomeric with laurel-camphor. This the author calls *inulol*. The other, which exists in much larger quantity, is the anhydride of an acid termed *inulic acid*.

Inulol.—Elecampane root yields by distillation with steam a white crystalline mass, which is a mixture of inulol and inulic acid. On pressing the mass between blotting-paper, the inulol is absorbed, and may afterwards be obtained tolerably pure by distilling the paper with steam. Inulol is a slightly yellow liquid, of aromatic taste and peppermint-like odour, boiling at 200°. Its composition agrees with the formula $C_{10}H_{16}O$. When distilled with phosphorus pentasulphide, it yields hydrocarbon, $C_{10}H_{14}$, which boils at 175°, and is converted into terephthalic acid by oxilation with chromic acid.

Inulic Anhydride.—When the crystals obtained by distilling elecampane root are recrystallized from alcohol, inulic anhydride is obtained in colourless prismatic needles of faint smell and taste, melting at 66°. It dissolves sparingly in water, freely in alcohol, ether, etc., boils at 275° with partial decomposition, and sublimes when gently heated. Analysis leads to the formula $C_{15}H_{20}O_2$.

Inulic acid, obtained by heating inulic anhydride with weak potash, and decomposing the salt thus formed with hydrochloric acid, is sparingly soluble in water, but dissolves easily in alcohol, and crystallizes therefrom in delicate needles melting at 90°—91°. When melted it gives off water, and is converted into the anhydride. The numbers found by analysis agree with the formula $C_{15}H_{22}O_3$. The acid is diatomic and monobasic. The potassium salt is freely soluble in water and alcohol, and is obtained with difficulty in small needles. It is decomposed by carbon dioxide, with separation of inulic anhydride. The ammonium salt, formed by dissolving the acid in aqueous ammonia, decomposes on evaporating the solution, leaving the pure acid. The silver salt, $C_{15}H_{21}AgO_3$, crystallizes in small brilliant scales. The barium salt is moderately soluble in water, and separates in warty mases on evaporation.

A solution of inulic acid in absolute alcohol, into which dry hydrochloric acid gas is passed, yields large, colourless, rhombic tables, which melt at 140°, decomposing, and giving off hydrochloric acid. This substance forms

* From the *Journal of the Chemical Society* [*Deut. Chem. Ges. Ber.*, ix, 154–147].

salts, which however decompose easily, yielding chlorides. Its formula is $C_{15}H_{21}O_2Cl$. By the action of excess of potash upon it, a new acid, *di-inulic acid*, is formed. This acid—a white amorphous powder—forms two series of salts, of which only one (the neutral) has yet been obtained pure. The potassium salt crystallizes in delicate pearly laminæ, moderately soluble in water: its solution is decomposed by much water. The silver salt, $C_{30}H_{40}O_5Ag_2$, obtained by precipitating silver nitrate, is a white flocculent precipitate, slightly soluble in water.

Inulamide, $C_{14}H_{20}(OH)CO,NH_2$, obtained by passing ammonia into an alcoholic solution of inulic anhydride, forms small feathery crystals, feebly basic, and sparingly soluble in alcohol. It melts at about 210°, undergoing decomposition. It is decomposed by potash, the products being ammonia and potassium inulate. Inulamide forms with hydrochloric acid the compound $2(C_{15}H_{23}NO_2) + HCl$, which gives with platinum chloride a double salt insoluble in water and very sparingly soluble in alcohol.

FENUGREEK.*

BY J. R. JACKSON, A.L.S.

Trigonella, the genus to which the fenugreek belongs, is a group of herbaceous plants belonging to the Papilionaceæ, natural order Leguminosæ, rather widely distributed in Southern Europe, Northern, Central, and Southern Africa, Western and Central Asia, and one species (*T. suavissima*) in Australia. All the plants possess a strong, clinging, aromatic odour, which is particularly the case with *T. Fœnumgræcum*, the most important plant in the genus. It is a native of the region of the Mediterranean, where it has been cultivated for a very long time, and is an erect annual from one to two feet high, with obovate cuneate leaflets and yellow papilionaceous flowers borne in the axils of the leaves. The pods are from two to four inches long, pointed or beaked, and contain from ten to twenty small, rough, brown seeds.

The fenugreek claims a history of great antiquity; the plant was much valued by the ancients both for food and medicine, and it was also grown for the purpose of feeding oxen. It is referred to by Hippocrates, and was prescribed by Aretæus both for internal and external application. Reduced to a powder, the seeds were recommended by Dioscorides to form cataplasms in inflammatory cases. Pliny refers very fully to its medicinal virtues, and other authors, especially Avicenna, treat of its properties at some length. Pomet, in his 'Compleat History of Druggs,' published in London in 1725, says, "The ancients and some Germans at this time make a decoction of this seed, and eat is as they do other pulse, to remove and expel wind; but I believe few or none will imitate them in this practice, which is so disagreeable to the nose and palate; it is much better for cattle, and especially horses, to mix with their oats to fatten them. It is of greater use externally than internally." These seeds continued to be used for external application, chiefly for cataplasms and fomentations, down to a comparatively recent period, but at the present time their chief uses with us are in veterinary practice, and as a condiment in curry powder. It is not many years since, however, that they were included in the Greek Pharmacopœia. Pomet's opinion that these seeds are "much better for cattle, and especially horses, to mix with their oats to fatten them," seems to have become fully realized, for at one time the powdered seeds of fenugreek were greatly in demand for feeding cattle, and it is said that the patent cattle foods so much advertized at the present time are largely composed of, or seasoned with, these seeds. Be this as it may, it is certain that, when crushed, they are much used for flavouring damaged hay.

Pomet, in the work before referred to, gives a quaint but tolerably accurate description of the plant, as well as a figure. He says:—"Fenugreek, which some call improperly Senegrè, and others Bucera or Aigoceros, because the pods which enclose the seed resemble in some manner a goat's horn, is a plant which grows in several parts of France. Its stalks are round, hollow, of a darkish colour, the leaves small, half-round, composed of three and three together, something after the nature of the trefoil, the flowers small and white, bearing a large pod, which is long and sharp, representing, as said before, a bull's, or rather, a wild goat's horn. The seed carries the name of the plant, and is the only part of it which is sold by the name of fenugreek. This seed ought to be fresh, of a lively yellow, towards a gold colour, but it becomes reddish, and changes brown if long kept; it is about half as big as a grain of wheat, hard and solid, and is of a triangular shape, but the smell and taste of it are both offensive. The farmers about Aubervilliers sow and cultivate this as they do coriander seed, which is sent to Paris, and from thence to Holland and other parts."

Woodville in his 'Medical Botany' refers to the plant as a native of Montpellier, and as having been first cultivated in Britain by Gerard. Southern France and Germany furnished this country with its supplies of fenugreek seeds at the time Woodville wrote, the plants being cultivated expressly for the seeds, which were largely exported. That these formed an article of import long prior to the date of the above work—1793—or even to that of Pomet, is clear, for in a curious little book called 'The Treasury of Drugs Unlocked,' by Jo. Jacob Beehe, of London, merchant in drugs, published in London, in 1690, we find in a simple alphabetical list of useful seeds and the places of their production, the following:—"Semen Fænugreci, Germany." The plant is now cultivated largely in India, also in Morocco, the South of France, some parts of Germany and Switzerland, as well as in other warm climates. In Alexandria the seeds are eaten as an article of food prepared in the following manner: They are put into cups, and kept wet to cause germination. In a few days the cups are filled with growing plants, in which state they are sold in the streets, and appear to be relished as a great delicacy. In India the fresh plants are eaten as a green vegetable, but the seeds are by far the most important product, as is proved by some statistics quoted by Dr. Flückiger and Mr. Hanbury in their new work on drugs, which show that the quantity of seeds imported from Sind to Bombay during the year 1872–73 amounted to 13,646 cwt., the value of which was £4405. From Bombay also were shipped in the same year 9655 cwt., of which quantity only 100 cwt. were sent to the United Kingdom.

* From the *Gardeners' Chronicle*, July 29, 1876.

CONTRIBUTION TO THE HISTORY OF ELEMI. —AMYRIN.*

BY DR. EUGEN BURI.

The constituents of elemi have been investigated by Professor Flückiger, who showed that bryoidin, a crystallizable substance occurring in that resin only in small quantity, corresponded with the formula $(C_{10}H_{16})_2 + 3\,OH_2$, and suggested that the preponderating constituent, named amyrin by Baup, might have a composition represented by the formula $(C_{10}H_{16})_2 + OH_2$.† The author's investigations were devoted to this substance.

Amyrin is present in elemi in microscopic crystals, which are left behind when elemi is treated with cold 90° alcohol, the other constituents being dissolved. It

* Abstract of a communication from the Pharmaceutical Institute of the University of Strassburg (*Neues Repert. f. Pharmacie*, vol. xxv. p. 193).

† *Pharm. Journ.* [3], vol. v., p. 142.

can be purified by recrystallization from boiling alcohol until it appears perfectly colourless, and gives up nothing further to boiling water. Amyrin crystallizes from the hot alcoholic solution on cooling in colourless doubly refracting needles, which are united into a spherical aggregations having a silky lustre. It melts at 177° C., and remains fluid far below the melting point.

In solidifying, it forms a transparent mass resembling colophony, but it can easily be obtained again in crystals from alcohol. In water it is insoluble. In hot alcohol of about 90° it dissolves plentifully, the greater part of it crystallizing out on cooling; a saturated solution at 16°C. contained 3·5 per cent. of amyrin. Its reaction in alcoholic solution is neutral. Amyrin is also soluble in ether, and especially so in chloroform and carbon bisulphide. It dissolves also in aqueous solutions of the caustic alkalies, but not when boiling. An alcoholic solution of amyrin rotates the plane of polarized light to the right.

Amyrin is not volatilized in the vapour of water at the ordinary atmospheric pressure. When heated in a retort it fuses, a very small quantity sublimes, and decomposition commences simultaneously. At 200° C. drops of a thick yellow oily liquid appear, the temperature rapidly rises, the liquid in the retort begins to boil, whilst the distillate becomes progressively thicker. Finally it solidifies in the neck of the retort while passing over, and when the retort commences to redden, a heavy vapour is formed that condenses in the neck of the retort to a yellow powder. A considerable quantity of a shining spongy coke is left as a residue.

By very careful heating of a thin layer amyrin can be sublimed in long extremely slender needles that become felted into a very light mass resembling a spider's web. But the yield of sublimate is very small, the greater part of the amyrin being decomposed into the above named products, by which also the sublimed portion is contaminated. The sublimed amyrin crystallizes from alcohol in the same manner as that which has not been sublimed, and it agrees with it in melting point and composition. Elementary analysis of the two kinds gave results corresponding with the formula $C_{25}H_{42}O$, or $(C_5H_8)_5 . H_2O$, which would represent amyrin as a terpene hydrate.

	Unsublimed. I.	II.	III.	Sublimed. I.	II.	Required.
C	83·31	83·77	83·73	83·63	83·34	83·80
H	11·39	11·65	11·63	11·76	11·81	11·73
O	5·30	4·58	4·64	4·61	4·85	4·47

Concentrated sulphuric acid dissolves amyrin with a yellow red colour; water precipitates it from the solution as a brown mass. Amyrin is slightly attacked by melted potash, on the surface of which it floats, but does not mix. Upon stronger heating it behaves as when dry distilled. When the fused mass is heated with water there remains a considerable residue. The solution contains oxalic acid, and gives on distillation only traces of volatile acid having a faint smell of butyric acid.

An atom of hydrogen in the molecule of amyrin can be replaced by the radical of acetic acid. One part of amyrin was heated for some hours to 150°, with four parts of anhydrous acetic acid, in a glass tube. After cooling, the solid contents of the tube were dissolved in boiling absolute alcohol, from which, after one recrystallization the acetyl-amyrin was yielded in dazzling white scales that appeared under the microscope as very thin tables. It melts at 198° C., and is more insoluble in alcohol than amyrin. Elementary analysis gave results corresponding with the formula $C_{27}H_{44}O_2$, or $C_{25}H_{41}O . C_2H_3O$.

Bromine acts very energetically upon solid amyrin, a greenish black mass being formed with a tumultuous evolution of hydrobromic acid. When a cold saturated alcoholic solution of amyrin was treated with excess of bromine a yellowish precipitate was formed in a few minutes, that after one recrystallization from warm alcohol was obtained as a colourless crystalline powder which could not be melted without decomposition. This compound contained about 30 per cent. of bromine.

Upon boiling with nitric acid amyrin yielded a clear yellow solution, which upon evaporation left a yellow spongy residue. This treated with water gave an acid yellow solution that contained oxalic acid and reduced Fehling's solution when heated. But the greater part remained undissolved. It was an acid resin, an alcoholic solution of which had an acid reaction. From a hot saturated solution it was deposited on cooling as a yellow powder. It dissolved in a solution of sodium bicarbonate when warmed, with evolution of carbonic acid gas, forming a brown liquid that frothed when shaken. Dry hydrochloric acid gas is without action on solid amyrin, neither does it attack amyrin dsssolved in chloroform.

The author compares these results with those obtained by Stenhouse and Groves with icacin derived by them from a drug which they call incense resin, but which Professor Flückiger considers to be an elemi resin. The melting point of icacin (175°) corresponds closely with that of amyrin (177°). The mean of analyses gave C 85·6, H 11·8, from which Stenhouse and Groves attributed to it the formula $C_{46}H_{76}O$. Professor Flückiger, however, thinks icacin is more closely related to amyrin, and suggests for it the formula $C_{45}H_{74}O = (C_5H_8)_9 + OH_2$, which would represent it also as a terpene hydrate. Icacin appears to replace amyrin in certain sorts of elemi.

If the formula suggested by Professor Flückiger be adopted, we have the following remarkable series of elemi constituents:—

Volatile Oil	$(C_5H_8)_2$
Icacin	$(C_5H_8)_9 + H_2O$
Amyrin	$(C_5H_8)_5 + H_2O$
Bryoïdin	$(C_5H_8)_4 + 3H_2O$

HANBURY MEMORIAL FUND.

Subscriptions Received.

	£	s.	d.
Amount previously acknowledged	263	17	0
Armstrong, Henry E., F.R.S.	1	1	0
Baildon, Henry B. ..	1	1	0
Bailey, William.. ..	1	1	0
Baker, C. P. and G..	1	1	0
Balkwill, George ..	0	5	0
Bird, Augustus.. ..	1	1	0
Blain, William	1	1	0
Bland, John	0	10	6
Boyce, George	1	1	0
Carter, William.. ..	0	10	6
Chapman, David Barclay	1	1	0
Chater, Edward Mitchell	1	1	0
Cooke, William.. ..	0	5	0
Cupiss, Francis.. ..	1	1	0
Davenport, John Thistlewood	1	1	0
Dunning, Joseph William	1	1	0
Evans, Gwilyn	0	10	6
Evans, Henry Sugden	1	1	0
Gilbert, Joseph Henry. F.R.S.	1	1	0
Glaisyer, Thomas ..	1	1	0
Goddard, Joseph ..	1	1	0
Grant, Colonel J. A., F.R.S.	1	1	0
Hallaway, John ..	1	1	0
Harley, Dr. J.	1	1	0
Harris, Edward ..	1	1	0
Holmes, Charles Joseph	1	1	0
Hopkinson, John ..	1	1	0
Horsley, Thomas Wood	0	10	6
Hovenden, Frederick	1	1	0
Hughes, Edward ..	0	5	0
Jefferson, Thomas ..	1	1	0
Johnson and Sons ..	0	10	6
Johnson, Thomas Simister	1	1	0
Kent, Alfred	1	1	0
Kent, Thomas	1	1	0
Knights, John Atmore	1	1	0
Lea, Charles Wheeley	1	1	0
Lister, Arthur	1	1	0
Mayfield, John T. ..	1	1	0
Metcalfe, Christopher L.	1	1	0
Miers, John, F.R.S..	1	1	0
Negus, Samuel .. .	0	5	0
Nicholson, E. Chambers	1	1	0
Peckover, Algernon..	1	1	0
Perrins, J. Dyson ..	1	1	0
Piesse, G. W. Septimus	1	1	0
Pochin, Henry Davis	1	1	0
Reynolds, James John	1	1	0
Ronalds, Edmund ..	1	1	0
Roper, Freeman C. S.	1	1	0
Saywell, Samuel ..	0	5	0
Schweitzer, Edward G.	1	1	0
Smart, John	1	1	0
Taylor, Thomas ..	0	10	6
Thorne, Augustus ..	1	1	0
Tuck, George Frederick	1	0	0
Von Mueller, Baron F.	1	1	0
Whaley, Edward ..	0	10	6
Whitaker, John.. ..	1	1	0
Woolley, Hermann ..	1	1	0
Yates, Samuel Pearce	0	10	6

The Pharmaceutical Journal.

SATURDAY, AUGUST 19, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

AMERICAN VIEWS OF PHARMACOPŒIA REVISION.

AT a recent meeting of the Medical Society of the State of New York Dr. SQUIBB presented his report as a delegate to the American Medical Association which met in Philadelphia last month, and among other subjects dealt with was the revision of the Pharmacopœia. The time for undertaking this work is now very near, and the questions discussed had reference to the mode in which the work was to be done in future.

Hitherto the revision and publication of the U. S. Pharmacopœia has been in the hands of a special Convention, according to the plan adopted in 1820, and in dealing with the question whether this plan could not be improved upon, Dr. SQUIBB pointed out that at the time of the establishment of the National Convention there was no body in existence such as the National Medical Association that has since been formed, and he suggests that the revision of the Pharmacopœia would now be appropriately entrusted to that body. In support of his argument he urges that the American Medical Association is a truly national organization of the medical profession, having been originated in 1847 with a representation from about twenty-three States, and having grown since then to such an extent that it consists of representatives from nearly all the States.

As a contrast to this, Dr. SQUIBB points to the fact that the organization which has hitherto had the control and management of the national Pharmacopœia has been representative of only a comparatively small portion of the medical profession, only eight to twelve States being represented in the Convention. On this ground he argued that it is not sufficiently representative to be the fit custodian of the interests involved in the preparation of a national Pharmacopœia.

Another argument in favour of the suggested change is that while many of the men who originated the present plan, and worked laboriously in carrying it out, are no longer available for such active work, there is also the fact that in some of the later revisions of the U. S. Pharmacopœia the existing plan has not been so successful as it was formerly, and on the last occasion there was a direct antagonism between the Committee of final revision and the Convention by which it was appointed.

As regards the fitness of the decennial period for revision, adopted as suitable so long ago as 1820, it has frequently been thought that the revision should be at shorter intervals, in order to keep pace with the more rapid progress of general medical science, and many are of opinion that a supplement might well be issued with advantage every two years, or even annually, so as to keep the Pharmacopœia up to the level of current literature and knowledge. The long period of ten years has the advantage of allowing mere sensational novelties of materia medica to have their day and die out, without disturbing the standard authority, but at the same time there are, as pointed out by Dr. SQUIBB, intermixed with these worthless novelties all the real additions to our knowledge which claim a place in the national Pharmacopœia. It would, therefore, be a most valuable function of that work to furnish by the publication of supplements some aid to the profession in discriminating between the claims of new drugs.

Besides this the interval of ten years between the revisions gives occasion for such an amount of detail labour that the undertaking becomes almost impracticable. A more frequent review of the progress of medical science, besides reducing the labour on each occasion, would have the further advantage of furnishing fresher results to those engaged in medicine and pharmacy.

One of the most important points referred to in Dr. SQUIBB's report and the one which will most of all interest our readers is that relating to the representation of pharmacy in the organization which is entrusted with the revision and publication of a national Pharmacopœia.

On this point Dr. SQUIBB's views are no less distinct and decided than emphatically expressed, and coming from a member of the medical profession who is also an authority on pharmaceutical matters, we cannot do better than place them before our readers in his own words:—

"The next question is, if this Association be the proper custodian of the Pharmacopœia, and if it be wise for it to assume its right of management and control, whom can it invite to co-operate with it in the work? This question must be answered, that it cannot wisely nor safely avoid inviting the active co-operation of the "American Pharmaceutical Association," a national organization as general in its representative character, and nearly as old, as the "American Medical Association," and whose objects tend to the same general results, and belong to the same general interest. Indeed, pharmacy is the outcome and the expression of a Pharmacopœia, and a Pharmacopœia without pharmacy would be a theory without practice; and pharmacy without a Pharmacopœia would be but a desultory, roving occupation, and not a true art of medicine. Pharmacy was the first specialty that grew out of the general science and art of medicine, or rather, the first differentiation in the art of medicine; for when pharmacy began to grow out of medicine there was but little science behind the healing art. Pharmacy was the first specialty of medicine, surgery the second, and the art of the obstetrician perhaps the third. Then came ophthalmology and the other new numerous specialties. All are mechanical arts, and not sciences, and all derive their inspiration, their development, and their rate of progress from the general science or sciences of medicine, and all are on an equal footing, and equally subordinate to the general medical sciences and the general medical interest, and are but elements in the general art of medicine. The general art of medicine could no more do without the special art of pharmacy than it could without the special art of surgery. But, had there been no general art of medicine, the special arts of pharmacy, surgery, etc., would never have existed. Hence the general science and art of medicine, as represented in this and all other national associations, is superior, and the special arts are subordinate, and as streams, the special arts can never be independent of, nor can they ever rise higher than, their source. Medicine and pharmacy without their natural connection and dependence upon each other, would soon lose their utility to mankind, and pharmacy, first of the two, would die out, or degenerate into something else. And an imaginary antagonism between them, which has been too much cultivated of late on both parts, is exercising a degenerating effect on both.

"Such reflections, carried to their legitimate and logical conclusions, are so confirmed by the best experience of the time as to convince almost any one sufficiently conversant with the subject, that it would be almost as impracticable to manage the interests involved in the Pharmacopœia without the co-operation of pharmacy as for pharmacy to manage them without medicine, simply because pharmacy has accumulated an amount of knowledge and experience which medicine has long ceased to work for and accumulate, and which medicine cannot afford to do without or to disregard.

"Pharmacy is represented in the National Pharmaceutical Association just as medicine is represented in this Association; and pharmacy is essential to the Pharmacopœia; therefore, the co-operation of the American Pharmaceutical Association is the legitimate, the proper, and the best way in which to seek the aid of pharmacy in the management and control of the Pharmacopœia. And it is altogether probable that if this Association should, in a proper way, invite the co-operation of the American Pharmaceutical Association in this work, under the fully recognized leadership of the Medical Association, the invitation would be accepted."

ACCLIMATIZATION OF PLANTS.

THE Liberian Coffee, which it is hoped will be proof against the disease that has for some time ravaged the coffee plantations, and which, moreover, produces a very large seed, is reported as having been successfully introduced in most of the coffee-growing countries, whether colonial or foreign. Next in importance to the coffee experiment is that respecting the acclimatization of the Para Caoutchouc (*Hevea brasiliensis*) in India. Plants of this, the most valuable rubber known in commerce, have been raised from seeds at Kew and they are also capable of easy propagation by cuttings. Of the *Castilloa elastica*, from which the Central American rubber, also a fine quality, is obtained, 7000 seeds were received at Kew during the past year; all of these failed to germinate; a quantity of cuttings, however, arrived safely, from which many plants have been raised, and these will be transmitted to India shortly.

THE EUCALYPTUS GLOBULUS IN ITALY.

IN a paper read at the Evening Meeting of the Pharmaceutical Society in February last, Mr. GLOVER described the results following the cultivation of the *Eucalyptus globulus* in the unhealthy district of San Paolo fuori le mura di Roma by a band of Trappist monks. The *Lancet* states that the Italian Government, moved by the success of the experiment, is now supplying landholders with large quantities of slips of this tree for the formation of plantations in other malarious districts. It is also intended to plant trees along the boulevards of the large cities and on the banks of the various railways. The landowners are reported to be freely following the initiative of the Government, and it is expected that in a few years malaria will be as effectively expelled from Italy as ague has been from Lincolnshire.

In the report of the Kew Gardens to which we referred recently, Dr. HOOKER says, "The *Eucalyptus globulus*, which has been so largely distributed on account of its supposed prophylactic virtues, will probably turn out to be extremely useful for its timber in countries not too hot for its growth. The plant seems to be proof against parasitic plants, the bark being deciduous causes the seeds of any parasite to be dislodged before they have time to germinate and so obtain a footing in the tissues of the plant."

A STRIKE AMONG ANALYSTS.

THE post of public analyst, which in Great Britain is so frequently the object of a spirited competition, appears to be at a discount in the Empire city. According to *New Remedies* several cases of poisoning have recently taken place in New York city, and the coroners have to lament that they are unable to obtain the services of competent chemists who will undertake the labour or responsibility of the necessary analyses. It appears that bills for similar services are outstanding against the city treasury, payment of which has been refused. *Hinc illæ lachrymæ!*

"WHEN DOCTORS DISAGREE WHO SHALL DECIDE?"

THERE appears to be some diversity of opinion amongst our medical contemporaries as to the value of the addresses delivered recently at Sheffield to the members of the British Medical Association. Notably is this the case with respect to Dr. ALFRED CARPENTER's address in public medicine. This the *Medical Examiner* says is "colourless, and must have been intolerably boring to those who heard it." On the other hand, the *Medical Times and Gazette* devotes more than three columns of editorial comment upon the first half of "Dr. CARPENTER's very able and suggestive address," and commends the whole of it to the careful and considerate study of its readers. The *Lancet* also speaks of it as "eloquent and instructive."

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The half-yearly meeting of the members of this Association was held at the rooms, Halford Street, on Tuesday, the 1st inst. The report of the committee having been read was unanimously adopted.

The committee reported that the application made during the earlier part of the session to the Pharmaceutical Society for monetary aid in carrying on the work of the Association was favourably received, a grant of £15 being voted by the Council. With this sum several valuable additions have been made to the resources of the Association—viz.: a microscope, possessing polariscope, camera lucida, etc., as accessories; a bookcase, with secretary's cupboard; a small but choice selection of books has also been purchased. Messrs. Evans, Lescher and Evans, of London, had again placed the Association under a debt of obligation by presenting a considerable number of British Pharmacopœia preparations. The thanks of the committee were gratefully accorded to these gentlemen for their kindness. As in former sessions the society had had to sustain the loss of some of its more prominent members—two old teachers and committeemen having left the town. Forty-four meetings of classes had been held, conducted by Messrs. Clarke, Duncalf, Garrett, Hammond and Baron. The average attendance at each class had been 7·5, which was below the level of previous sessions. Four special lectures had been delivered by Messrs. Young, Cadoux, Bishop and Baron. At the recent examinations conducted by the various class teachers H. Fry and J. Garrett stood highest on the list of successful competitors, they will therefore receive the prizes generously offered by Messrs. Butler and Lloyd. The number of ordinary members during the past session has been 26, and of honorary members 27. The committee stated that several of the students had made marked progress during the past session.

After the transaction of routine business the members proceeded to elect the committee for the ensuing session with the following results:—W. B. Baron, President; W. Hammond, Vice-President; J. Garrett, Hon. Secretary; W. B. Clarke, Treasurer; E. H. Butler, C. B. Lomas and T. C. Raynor.

The statement of accounts showed that the receipts during the half-year amounted to £18 17*s.* 11*d.*, and the expenditure to £30 11*s.* 2*d.*, leaving a balance due to the treasurer of £1 3*s.* 8*d.*

Proceedings of Scientific Societies.

PHARMACEUTICAL SOCIETY OF VICTORIA.

The first annual dinner of the Pharmaceutical Society of Victoria was held on Wednesday, May 24th, at Clements's Hotel; there was a numerous attendance. Mr. Joseph Bosisto, M.L.A., the president of the society, occupied the chair, and Mr. D'Arcy Irvine, the vice-chair. The usual loyal toasts having been disposed of,

Dr. Neild proposed "The Pharmaceutical Society of Victoria, coupled with the name of the president." He observed that the large number present at this the first dinner promised well for the future of the society. The advantages of such a society were obvious, both scientifically and commercially, and he had great pleasure in coupling the name of the president with the toast, because Mr. Bosisto was not only respected as a man, but had also taken a high position in the pharmaceutical world. The public owed much to Mr. Bosisto for the discoveries he had made of the properties of the colonial vegetation, and he therefore called upon all present to drink the toast of the Pharmaceutical Society of Victoria, and the health of its president.

Mr. Bosisto, in responding, said that the object of the members of the society was to keep themselves up in pharmaceutical and chemical knowledge; to hold social meetings, so that the members of the profession might be joined together in a band of brotherhood, and to show forth a spirit of benevolence towards their brethren in misfortune. He thought that, altogether, their labours had not been in vain. Chemists stood between the public and the medical profession, and if they failed in their duty they failed towards both. Hence the necessity of their studying pharmacy. Another object of the society was to get a "Pharmacy Bill" passed through Parliament. They had a measure already drafted, and if it was not introduced by the Government next session, it would be brought forward by private members. The society was much indebted to Dr. Neild in connection with this bill, and to Baron von Mueller was due the credit of showing the pharmaceutical value of many of the native plants. There was a wider field for the society in this work of developing the chemical properties of the native vegetable products, and it would be the duty of the society to educate young pharmacists in this work, so that in the future they might have their own "Materia Medica," and be able to take their position among the pharmacists of the world, and so that pharmacy might take its place, side by side with the medical profession, in relieving the ills to which humanity was subject.

Mr. D'Arcy Irvine proposed the toast of "The Medical Profession of Victoria," which was acknowledged by Dr. Neild and the Baron von Mueller.

The remaining toasts were "The Pharmaceutical Society of Great Britain," "Kindred Societies," "The Press," and "The Ladies."

ROYAL SOCIETY.

PICROROCELLIN.*

BY JOHN STENHOUSE, LL.D., F.R.S., AND CHARLES EDWARD GROVES.

Through the kindness of Mr. C. Lavers Smith, the eminent orchil manufacturer of Spitalfields, we were furnished with a quantity of a lichen which he had observed to have a very bitter taste, and which came into the market through a Portuguese house. It is believed to have been brought from the West Coast of Africa; but our endeavours to ascertain the exact locality have hitherto been unsuccessful. From the appearance of the lichen it seems to grow on limestone rocks; and Mr. W. Carruthers, of the British Museum, and the Rev. J. Y. Crombie, to whom we submitted it, pronounced it to be a variety of *Rocella fuciformis*, the ordinary *Rocella* usually growing on trees. This lichen is remarkable for its intensely bitter taste; and the preliminary experiments showed that this is due to the presence of crystalline compound which is but slightly soluble in water.

Picrorocellin.—The lichen was accordingly first treated with water and hydrate of lime, in the usual manner, to extract the erythrin which it contains in common with other varieties of *Rocella*, and the residue, after being dried at the ordinary temperature, was extracted by boiling spirit. The alcoholic solution, which contained the bitter substance together with chlorophyll and various fatty and resinous impurities, was concentrated by distillation until almost the whole of the alcohol was removed. When cold, the dark-coloured pasty mass was pressed in a cloth, boiled up with a small quantity of strong spirit, and allowed to cool, pressed, and again

* Read May 18, 1876. From the 'Proceedings of the Royal Society.'

treated in the same manner. By this means much of the chlorophyll and almost the whole of the oily matters were dissolved out, leaving a dark green-coloured crystalline product. In order to remove the last traces of chlorophyll from this, it was boiled up twice or thrice with benzine, in which the crystals are only slightly soluble.

The spent "weed" from this variety of lichen which has been exhausted with ammonia in the ordinary process of the orchil manufacture also yields the same crystalline substance, but it is much more difficult to purify than that obtained from the lichen which has been exhausted with milk of lime. The erythrin in this lichen is identical with that from the ordinary kinds of *R. fuciformis*, yielding orcin and erythrite when boiled with lime or other alkalies.

The nearly colourless substance was now boiled for some time with about ten times its weight of spirit, and filtered whilst hot through a vacuum filter. In this operation it is necessary to use a hot-water funnel, as, otherwise, the crystals which separate soon choke up the filter. The filtered solution, which should be boiled until clear, on cooling deposits a large amount of crystals, which evidently consist of a mixture of two substances, one forming lustrous prisms, the other feathery tufts of minute flattened needles. These two substances can be easily separated mechanically by elutriation, the comparatively large prisms of picrorocellin, from their size and weight, rapidly sinking to the bottom of the solution, whilst the light feathery tufts of the other compound remain suspended. One or two recrystallizations from spirit generally suffice to purify the former; but if they have any green tinge, it is necessary to treat them previously with boiling benzine in order to remove the trace of chlorophyll to which the colour is due.

The new compound crystallizes in long prismatic crystals of considerable lustre, which are moderately soluble in boiling spirit, slightly soluble in ether and benzine, but almost insoluble in water, petroleum, and carbon bisulphide. It melts at 192°–194° C., and when more strongly heated boils and gives off vapours of an oily substance of a pleasant aromatic odour, leaving a small amount of carbonaceous residue. Cold concentrated sulphuric acid colours it of a deep brown; but when it is warmed it dissolves, forming a pale yellow solution, from which water precipitates a yellow compound. If the sulphuric acid solution be heated nearly to its boiling-point, it darkens and gives off sulphurous anhydride; the addition of water then gives no precipitate. It is also soluble in warm nitric acid, and the addition of water causes a yellow precipitate similar in appearance to that produced in the sulphuric acid solution; the nitric acid solution, when heated, gives off nitrous fumes. If boiled with dilute sulphuric or hydrochloric acid for a short time, the picrorocellin is decomposed, a compound, *xanthorocellin*, being formed which crystallizes from alcohol in long silky needles of a pale yellow colour. When picrorocellin is distilled with a mixture of dilute sulphuric acid and potassium dichromate, it is decomposed, an oil passing over having the odour of benzoic aldehyde, accompanied by a white crystalline substance. The latter, after being purified by recrystallization, melted at 121° and had the general appearance and properties of benzoic acid, with which it is identical. It was also found to be oxidized by an acid solution of potassium permanganate, but no odour of bitter-almond oil was observable.

The substance dried at 100° was submitted to analysis, with the following results:—

I. ·263 gram substance gave ·657 gram carbonic anhydride and ·151 gram water.

II. ·178 gram substance gave ·444 gram carbonic anhydride and ·100 gram water.

III. ·218 gram substance gave ·02285 gram ammonia.

IV. ·215 gram substance gave ·02219 gram ammonia.

		Theory.	I.	II.	III.	IV.	Mean.
C_{27} ...	324	68·21	68·13	68·03	...	...	68·08
H_{29} ...	29	6·11	6·38	6·24	...	..	6·31
N_3 ...	42	8·84	...	...	8·63	8·50	8·56
O_5 ...	80	16·84					
	475	100·00					

The numbers obtained from the results of these analyses agree very closely with those required by the formula $C_{27}H_{29}N_3O_5$: As this compound is obtained from a species of *Rocella* and possesses an exceedingly bitter taste, we purpose calling it *picrorocellin*. It is remarkable as being the first crystalline organic substance containing nitrogen which has been found in the lichens.

Occasionally specimens of *Rocella* are met with which have a comparatively feeble bitter taste; but hitherto we have been unable to isolate any crystalline compound from them to which this property might be ascribed.

We have not, as yet, examined the second substance crystallizing in minute, difficultly soluble needles, and which accompanies picrorocellin in this lichen, but hope to be able to do so ere long. We have ascertained, however, that it is not merely a fatty substance of a nature similar to rocellic acid, since on boiling it with a dilute solution of sodic hydrate, benzoic aldehyde appears to be produced.

Xanthorocellin.—When picrorocellin was heated above its fusing-point it decomposed, the products obtained varying with the temperature. When strongly heated, water and ammonia were given off, and a brown oily body distilled, which on being put aside for some time deposited crystals. These, after being separated from the fluid portion and recrystallized two or three times from spirit, formed colourless plates which are moderately soluble in alcohol but insoluble in water. This substance has been reserved for further investigation.

If, however, instead of subjecting the picrorocellin to destructive distillation it was merely heated for about ten minutes to 220°, it gave off water, and the fluid product if poured out and allowed to cool solidified to a resinous-looking mass. This, when finely powdered and dissolved in about three times its weight of boiling spirit, solidified on cooling to a pulp consisting of long, slender, yellow needles of xanthorocellin. This substance may be more conveniently prepared, however, by the action of dilute acids on picrorocellin, the proportions which gave the most satisfactory results being 1 part of picrorocellin to 4 of strong hydrochloric acid and 4 of water. The mixture was boiled for about 8 hours in a flask furnished with a return condenser, and the product, which still contained some unaltered picrorocellin, was collected, washed, and dissolved in boiling spirit. On cooling, the xanthorocellin was deposited in slender needles of a pale yellow colour, which amounted to about 70 per cent. of the picrorocellin originally employed. They were easily purified by two or three crystallizations from boiling spirit. When dilute sulphuric acid was substituted for the hydrochloric acid, the results obtained were not so good, oily impurities seeming to be formed at the same time. The compound as prepared by this process is identical with that obtained when picrorocellin is subjected to a temperature of 220° in the manner previously described, both substances melting at 183°.

Although xanthorocellin could be prepared with tolerable facility by the action of dilute hydrochloric acid on picrorocellin, yet it had the disadvantage that a portion of the latter always remained unattacked; this was due, no doubt, to its insolubility in the dilute acid. It seemed possible that this inconvenience might be obviated by employing an alcoholic solution of picrorocellin. On making the experiment, it was found that when an alcoholic solution of the substance was acidulated with hydrochloric acid and boiled, although xanthorocellin was readily formed, yet in order to recover it, it was necessary to partly distil off the spirit and then precipitate with water; the product was in this case accompanied with more or less of a tarry matter. These difficulties, however, were overcome by the use of glacial acetic acid. Picrorocellin dissolved readily in the boiling acid, and if sufficiently concentrated crystallized out again unchanged on cooling. On adding a drop of hydrochloric acid to the hot colourless solution and again boiling it, it almost instantly became of a yellow colour, and now no longer deposited crystals of picrorocellin when cooled. The addition of water to this solution immediately produced a precipitate of xanthorocellin.

After numerous trials, the following was found to be the best method of preparing xanthorocellin:—10 grams of picrorocellin are dissolved in 15 grams of boiling glacial acetic acid, 6 drops of concentrated hydrochloric acid are added and the whole boiled for 15 minutes in a flask furnished with an inverted condenser. On allowing it to stand for some time after it has become cold, it solidifies to a mass of crystals of the xanthorocellin. These are stirred up with water, thoroughly washed to remove adhering acid, and then recrystallized from spirit. The yield in this case was found to be 76 per cent. of the picrorocellin employed, and the alcoholic mother liquors when evaporated left neither tarry residue nor undecomposed picrorocellin. When dilute sulphuric acid was substituted for the hydrochloric acid in this experiment, the result was very similar to that observed with the aqueous acid; xanthorocellin was formed, but the yield was much smaller, only 56 per cent., owing, doubtless, to secondary decomposition; this supposition was corroborated by the fact that the addition of water to the glacial acetic acid solution precipitated the crude xanthorocellin as a yellow oil, which only crystallized after it had been standing for some short time. This substance is insoluble in petroleum, and but slightly soluble in hot carbon bisulphide or in ether. It is moderately soluble in hot benzine, and readily soluble in boiling spirit.

The substance dried at 100° gave the following results:—

I. ·247 gram substance gave ·692 gram carbonic anhydride and ·115 gram of water.

II. ·350 gram substance gave ·979 gram carbonic anhydride and ·171 gram of water.

III. ·160 gram substance gave ·450 gram carbonic anhydride and ·079 gram of water.

IV. ·261 gram substance gave ·02742 gram ammonia.

V. ·240 gram substance gave ·02415 gram ammonia.

	Theory.	I.	II.	III.	IV.	V.
C_{21} ...252	76·60	76·44	76·28	76·71		
H_{17} ... 17	5·17	5·17	5·43	5·49		
N_2 ... 28	8·51	...	....	...	8·65	8·29
O_2 ... 32	9·72					
329	100·00					

These numbers correspond pretty closely with those required by the formula $C_{21}H_{17}N_2O_2$.

When xanthorocellin was boiled for some time with a moderately strong aqueous solution of sodic hydrate, it acquired a yellow colour, but did not appear to dissolve to any great extent. On collecting this insoluble compound and washing it, first with strong caustic soda and then with a saturated solution of sodium carbonate, a bright yellow powder was left. This yellow compound, when treated with a small quantity of spirit, to which a few drops of sodium hydrate solution had been added, dissolved only partially, leaving a residue consisting of colourless crystals. These were readily soluble in water; and on adding an acid to the solution, a white precipitate was obtained. The addition of a concentrated solution of sodium hydrate to the clear yellow alcoholic solution immediately produced a yellow precipitate. It was observed that xanthorocellin dissolved in boiling water to which a *few drops* of a solution of sodium hydrate had been added, and on cooling it crystallized out again apparently unaltered. If, however, instead of allowing it to cool, strong soda was added to the hot clear solution, a bright yellow precipitate was produced. A similar precipitate was obtained on heating xanthorocellin with spirit containing a little sodium hydrate in solution, pouring off the clear liquid from the colourless crystals which were formed, and adding excess of soda.

Xanthorocellin is soluble in warm concentrated sulphuric acid with a brilliant orange colour; but on adding water, the substance is precipitated unaltered. If the acid solution be strongly heated, however, it effervesces slightly, and becomes somewhat darker in colour: the addition of water to this no longer produces a precipitate.

Xanthorocellin dissolves in cold nitric acid, and if water be at once added the substance is precipitated apparently unaltered. On allowing the nitric acid solution to stand for some time, however, or on gently heating the mixture, decomposition takes place with the formation of new compounds. These may be more conveniently obtained, however, by the action of nitric acid on the substance dissolved in glacial acetic acid, in the following manner:—5 grams of xanthorocellin were dissolved in 10 c.c. of boiling acetic acid, and the solution rapidly cooled, but without agitation, so as to avoid as much as possible causing the substance to crystallize out; 5 c.c. of nitric acid (specific gravity 1·45) were then added, the whole thoroughly mixed and gently heated in a water-bath until the action had set in. When this took place, the source of heat was withdrawn, the heat developed by the reaction being sufficient to cause the liquid to boil; large quantities of nitrous fumes were given off, and lustrous scales soon began to appear in the liquid. If, as sometimes happened, the action became too violent and threatened to eject the contents from the flask, it was easily moderated by plunging the latter into cold water for a few seconds. As soon as the reaction was complete, the contents of the flask were poured into a beaker, and put aside for a few hours; the solid crystalline mass thus obtained was then thoroughly incorporated with 30 c.c. of spirit, which dissolved nearly everything except the scales. The latter were collected on a Bunsen filter, and washed thoroughly with cold spirit, in which they are almost insoluble. The yield of the new substance is about 35 per cent. of the xanthorocellin originally taken; it crystallizes in beautifully white hexagonal plates, which do not melt at 275°, but begin to undergo decomposition below that temperature. The spirituous washings from these crystals, obtained when the crude product was treated with alcohol, were allowed to evaporate spontaneously, until the latter had disappeared. On distilling the residue in a current of steam, some benzoic aldehyde passed over with the aqueous vapour, but no hydrocyanic acid could be detected in the distillate. The crystalline substance left in the retort appears to be a nitro-acid of high melting-point, totally different in its properties, however, from nitrobenzoic acid. We hope to be able, at some future time, to examine the products of this interesting reaction more fully.

Action of sodium hydrate on picrorocellin.—When picrorocellin was boiled with three times its weight of spirit, and an aqueous solution of sodium hydrate was gradually added until all the crystals had disappeared, a solution was obtained which, when filtered and rendered acid with acetic acid, deposited crystals of very pure unaltered picrorocellin equal in weight to about half those originally taken.

The alcoholic mother liquors on being evaporated left an oily residue insoluble in water. It was exceedingly soluble in hot water, however; and the solution, if sufficiently concentrated, deposited colourless crystals of a new substance mixed with more or less picrorocellin.

As from this experiment picrorocellin seemed to be altered by the action of alkalies, a quantity of it was boiled with a concentrated solution of sodium hydrate, when it became evident that it was rapidly being changed, and in a few minutes it became red, and fused to an oily mass enclosing crystals of the unaltered substance. The whole was then allowed to cool; and after the soda solution had been poured off, the red mass was gently heated with water, which readily dissolved most of it, leaving merely the unattacked picrorocellin. The addition of sodium hydrate to the deep yellow solution thus obtained threw down a yellowish-red resinous mass, whilst acids caused the formation of a voluminous, almost white precipitate. This readily aggregated to a plastic mass, which was washed by kneading it in tepid water. During the action of caustic soda on picrorocellin, a volatile substance is produced having a pleasant aromatic odour.

It was found, however, that the principal product of this reaction could be obtained far more readily, and in a purer state, by operating with dilute solutions of sodium hydrate. For this purpose 3 parts of solid sodium hydrate were dissolved in 180 to 200 of boiling water, and then 10 parts of finely powdered picrorocellin were added; the crystals dissolved rapidly in the boiling liquid, ammonia was given off in small quantity, and after about an hour's digestion the reaction was considered to be complete. When nearly cold, acetic acid was added to the solution in slight excess; this produced a glutinous kind of precipitate, which could be moulded under the warm liquid into a stick closely resembling bleached shellac in appearance, being lustrous and silky. The product was found, however, to be far from pure; and in order to obtain it in that state, it had to be crystallized successively from alcohol and from carbon bisulphide. The crude product was therefore digested with two thirds of its weight of boiling spirit until dissolved, and then set aside to cool. After standing a considerable time, it deposited the new substance in colourless crystals, which were collected on cotton wool on a vacuum filter, washed with *a very small quantity* of cold spirit, and dried. These crystals were then boiled with 30 times their weight of carbon bisulphide until dissolved, the solution filtered, and then concentrated to about half its bulk by distillation. On cooling, the substance crystallized out in large, brilliant, colourless prisms, amounting to from 40 to 45 per cent. of the weight of the picrorocellin originally taken. These may be rendered quite pure by crystallizing them first from a mixture of equal weights of alcohol and water (10 parts) and finally from strong spirit.

The crystals, whether prepared by boiling picrorocellin with an aqueous or with an alcoholic solution of sodium hydrate, are identical, both melting at 154° C. The fused compound remains quite liquid even when cold; but on adding a crystalline fragment of the substance it instantly solidifies. Dried at 100° C. and submitted to analysis it gave the following results:—

I. ·287 gram of substance gave ·778 gram carbonic anhydride and ·175 gram of water.

II. ·193 gram of substance gave ·523 gram carbonic anhydride and ·113 gram of water.

III. ·280 gram of substance gave ·760 gram carbonic anhydride and ·169 gram of water.

IV. ·368 gram of substance gave ·03264 gram ammonia.

V. ·297 gram of substance gave ·02611 gram ammonia.

VI. ·243 gram of substance gave ·02089 gram ammonia.

	Theory.	I.	II.	III.	IV.	V.	VI.
C_{24} ...288	74·04	79·93	73·91	74·03			
H_{25} ... 25	6·43	6·78	6·51	6·71			
N_2 ... 28	7·20	...	...	...	7·30	7·24	7·08
O_3 ... 48	12·33						
389	100·00						

These numbers correspond very closely with the formula $C_{24}H_{25}N_2O_3$. This compound is almost insoluble in petroleum, and only very slightly soluble in ether, moderately so in boiling benzine. When strongly heated, it fuses and becomes deep yellow, being converted into xanthorocellin. Nitric acid oxidizes it, benzoic aldehyde being first produced, which, by a continuance of the action, is converted into benzoic acid. A similar result is obtained when it is treated with chromic acid mixture. The crystals dissolve in concentrated sulphuric acid by the aid of a gentle heat, and on adding water a precipitate of xanthorocellin is obtained.

As picrorocellin possessed such an extremely bitter taste, and was, moreover, a nitrogenous compound, it seemed not improbable that it might possess medicinal properties. It was therefore submitted to our friend Dr. T. Lauder Brunton, F.R.S., who kindly undertook its examination with especial reference to the possible resemblance between its actions and those of quinine. He says, "The results may be briefly stated as follows:—

"1. The substance when injected under the skin of an animal exerted no perceptible action whatever.

"2. When injected under the skin of a frog it diminished reflex action. This diminution appeared to be caused in the same way as that effected by quinine, namely by irritation of the inhibitory centres within the head. As the whole subject of the action of quinine on the functions of the spinal cord is at present unsettled, too much stress must not be laid on this action of picrorocellin.

"3. When an ethereal solution of picrorocellin is added to make an alkaline solution of sulphate of indigo, with blood and ozonized turpentine, in the manner recommended by Binz and employed by him in his researches on quinine, the production of isatin is not in the least retarded, whilst quinine retards it very greatly. Picrorocellin thus differs from quinine in not arresting oxidation, a most remarkable characteristic of the latter.

"I regret that I have been unable to test it chemically in a case of ague, as the patients I see come and go so irregularly that little or no information would be gained by administering it to them. The sparing solubility of picrorocellin is a serious objection to its use in medicine, even supposing it to have the same properties as quinine; and as it does not possess one of the most important of these properties, there is no probability that it can ever be used as a substitute for quinine."

ANN ARBOR SCIENTIFIC ASSOCIATION.*

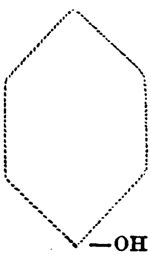
THE AROMATIC GROUP IN THE CHEMISTRY OF PLANTS.

BY PROFESSOR PRESCOTT.

(*Continued from page* 146.)

After the hydrocarbons, we next inquire as to the distribution of the *oxidized products* of the aromatic group: phenols, acids, aldehydes, etc.

The *phenols* are formed by substitution of OH for H attached directly to the C of the ring. The first phenol



known as purest grade of carbolic acid, is obtained by gentle decomposition of many plant constituents. Cymophenol, $C_{10}H_{13}OH$, is found in the oil of thyme, from the *Gymnospermæ*. Of the diatomic phenols, pyrocatechin, $C_6H_4(OH)_2$, is readily obtained from tannins by distillation and exists ready formed in *Ampelopsis Hederacea*. Creosote, obtained by destructive distillation of many bodies, contains two homologous phenols, diatomic and triatomic, each bearing methyl:

$$\text{Guaiacol, } C_7H_8O_2 = C_6H_4 \left\{ \begin{array}{l} O.CH_3 \\ OH \end{array} \right.$$

$$\text{Creosol, } C_8H_{10}O_2 = C_6H_3 \left\{ \begin{array}{l} CH_3 \\ O.\ CH_3 \\ OH \end{array} \right.$$

Pyrogallol (pyrogallic acid, largely used as a deoxidizing agent by photographers) is a triatomic phenol, $C_6H_3(OH)_3$,

* Reprinted from the 'Proceedings' for 1875-6.

and is readily formed from tannins and from gallic acid; while its isomer, phloroglucin, is obtained from resins and from glucosides by heating with potassa.

The orcins, isomers of $C_7H_8O_2$, substitutions of two molecules of hydroxyl and one of methyl for three atoms of hydrogen in benzene, are found ready formed in lichens. The dyes archil, cudbear and persio contain orcins,—as also litmus, from *Leconora tartarea*. Aloes, treated with potassa, yields orcins.

And now, in 1872, Schiff ascribes to *gallic acid*, $C_7H_6O_5$, a rational formula consisting of the introduction of one carboxyl and three hydroxyl molecules in place of four of the hydrogen atoms of benzene.* Farther, he

$$C_6H_2\left\{\begin{matrix}C\left\{\begin{matrix}O\\OH\end{matrix}\right.\\OH\\OH\\OH\end{matrix}\right.$$

presents and maintains a rational formula for fermentable *tannic acids*, the natural source of gallic acid.† Having at last synthesised tannic acid from gallic acid by working in accordance with his theory, it cannot be ignored. Schiff also traces a very interesting correspondence between the astringent acids and other aromatic compounds, in the bright colours which great numbers of them give with ferric salts; the most familiar instance being that of ink, and instances being familiar to analysts, in the identification of phenol, benzoic, salicylic and cinnamic acids, etc. The wide distribution of the tannins gives great significance to this insight into their construction. Of the 576 plants in Wittstein's summary, 35, or 6 per cent., are given as containing tannic acids; these plants being found in 17 per cent. of the natural orders.

The quinones claim attention in this inquiry, for though they are not found in plants they are next steps to plant constituents. They hold oxygen atoms united to each other, as before stated. Ordinary quinone, $C_6H_4(O_2)''$, is easily obtained from the quinic acid of the cinchonas and from the allied caffeic acid of coffee,—being in each case a means of recognition in analysis. Resins, by heat, yield umbelliferone, an isomer of quinone.

The quinone of anthracene (the triple-hexagon nucleus) is called anthraquinone, $C_{14}H_8(O_2)''$. From this, by displacing H_2 with $(OH)_2$, is now manufactured dioxyanthraquinone, the *alizarin of madder*, as hereafter to be described. Isomeric with alizarin is the chrysophanic acid found in rhubarb, senna, and the wall lichen (*Parmelia parietina*). Chrysammic acid, which is formed from the aloin of aloes in the common nitric acid test, also from the chrysophanic acid of rhubarb in the same way, has the composition of tetranitra-dioxy-anthraquinone, $C_{14}H_2(NO_2)'_4(OH)'_2(O_2)''$.

Taking next the *acids* derived from the benzene nucleus, with their aldehydes and alcohols, we have first benzoic acid and bitter almond oil, the well-known subjects of Liebig and Wobler's first advance into the aromatic group. Always classed with these are salicylic, cinnamic, cuminic, and anisic acids, aldehydes and alcohols; the alhehydes being essential oils of plants and the acids being the products of the natural oxidation of the aldehydes. In the following list, *each dash prefixed indicates the displacement of one atom of hydrogen from benzene*, C_6H_6, to the residue of which the additions are made. Thus, benzoic acid is $C_6H_5C\left\{\begin{matrix}O\\OH,\end{matrix}\right.$ etc. (the H of OH in acids being replaced by metals, forming salts).

	Acid.	*Aldehyde.*	*Alcohol.*
Benzoic	$—C\left\{\begin{matrix}O\\OH\end{matrix}\right.$	$—C\left\{\begin{matrix}O\\H\end{matrix}\right.$	$—C\left\{\begin{matrix}H\\H\\OH\end{matrix}\right.$
Salicylic	$\begin{matrix}—OH\\—C\left\{\begin{matrix}O\\OH\end{matrix}\right.\end{matrix}$	$\begin{matrix}—OH\\—C\left\{\begin{matrix}O\\H\end{matrix}\right.\end{matrix}$	$\begin{matrix}—OH\\—C\left\{\begin{matrix}H\\H\\OH\end{matrix}\right.\end{matrix}$

$$\text{Cinnamic (Phenyl-acrylic)}\ \left\{\begin{matrix}—\\(C_3H_3)'''\end{matrix}\right\}\begin{matrix}O & —\\O & O\end{matrix}\Big\}(C_3H_3)'''\quad\begin{matrix}—\\(C_3H_3)'''\end{matrix}\left\}\begin{matrix}H\\H\\O\end{matrix}\right.$$

$$\text{Cuminic (Phenyl-propylic)}\ \left\{\begin{matrix}—(C_3H_7)'\\—C\left\{\begin{matrix}O\\OH\end{matrix}\right.\end{matrix}\right.\quad\begin{matrix}—(C_3H_7)'\\—C\left\{\begin{matrix}O\\OH\end{matrix}\right.\end{matrix}\quad\begin{matrix}—(C_3H_7)'\\—C\left\{\begin{matrix}H\\H\\OH\end{matrix}\right.\end{matrix}$$

$$\text{Anisic}\ \left\{\begin{matrix}—O(CH_3)\\—C\left\{\begin{matrix}O\\OH\end{matrix}\right.\end{matrix}\right.\quad\begin{matrix}—O(CH_3)\\—C\left\{\begin{matrix}O\\H\end{matrix}\right.\end{matrix}\quad\begin{matrix}—O(CH_3)\\—C\left\{\begin{matrix}H\\H\\OH\end{matrix}\right.\end{matrix}$$

Benzoic acid is accompanied in the balsams,* and often complemented by cinnamic acid. It is formed from its aldehyde, bitter almond oil, by exposure of the latter to air. It is now manufactured from the naphthalin of coal tar (the double molecule benzene before described), by the process mentioned farther on. Benzoic aldehyde is hardly an educt; being a product, along with hydrocyanic acid and sugar, in the natural fermentation of amygdalin which is found in many plants of the almond family.

Salicylic acid does not exist uncombined in plants, that the writer is aware, but as methyl salicylate it makes the principal portion of "wintergreen oil," from *Gaultheria procumbens* and *Betula lenta* (sweet birch), and occurs in great purity and abundance in *Andromeda Leschenaultii*.† This acid, the new antiseptic, is now being manufactured on the large scale from carbolic acid, as presently to be described. It is not poisonous; $1\frac{1}{4}$ gramme doses being taken without apparent ill effect. It prevents most fermentive and putrefactive changes; including those, like the sinapous and amygdalous, which are not dependent upon an organized ferment, as well as the alcoholic and lactic. One-tenth per cent. prevents grape juice from fermenting, and 0·04 per cent delays the souring of milk 36 hour later than when the milk is not so treated.‡ It arrests putrefactive changes as well as fermentive. Unlike carbolic acid, its antiseptic power is destroyed by alkalies. The methyl salicyate has been to some extent manufactured for use instead of natural wintergreen oil. *Salicylic aldehyde* is known as the oil of spirœa, found in "meadow sweet" and "hardhack." It is readily obtained by fermentation of the glucoside *salicin*, the bitter substance of the willow and poplar, and found with its product in meadow sweet. Populin and helicin both readily yield salicin.

Cinnamic acid—phenyl-acrylic—is found in the balsams, and appears when its aldehyde cinnamon oil is exposed to the air. The balsams also contain,—in styrax, cinnamic alcohol, cynnyl cinnamate ($C_9H_9C_9H_7O_2$), and cinnamene, C_8H_8. Cinnamate of benzyl ($C_7H_7C_9H_7O_2$) forms a large part of Peru balsam and a small part of tolu balsam.

Cuminic aldehyde is found, with cymene, in cummin oil (from *C. Cyminum*).

The *Anisic series* is closely related to the oil of anise (*Pimpinella Anisum* and *Illicium Anisatum*).

The benzene nucleus has not been traced in many of *the alkaloids*. Atropia, however, yields an isomer of cinnamic acid, and it is conjectural that other alkaloids of the Solanaceæ contain the benzene nucleus.

In the Summary of Wittstein, before mentioned, $\frac{26}{116}$ or 22 per cent. of the natural orders contain aromatic bodies—terpenes and resins not being included as such.

After this slight survey of the constitution and natural distribution of the aromatic bodies, we will next consider what has been accomplised in their *artificial synthesis*.

* *Ann. Chem. Phar.*, clxiii., 209; *Jour. Chem. Soc.*, 1872, 820.

† *Jour. Chem. Soc.*, 1872, 245, 1019, 1098; 1874, 267.

* *Styrax Bensoin Myrospermum toluiferum, Myrospermum peruiferum, Euonymus Europœus.*

† Broughton: *Phar. Jour.*, Oct. 7, 1871.

‡ Neubaur: Kolbe: Muller: *Jour. Chem. Soc.*, 1875, 459, 460.

Benzene itself, it will be observed, is a polymer of acetylene, C_2H_2. And by heat, in a bent tube over mercury, acetylene (13 times denser than hydrogen) is transformed into benzene (39 times denser than hydrogen). Acetylene is formed, from the elements carbon and hydrogen, in the electric arc, with a strong battery (one of 40 or 50 Bunsen's elements given 100 c.c. of the gas per minute).* Also from marsh gas, or from carbon disulphide with carbon monoxide, by electric discharge.

Toluene is formed from benzene, (1) by action of methyl iodide and sodium (Fittig and Tollens), (2) by marsh gas when both it and the benzene are nascent (Berthelot).† In the last reaction, xylene and cumene are also produced.

In these and other ways all *the hydrocarbons* expressed with the single hexagon may be synthesized from benzene. Naphthalene, of the double hexagon, is formed on passing toluene through a white-hot tube (Berthelot).‡

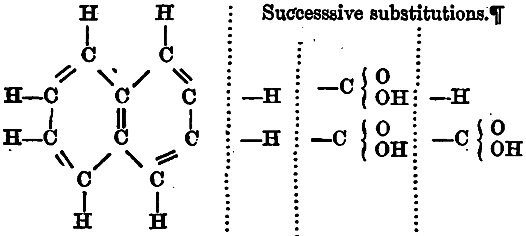
It is familar to every one that these hydrocarbons, with the phenols and many other aromatic compounds, are formed every day in every town, *from coal, by distillation*, at ten or twelve hundred degrees Fahrenheit, and this, it is submitted, is organic synthesis. Coal is a very simple if not completely mineralized mixture of carbon with bituminous hydrocarbon, and it seems a misnomer to style as "destructive distillation" the formation of the aromatic group from such material. It is *formative* distillation: prolific beyond parallel in the action of heat upon elements.

It may be safely stated in general terms that the formation of the aromatic compounds, from the elements, outside of living bodies is assured. And there are now at least four aromatic substances manufactured on a large scale from coal-tar; one being anilin and its homologues, and the other three being vegetable educts, benzoic acid, alizarin, and salicylic acid.

The manufacture of *benzoic acid* from naphthalin is carried on through two steps, namely:—

1. Oxidation, by hot nitric acid, to phthalic and oxalic acids.§
2. Removal of the elements of carbonic anhydride from phthalic acid, by heating with lime in a close vessel.||

Successsive substitutions.¶

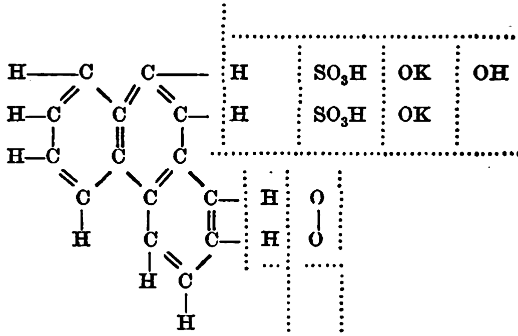


Naphthalin. Phthalic Acid. Benzoic Acid.

In the manufacture of alizarin from anthracene, there is:—

1. Oxidation to anthraquinone.
2. Farther oxidation to dioxyanthraquinone.**

Successive Substitutions.



Anthracene, C_{14}, H_{10}.

Anthraquinone, C_{14}, H_8, O_2.

Dioxyanthraquinone or Alizarin, $C_{14}H_6(OH)_2O_2$.

The history of this triumph may be indicated as follows:—*

Investigation of alizarin of madder—Schunck.........1848
of anthracene ....Anderson 1862
of the quinones ....Græbe 1868
Formation of anthracene from alizarin, Græbe and Lieberman...1868
of alizarin from anthracene, Græbe and Lieberman...1869

Purpurin, the less important colour compound of madder, having the ultimate composition of trioxyanthraquinone, is this year reported to be synthesized from alizarin.†

A ton of alizarin is saved from about 2000 tons of coal or 160 tons of coal tar. By this saving, large agricultural districts in Holland and Alsace and in Asia Minor, employed hitherto in producing colour, can be devoted to the production of food.

(*To be continued.*)

Parliamentary and Law Proceedings.

"Teaspoonfuls."

An inquest was held at Sidmouth on Tuesday Aug. 8, by Mr. S. M. Cox, county coroner, respecting the death of a child named Ernest Ward. The first witness examined stated that on the previous Friday the mother of the child called her in to look at it, and as it appeared to be very ill she advised her to send for a doctor. Mrs. Ward went herself, and Dr. Hodge came and examined the deceased. Mrs. Ward told the doctor that she had given the child something for diarrhœa that she had obtained from Mr. Talbot, chemist, and showed him a bottle. Dr. Hodge gave the child something, and then sent for Mr. Fox, surgeon. The child died the next day. She did not see any of the mixture given to the child, and did not notice particularly by the bottle how much had been taken, but should think about three spoonfuls. The mother told her that she had given the child only one teaspoonful, that she held the spoon over the glass, and let the child drink out of the glass.

---

* Berthelot: *Compt. Rend.*, IV., 640; Watts' 'Dict.,' 1st Sup., 30, 31.

† $C_6H_6+CH_4=C_7H_8+H_2$.

‡ $4\ C_7H_8=C_{10}H_8+3\ C_6H_6+3\ H_2$.

§ $C_{10}H_8+8O=C_8H_6O_4+H_2C_2O_4$.

|| $C_8H_6O_4=C_7H_6O_2+CO_2$.

¶ One side of the double ring is broken up; its four points of CH being oxidized to four semi-molecules of carboxyl, two of which enter into the phthalic acid, the other two uniting as oxalic acid.

** First, $C_{14}H_{10}+3O=C_{14}H_2O_2+H_2O$.
Second, $C_{14}H_8O_2+2H_3SO_4=C_{14}H_6(HSO_3)_2O_2+2H_2O$.
$C_{14}H_6(HSO_3)_2O_2+6KHO=C_{14}H_6(OK)_2O_2+2K_2SO_3+4H_2O$.
$C_{14}H_6(OK)_2O_2+2HCl=C_{14}H_6(OH)_2O_6+2KCl$.

* Artificial production of alizarin: Roscoe: *Chem. News*, xxi., 185.

† Lalande: *Compt. Rend.*, lxxix., 669; in *Journ. Chem. Soc.*, 1875, 69. Rosentiehl: *Compt. Rend.*, lxxix., 764; in *Journ. Chem. Soc.*, 1874, 373.

Dr. Hodge gave evidence as to the appearance and condition of the child, and the treatment which it received from him. The mother told him that she had given the deceased a teaspoonful of the mixture, but very much more was missing from the bottle. He sent for Mr. Fox, and certain treatment was continued for several hours. The child was carefully treated up to its death. The term "teaspoonful" was frequently used.

Elizabeth Ward, the mother, deposed that the child was eleven months old, and was very healthy. It had been teething, and she had been in the habit of giving it Steadman's teething powders. She gave it one on Thursday evening last, as it was relaxed, and she thought it was teething as usual, but she believed it vomited it. The child was very restless all night, and the next morning was sick, and could not eat anything. She sent to Mr. Talbot's for something for diarrhœa, and he sent back a bottle of mixture labelled "Diarrhœa mixture, shake the bottle, and give a teaspoonful every four or five hours." She poured a teaspoonful of the mixture into a wineglass and gave it to the child. She gave only one spoonful; it did not run over. Some hours afterwards a change came over the child, its lips turned purple, and its eyes glazed. She afterwards went for Dr. Hodge.

Mr. Hugh Talbot, druggist, stated that the mixture contained 1 grain of opium, 2 drachms of sugar, ½ drachm of prepared chalk, and about 15 drachms of dill water. He thought it impossible for 1 teaspoonful to have hurt the child, but thought the whole quantity missing would kill it. Three teaspoonfuls were missing from the bottle. Put only 1 grain of opium in the bottle.

Dr. Pullin, who was present as a witness for Mr. Talbot, to give evidence as to the previous health of the deceased, etc., here stated that his son, Mr. F. B. Pullin, had during the inquiry measured the three spoons produced by the mother, out of one of which she had given the medicine, and that he had found one contained 120 minims, or 2 teaspoonfuls instead of 1, and the two others 90 minims, or 1½ teaspoonful instead of a single teaspoonful. The mixture, if given in the larger spoon, would be equivalent to $\frac{1}{8}$ of a grain of opium instead of $\frac{1}{16}$, as prescribed by Mr. Talbot, and if given in either of the smaller ones would reach almost the same excess, and might possibly account for all that had occurred.

The Coroner in summing up, strongly deprecated the the use of the word "teaspoonful" by medical men as a measure.—The jury after a very short deliberation, returned a verdict of "Died from an accidental overdose of opium," and also desired to express their strong disapproval of the use of the word "teaspoonful," inasmuch as the term was proved in the present instance to be deceptive and dangerous.—*Western Morning News.*

POISONING BY PRUSSIC ACID.

On Saturday last, an inquest was held respecting the death of Charles Porter, surgeon, Birmingham. On the previous Thursday night deceased came home intoxicated, and at his direction his wife mixed medicine for the patients. After a short sleep on the sofa he asked whether a detective had called, and receiving a negative reply, exclaimed, "Then it is a dream." A few minutes later he poured some liquid into a glass of ginger beer, and, drinking the same, exclaimed "If that is prussic acid, I am a dead man." Death ensued. Mrs. Porter said her husband was 38, and addicted to drink. Some weeks he was intoxicated every day, and was in the habit of taking drugs to sober himself, and boasted that he could make a drunken man sober in a minute. The jury found death resulted from an overdose of prussic acid, taken by misadventure.—*Echo.*

Notes and Queries.

[523.] INDIAN BAEL SHERBET.—Can any reader inform me through the medium of the Journal how Indian Bael Sherbet is made? It is, I am informed, a common drink in India. S. W.

[515.] CISTERNS FOR STORING TURPENTINE.—About 25 to 30 years ago, I had a cistern made for turpentine of good sheet tin, of the circumference of 9 feet, and 5 feet 3 inches high which holds about 190 gallons; it has hoops made of tin to cover the joints at the distance of every sheet; in the inside about the middle two pieces of iron about half inch thick cross each other, the ends bent down and soldered to the sides of the cistern; near to the bottom it has a tap of half an inch bore with a key to fit. Resin was used in the soldering of it, but muriatic acid would have been better; within the bottom hoop it is fitted with a circular piece of wood to support it on the cautery, and at the top a bung hole an inch and a half diameter for inserting the funnel. It has been painted about four times; the tap has lasted the whole time, it has only been emptied once, and that was when turpentine was dear in the American war; when a cask or two is put into it, the spirit is turbid for a day or two, and after that it is as bright as distilled water. I should recommend galvanized iron hoops now, but whither a galvanized cistern would be preferable I do not know, as I once had some in one and it became very red with rust, but it might have been rusty as it was not new. T. COLTON.

[519.] GODFREY'S ESSENCE FOR SMELLING SALTS.—In answer to Beta, I have used the following formula for years with general satisfaction:—W. SCOTT, Hamilton, July 31, 1876.

℞	Ol. Lavand. Ang.	
	Tinct. Moschi	āā ʒij.
	Ess. Bergamot. super. . . .	ʒj.
	Ol. Caryoph.	ʒss.
	Otto Di Rosa (Virgin) . . .	gtt. v.
	Ol. Cinnamomi	gtt. iij.
	Liq. Ammon. Fortissim. . .	℥x.
	Ess. Cocci	q.s.

I use Tinct. Moschi according to Beasley (ʒij to ℥xiii.)

[521.] GLYCERINÆ PHOSPHAS.—I observe in the Journal an inquiry for the form for Glycerinæ Phosphas. By this I presume is meant Glycerinum Phosphori, which is, I believe, prepared as follows:—

℞	Phosphori	gr. $\frac{1}{30}$th
	Glycerin	ʒj

Solve, more dictu pro Ol. Phosp. B. P.

L. P.

BOOKS, PAMPHLETS, ETC., RECEIVED.

ΕΛΛΗΝΙΚΗ ΦΑΡΜΑΚΟΠΟΙΙΑ *κατα Βασιλικην Διαταγην και κατ' εγκρισιν του Β. Ιατρικου Συμβουλιου εκδοθεισα. Συνταχθεισα δε παρα Ιοαννου Βουρου, Ξανεριου Λανδερερου και Ιωσηφ Σαρτοριου. Εκδοσις β'.* Athens: K. Antonias. 1868. From Professor Landerer.

WINE AND ITS COUNTERFEITS. By JAMES L. DENMAN. London: 1876. From the Author.

INTRODUCTION TO THE STUDY OF CHEMICAL PHILOSOPHY. By WILLIAM A. TILDEN, D.Sc. Lond., F.C.S. London: Longmans. 1876. From the Publishers.

GUIDE PRATIQUE POUR SERVIR À L'EXAMEN DES CARACTÈRES PHYSIQUES, ORGANOLEPTIQUES, ET CHIMIQUES qui doivent presenter les Préparations pharmaceutiques officinales inscrites au Codex, ainsi qu'à l'Essai des Médicaments chimiques. Par P.-H. LEPAGE et CH. PATROUILLARD. Paris: P. Asselin. 1876. From the Authors.

SUR LA RECHERCHE DES SUBSTANCES AMÈRES DANS LA BIÈRE. Par le docteur DRAGENDORFF. Traduit de l'Allemand par le docteur JUL. MOREL. Ghent: E. Todt. 1876. From the Translator.

ÉTUDE SUR LES PRINCIPAUX PRODUITS RÉSINEUX DE LA FAMILLE DES CONIFÈRES. Par A. HERLANT. Brussells: H. Manceux. 1876.

QUINOLOGY OF THE EAST INDIAN PLANTATIONS. By JOHN ELIOT HOWARD, F.R.S., etc. Part II. and III. London: L. Reeve and Co. 1876. From the Author.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE COUNCIL AND THE BIRMINGHAM TRADE CONFERENCE.

Sir.—Permit me to express, with others, my surprise at the position taken up by a number of the leading members of Council on the action taken by the Conference held at Birmingham last month. It may be quite true that the trade generally does not know all with regard to the question of co-operative stores for instance, and that the Parliamentary Committee of the Council does, but why should the members of Council leave the trade in ignorance of what they know? From the remarks made by Mr. Atkins, who has only recently got behind the scenes, it would appear that the Council has not been idle, and that there are some difficulties in the way. But what is being done to remove those difficulties? This is just what prompted the Birmingham resolution, and what the whole trade have been for years loudly calling for, that some show of energetic action should be exhibited. With regard to the President's remark respecting the eloquence displayed at Birmingham, when there has always been such a lack of it of late years at the May Meetings at Bloomsbury Square, I think, Mr. Editor, you will support me when I say that most of the gentlemen whose names were associated with the Birmingham meeting have from time to time been quite as eloquent through the correspondence columns of your Journal, as well as in private letters to the Secretary; but what has resulted from them? Next to nothing, so far as outward appearance goes. I just fear that London influence is beginning to predominate too much again at the Council board. There has been not a little whispering about their conduct in placing a London man on recently when a country man retired, a step which was all the more unjustifiable when it is remembered that another gentlemen representing the country had been returned two years in succession at the top of the rejected list at the general election. I do hope that our London friends will remember that they are sent to the Council to legislate for the entire trade, otherwise some of us will have to transfer our subscriptions to another body that will do our work.

M.P.S.

CO-OPERATIVE STORES.

Sir,—I think but few of our brethren will deny that the thanks of the trade are due to Mr. Hampson for the able manner in which he treated the subject of co-operative stores at the Birmingham Conference.

Again, I believe there are but few who will question the wisdom of the resolution with which the discussion on that paper concluded. Would that I could add that the same feeling of satisfaction will follow the discussion which took place on the receipt of that resolution by the Council!

In the first place it struck me as somewhat remarkable that the apparently chief exponent of the feelings of the Council should happen to be one of the latest elected members of that board, who could only assert that he had "that morning learnt (presumably for the first time) that some of the more important questions did receive the most careful attention they could bestow," and yet subsequently the same gentleman, in a second speech, as with authority, kindly and most patronizingly assures the "struggling members of a trade rather than a profession, that the Council would entertain every fair and just representation which came before them." How it happened to be delegated to this gentleman, then, to speak in the name of the Council seems peculiarly strange.

The President, in his concluding remarks, expresses regret that "those gentlemen who were so eloquent at Birmingham did not come to the annual meeting of the Society and give them the benefit of their suggestions." I would remind the President that this question has repeatedly been ventilated—sometimes somewhat warmly—at the annual meetings, when the difficulty has not been in "keeping up a discussion for half an hour," but in restraining it within the bounds of a morning sitting; and yet what fruit has been borne? Where have been the direct efforts to remove the difficulty? Hence, I apprehend, comes the necessity (as has been the case before) of bringing outside influence to bear on the Council in order to awaken that body to action.

I know full well the solemn air of mysterious awe which shadows the countenance of some of our representatives at the bare mention of legal proceedings and the oft repeated tale that "the Council had been advised that such a step could not but be abortive as regards the object in view, and would but tend to advertise our opponents." It is time such fallacies were thrown to the winds; if the widow in her solitary loneliness and possible penury can be, and is, proceeded against by the Society, and debarred from a paltry pittance from a business carried on by a qualified assistant, on what principle of justice can the affluent and the titled be allowed with impunity to trade and to make large profits under the shelter of a co-operative company, to the untold injury of those who have spent time and money in acquiring that educational qualification which the law of the land demands?

The question having once more been brought to the front, and finding an exponent proof against the mesmeric influences of the Council chamber, it is to be hoped it will not be allowed again to slumber until it has been thoroughly sifted and tried in the courts of law. I cannot but regard it as the absolute duty of the Council to face the difficulty, and either to prove that the Pharmacy Act is, as it was intended and expected to be, a real protection to the public and a guarantee of some equitable return to those who enrol themselves under its power, or failing such evidence, one of two things remains, either to repeal or repair the Act.

EDWIN B. VIZER.

Belgrave House, Cliftonville,
Brighton, August 15, 1876.

[*** "*Fair Play*" writes to express his disapprobation of the "clipping trade" carried on by a Co-operative Drug Company in Brighton under the management of a registered chemist and druggist, and he instances several articles which are offered for sale at this establishment much below the ordinary prices. He also quotes from a circular the statement that prescriptions are "dispensed at considerably reduced prices." We agree with our correspondent in thinking that such a practice is neither wise nor commendable, but we fail to perceive any influence sufficient to deter persons from such a course unless it be the ruinous effect it eventually has upon themselves.—ED. PHARM. JOURN.]

A. Z.—Communicate with the Secretary, at 17, Bloomsbury Square.

H. and A.—Dissolve the borax in the glycerine; add gradually the oil and carbolic acid, and stir well; lastly, add the elder flower water and shake well until an uniform emulsion is formed.

"*Sixty-six.*"—We think aqua limonis might be extemporized by shaking oleum limonis with distilled water and filtering. For an answer to your second question, see "Notes and Queries," p. 167.

"*Lover of Stains.*"—*Mahogany Stain.*—Logwood, 2 oz.; madder, 8 oz.; fustic, 1 oz.; water, 1 gal.; boil two hours and apply it several times to the wood boiling hot; allow the wood to dry and brush it over with a solution of pearlash, 1 oz. in one quart of water; dry and polish. (Cooley.)

"*Catechu.*"—*Depilatories.*—A strong solution of sulphuret of barium with sufficient starch to make a paste has been recommended as a depilatory. Also one part of finely powdered crystallized sulphydrate of sodium and three parts of prepared chalk made into a paste with water. Neither of these should be allowed to remain in contact with the skin more than two or three minutes.

"*Bicycle.*"—See the recipe on p. 1018 of the *Pharm. Journ.* for June 17 last.

H. W. Langbeck.—We cannot say. It would depend probably upon conditions referred to in the Worcestershire Sauce case, reported before, p. 106.

"*Omega.*"—Applications for the appointment of Dispenser in a Naval Hospital have to be made in writing to the Director-General of the Medical Department of the Navy at the Admiralty.

COMMUNICATIONS, LETTERS, etc., have been received from Professor Dymock (Dymock), Mr. Dadford, Professor Attfield, "Devonian," H. A.,

ARROWROOT.

BY THOMAS GREENISH, F.C.S.

The origin of the term arrowroot is involved in some obscurity, and its application to the starch derived from the Maranta to the exclusion of that from every other source may, I think, be called in question. The authors of the 'Pharmacographia' dispute the opinion of Martius,* "that the name is derived from that of the Aruac or Aroaquis Indians of South America, who call the finest sort of fecula they obtain from the Mandioc Aru-Aru." Other writers consider that there is great probability in the explanation afforded by Martius, the word "aru," signifying meal or flour, and they are of opinion that "ara-ruta," which means mealy root, is the word from which arrowroot is derived.

An opportunity was afforded me of making some inquiries of old Brazilian residents with reference to this subject, and I learnt that the word "ara-ruta" is one well known in Brazil, that it originated with the native Indians, and that it certainly is not derived from our "arrowroot." That "ara-ruta" is a native Indian word is, I think, beyond dispute, and as it was the practice of the native Indians to eat the simple root without any further preparation than roasting it in hot ashes, it therefore appears natural that a native Indian would apply just such a word to a root that he found yielding so large a proportion of a farinaceous substance as the maranta or the cassava.

It is generally admitted that the manihot, which yields the starch known as cassava starch, is a native of Brazil; if therefore the maranta be an introduced plant, which agrees with common report, the probability is that the term "ara-ruta" originally applied to one or more varieties of the manihot, and if so, cassava starch has certainly equal claims with the maranta to the more popular and commercial name "arrowroot." The *Manihot utilissima*, Pohl., yields the cassava starch of commerce; it is also that used in the manufacture of tapioca. Another variety of manihot yields a starch having a little colour: this is kept for home consumption. I think it probable that at different periods, when a starch has been found capable of preparation so as to become an acceptable article of diet the term "arrowroot" has been applied to it, and thus we have other starches which have long been designated by the name of arrowroot.

Brazilian arrowroot (Manihot).
Tahiti arrowroot (Tacca).
Portland arrowroot (Arum).
East India arrowroot (Curcuma).

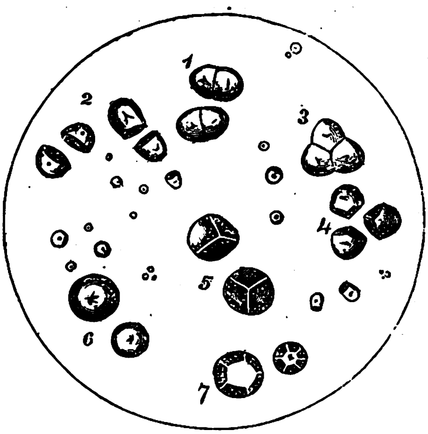
Some of these are rarely, if ever, found in commerce, although extensively used in the countries where they are produced.

The cassava is cultivated chiefly in Brazil for food purposes and home consumption, and, excepting as tapioca, there is little of the starch imported into this country. "The returns do not specify the quantity of starch apart from its product tapioca, but the value of farinaceous substances imported from Brazil, nearly all of which was tapioca, was in 1871, £14,092. Twenty years since 11,000 cwt. of tapioca used to be imported annually, now we only receive half that quantity."* Much of the cassava starch that is imported is used as a stiffening material in the Manchester district.

The tapioca is prepared from the starch of the bitter cassava by heating it whilst moist on metal plates; the starch grains for the most part burst and the product agglomerates into semi-opaque gum-like masses, with here and there grains but little altered.

The cassava starch has been found on several occasions mixed with that of maranta, and sold as arrowroot. One case occurred in the Borough, and Dr. Muter certified to its presence as an adulterant. Mr. Jones, of Birmingham,† has detected it in a maranta "as imported." It is beyond question that for some time marantas have been imported into this country adulterated with cassava. I have several times detected it as an adulterant of pepper, and have also found it mixed with a maranta, but I had no means of ascertaining whether this arrowroot was "as imported" or had been tampered with in this country.

The starch of the manihot, commonly called cassava starch, is one with which every pharmacist who has a microscope, and no pharmacy is complete without one, should be familiar. The accompanying woodcut shows the usual forms of this starch.



They are for the most part muller-shaped, with a fair sprinkling of the circular; some of the muller-shaped have truncate, others dihedral bases. If the starch be examined *in situ*, as in the meal of the cassava, there will be found a good many doublets and triplets, as shown in the drawing, but these combinations are rarely present in a commercial sample of the prepared starch. The separation of the grains composing the doublet gives the muller-shaped truncated granules and that of the triplet the muller-shaped with dihedral bases. The diameter of the granules ranges from 0·008 to 0·022 mm.

A very interesting and instructive experiment, with the view of determining the true forms of these grains to which the names muller-shaped and circular are given, may be witnessed with advantage. After having examined under the microscope a little of the starch, using as a medium some such a fluid as I mentioned in the Journal,‡ the single forms here

* 'Flor. Brasil.' iv., p. 416.

* Simmonds.
† *Pharm. Journ.* [3], vol. vii., p. 23.
‡ *Pharm Journ.* [3], vol. v., p. 923.

given will for the most part be seen in the field of the microscope. If now a drop of alcohol be placed on the edge of the covering glass, capillary attraction will cause it to run in rapidly, and in its course the grains will be rolled over several times. It will be observed that a granule which appears muller-shaped when seen from the side, with the nucleus indicated by a spot or a fissure a little out of the centre, or eccentric, when rolled over so as to be seen with its crown towards the observer, appears circular; also that one of the triplet grains with a dihedral base when seen with its base uppermost will give, with other grains having polyhedral bases, those angular forms of which the drawing indicates one or more examples. Careful illumination will occasionally show one or two zones indicating the lamination of the grain. If when the grains have ceased to revolve, another drop of spirit be applied to the opposite side of the covering glass the movement will be repeated.

I should be glad to see in published documents connected with adulteration or otherwise the word "arrowroot" less vaguely used, and instead of it the term "starch" employed in a generic sense to designate the organized structure observed, and its source added to distinguish the particular kind; thus, the starch of a maranta or the starch of a manihot; the starch of wheat or that of potato. I think that the time has arrived when we may expect from scientific men who hold public and responsible positions a little more exactness as regards the adulterant. Nothing can be more vague than a statement now before me, and which may be taken as typical. A tradesman is summoned for selling adulturated arrowroot; the public analyst's certificate states that "the arrowroot was adulterated with *tapioca* and *starch*." A sample of this "adulterated arrowroot" was sent to me for examination. It was the starch of a maranta, with a mixture of that of cassava. Tapioca is a granulated article, and not likely to be used as an adulterant, and arrowroot is itself a starch.

The starch of the tacca, called Tahiti arrowroot, is one resembling that of the cassava, but it is rarely found in commerce; the muller-shaped granules are, however, larger, and there are not proportionately so many circular ones. The diameter ranges from 0·026 to 0·045 mm.

The only other starch of this form is that of the *Castanospermum Australe*, or Moreton Bay chestnut. It was shown at the Paris exhibition, but from that time to the present it has not appeared as a commercial article, so that it is not likely by its presence to complicate matters, or embarrass the observer.

I believe that all the cassava of commerce is the produce of *Manihot utilissima*, Pohl.

NOTES ON INDIAN DRUGS.

BY W. DYMOCK.

(*Continued from p.* 110.)

FERULA Sp? *The Seed.—Local Name*, DOOKOO.

Is said to be imported from Persia and Affghanistan. The carpels are broadly elliptical, and vary much in size, the largest are five-eighths of an inch long and three-eighths broad; foliaceous, convex in the middle, with a dilated border consisting of coarse cellular tissue; colour reddish brown over the seed, margin yellowish; dorsal ridges seven, the three central filiform; vittæ in dorsal furrows ten to thirteen; vittæ of commissure six. The vittæ contain a quantity of yellow oily fluid having a powerful lemon odour.

By distillation a light yellow essential oil was obtained with an odour like oil of orange leaf. This seed is used as a carminative and stimulant; it is also said to be diuretic.

LOBELIA NICOTIANÆFOLIA.

This gigantic lobelia is common on the Ghauts. The lower part of the stem is woody, an inch and a half or more in diameter, and almost solid; the upper portion is a hollow tube ending in a crowded head of flower spikes; the latter are about a foot in length, and when the plant is in fruit, are thickly set with globular capsules about the size of a pea, to which a portion of the dry flower is often adherent; the capsules are two celled, each cell containing a fleshy placenta. The seeds are numerous and very small ($\frac{1}{50}$th of an inch in length), oval, flattened and marked with delicate lines. Several small tubercles surround the site of the placental attachment; the colour is light brown. The leaves resemble those of tobacco, they are finely serrated, and covered with simple hairs. The whole plant when mature is studded with small spots of resinous exudation, and is hot and acrid when chewed. Six ounces of the dry spikes from which the seeds had fallen yielded half an ounce of dark brown resin when treated with rectified spirit. The native name, Bokenul, or tubular poison plant, would lead one to infer that the plant is poisonous, but I am not aware that this has ever been proved. It is said to be antispasmodic in the Pharmacopœia of India. Its acridity being due to the resin it contains, a tincture would be an efficient preparation.

PAVETTA INDICA. *The Root.—Local name*, PAPTEE CHE MUL.

This small shrub is very common, the root is much crooked, and from one inch to quarter of an inch in diameter. Its bark is grey with a light brown papery epidermis, and seems to be the most active part. It has a slightly bitter and subacrid taste. A section placed under the microscope showed large laticiferous vessels containing a greenish latex, and a cellular structure containing many small starch granules. Paptee is bitter and aperient; no exact observation of its action appears to have been made.

TRICHOSANTHES PALMATA.—*Local name*, KOUNDAL.

The fruit is round, oval, or pyriform, the size of a small apple, of a dirty yellow colour, marked at one end by a deep cicatrix with sharped raised edges, at the other there is a prominence to which a portion of the stalk sometimes remains attached. In the dry fruit, which has a thin brittle, very bitter shell, the segments of pulp with their seeds are loose, so that when sound the contents of the gourd rattle. If a dry segment be soaked in water it soon softens, yielding a dark green pulp which smells like savin and has an acrid and bitter taste. The seeds are flat, but very irregular in shape, generally somewhat triangular, and average seven-sixteenths of an inch in length, they have a hard blackish shell and sweet oily kernel. The vine is perennial, often as large as the middle finger, it has a warty grey bark marked by seven deep longitudinal fissures which correspond to the medullary divisions between seven wedge shaped vascular bundles into which the stem is divided. The vine is not bitter. With regard to the medicinal properties of this plant nothing definite appears to be known, the natives sometimes smoke it as a remedy for asthma.

AGATI GRANDIFLORA.—*Local name,* AGASTA.

The tree though not a native is now very common in this part of India. The bark is much fissured longitudinally, of a greyish brown externally, the dry portion nearly equal to the living in thickness; in the fissures may be seen numerous small tears of gum of a garnet colour when fresh, but soon becoming almost black. The suberous layer of the living bark is of a reddish colour, from a deposit of the same kind of gum in its cells. In the vascular zones of the bark are large laticiferous vessels which are filled with the gum in a fluid state and of a paler colour. The dry suber already mentioned is loaded with small deposits of gum. This is partially soluble in spirit, and also in water, leaving a gelatinous residue of small bulk. The bark and gum are intensely astringent; the former is not bitter. The leaves have an astringent taste. Neither bark, gum, or leaves, appear to be made use of in Bombay, but the juice of the flowers is a popular remedy in nasal catarrh; it is blown up the nostrils, and causes a very copious discharge of fluid.

POLANISIA ICOSANDRA.—*The Herb.—Local name* KANPHOOTEE.

An annual weed from one to two feet high, leaves 3—5 foliolate, leaflets obovate, flowers yellow. The whole plant is pubescent and extremely viscid, the hairs are surmounted by a round gland from which a reddish viscid secretion exudes. The plant has a powerful odour like a mixture of black currants and oil of mustard. The juice is used in purulent discharges from the ear.

CALOSANTHES INDICA.—*Local name,* TETOO or PHULPHURA.

A small tree remarkable for its terminal spikes of fleshy, lurid flowers, which appear at the commencement of the rainy season. The bark is light brown, marked with the large rough scars of the fallen petioles and also thickly studded with wart-like protuberances about the size of a pin's head; internal surface yellow. The minute structure of the bark does not call for remark, but upon placing a section under the microscope in a little water the whole field is seen to be filled with delicate needle-shaped crystals which have escaped from the cut cells of the parenchyma; in entire cells the crystals can be seen *in situ.* This bark is a favourite remedy in dysentery; it is faintly bitter and a little acrid to the taste, with no particular odour. I am not aware of any analysis having been made, or of its having been tried in European practice.

SIZYGIUM JAMBOLANUM.—*Local name* JAMBOOL, *The Bark and Fruit.*

The bark is grey and fissured externally, internally it is red and fibrous; its minute structure is remarkable in having several rows of very large, pitted, oblong-oval cells, which can be seen with the naked eye. The smell is something like that of oak bark, and the taste very astringent. The fruit is purple, the size and shape of an olive; the fleshy portion, which is very astringent, encloses a thin white papery shell containing a green coloured nut. The bark and fruit are excellent astringents. As the tree is very common they can almost always be obtained.

ARGEMONE MEXICANA.—*Local names,* DARURI, PEELA DHOTRA.

The plant is sufficiently well known; it is found abundantly on waste ground in Bombay. I can speak favourably of the oil of the seeds as a gentle aperient, free from taste, in doses of from 30 to 60 minims. In India it is necessary to express your own oil, otherwise it is sure to be adulterated: this has probably been the cause of the unfavourable reports of some medical men. The whole plant in flower was analysed by the late Dr. R. Haines of Bombay, who failed to find any trace of an alkaloid in it. At the same time an extract was made and administered in gradually increasing doses to a number of European patients in the general hospital; it was found to be aperient only.

NOTONIA GRANDIFLORA.—*Local name,* WANDER ROTEE.

Numerous experiments with this plant were made by the late Dr. R. Haines and myself upon animals and human beings, the result was that in large quantity it proved slightly aperient.

PSIDIUM POMIFERUM.—*The Bark.—Local name,* PEROO.

The external surface of this bark when fresh is brown and smooth, marked by superficial scars indicating the separating of squamous plates of dead bark. These plates sometimes remain partially attached. Beneath the brown epidermis the bark is green; its inner surface is marked by longitudinal striæ and is of a light brown colour. Sections show that it consists of an epidermis made up of two rows of brick-shaped brown cells, and alternate rows of vessels and parenchymatous cells, varied towards the inner part by three broken circles of liber cells. The medullary rays are numerous and together with the parenchyma of the outer part of the bark loaded with green colouring matter; in the rays this extends some distance into its substance, and makes them very conspicuous. The vascular system is loaded with crystalline deposit. Guava bark is astringent and agreeably acid; its astringent properties are noticed in the Pharmacopœia of India. The acidity is most likely due to the crystalline deposit, which is probably an acid salt of lime or potash.

MICHELIA CHAMPACA.—*Local name,* CHAMPA.

The fresh bark is externally covered with a light brown epidermis, which is easily removed; beneath this it is of a reddish brown colour mottled with longitudinal green stripes (not visible in the dry bark), and pale yellowish scars of very irregular form; the inner surface is yellowish and fibrous. The bark is feebly bitter and has a slight aroma. Its minute structure is chiefly remarkable for numerous bundles of liber cells and for aggregations of large stony cells of a bright yellow colour. The cells of the parenchyma contain much starch. Champa bark is mentioned as a febrifuge in the Indian Pharmacopœia, but I have not heard of its being tried in this neighbourhood. From its very feeble bitterness I should not think it likely to be of much use.

AMORPHOPHALLUS SYLVATICUS.—*Local name,* JANGLI SOORUN.

The tuberous root, Madan Must or Kummer Kas, is found in most of the shops peeled and cut into segments, which are strung upon a string; the segments are about the size of those of an orange, of a reddish brown colour, shrunken and wrinkled, brittle and hard in dry weather; the cut surface is mammillated. When soaked in water they swell up and become very soft and friable, developing a sickly smell like that of the spadix of the plant when in flower. A microscopic examination shows that the root is almost entirely composed of starch. Madan Must has a mucilaginous taste, and is faintly bitter and acrid; it is supposed to have restorative powers, and is in much request. It is probable that the roots of the wild *Amorphophallus campanulatus* form a part of the commercial article. The cultivated variety of the latter plant is largely used as a vegetable; under cultivation it loses its acridity, and grows to an enormous size.

ACACIA ARABICA.—*Local name,* BABUL.

The gum of this tree is yielded in great abundance in March and April. Much of it is of a bright red colour, and translucent; sometimes it is almost colourless; very large masses are met with. As a gum it is of little value, as it forms a very weak mucilage; the colour is also objectionable. It is entirely soluble in cold water, and tastes like gum arabic.

CONOCARPUS LATIFOLIUS.—*Local name,* DAVRA, *or* DAWARA.

The gum is in vermicular pieces, very slightly coloured, translucent; it tastes like gum arabic, is readily soluble in cold water, and forms a good, almost colourless mucilage, with a faint peculiar odour. The tree is common in the Concan and Khandesh.

(*To be continued.*)

THE PRESENCE OF AN ALKALOID IN PYRETHRUM CARNEUM.*

BY JOUSSEL DE BELLESME.

It is known that the powder of pyrethrum constitutes the basis of nearly all the insecticides at present in use. It has been thought, probably wrongly, that the pyrethrum acts only mechanically upon insects, by obstructing their spiracles. The author has brought under the notice of the Société de Biologie a number of cockroaches that had been kept ten hours in various inert powders—such as powdered dry leaves, wood, etc.—and showed that these insects did not present any morbid phenomenon. For comparison he exhibited others which having been kept one hour in pyrethrum powder, were already nearly dead, and showed convulsive movements very clearly. But if the powder is previously treated with alcohol it loses its insecticidal properties, whilst the alcohol becomes toxic. The author also combats the opinion which attributes the poisonous properties to the volatile oil it contains, he having isolated the oil and found it to be innocuous to insects. Having submitted pyrethrum powder to the treatment suitable for isolating alkaloids, the author succeeded in extracting a crystalline principle possessing in a high degree the toxic properties of the plant. This he considers to be an alkaloid, the composition and chemical properties of which remain yet to be investigated.

* *Journal de Pharmacie et de Chimie* for August, from he *Journ. Chem. Med.*

THE ESTIMATION OF ASTRINGENT MATTERS.*

BY F. JEAN.

The author has found that solutions of astringent principles, when added to an alkaline carbonate, absorb solution of iodine with an energy comparable to that of arsenite of soda. Numerous experiments have shown that this absorption takes place exactly in direct proportion to the quantity of astringent matter used, and that one part by weight of dry tannic acid absorbs four parts of iodine, forming a compound that has not yet been studied. Upon this reaction he bases a method of estimating astringent matter.

The solution of iodine used is made by dissolving four grams of iodine in iodide of potassium and adding sufficient distilled water to make the volume 1000 c.c. To standardize the iodine solution 10 c.c. of a solution of tannin (0·1 per 100) should be placed in a test tube; 2 c.c. of a solution containing 25 per cent. of crystallized sodium carbonate is added; then from a graduated burette the iodine solution is let fall drop by drop, until it gives a spot upon starched paper. With a solution containing four grams of iodine per litre the correction is usually 0·1 c.c. for a volume of 10 to 12 c.c.; but the greater or less purity of the sodium carbonate may cause this correction to vary slightly. For 0·01 gram of tannin dissolved in 10 c.c. of water it is usually necessary to employ 10·5 c.c. of solution of iodine containing 4 per 1000.

Under the influence of iodine the solutions of tannin, even when very dilute, take a rather intense orange red colour, so that it is impossible to seize sharply the coloration of the iodide of starch, when starch paste is added to the tannin solution. The author, therefore, uses for the purpose a sheet of white filter paper, over which is dusted a slight layer of starch. When half a drop of liquor containing free iodine is touched on such a paper it is immediately absorbed and the characteristic violet colour becomes perceptible even when the liquor is strongly coloured.

When the strength of the iodine solution in relation to a known weight of tannic acid has been established the test liquor can be employed in the titration of other astringent principles, by taking tannic acid as the type of the active principle of astringent matters, as is done by other authors. M. Jean has made experiments to test its value in the estimation of barks employed in tanneries and is quite satisfied with the results. Special experiments made to ascertain whether the astringent matters accompanying tannin in a decoction of oak bark had any action on the solution of iodine, showed that it could be safely used for such purpose, and that crystallized gallic acid acted upon the iodine solution exactly in the same proportion as tannic acid.

VIEWS OF THE NATURE OF HEAT.†

BY F. MOHR.

The phenomena of heat have been till now almost exclusively explained in text-books by the assumption of a heat-substance. The discoveries of Melloni have made this view inapplicable to the phenomena of radiant heat; they require the assumption of vibrations similar to those of the undulatory theory of light. The propagation, transmission, and polarization of radiant heat have

* *Comptes Rendus.*, vol. lxxxii., p. 982.

† Translated from Liebig's *Annalen,* vol. xxiv., 1837. Reprinted from the *Philosophical Magazine,* August, 1876.

been completely explained by these assumptions; and, with such facts to guide us, it is certainly no mere idle speculation to attempt to extend this view to the phenomena of common or stationary heat; rather it is in the highest degree seasonable to point out how this view, which depends upon the well-settled facts of Melloni, explains with overwhelming clearness most of the phenomena of stationary or conducted heat; and it is to be expected that, with this reform in our ideas, there will be a corresponding reform in our terminology.

Heat is thus no longer a particular kind of matter, but an oscillatory motion of the smallest parts of bodies. Radiant heat is propagated in straight lines; and the molecules vibrate in all directions in a plane perpendicular to the direction of the ray. A polarized ray vibrates in one direction only in this plane; on the contrary [the particles of] an ordinary hot body vibrate in all possible directions of space, and therefore propagate their heat uniformly in all directions. The propagation of heat by contact is thus a communication of motion by impact; and cooling is a relative coming to rest. The number of heat-vibrations per hour must, as in the case of light, be very large, since all bodies become luminous at a certain temperature; but even at this temperature waves of light and of heat are not identical; their difference has been hitherto just as little cleared up as that between rays of heat from different sources.

The difficult idea of imponderability is at once got rid of, since a body when vibrating cannot be either heavier or lighter than when at rest. The so-called absolute zero [of temperature] is therefore absolute rest—no doubt altogether unknown to us in reality, but presenting no difficulty to the mind.

Heat appears as force (*Kraft*). It overcomes the cohesion of bodies, which is a force; *but that which overcomes a force must be itself a force.* And the expansion of bodies by heat is a force-phenomenon of the highest kind; but that which produces motion or manifestation of force must be a force.

The expansion of bodies by heat is thus an extended amplitude of vibration. The bodies themselves do not expand, but only the space they occupy is increased by their larger vibrations. The compression of bodies is due to a change of the amplitude of vibrations by external power. At the absolute zero all bodies must be absolutely incompressible. One can measure the expanding force in certain bodies in terms of weight. Water expands by heating 0·00466 of its volume for 1° C. Experiment shows that water loses about $\frac{48}{1000000}$ of its volume under one atmosphere of pressure. To expand water thus much by heating there would be necessary $\frac{0\cdot000048^\circ}{0\cdot004660} = \frac{1^\circ}{97}$ C. The two forces would then be in equilibrium. Heating by $\frac{1^\circ}{97}$ C. produces in water a force of pressure of one tmosphere. 1° C. is thus to be considered = 97 atmospheres, and 10° C. = 970 atmospheres.

When a body passes from the solid to the liquid state, heat becomes latent. But one cannot understand how heat can be present in a body without becoming evident to our senses. The usual explanation is that the body is melted; but this is no explanation, merely the repetition of the fact to be explained. The easier explanation, from our point of view, is as follows: when heat-force is expended in overcoming another force, cohesion, it must itself cease to be perceptible as force; thus every case in which heat becomes latent is connected with production of motion or with alteration of state of aggregation—that is, with annihilation of material forces. Since matter cannot overcome any force, this explanation was not at command of the old view. A melted body cannot solidify without giving up to another body the force which destroys its cohesion:—*Evolution of heat in the solidification of melted bodies.*

In the production of gas the same thing takes place. In order to overcome the cohesion of water, some heat must be destroyed and become imperceptible. In the coming back to the liquid state this heat must be again disposable and able to put into vibration, *i. e.*, to warm, the thermometer or the hand. A gas vibrates so that its particles always tend to drive one another further off. The mere presence of a gas therefore acts like a material force. In a *solid body* the particles are by the vibration *not* driven out of the sphere of attraction, *in a liquid body partly, and in a gas entirely.* When one compresses a gaseous body so as to make its particles move within this sphere of attraction, they attract one another and become liquid:—*Liquefaction of gases by pressure.*

There is an essential difference between gases on the one hand, and the two other states of matter on the other.

In solids and liquids each temperature corresponds to a determinate expansion, or each number of vibrations to a definite magnitude of their amplitude; on the contrary in gases the endeavour is at all temperatures to indefinitely increase these amplitudes. This endeavour shows itself as tension (*Spannung*), and appears in gases only. The temperature is the number of vibrations which a body makes in a given time; this number increases with elevation of temperature. All heat which is not employed for this purpose disappears to our senses, and thus we have the simple distinction between sensible and latent heat: *Sensible heat increases the number of vibrations; latent heat increases their amplitude, or overcomes material forces,* i.e., *destroys states of aggregation.*

When a mass of gas is suddenly compressed, the excursions of the separate particles are diminished; and thus some of that force becomes disposable which before determined extent of vibration, and was therefore not perceptible by our senses. This force can now be employed only to increase the number of vibrations, since their extent is limited; that is, the gas becomes warmer. *Apparatus for inflaming tinder by compression of air.* (*Compressionsfeuerzeug.*)

When a gas is suddenly expanded, the separate particles are compelled to make larger vibrations, for which greater force is required. This can only be taken from the force which determines the number of vibrations (temperature), or from surrounding bodies, *i.e.*, the gas becomes cooled; which experiment verifies. Both phenomena are entirely unexplained by the old view.

Wide vibrations have greater force than narrow; but at high temperatures the vibrations always increase in extent. This increase corresponds, for equal increments of heat, to a definite fraction of the immediately preceding volume, and not of that at 0° C., which temperature has no definite relation to gases. Now, since this fraction must itself become absolutely larger with the already too much increased motion, a greater force must be required to heat a body from 90° to 100° C. than from 0° to 10°. This is the already generally *observed increase of capacity for heat at high temperatures.* All bodies which expand according to this law must show increasing capacity for heat. In the neighbourhood of the melting-point bodies expand rapidly and irregularly; thus much heat becomes latent—most of it, however, during the melting itself. In most cases, in melting, heat is rendered latent in two ways:—by expansion and by melting respectively; in the case of water, which contracts in melting, some heat is by this means given out; or, more correctly, the quantity of that rendered latent is diminished.

If any species of gas is heated more strongly, it strives not only to increase the number of its vibrations, but also to enlarge their amplitudes. If one prevents this expansion, it appears as increased tension. One would require therefore a smaller quantity of heat to warm a gas shut in by firm walls than a gas contained in yielding walls, since, if heat be the cause of the expansion, just as much heat must become latent as there would be cold developed if the gas were allowed to expand as much as before but without the supply of heat. An imprisoned gas, therefore, cannot show the phenomenon of increased capacity for heat. Were we able so to compress solids and liquids that they could not expand by heat, even these would show no increase of capacity for heat; and one could thus save an amount of heat which would, according to the previous calculation, be equal to the compressing force. On this account also the notion of changing, by pressure, liquids into solids is by no means impossible, although we do not as yet know what force would be necessary. The compression of water in a piezometer is in approximation to this.

The increased power of absorption of rough bodies for radiant heat is to be explained by the easily produced vibration of projecting points; while on polished closed planes the very cohesion is opposed to the assumption of vibrations. It would take us too far were we to attempt to reduce all heat-phenomena to this view. Those we have given suffice to show how they are all much more easily and intelligibly deduced from the assumption of vibrations than from that of heat-substance,—and that it is now time to give up, in science and in text-books, the indefinite nomenclature of the earlier view.

SIUM LATIFOLIUM, GRAY.*

BY ANDREW R. PORTER, PH.G.

Sium latifolium, an umbelliferous plant, growing in California and along the Pacific coast, in damp and marshy places, commonly known as wild parsnip, was brought to the notice of the people there about three years ago, by a man being poisoned by eating some of the root.

Sium latifolium has a short, upright root stock, varying in size from one-half to two inches or more in length, and about the same in diameter, so it becomes almost spherical in outline; bases of leaves are still attached to the crown. It presents a very rough, wrinkled appearance, and is of a grey or yellowish-brown colour. It branches at once into a number of large roots, from four to twelve, and even more. These are of the same colour, from $\frac{1}{8}$ to $\frac{1}{4}$ or $\frac{3}{8}$ inch in thickness, and 2 to 6 inches long, very much wrinkled longitudinally, somewhat flattened and contorted, and nearly uniform in thickness. On soaking in water, they become about twice as large. The dried root breaks with a very short fracture, is white inside, with a yellowish, spongy meditullium and numerous resin cells, which are plainly visible with the naked eye, scattered irregularly throughout the bark. The root has rather an agreeable aromatic odour, and a sweetish, aromatic and somewhat pungent taste.

In attempting to separate the proximate principles of the root, an alcoholic tincture was made, concentrated and precipitated by water. In the clear aqueous solution, Trommer's test indicated the presence of much *sugar*, besides some colouring matter. The precipitated oleoresin was distilled with water, the distillate containing some *volatile oil*, which was colourless, and had the aromatic odour and warm, pungent taste of the root. The soft residue was separated by hot petroleum benzin into a *fixed oil* and *resin*. The oil was thick, deep-red, of a slight odour and disagreeable taste, soluble in alcohol, chloroform, ether, oil of turpentine, benzin and carbon bisulphide.

The resin was easily rubbed into a reddish-brown powder, which had a very slight odour and but little taste, fusible when heated, and uncrystallizable, soluble in alcohol, chloroform and ether, insoluble in benzin and bisulphide of carbon. This resin appears to be the poisonous principle, since a small portion of it, given to a cat, produced in the course of two hours frothing at the mouth, considerable pain and then convulsions, from which, however, the cat recovered. This resin was not quite pure, since caustic potassa dissolved only a part, leaving a portion insoluble, and not fusible by heat.

The root exhausted by alcohol was found to contain *gum*, *albumen* and *pectin*, but no starch.

An alkaloid having been searched for with negative result in the alcoholic tincture, a decoction of the root was distilled with caustic potassa. The distillate had an alkaline reaction, and its odour reminded of that of conium; but, when neutralized with an acid, the distillate was neither precipitated by tannin nor by iodohydrargyrate of potassium; it was probably *ammonia* contaminated with some odorous product of decomposition.

* From the *American Journal of Pharmacy*, Aug., 1876.

THE CONSTITUENTS OF SYRUP OF PHOSPHATE OF IRON.*

BY E. B. SHUTTLEWORTH.

So long as the syrups and elixirs containing the salts of the acids of phosphorus retain their popularity the subject of their production will be regarded with particular interest by the pharmacist. The preparation of this extensive class of compounds generally falls to the lot of the retail druggist, and more seldom to the wholesale manufacturer. The processes involved require neither costly or special apparatus, nor great skill; are unattended with the evolution of injurious or disagreeable gases, and can therefore be readily carried out in the shop. Operations of this kind should always be performed when at all practicable. They tend to keep up an interest in chemistry, and keep before the mind the fact that the pharmacist is a chemist as well as a druggist; they also provide a means of diverting the mind from the tedious duties of mere shop-keeping, and are at the same time attended with considerable pecuniary gain.

During the past few years, and more particularly the last three months, there have appeared in the pharmaceutical journals numerous papers and notes on phosphate of iron and the syrups containing it. Several of these are exceedingly valuable. Amongst them may be mentioned a very lengthy and exhaustive paper read by Mr. W. L. Howie, F.C.S., before the North British Branch of the Pharmaceutical Society at Edinburgh; and that of Mr. Rees Price, read at an evening meeting of the Pharmaceutical Society of Great Britain. Both these papers elicited considerable discussion, drawing forth many interesting facts and practical details.

I think that a useful purpose may be served by reviewing the literature, and representing in as concise a form as possible the main points of the subject, omitting all unessential details. In order to perform this service in as systematic and useful a form as possible, I shall not encumber this paper with special references relating to authors or periodicals, and shall work in such observations of my own as may have been made during a fair experience with tolerably large quantities of materials. For those whose time and opportunities will permit more extended reading, a list of authorities is subjoined.†

Phosphoric Acid.—Of this substance there are several varieties. The *tribasic* acid, having the composition H_3PO_4, combining weight 98, is that used in medicines. In order to distinguish this form from the others, add a little tincture or solution of perchloride of iron; if the mixture remains clear, the tribasic acid is present—other-

* From the *Canadian Pharm. Journ.*, August, 1876.

† Carteighe, *Pharm. Journ. and Trans.*, March, 1871; Jones, *Pharm. Journ. and Trans.*, vol. v., p. 541; Shuttleworth, *Can. Pharm. Journ.*, July, 1872; Dohme, *Proc. Amer. Phar. Assoc.*, vol. xxii., pp. 431-511; Thompson, *Pharmacist*, May, 1874; Broad, *Pharm. Journ. and Trans.*, June, 1874, and *Can. Pham. Jour.*, August, 1874; Markoe, *Proc. Amer. Pharm. Assoc.*, 1875; Dohme, *Proc. Amer. Pharm. Assoc.*, 1875, and *Can. Pharm. Jour.*, April, 1875; Daniel, *Pharm. Journ. and Trans.*, December, 1874, and *Can. Pharm. Journ.*, January, 1875; Croft, *Can. Pharm. Journ.*, June, 1875; Maisch, *Amer. Journ. Pharm.*, October, and *Can. Pharm. Journ.*, December, 1875; Shuttleworth, *Can. Pharm. Journ.*, February, 1876; Price, *Pharm. Journ. and Trans.*, March 4, 1876, pp. 701-716; Howie, *Pharm. Journ. and Trans.*, April 7, 1876, and April 15, p. 834.

wise, a whitish precipitate is produced. The official form of this acid is the *Acid. phosphoric. dilutum*, but, in order to avoid disappointment, it is always well to submit this preparation to the above test. If a precipitate is produced, boil down the acid to the consistence of syrup, *allow it to cool*, and add water up to the ordinary bulk. If the official acid is not at hand the glacial acid may be substituted, being previously treated with nitric acid after the manner of the United States Pharmacopœia. This will not always furnish the tribasic acid, and simple solution and evaporation of the glacial acid, without the addition of nitric acid, often gives as good results. Neither method can be relied upon with all samples of acid. The preparation of phosphoric acid from phosphorus should never be attempted by the pharmacist. The process requires much care and experience, is not economical, except with large quantities, is attended with the evolution of poisonous and disagreeable gases, and, like all operations with phosphorus, is always more or less dangerous.

For preparing syrups, and, indeed, for most purposes, an acid stronger than that official (10 per cent. anhydrous acid), might be advantageously employed. The so-called *syrupy* acid, which can be obtained from some manufacturers, and which is about five time stronger than the other (49 per cent. anhydrous acid, and of specific gravity 1·5), will be found very useful.

Phosphate of Iron.—Five methods have been recommended for preparing this substance: (*a*) By mixing together solutions of sulphate of iron and phosphate of soda; (*b*) by using these salts with the addition of acetate of soda; (*c*) by substituting carbonate or bicarbonate of soda for the acetate; (*d*) by employing an excess of phosphate of soda; (*e*) by forming the phosphate by direct combination of phosphoric acid and metallic iron. By the first method, which is that of the United States Pharmacopœia and Parrish's 'Pharmacy,' about 30 per cent. of the phosphate of iron escapes precipitation, as the free sulphuric acid, liberated in the reaction, dissolves or holds this amount. The framers of the British Pharmacopœia sought to escape this loss by employing acetate of soda for neutralizing the free sulphuric acid, as in the second method. This addition has been shown to be an improvement, but is still in great part ineffectual, as from 22 to 28 per cent. of the phosphate is lost. In the third method, that of Mr. Schweitzer, in which carbonate or bicarbonate of soda is employed, the loss is reduced to less than one per cent. The fourth method, that of Mr. Rees Price, is said to yield results equally satisfactory, but nearly three times the usual quantity of phosphate of soda is required. On the score of economy this is quite a consideration. The fifth method, that of direct combination, answers well where time is not an object. If acid of sp. gr. 1·5 be used, it should be diluted with an equal weight of water, and the iron should be in the form of filings, preferably of Swedish, or wrought metal. In order to produce a preparation similar to the *Syr. Ferri Phosphatis*, B. P., and containing one grain of phosphate in each fluid drachm, the following formula may be employed:

Iron	38	grains.
Phosphoric Acid, sp. gr. 1·5	6	fluid drachms.
Water	6	„ „
Syrup	8½	„ ounces.

Mix, in a flask, the phosphoric acid and water; add the iron, and plug the mouth of the flask with cotton; when the iron is dissolved, filter the solution and add it to the syrup.

The blue phosphate of iron is not a substance of very definite composition, and it is questionable whether the above methods furnish compounds which are identical. Even when the same ingredients are used in proportions exactly alike, the products may differ if the details of manipulation be changed. In all cases the intention is to produce *ferrous* phosphate, but this is never altogether accomplished, as a great portion of the salt passes to the *ferric* condition; or, as may be better understood, passes from a *proto* to a *per* salt. An analysis of six samples of commercial phosphate showed a range of from 20 to 46 per cent. of ferrous salt. It appears likely that the last method noted above would yield a preparation richer in ferrous salt than any of the others, but it is said that the third method gives a salt containing 51 per cent., which is more than 5 per cent. better than the B. P. standard.

Taking everything into account, I much prefer this process, and have used it with satisfaction for several years. The proportions of the sulphate of iron and phosphate of soda, as given in the B. P. may be retained, but instead of one ounce of acetate of soda, about half that quantity of bicarbonate of soda must be used. A better form is that of Mr. Howie:

Sulphate of Iron	7½ parts.
Phosphate of Soda	6½ „
Bicarbonate of Soda	1½ „

Dissolve the salt in ten times its weight of water, which has been previously boiled, in order to expel air; and the phosphate of soda in a like quantity, similarly treated. Let the solutions cool to between 100° to 135° F., and pour the phosphate very gradually into the iron, with constant stirring. Add the bicarbonate, either in powder or solution. Let the precipitate subside; decant; wash well with previously boiled water; collect on a filter and squeeze out as much water as possible, either with the hand or an ordinary press. These details of manipulation must be rigidly adhered to—more especially those relating to the order of mixing and temperature—or uniform results cannot be obtained. If, in the above formula, the *parts* be held to indicate *drachms*, it may be read as part of Parrish's receipt for the so-called chemical food, published in his 'Practical Pharmacy,' p. 425, and the iron strength of the resulting preparation will accord with the compound sold as genuine.

Sugar.—Some English writers have enlarged considerably on the importance of obtaining pure cane sugar. It is said that beet sugar is very abundant in the English and French markets, and is largely substituted for that of the cane. I do not know that this adulteration is practised in America, but am quite certain that the sugars with which we are supplied are now anything but pure, and that a great many of the pharmacists' troubles relating to the fermentation and precipitation of syrups are referable to this cause. In Canada we formerly had an article which was unexceptionable, but since that refinery has been closed the average quality has become sensibly lower. Inferior grades of American and Scotch imperfectly refined loaf sugar have been introduced, and I doubt not but my brother pharmacists have already realized the effects of the change. It is a matter of prime importance to secure a good article, but I know of no other ready method of attaining this end than comparing samples and selecting that which has neither colour, odour, nor taste, other than that of sweetness, and which is in the hardest and most sparkling crystalline lumps.

SALICYLIC ACID IN THE DAIRY.*

BY L. MANETTI AND G. MUSO.

The authors undertook a series of experiments to elucidate the influence of salicylic acid upon (I.) the preservation of milk; (II.) the separation of the cream; (III.) the preservation of butter, and (IV.) the progress of caseification, the results of which have been recorded in the *Bullettino dell' Agricoltura*.

I. *Influence of Salicylic Acid upon the Preservation of Milk.*—The experiments undertaken to define this influence were executed upon volumes of milk varying from one-tenth of a litre to 400 litres and upwards, at temperatures between 10° and 25° C., and the acid was mixed in a manner to be described with the milk in varying proportions of 1 part of acid to from 250 to 10,000

* From the *Moniteur Scientifique-Quesneville* for August.

parts of milk. Milk was always used that had been drawn two to four hours and transported a distance of two or three kilometres, a circumstance that should be taken into account as interfering with the preservative efficacy of the acid. The results obtained in this first series of experiments confirmed the assertion of Kolbe that the preservative effect of salicylic acid depends essentially upon the temperature at which the milk is kept. In the proportion of 1 in 10,000, at 10° C., it retarded the coagulation of milk upwards of eight hours, especially when operating upon moderately large quantities, but at 25° to 30°, and if the quantity of milk was small, the acid did not notably retard the coagulation. In the proportion of 2 in 10,000 salicylic acid retarded on the average the coagulation of milk kept at 18° to 20° C. twelve hours, and milk kept at 12° C., twenty to twenty-four hours. With 5 parts of acid in 10,000 of milk kept at 15° to 20° C., coagulation was retarded two to four days, and at 12° C. three to five days. With 1 part in 1000° C. the milk was preserved in a liquid state much longer, but the acid communicated to it a sweetish taste that was perceptible to a delicate palate.

But besides the temperature and quantity employed the anti-fermentescible power of salicylic acid upon milk is dependent upon—(*a*) the chemical constitution of the milk; (*b*) the time elapsed between the milking and the addition of the acid; and (*c*) the electrical condition of the atmosphere. Thus a litre of milk treated with 0·5 gram of salicylic acid on the 15th of May, and kept at a temperature of 10° to 12°, coagulated after a lapse of time different from that taken by a litre so treated on the 21st of May, and kept under the same conditions.

On the 10th of June two glasses, each containing 100 c.c. of milk, were set aside, after first adding to one (B) 0·05 gram of salicylic acid, and to the other (A) a quantity of water corresponding to the salicylic acid solution. The glasses were covered with a sheet of paper, placed on the same table, and left for 24 hours at a temperature o 120° to 25° C. The lactin was estimated in the milk itself by Fehling's liquor.

	A.	B.
Lactin at the commencement . .	4·73	4·73
after 24 hours	2·06	3·35
Consumed	2·67	1·38

Both specimens were coagulated.

On the 13th of June this experiment was repeated, but adding 0·1 gram of salicylic acid to B.

	A.	B.
Lactin at the commencement . .	5·07	5·07
„ after 24 hours	4·59	4·98
Consumed	0·48	0·09

Another experiment made on the 17th of June gave similar results, the quantity of lactin transformed in a given time being smaller in proportion as the quantity of acid employed was increased.

Specimens of milk treated with 1 part in 250 and 1 part in 300 of acid had a pronounced sweetish taste. They did not allow of the time of coagulation being clearly noted, and when coagulated appeared as a white semi-liquid homogeneous mass, without any perceptible separation of serum. The longer the milk was kept the more blue it became; the upper stratum became more dense, and at last became the substratum of an abundant cryptogamic vegetation. When, in consequence of the above mentioned disturbing causes, milk treated with salicylic acid remained liquid longer than usual, it did not usually coagulate throughout simultaneously. It commenced to coagulate just below the cream, and this layer thickened until it reached the bottom, or met with another layer rising from the bottom.

In introducing the salicylic acid into the milk, a solution saturated at the ordinary temperature cannot be used, as that would introduce too much water; neither can a boiling saturated solution in water be used as it would coagulate the milk wherever it came into contact with it. The authors prefer to use a fine powder prepared from large salicylic acid crystals, which is thrown upon the milk a little at a time, and well stirred in. The large crystals are prepared by pouring boiling water upon one third of the quantity of salicylic acid it is capable of dissolving, and allowing the solution to cool slowly. Salicylic acid dissolves in 15 to 20 parts of boiling water, and 300 parts of cold water.

II. *Influence of Salicylic Acid on the Separation of the Cream.*—In all these experiments, which were made under varying conditions of temperature, and with different proportions of acid, it was found that after standing 24 hours, the salicylized milk formed a layer of cream equal to that formed on the milk to which acid had not been added, and that the salicylic acid did not exercise any influence on the separation of the cream. But it was noted that while the cream on the specimens of milk that had not been treated with acid and had been kept at a temperature above 15° to 20° C. presented after 24 hours an unsatisfactory appearance, being deficient in coherence and rather disposed to turn rancid, the cream on the salicylized specimens presented all the characters of fresh and sound cream. The fact that by means of salicylic acid milk can be preserved in a liquid and sweet condition for a relatively long time points to the probability that it would allow of a more complete separation of the cream taking place, as at certain seasons the operation of creaming has to be much hurried. It was found also that in operating upon large quantities of milk the same results were obtained with less acid in proportion than with small ones. Fifty grains of salicylic acid added to 430 litres of milk exercised a preservative influence equal to that of 150 grams of borax.

III. *Influence of Salicylic Acid upon the Preservation of Butter.*—By different experiments it was found that a solution of salicylic acid could not be incorporated with butter in sufficient quantity to affect sensibly its preservation. But when powdered salicylic acid was worked up with one thousand times its weight of butter, the butter kept at the ordinary temperature remained sound upwards of a week longer than butter that had not been so treated. Two parts of salicylic acid in a thousand of butter gave still better results so far as preservation was concerned, the rancidity being deferred upwards of a fortnight, but the butter acquired an easily perceptible sweetish taste. By placing butter in tin boxes and covering it with a solution of salicylic acid saturated at the ordinary temperature a still greater preservative effect was obtained, one specimen remaining without trace of rancidity five weeks, the greater part of the time at a temperature of 25° C. The best preservative effects would therefore appear to be attainable by incorporating uniformly the salicylic acid as a powder with the butter, in the proportion of 1 part in 1000, and keeping the mixture covered with a layer of solution of salicylic acid saturated at the ordinary temperature.

But although butter kept a fortnight or a month under solution of salicylic acid does not lose much colour, the odour and aroma disappear completely. Placed in the mouth it does not melt and diffuse so rapidly, but produces a disagreeable pasty impression. The authors, therefore, think that when salicylic acid is used for the preservation of butter, it would hardly yield a product fit for the table

IV. *Influence of Salicylic Acid upon Caseification by Rennet.*—The authors treat this section of the inquiry under three heads—(*a*) the promptitude of the coagulation, (*b*) the progress of the caseification and the success of the cheese, and (*c*) the yield of cheese.

a. Milk coagulates at the ordinary temperature, when it contains 0·55 to 0·66 per cent. of lactic acid; and at the boiling temperature when the lactic acid represents 0·20 per cent. of the milk. Other soluble acids act in the same manner as lactic acid. The action of rennet being thus facilitated by the presence of acids, it might be considered *à priori* that salicylic acid would accelerate the coagulation. But the coagulation of milk by rennet is the result of the action upon the casein of the milk of a peculiar ferment, to the activity of which is associated in certain cases that of other organic ferments (pepsin and lactic ferment) also obtainable from the gastric mucus of calves, and perhaps of all the vertebræ. The researches of Kolbe, Nebauer, and Kop have shown that salicylic acid diminishes the activity of certain ferments; J. Müller also has shown that the peculiar action of ptyaline and that of pepsin are stayed in the presence of certain proportions of salicylic acid. It remained therefore to ascertain whether salicylic acid exercises upon the ferment of rennet an action analogous to that it exercises upon the other ferments. The result of the experiment was that salicylic acid accelerates the coagulation, and consequently favours the action of rennet. In 370 litres of milk, treated with 100 grams of salicylic acid, this acceleration of coagulation was estimated at ten to fifteen minutes.

b. The next question, whether salicylic acid exercises any influence on the maturation of the cheese the authors' experiments lead them to answer in the negative. In fact this is what might be expected, as when, for example, a milk has been used to which salicylic acid has been added in the proportion of 1 in 4000 the quantity of acid introduced into the cheese is too small to produce sensible effects.

c. The investigation of the question of the influence of the presence of salicylic acid in milk upon the yield of cheese led the authors into a thorough experimental study of the phenomena of caseification, the description of which is too long for more than a reference here. Briefly the conclusions at which they arrived, and which they consider are likely to influence largely the manufacture of cheese, are as follows:—

1. The phenomenon of caseification with ordinary rennet is synthetically comparable to that of the gastric digestion of the albuminates.

2. During the caseification the lactic acid, which appears in considerable quantity, causes to redissolve and pass into the serum all the salts (phosphates) that the protein held in solution in the milk and which had been precipitated and enveloped by the coagulation.

3. *At the same time* a metamorphosis of the protein of the milk takes place which causes one part of the coagulated albuminates to assume new properties with the soluble state. This metamorphosis is due essentially to lactopeptic acid. The variable quantities of this acid, the degree to which the coagulated mass is agitated, etc., are causes that influence the transformation afterwards described.

4. Even after the apparent coagulation of the milk, all the protein precipitable by rennet is still not coagulated; but whilst the temperature rises and the operation progresses a fresh quantity of protein is precipitated by the rennet.

5. Two opposed phenomena are therefore in play during the course of caseification. On the one hand there is a further precipitation of protein; on the other there is produced an indefinite impoverishment in the shape of salts and a partial transformation of the coagulum into soluble products. These two phenomena are not produced to a parallel degree, but the decrease of the first probably coincides with the increase of the second.

6. Substances which, employed in suitable quantities, favour or impede the gastric digestion, also diminish or increase the yield of cheese.

7. Salicylic acid added to the milk to be used for cheese-making in the proportions of 2 to 4 parts in 10,000 does not augment perceptibly the yield of cheese, as it does not impede sensibly (in these proportions) the gastric digestion.

Previous experimenters had stated that when liquid rennet is used for converting milk into cheese, other things being equal, a larger yield of cheese was obtained then when rennet prepared according to the old method was used. Such a result the authors consider to be explained by their experiments, as through the method adopted in their preparation the liquid rennets would contain a much smaller quantity of *pepsine* than the rennet ordinarily employed.

The authors are of opinion that considering the low price of borax, its value as shown by experience, and the facility of its application, its use in the dairy will not be abandoned in favour of salicylic acid; but that probably salicylic acid might be used with economy in small dairies where butter is not made every day and for the preservation of butter where it cannot be stored in a sufficiently cool place or has to be sent to a distant market.

The following is stated to be the method of treatment adopted with the Swedish butter sent to the English market. After being removed from the churn it is spread out in a trough, powdered with one per cent. of its own weight of salt and worked up with a wooden spoon (the hands should never be allowed to touch the butter) so as to eliminate the greatest possible quantity of liquid. Then it is again spread out in the trough, and a mixture is scattered over it consisting of 3 parts of salt, $\frac{1}{2}$ of honey, and $\frac{1}{2}$ of nitre for every 100 parts of butter and it is again worked up with the wooden spoon. The butter is then placed in new square beech boxes which have been kept during six days full of pure water and then for two days full of salt water. A small layer of salt is placed on the bottom of the box, the butter is well rammed down on a linen cloth, and then is covered with another linen cloth, and above all is spread another small layer of salt. After some days the butter contracts a little and consequently separates from the sides, when the interval is filled with salt water; the box is then closed and is ready for dispatch.

SACCHARIFICATION OF AMYLACEOUS BODIES.*

BY L. BONDONNEAU.

The saccharification of amylaceous bodies in water has been explained in two different ways. In the one and oldest mode of explanation, starch yields at first dextrin, which by hydration forms glucose. In the second a dividing, together with hydration, is admitted, producing at the same time dextrin and glucose. The study of these reactions, and of the products formed by them, has proved to us that it is the first hypothesis which accords with the results obtained. In fact, from the hypothesis of division, admitted by many authors, at whatever moment the reaction, and however much there is still of the amylaceous matter, the saccharine portion should not contain less than 25 per cent. of glucose, according to the last formula given by M. Musculus:—

$$4(C_{12}H_{10}O_{10}) + 2HO = C_{12}H_{12}O_{12} + 3(C_{12}H_{10}O_{10}).$$

Now such a syrup, dessicated in the cold to render the "amylogène" insoluble, being taken up by cold water, gives a solution containing:—

Glucose	13·70
Dextrin	86·30

Also, there should exist in the solution only glucose and a single dextrin; we shall prove that the latter exists in three isomeric forms in every saccharification. On examining the products formed by the action of dilute acids, no matter at what stage of the reaction, it is observed at the first appearance of saccharification (the amylogène, if it *exists still*, being eliminated by a small quantity of alcohol), that the solutions are coloured red by iodine, and that the dextrin, separated by alcohol, then purified by the means which we have indicated, is composed of a variable mixture of colourable dextrin identical with that obtained by torrefaction, which we will indicate by the letter *a*, and of non-colourable dextrin, a mixture which can be recognized by the colorimetrical trials of red tints produced by iodine, comparatively with those furnished by pure dextrin. The action of the acid being continued the dextrin *a* diminishes more and more, and finally dis-

* *American Chemist*, from the *Bulletin de la Société de Chimique de Paris.*

appears; alcohol precipitates another dextrin, not coloured by iodine identical with that obtained by the action of the diastase on starch; we will designate this dextrin by the letter β. The alcoholic solutions, evaporated after the elimination of the above dextrins, are treated with absolute alcohol until all the substances soluble in this reagent are dissolved; by analysis we have obtained:

Glucose	75·40	70·20
Product non-reducing	24·60	29·80

This large quantity of soluble product, not reducing copper solution, is not a portion of the dextrin β held in solution by the presence of glucose, because, in a mixture of 90 parts of pure glucose and 10 parts of dextrin β, this latter is precipitated by the addition of absolute alcohol. Besides, this non-producing product is wholly transformed into glucose by the action of dilute acids, which indicates that this substance is a dextrin intermediate between dextrin β and glucose; we will designate it by the letter γ. The same products are formed under the influence of diastaste; the presence of the dextrin α, which is ephemeral, cannot be doubted, since the "amylogène" having completely disappeared, the solution is coloured red by iodine; dextrin β is the principal product, it is removed easily by alcohol, and finally the alcoholic solutions undergoing the treatment indicated above, show the presence of dextrin γ in large proportion. To complete this work we will indicate some new properties of these dextrins. The pure dextrins α and β, in concentrated solutions, cooled to +1°, are precipitated upon the bottom of the dish with a milky appearance, but upon raising the temperature, this precipitate becomes transparent, and by vigorous agitation is dissolved, without leaving traces of an insoluble product; a small quantity of glucose does not prevent this reaction, which is stopped, however, by a large quantity of this sugar. This action of diastase on dextrin α is remarkable, and explains the difficulty which is encountered in discovering its production in the treatment of starch with this substance. A solution of dextrin α, with the addition of diastase, is not coloured red by iodine after fifteen minutes or thereabouts of contact with cold; the rotatory power declines $\frac{1}{20}$c: the quantity of the existing glucose remains constant; the dextrin γ is not found in the reaction, which shows that the diastase is without action in the cold upon the dextrin β found in this experiment. In a warm place the dextrin α disappears almost immediately, even from the solutions at 25° and 40° Baumé; and, by prolonging the heat, there are formed dextrin γ and some glucose, the diastase acting under these conditions upon the dextrin β, of which a portion remains in the solution.

We are not able thus far to obtain the dextrin pure. The products formed in the oxidation of glucose by the copper solution are, after acidulation, soluble in alcohol, as is the dextrin; the aqueous solutions treated with baryta and precipitated by alcohol give equally a mixture of two products.

Under the influence of the yeast of beer this dextrin becomes hydrated rapidly, and ferments at the same time as the pre-existent glucose; 1 kilogramme of compact glucose of commerce, containing 12 per cent., has only given, after eight days of active fermentation, 40 grains of a syrup containing some glucose, some dextrin β, the presence of which we have ascertained in the original material, and lastly several grains of dextrin γ, of which we should have obtained a hundred grains. This dextrin becomes hydrated easily in presence of dilute acids, the hydration takes place equally as well by long contact with cold water; a solution with 20 per cent. of alcohol, to prevent mouldiness, including for 100 c.c.—

Glucose	23·70
Dextrin	4·80

contained, at the end of six months, only 2 per cent. of dextrin, the remainder was converted into glucose.

Finally, this solution having been diluted with water has given, after two months, for 100 c.c.—

Glucose	1°70
Dextrin	0·05
Rotatory power for 2 decimetres	1·85

The rotatory power of dextrin γ, determined by calculation from the deviation produced by its mixture with glucose, has been worked out in two different samples, equal to 165° 24′ and 163° 21′, average 164° 22′; taking as the rotatory power of glucose the numbers 47° 24′ for $C_{12}H_{12}O_{12}+2HO$, or 52° 8′ for $C_{12}H_{12}O_{12}$, found by M. Aimé Girard for pure glucose of fecula, examined with a large polariscope. Concerning the action of diastase on dextrin α, and of the presence of three isomers at the first appearance of the saccharification of amylaceous bodies, we are able to conclude then that it is not a dividing with hydration which takes place, but that each amylaceous molecule, in order to reach the last product, glucose, is obliged to pass successively through the following products:—

	Rotatory Power.	Action of Iodine.	Action of absolute Alcohol.
"Amylogène"	216°	blue	insoluble
Dextrin α	186°	red	„
„ β	176°	uncoloured	„
„ γ	164°	„	soluble
Glucose	52°	„	„

BRITISH PHARMACEUTICAL CONFERENCE.

The following is a list of the papers that up to the present time have been promised for reading at the thirteenth Annual Meeting of the Conference, to be held in Glasgow, on Tuesday and Wednesday September 5th and 6th:—

1. Liquid Extract of Pareira. Mr. Barnard S. Proctor.
2. Variation in the Strength of the Preparations of Opium. Mr. D. B. Dott.
3. Report on the Assay of Opium for Morphia. E. L. Cleaver, F.C.S.
4. Note on the Assay of Opium. Mr. Barnard S. Proctor.
5. New Derivatives from the Opium Alkaloids. Dr. Wright, F.C.S.
6. The Presence of Free Acetic Acid in Opium. David Brown, F.C.S.
7. New Excipients for the Official and other Pill Masses. Mr. G. Welborn.
8. The Preparation and Preservation of Phosphorus Pills. Mr. T. Haffenden.
9. Notes on some Salts of Pilocarpine. Mr. A. W. Gerrard.
10. Report on the Aconite Alkaloids. Dr. Wright, F.C.S.
11. The Solubility of Cinchona Principles in Glycerine. Mr. T. Andrews.
12. The Therapeutic Value of the Aloins. Dr. Tilden, F.C.S.
13. The Active Principle of Capsicum Fruit. J. C. Thresh, F.C.S.
14. Report on the Oxidation of the Essential Oils. Part IV. C. T. Kingzett, F.C.S.
15. Report on the Essential Oil of Sage. M. M. P. Muir, F.C.S.
16. Note on the Benzoates in Suint. Mr. A. Taylor.
17. Note on the Colouring Matter of *Crocus Sativus*. W. W. Stoddart, F.C.S.
18. Pekoe "Flower"—or, Hair of the Tea Leaf. T. B. Groves, F.C.S.
19. A New Form of Plaster of Cantharides. Mr. A. W. Gerrard.
20. A Proposed Solution of Citrate of Iron and Quinine. Mr. J. F. Brown.
21. Preliminary Report on the Chemistry of Ivy. R. H. Davies, F.C.S.
22. Supplementary Note on Phosphate Syrups. W. L. Howie, F.C.S.
23. On Filtering Papers. Thomas Greenish, F.C.S.
24. Further Experiments on the Antiseptic Action of Salicylic Acid. Mr. J. C. Hunter.
25. Strength of the Tincture of Nux Vomica. L. Siebold, F. C S.
26. Preparation of Milk of Sulphur. L. Siebold, F.C.S.
27. The Condition in which Salicylic Acid is excreted by Patients. F. B. Benger, F.C.S.

The Pharmaceutical Journal.

SATURDAY, AUGUST 26, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

BRITISH PHARMACEUTICAL CONFERENCE.

THE approaching Pharmaceutical Conference at Glasgow will probably be in no degree inferior to previous gatherings of the same kind as regards the scientific and practical interest of the subjects that will be brought forward for discussion, if we may judge from the list of papers to be read which we publish on another page. But in addition to the more purely technical interest attaching to the proceedings of this meeting there is another circumstance which may fairly be expected to have no inconsiderable influence in attracting to the Conference at Glasgow a much larger number of the trade than has ever met together on previous occasions. We refer to the proposal which has been announced in our advertisement columns of holding a meeting of the Chemists' Trade Association during the week in which the Pharmaceutical Conference is held.

It is now being made known by a circular addressed to every chemist and druggist on the register that this meeting is to take place at ten o'clock on Friday morning, the 8th of September, in the Central Hall of the Royal Hotel, St. George's Square, Glasgow, and invitations have been sent to all members of the trade. It will of course be understood that though this meeting is coincident in point of time and place with the Pharmaceutical Conference it is in no way otherwise connected with the Conference, and that the object of holding a meeting of the trade association immediately after the business of the Conference terminates is merely to take advantage of the fact that a number of pharmacists will then be assembled in Glasgow, who might not have an opportunity of attending the trade meeting at another place.

No definite plan of proceedings has yet been issued by the Committee that has organized the meeting, and in the circular that has been issued the desirability of such an association has been taken as an established fact, on the ground of the support that has already been given to its formation by the enrolment of members, and by donations towards the establishment of a fund, as well as by the numerous expressions of sympathy and promises of support that have been received. The Committee considers that it is unnecessary to enter into any arguments in proof of the desirability of a Chemists' Trade Association, since no question was more definitely and clearly put before the Birmingham Conference than the question whether existing associations did or did not render a trade organization unnecessary, and the Committee expresses a hope that there will be throughout the trade a general unanimity in the opinion expressed by the Birmingham Conference.

We cannot altogether agree with the anticipations which the Committee appears to entertain in regard to such general concurrence in the views of the Birmingham Conference, for in addition to expressions of dissent which have been publicly made there is a further and more cogent reason for doubting whether those views are held, in the trade, to any such extent as would be indispensable for the establishment of an association competent to carry out the work contemplated by the Birmingham Conference. As we have stated on a previous occasion, when the project of a trade association was in embryo, we consider that the beneficial action of such an organization, in fact the very continuance of its existence, must depend upon its being representative of the greater part if not of the entire trade, and so far as we can gather from the circular that is being sent out to announce the meeting in Glasgow there is in this essential particular a very signal deficiency.

Considering that a month has now elapsed since the Birmingham Conference, when the formation of the Chemists and Druggist's Trade Association became an established fact, and considering the stress that its promoters have always laid upon the necessity of very general support being given by the entire trade, it certainly seems to us unpromising, to say the least, that we find no mention of the number of enrolled members being at all in approximation to the number of those for whose benefit the establishment of the Trade Association was projected.

We trust that in making these remarks it will not be supposed that we disparage the opinions by which the promoters of this trade organization have been induced to attempt its realization, or that we are in the least disposed to discourage them in the task they have undertaken. On the contrary, we are so far in accord with them as to believe that whatever evils afflict the pharmaceutical body, they are to be ascribed in great measure to the absence of internal organization; and that one of the most essential conditions of the advancement of pharmaceutical interests is the union of the whole body for mutual benefit of its members. Whatever may be the fate of the Trade Association we sincerely trust that the steps taken for its establishment may in some way, directly or indirectly, have the effect of bringing about such advantages as have been gained in a partial manner by the Pharmaceutical Society and by the Pharmaceutical Conference.

There is one other point referred to in the circular of the Trade Association, viz., the possibility of interference with the functions of the Pharmaceutical Society. The letter of Mr. JONES, the President, which we publish among the Correspondence, distinctly disavows the existence of any such inclination on the part of those connected with the Chemists and Druggist's Trade Association.

In referring to the same point, in the circular just issued, the Committee denies the probability that the Association would compete with the Pharmaceutical Society in any work that is undertaken for the protection of trade interests, adding also the opinion that it would often be able to strengthen the Society's hands by co-operation, and to relieve it of some claims now made upon it for protection which are felt to be of an invidious or critical nature for a Society charged by the State with various administrative functions.

SPONTANEOUS COMBUSTION OF COAL CARGOES.

IN April, 1874, the Board of Trade decided to hold no more inquiries under the Merchant Shipping Act into casualties caused by explosions or fires in coal laden vessels. The decision was not based upon a decrease in the number of such accidents, for the returns of the previous sixteen months disclosed a serious increase in the risk to life that appeared to be involved in service in coal laden vessels; but the reason given was that no new facts were ever elicited in these inquiries and that the conclusions of the Courts had apparently been productive of no practical results. The upshot of this dead lock was the appointment of a Royal Commission which has just issued its report.

The inquiries of the Commission showed that following and possibly in consequence of a large number of fires that occurred in 1874 in coal ships bound to distant and tropical parts there was a falling off last year in the shipment of coals on long voyages amounting to 190,000 tons, or nearly 7 per cent., although the gross export of coal increased more than 500,000 tons. The connection between spontaneous combustion and long voyages becomes still more apparent in the light of statistics, which show that in the shipments to European ports, though amounting to six-sevenths of the whole number of shipments, only ten such accidents occurred, whilst the remaining one-seventh—shipments to Asia, Africa, and America,—suffered from sixty casualties.

It became evident also that "to a startling extent the proportion of casualties traceable to spontaneous combustion increases *pari passu* with the tonnage of the cargoes." Thus, not including the European trade, with cargoes under 500 tons the casualties were under ¼ per cent.; between 500 and 1000 tons they amounted to over 1 per cent.; between 1000 and 1500 tons to 3½ per cent.; between 1500 and 2000 tons to 4½ per cent.; and exceeding 2000 tons to 9 per cent. Of five ships sent to San Francisco in 1874 with cargoes of over 2000 tons of coal two came to grief.

The Commission requested two of its members, Professor ABEL and Dr. PERCY, to draw up a paper (see p. 184) which should describe simply and clearly the chemical conditions that tend to originate and develop spontaneous combustion or produce explosion. Armed with this document and various returns the Commission proceeded with the inquiry. The principal conclusions arrived at were that certain descriptions of coal are intrinsically dangerous for shipment on long voyages, and that even when the coal may not in itself be thus unfit its breakage during transit from the pit's mouth to the ship's hold, the shipment of pyritic coal in a wet condition, and, especially, *ventilation through the body of the coal cargoes*, are conditions conducive to spontaneous combustion. This latter conclusion respecting ventilation is directly opposed to what underwriters have enforced in many cases for greater security; but it is quite in accord with the evidence furnished by the returns and with the opinions expressed by Professor ABEL and Dr. PERCY in their memorandum.

The evidence disclosed, however, that to a considerable degree spontaneous combustion and explosions in coal cargoes are confounded with one another, although it is obvious they may arise from totally different causes. The Commission is of opinion that to guard against explosion free and continuous egress to the open air, independently of the hatchways, should be provided for the explosive gases by means of a system of *surface* ventilation.

One other subject alluded to in the report is of interest—the application of carbonic acid gas as a means of extinguishing such fires. Whilst granting that this gas might be useful by excluding the atmospheric air necessary for combustion, it is objected that it would not, as water does, exert any sensible cooling effect on the ignited coal. The Commission considers water and steam to be the only agents practically available for the extinguishment of fire in coal cargoes.

PHARMACY IN SOUTH CAROLINA.

THE Legislature of South Carolina has recently incorporated a Pharmaceutical Association, which through its examiners is to have "power to license pharmaceutists, apothecaries, and druggists within the State." There are to be two boards of examiners, one of them to have its seat at Charleston and the other at Columbia. Each Board will consist of six members, four of which are to be elected by the Association and two to be appointed by medical authorities. The appointments will last for one year. Mr. G. LUHN, of Charleston, has been elected the first President of the Association.

GERMAN PHARMACEUTICAL CONFERENCE.

AT the same time that the British Pharmaceutical Conference will be assembling in Glasgow the German Apothecaries' Union (*deutsch Apotheker-Verein*) will be holding a General Meeting in Stuttgart, the sittings commencing on the 4th and closing on the 6th of September.

Proceedings of Scientific Societies.

ROYAL SOCIETY.

Absorption Spectra of Iodine.*

BY SIR JOHN CONROY, BART, M.A., F.R.S.

Iodine, as is well known, when in very thin layers, appears red by transmitted light; and when in solution the colour of the liquid depends not only on the amount of iodine contained in it, but also on the nature of the liquid in which it is dissolved.

Schultz-Sellack has pointed out (*Pogg. Ann.*, vol. cxl. p. 334) that the liquids in which iodine is soluble may be divided into two classes:—first, those with which it gives reddish-brown solutions, like alcohol; and secondly, those with which it gives violet ones, as bisulphide of carbon; and also that the colours of these two solutions correspond respectively with the colour of solid iodine, when seen by transmitted light, and with that of iodine vapour.

Andrews ('Brit. Assoc. Report, 1871') has also remarked that iodine vapour and the solution of iodine in bisulphide of carbon are dichroic, while such is not the case with its solution in alcohol.

As I am not aware of any other observations on the absorption of light by iodine in solution or in the solid state having been published, I have the honour of having an account of some experiments I have recently made on this subject communicated to the Royal Society.

For these observations I have used one of Browning's spectroscopes with a single dense-glass prism of 60°, as with a greater amount of dispersive power it became more difficult to observe the beginning and end of the absorption. The spectroscope was firmly screwed to the wall of the room, with the collimator pointing vertically downwards, the light from a paraffin-lamp being reflected along it by a mirror—the width of the slit and the position of the mirror and lamp remaining unaltered during the course of the experiments, in order that the different absorption-spectra should, as far as possible, be comparable with each other. The solution whose absorption was to be observed was contained in a small beaker, supported by the ring of a retort-stand between the mirror and the slit of the collimator.

This arrangement was adopted in order to be able to observe the absorption through various thicknesses of the same solution, without having to use a wedge-cell, as some of the liquids in which iodine is soluble act very quickly on the cement with which such cells are fastened together.

A vertical scale was attached to the beaker, so that by gradually pouring a solution into it, the absorption through different known thicknesses could be observed, the solutions of the iodine in bisulphide and tetrachloride of carbon being covered with a thin layer of water to prevent their evaporating.

When the absorption-spectra of solid and liquid iodine were to be observed, the beaker was replaced by a large cork which fitted the ring of the retort-stand, and through which a hole had been bored in a line with the axis of the collimator, and the glass slips between which the iodine had been melted laid on this. In the case of the liquid iodine, the low conductive power for heat of the cork retarded the cooling of the glass, and facilitated the observation of the absorption.

The telescope of the spectroscope, the eyepiece of which was furnished with cross wires, was carried by an arm moving over a divided arc; and the position of 10 of the principal lines in the solar spectrum having been observed, from the measurements, and from the wave-lengths of the same lines, as determined by Angström, a curve was constructed, by means of which the readings of the spectroscope were reduced to wave-lengths.

* Read May 18, 1876. From the 'Proceedings of the Royal Society.'

Solid Iodine.

Layers of iodine sufficiently thin to be transparent can be readily obtained, as Schultz-Sellack has remarked, by squeezing melted iodine between two pieces of flat, well-polished glass; it is only necessary to place a small fragment of iodine between two pieces of glass which have been previously well cleaned with alcohol, and heat them over a spirit-lamp till the iodine melts, and then press them together. I have obtained the best results by heating the iodine till it just melts, placing the pieces of glass on a smooth block of wood and squeezing them together with a flat cork.

The layers of iodine thus obtained are not usually of uniform thickness; and, in addition to this, they contain so little iodine that I was unable to determine their thickness by ascertaining the weight and area of the film. When seen, however, by reflected and transmitted light, the iodine film usually appears surrounded by coloured, rings; and as these alter their position and shape when the glass slips are pressed together, they must be due to a thin layer of air, and not to any substance adhering to the glass; and consequently the layers of iodine are probably less than ·00004 inch, or ·001016 mm., in thickness.

When seen by transmitted light, these layers of iodine vary in colour from a deep brownish red, through different shades of brown, to a more or less pure yellow, according to the thickness and nature of the film; for, as is shown in the paper "On the Polarization of Light by Crystals of Iodine," the colour of the transmitted light apparently does not depend solely on the thickness of the layer of iodine through which it passes. These films correspond in colour with alcoholic solutions of iodine of different strength, and the absorption-spectra are very similar—the whole of the blue end of the spectrum being cut off, and the absorption extending further and further towards the less refrangible end of the spectrum, as the thickness of the film increases, till at length only light having a wave-length of about 650 (in "tenth-metres"), or slightly more refrangible than the C line, passes through; and a very slight increase in the thickness of the film is sufficient to stop this also.

Liquid Iodine.

With a little careful management it is usually possible to melt one of these thin layers of iodine by heating it over the flame of a spirit-lamp, without causing it either to be dissipated in vapour or to run together. The liquid iodine appears to be more transparent than the solid; for a layer which appears a deep red colour by transmitted light when hot, sometimes becomes perfectly opaque on cooling. When hot it is also of a deeper red than when cold; and the spectroscope shows that while the less-refrangible rays of the spectrum are freely transmitted, there is more absorption of those of mean refrangibility than is the case with solid iodine.

The absorption-spectrum as deduced from the mean of five observations showed that just as is the case with solid iodine, light of a wave-length of about 650 suffers the least amount of absorption during its passage through a layer of iodine.

Iodine in Solution.

As I have before mentioned, the liquids in which iodine is soluble may be divided into two classes; first, those with which it forms brownish-red solutions, as alcohol, ether, ethyl bromide, Dutch liquid, benzole, glycerine, potassium iodide in an aqueous solution, hydrogen chloride, etc.; second, those with which it forms violet solutions; this latter class is less numerous, and as far as I have hitherto been able to ascertain by actual experiment, only consists of the following substances—the bisulphide, tetrachloride, and monochloride of carbon, chloroform, phosphorus terchloride, tin tetrachloride, and under certain circumstances, as will be hereafter mentioned, hydrogen sulphate. In Watt's 'Dictionary of Chemistry,' vol. i. p

381, it is stated that the solution of iodine in chloral has a purple colour.

In order to obtain solutions of iodine of a known strength, some of the liquids in which it is soluble being very volatile, a small glass weighing tube closed with a cork was nearly filled with iodine which had been crushed small with the edge of a platinum spatula. A stoppered flask holding 25 c.c. was filled with the liquid in which the iodine was to be dissolved; and the tube having been weighed, a small quantity of iodine was shaken out of it, and the tube again weighed, and so on, till the desired amount had been added to the liquid.

In this way solutions of iodine in bisulphide and tetrachloride of carbon, chloroform, alcohol, and in aqueous solutions of potassium iodide were prepared, and the absorption produced by different thicknesses of these solutions observed.

Solutions of iodine in alcohol, and of iodine in an aqueous solution of potassium iodide, of different strengths were then prepared, and the absorption produced by layers of these solutions, varying in thickness from 5 mm. to 25 mm., was observed.

Solutions of iodine in both liquids were, when of equal strength, of the same colour and the absorption-spectra were similar, and also similar to that of the solid iodine, except that the absorption did not appear to extend quite so far down the spectrum; but as the transition from strong absorption to none at all is a very gradual one, it is somewhat difficult to determine the exact point at which the absorption ends.

Iodine dissolved in bisulphide of carbon absorbs most strongly light of mean refrangibility; and the absorption-spectrum resembles that of the vapour of iodine as represented in the map to M. Thalen's memoir, 'Le spectre d'absorption de la vapeur d'Iode' (Upsal, 1869), except that the absorption is continuous, and does not extend quite so far towards the less refrangible end of the spectrum.

The mean result of eighty-one measurements of the position of the absorption produced by different thicknesses of these solutions showed that the rays whose wave-lengths lie between 450 and 560 (approximately) are first absorbed; and as the thickness of the layer or the concentration of the solution is increased, the absorption extends towards both ends of the spectrum, though more rapidly towards the less-refrangible one.

Just as was the case with the solution of iodine in alcohol, and with solid and liquid iodine, light of a wave-length of about 650 passes unabsorbed through a considerable thickness of the solution; but a thickness which is sufficient to stop the whole of the red rays still allows the blue and violet ones to pass; hence, whilst dilute solutions of iodine in bisulphide of carbon and other liquids of that class appear of a kind of red, when the light passes through a greater thickness, or the solution is more concentrated, they appear blue or violet.

Iodine is insoluble in cold hydrogen sulphate; but when some fragments of iodine are placed in a test-tube, partially filled with strong hydrogen sulphate, and the tube heated, the iodine first melts, and then gradually colours the liquid, till it becomes about the same tint as a very dilute solution of iodine in bisulphide of carbon.

·0100 grm. of iodine was placed in a test-tube containing 25 c.c. of strong hydrogen sulphate, and the test-tube carefully heated over a spirit-lamp until the whole of the liquid iodine had disappeared; the acid appeared of the same colour as a solution of iodine in chloroform containing about the same amount of iodine. The colour of the acid did not alter on cooling; after standing 24 hours the upper layer of acid for a depth of about one centimetre from the surface had become colourless; but at the end of five months the acid in the lower part of the tube was still pink, the upper half having become colourless, and a small quantity of a black powder having settled at the bottom.

Only a very small quantity of iodine can be held in solution by the hydrogen sulphate when cold, as any excess separates out in minute crystals.

It does not appear probable that the difference in the colour of the solutions which iodine forms with liquids of these two classes depends on any chemical fact, as both classes contain substances of very dissimilar chemical composition. I have not, however, as yet been able to ascertain any common property possessed by all the liquids of either class, beyond (as, indeed, is obvious) that all those in which iodine forms violet solutions are volatile liquids of high specific gravity.

It has been shown by various observers (H. Morton, *Pogg. Ann.*, vol. clv. p. 573; Hagenbach, *Pogg. Ann.*, vol. cxlvi. p. 533; Kraus, 'Chlorophyllfarbstoffe,' p. 53) that the position of the absorption-bands of substances in solution vary to a certain extent with the liquid in which they are dissolved; but this would appear to depend on some other cause; for, in addition to the displacement being small, it differs in amount with different liquids; whilst in the case of iodine, as far as I have been able to observe, the position of the absorption is the same for all the liquids belonging to one of the two classes. The action on light of iodine dissolved in alcohol greatly resembles the effect it produces when in the solid state; whilst the absorption of its solution in carbon bisulphide, and in other liquids of that class, bears, as has been pointed out to me by Professor Stokes, the same relation to the absorption-spectrum of the vapour as the spectrum of the solution of a coloured gas (nitrogen peroxide for example) does to that of the gas.

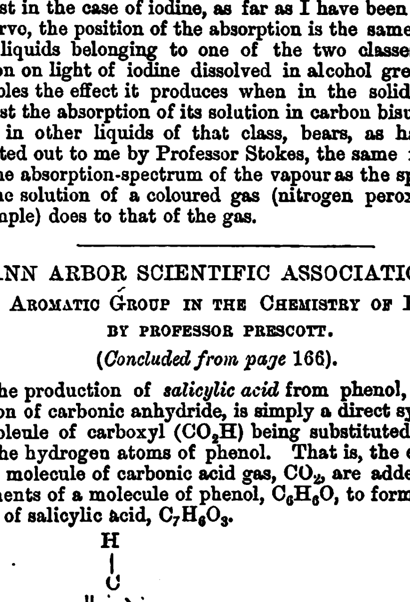
ANN ARBOR SCIENTIFIC ASSOCIATION.*

The Aromatic Group in the Chemistry of Plants.

BY PROFESSOR PRESCOTT.

(*Concluded from page* 166).

The production of *salicylic acid* from phenol, through action of carbonic anhydride, is simply a direct synthesis; a molecule of carboxyl (CO_2H) being substituted for one of the hydrogen atoms of phenol. That is, the elements of a molecule of carbonic acid gas, CO_2, are added to the elements of a molecule of phenol, C_6H_6O, to form a molecule of salicylic acid, $C_7H_6O_3$.



Phenol, C_6H_6O.

Salicylic acid, $C_7H_6O_3$.

This change was some time since effected by Professor Kolbe, through the action of carbonic acid gas on phenol in presence of sodium. Last year he gave preliminary notice of his present method, in which soda at elevated temperatures takes the place of metallic sodium, and early in the present year the manufacture of salicylic acid from carbolic acid and sal soda by use of carbonic acid gas commenced at Leipsic.†

It is singular that the reverse of this change, the manu-

* Reprinted from the 'Proceedings' for 1875-6.

† Kolbe: *J. pr. Ch.* [2] viii., 41; in *Journ. Chem. Soc.*, 1874, 373.

facture of pure carbolic acid from the salicylic acid of wintergeen oil, was reported on by Broughton, the quinologist of the British Government in India, in 1871, as possibly a remunerative enterprise, at least "in case of war" or other occasion of increase in the English price. The oil was obtained from the *Andromeda Leschenaultii*, which grows in great abundance on the Neilgherry hills.*

These few instances of artificial synthesis in the aromatic group have acquired prominence on account of their relations to wealth and industry; but instances of almost equal scientific importance are thickly spread among the reports of every month.

The natural production of aromatic bodies does not wholly elude chemical investigation. Some of the chemical changes in the aromatic constituents of *the balsams* are striking illustrations of the well known characteristics of these bodies. Resins are produced from the terpene and cymene oils by atmospheric oxidation; and benzoic and cinnamic acids are produced from the aldehyde, alcohol, and ether of the cinnamic series, by oxidation; and without doubt these oxidations occur within coniferous trees, as well as more generally after exudation from the bark, and in the same way in the bottle on the shelf where light falls. As changes of oxidation, these are not representative of the vegetable kingdom; nevertheless they are in the direction of greater complexity of chemical structure.

The production of resins from terpene and cymene oils, now that these are seen to be aromatic hydrocarbons, explains the ease with which other aromatic bodies (benzene, toluene, phenol, etc.) are obtained from resins, —for it can now be more than surmised that in this round of changes the benzene ring is never broken.

In the summary of Wittstein, of the 114 natural orders, 28 are reported to contain resins; of these 28 orders, 16 contain essential oils with the resins and 12 do not. On the other hand, there are 45 orders containing volatile oils, 29 of them not being reported as containing resins. Of the 26 orders given as furnishing aromatic bodies other than resins and oils, one-half have resins.

To enter fully into an inquiry as to *the chemical history of the aromatic bodies in plants* would be to overstep the limits of this paper. Indeed, it may be thought that such an inquiry would overstep the present limits of science. Let us consider what preparation we have and what foundation we have for entering upon such an inquiry.

In the first place, we have some measure of acquaintance with the structure (or to be more modest, the chemical character) of aromatic compounds. We know something as to what a given aromatic substance can be formed from, and what can be formed from it, and the conditions needed in both cases. This knowledge is demonstrated by the large number of *syntheses* which chemical science has effected in the aromatic group. But we must be cautious about assuming that substances producible in the laboratory in a certain way must needs be formed in the plant in the same way. We must recollect that we have already often observed that a given chemical production may be effected in different ways. There are, well known, at least three different ways of bringing gallic acid out of gallotannic acid: fermentation by the natural ferment, "fermentation" by boiling, and oxidation. Bruise a bitter almond kernel with water, and by reason of the emulsin present, bitter almond oil and prussic acid arise in vapour and the solution becomes sweet with glucose. Again, boil the almond pulp with dilute sulphuric acid, and the bitter almond oil and prussic acid and glucose appear with another product, formic acid Vinegar may be rapidly formed from alcohol, in the air, (1) when at ordinary temperature there is the contact of a certain species of living cells; (2) when, without cells, there is platinum black present; (3) when, without cells or porous body, the oxygen is nascent; the change being in each instance through aldehyde by the same equation. Now, if the styrax benzoin contained naphthalin, it would not certainly follow that the benzoic acid of the plant was formed from this naphthalin, through phthalic acid, because such is the case in the factory.

In the second place, as foundation for a study of the chemical history of aromatic bodies in plants, we have but a very limited knowledge of the constituents of plants in general. The *analytical work* in organic chemistry is behind the synthetical work. The proximate analysis of plants needs to be made as thorough as possible: no constituent can be assumed to be unimportant. As an illustration, it was stated above that in a certain summary of plant constituents, of 45 orders reported to contain volatile oils, 29 were not reported to contain resins. Considering the known methods of analysis and the ordinary purposes of analysis, the question arises, how many of the plants analysed in these 29 orders do nevertheless contain resins? And, taking a given plant known to contain both resin and volatile oil, what results might not come from a series of careful quantitative analyses of the plant in different stages of its growth and of different parts of the plant? Before the natural formation of carbon compounds can be traced, and before generalizations as to nature's chemical methods can be attained, an enormous amount of work has to be done.

In this discussion, it is of course taken for granted that *the molecules of matter are formed and conserved by chemism;* as truly in the plant as in the rock. Chemism may be, as has been held, due to an attractive force; or it may be due to harmonies and co-ordinations of atomic motion, rotatory or oscillatory; molecules may be plane or solid forms, in gaseous or solid state; and it may be that we have in no case attained any correct conception as to what causes molecular combination; but, none the less, the effects we know, and their consummate order we know under the name of chemical law. For myself, this is quite enough. I have a profound sense that the cause of chemical action is beyond the comprehension of man and is near to the hand of God. I do not see that the chemist can assume any more responsibility for the construction of molecules in the test-tube than can the biologist for the growth of cells under the microscope. If we could see and measure the molecules we should doubtless be no nearer the comprehension of their formation than the biologist is to the formation of cells under his inspection. But whatever be the scope of the human mind in chemical science, it is a science that embraces all that we can know of the composition of matter. In living tissue, the elements (which in mixture would be but dust and gases) are *combined* into certain kinds of matter, and this combination (with transformation) fulfils the definition of chemical union.

In limitation, it hardly need be remarked, that when chemical action has formed the molecule it can do no more; it cannot make *the cell*, or any other structure or coherent mass formed of molecules, any more than the cell-making action can make the molecule. Now, as cohesion and as heat and other actions impel or retard or modify chemical action, it seems almost certain to be true that the action of cell organization must impel or retard or modify chemical action. We see that red-hot charcoal will, with oxygen, form carbonic anhydride, while cold charcoal will not; the heat is indispensable, but we do not conceive the carbonic anhydride to be a calorific compound. It is a chemical compound, whatever nonchemical actions are essential to its formation. And, if it should ever be settled that certain substances can only be formed in living cells, it is submitted that these substances must none the less be accepted and studied as chemical products.

* *Pharm. Journ. and Trans.*, Oct. 7, 1871.

Parliamentary and Law Proceedings.

PAPER PRESENTED TO PARLIAMENT.

SPONTANEOUS COMBUSTION OF COAL IN SHIPS.*

BY FREDERICK AUGUSTUS ABEL, F.R.S., AND JOHN PERCY, M.D., F.R.S.

The so-called spontaneous development of heat which occasionally takes place in coal, is due to chemical changes which certain substances occurring in it undergo through the agency of atmospheric oxygen, and which are liable to acceleration by some conditions attending the storage or transport of coal.

The substances, the oxidation of which is attended by the development of heat, are iron pyrites (and possibly some other combinations of sulphur), and some carbo-hydrogen compounds, forming part of the coal itself, which are comparatively readily oxidizable.

Iron pyrites is of almost universal occurrence in coal. The condition in which it exists differs considerably in different kinds of coal; in some it is distributed so as not to be detectable by ordinary inspection, in others it is in form of more or less conspicuous laminæ of a brass yellow colour; occasionally small distinct crystals of cubical form and bright metallic lustre are observed, and not unfrequently it is found in nodules (known as "brasses") and layers of considerable dimensions.

Iron pyrites, a compound of sulphur and iron known as disulphide of iron, occurs in the mineral kingdom in two crystalline forms, which are identical in chemical composition. Pyrites vary greatly as regards their stability or their liability to undergo oxidation by contact with the atmosphere. Some, after remaining unchanged during long periods of exposure, will undergo oxidation without any immediately apparent inciting cause. Others are perfectly stable, and with others oxidation follows with more or less rapidity upon their exposure to the atmosphere.

The presence of moisture in air promotes the oxidation of pyrites; it does so apparently by bringing the atmospheric oxygen into more intimate contact with the surfaces of the oxidizable material. Similarly, the absorption of moisture by mineral substances of laminated or porous structure, through which pyrites are disseminated, promotes the oxidation of the latter by bringing the atmospheric oxygen, which is dissolved by the water, into more intimate contact with the oxidizable material.

Thus, the oxidation of pyrites in alum schist is accelerated, in the manufacture of alum therefrom by occasionally watering loose heaps of the mineral which are piled in such a manner that the access of air to the interior can be regulated.

The oxidation of pyrites (as in most instances of chemical action) is accompanied by the development of heat, which may accumulate to such an extent as to lead to the ignition of highly oxidizable constituents of minerals through which it is distributed. Heaps of alum schist exposed to the air and moistened will become heated to an extent to lead to the ignition of the carbonaceous constituents of that mineral, and similarly coal, through which pyrites are disseminated, may become heated to the point of ignition by the oxidation of pyrites disseminated through it.

Sulphur exists in coal in other forms of combination than that of iron pyrites. Thus sulphate of lime is occasionally disseminated through coal; the existence of sulphur in this form cannot give rise to the development of heat, as it is already in the completely oxidized or burnt condition; however, so far as is known they have not been found to possess any liability to spontaneous heating by oxidation. Some descriptions of coal or shale have been found to contain sulphur in somewhat considerable quantity in combination with carbon and hydrogen. An example of this is furnished by the so-called "resiniferous shale" occurring in Tasmania, which has been found to contain as much as five per cent. of sulphur in combination with carbon and hydrogen.

So far as is at present known, the spontaneous heating of coal is not ascribable to any tendency of such sulphur combinations to oxidation by atmospheric agency.

Pyrites appear therefore to be the only sulphur combinations occurring in coal, which by their oxidation, promoted by the presence of moisture and by mechanical conditions favourable to the accumulations of the heat developed by such oxidation, are liable to give rise to the so-called *spontaneous ignition* of coal.

Coal varies considerably not only in chemical composition, but in structure, some varieties being comparatively open and porous, others compact or laminated, and very friable or readily broken up.

Carbon in a finely divided or porous condition has the property of absorbing and condensing within its pores large volumes of certain gases, among which is oxygen.

Thus, wood charcoal which has been recently produced, or which has been freshly heated sufficiently to expel moisture and gases which it may have absorbed, will condense within its pores more than nine times its own volume of oxygen, and seven times its own volume of nitrogen, which it is capable of absorbing by exposure to the air.

The condensation of a gas by a porous body is attended by the development of heat, proportionate to the extent of that condensation. Moreover, the tendency to oxidation which carbon, and certain carbon compounds existing in such a substance as charcoal, possess, is favoured by the condensation of oxygen within its pores, whereby the very intimate contact between the carbon and oxygen particles is promoted. Hence the development of heat and the establishment of oxidation occur simultaneously; the latter is accelerated as heat accumulates, and chemical action is thus promoted and may in course of time proceed so energetically that the carbon or carbo-hydrogen particles may be heated to igniting point.

A good illustration of this action is afforded by the very porous charcoal prepared for the manufacture of gunpowder. It has to be protected against rapid access of air for some considerable time after it has been removed from the carbonizing retorts (by transferring it at once from the retorts to metal receptacles which are kept tightly closed for a number of days), otherwise the charcoal, though it may have been allowed to cool down perfectly, will speedily become heated upon exposure to air, by the action above explained, to such an extent as to ignite spontaneously. Even after the stick charcoal no longer exhibits any tendency to heating when exposed, its pulverization by grinding has still to be delayed; otherwise, when the absorption and condensation of oxygen by the internal portions of the pieces of charcoal become favoured by the reduction of these to a fine state of division and the consequent exposure of large surfaces to the air, ignition of the charcoal will take place. (Instances of such ignition upon the mill beds at powder works are not unfrequent.)

The spontaneous ignition of oiled cotton or silk waste, or cloths, which is of not unfrequent occurrence, affords another illustration of the manner in which the heat developed by the action of atmospheric oxygen upon readily oxidizable substances, consisting chiefly of carbon and hydrogen, which are exposed to that action under conditions very favourable to it, will readily accumulate to an extent sufficient to give rise to ignition. The porous cotton or silk waste serve, in such cases of spontaneous ignition, as vehicles for exposing the readily oxidizable oil or grease in a finely divided condition to the air, and thus favouring its rapid oxidation.

The foregoing explanation of the manner in which the spontaneous heating and eventual ignition of certain carbonaceous substances by the action of atmospheric oxygen

* From the Report of the Royal Commission.

are brought about, has a direct bearing upon the spontaneous ignition of coal. The more porous and readily oxidizable portions of coal, which are known to be more or less largely disseminated through seams from different localities, undergo oxidation by absorption of atmospheric oxygen, and by the exposure of large surfaces to its action, and the heat developed by that action will accumulate under favourable conditions to such an extent as soon to hasten the oxidation and the consequent elevation of temperature, until some of the most finely divided and readily inflammable portions actually become ignited.

The breaking up of the coal, which occurs for a more or less considerable extent before and during its shipment, obviously favours the absorption of oxygen, and consequently increases a tendency to heating by the action above described.

In a series of valuable experiments on the weathering of coal, by Richters and others, it has been demonstrated that a considerable quantity of oxygen is absorbed by freshly gotten coal, and that carbonic acid and water are evolved from such coal after absorption of oxygen, while a portion of the oxygen absorbed is fixed by the formation of some solid oxygenated compound in the coal. Spontaneous oxidation of coal by the oxygen absorbed from the air is therefore satisfactorily established, and is unquestionably one, if not the chief, cause of the spontaneous heating of coal.

Spontaneous ignition of coal, when due to the oxidation of the porous and readily oxidizable carbonaceous substances occurring in coal, does not appear to be favoured by the presence of water in the coal or by its access to a cargo; on the contrary, these portions, by becoming wet, would have their pores more or less filled with water, and their power of absorbing oxygen would be proportionately diminished; hence the presence of water must be antagonistic to the oxidizing action of the latter in many instances, though, when iron pyrites is present, it may promote or accelerate spontaneous heating as already pointed out.

The gases which are occluded (or confined in a more or less condensed condition) in coal, vary considerably in quantity and composition in different kinds of coal, and they also gradually undergo various changes in composition by exposure or keeping of the coal.

Their chief inflammable constituent is marsh gas, and it is to the admixture of this gas with a *considerable* volume of air that *explosions* are due in freights or stores. In pits where explosions are liable to occur, the gas escapes either with more or less rapidity and force from fissures ("blowers"), or gradually from the freshly exposed surfaces of coal seams. When coal from such pits is brought to the surface it continues slowly to evolve inflammable gas for some time afterwards, especially if the coal be in large masses or stored in compact heaps.

If facility is not afforded for the ready escape or removal into the open air of the inflammable gas emitted from the coal composing a cargo or contained in bunkers on board ship, the spaces between the masses of coal, or any partially confined spaces not occupied by the coal but in close proximity to or communication with it, will in time become filled with a mixture of the gas with the air in those spaces, which, unless the former be present in very small proportions, would explode on the approach of a flame to it, and with a violence depending upon the proportion which the air bears to the inflammable gas which has become diffused through it,

As the application of flame (or of a body raised to a high red heat) is indispensable to the ignition of mixtures of air with the inflammable gas evolved from coal, it is obvious that *explosions* cannot occur spontaneously from this cause on board ship, but must be brought about by the accidental or incautious approach of a light to localities where the coal is stored, or where the explosive mixture is likely to penetrate.

If coal, from seams which are charged with marsh gas, is placed on board ship shortly after being raised from the pit, there is obviously great liability to the formation of an explosive atmosphere in the hold or bunkers, or spaces communicating with them, and every possible means should in such cases be had recourse to for facilitating the escape of gas from the coal into the open air.

But, as the gas requires a large admixture of air to render it violently explosive, it is obvious that any attempt to ventilate the coal by passing or drawing air into the body of the freight would be most likely to favour the production of a violently explosive mixture of gas and air. The only useful application which might be made of any special means of ventilation with a view to diminish the risk of *explosions* would be to pass a current of air *over* the coal and immediately into the open air, so as to accelerate the escape and removal of the inflammable gas.

As regards the application of ventilation with a view to reduce the liability to spontaneous *ignition* of a cargo of coal, the only useful object which could *possibly* be aimed at by ventilation would be the rapid abstraction of heat developed in the coal (by chemical changes set up as described) by causing cool air to circulate freely and rapidly throughout the *body* of a mass of coal. The attainment of such a result, even by powerful means of artificial ventilation, elaborately applied, and with the coal in the mechanical condition most favourable to its free permeation by air, appears, to say the least, very doubtful, and there can be no question that any system of ventilation practically applicable on board ship would fail to attain such a result, even disregarding the fact that the mechanical (finely divided) condition of much of the coal constituting a cargo is quite antagonistic to the free passage of air through its mass.

It does not appear practicable, therefore, to apply ventilation with any prospect of guarding against the accumulation of heat in some portion of a cargo of coal. Such circulation of air as may be established even in the less compact portion of the cargo is not likely to have any valuable cooling effect, and the circulation, if there be any, must be very feeble among the more closely lying masses of small coal, so that heat, if developed in these will accumulate undisturbed. Indeed, its development would possibly be favoured by the fresh supply of oxygen which a gradual replacement of the air surrounding these parts would convey, so that a period would be reached sooner or later when the development of heat would be most seriously promoted by ventilation, some time before actual ignition demanded the total exclusion of fresh air.

The evidence which has been submitted to the Committee on the subject of the ignition of coal cargoes bears out generally the conclusion to which the above considerations lead, namely, that it is inadvisable to attempt *through ventilation* of cargoes in coal-laden ships.

Alleged Poisoning in a Sewer by Refuse from a Chemical Works.

On Monday last Mr. Carter resumed, at the Duchess of York, Battersea, the inquiry into the cause of the death of John Thomas Lomas, a flusher in the employ of the Wandsworth and Battersea District Board of Works. It appeared from evidence that in the centre of the New Road, which connects the Wandsworth Road with the Battersea Old Road, are situate the works of the Messrs. Wallace, manufacturing chemists. From time to time the noxious emanations from the sewers had been so bad that an indignation meeting was called and a memorial drawn up asking the interference of the Metropolitan Board of Works. It was understood that some steps were about to be taken when the fatal accident in question occurred. Mr. Straight represented the Metropolitan Board of Works, Mr. Besley the District Board, and Mr. Pettengill, solicitor, the Messrs. Wallace.

George Gates, a flusher employed by the Wandsworth

District Board, said that on the 9th inst. he was working at the sewer in the New Road with the deceased and two men named Scott and Prester. At a distance of 14 yards from the manhole in St. George's Road, they proceeded to remove the deposit at the bottom, 14 inches of sand, gravel, and other matter which prevented the flow of water through the sewer. They had been working about five minutes when they perceived a smell as of gas and sulphur coming down the sewer. It soon became unbearable, and they endeavoured to reach the manholes. The gas seemed to come from Wallace Place. Witness went as fast as he could towards the Battersea Road, and the others the other way. He could not run, the sewer being only 3ft. 2in. high. He fell down before he got to the entrance and lost his senses in consequence of the dreadful smell. When he came to he found himself sitting on the ground at the opening of the sewer, and some one tending him. He went to the manhole at the other end and looked down, but could not see the others. He called, and, hearing nothing, went down. He first saw Scott lying in the water with his head on the step of the manhole. Procuring assistance he got him out of the sewer. He went for Prester, who was drawn out and placed on the pavement. He then went down for Lomas but the stench drove him back. He waited a little time, and then re-entering the sewer found the deceased lying about 6 feet inside in the water, dead. He was pulled out and laid on the pavement. Witness again became very ill. They had worked in the sewer four days, but smelt no sulphur during that time. It came upon them suddenly from the direction of Messrs. Wallace's works. They had not been so high up the sewer before, but they had had strong smells once or twice at night time, and the man who is dead and Scott were nearly killed on one occasion. By Mr. Besley.—The water as it came down made a hissing noise like opening ginger beer, They felt the effects of it before they heard it, and could only see it 4 yards off them. It was like sulphur combined with gas, and they had noticed this on their lamps before dinner. By Mr. Pettengill.—He did think when they turned the overflow water on from the waterworks that the flow was 3 miles an hour. There would be 18 inches of water then, and 8 or 9 when it was not on. The water did not flow fast enough at usual times to take the ordinary sewage with it, and it became solid at the bottom of the sewer. It was their work to clear away the solid matter. They knew by smell the difference between what came from private houses and what came from manufactories. He could not say what other works flowed into this sewer. They did smell gas in different sewers of different kinds but the smell that day was quite unusual, quite different from anything he had smelt before. There was a block in the sewer 18 yards from the St. George's Road manhole, and the water hardly flowed over it in consequence of the depth of the bank of deposit.

Mr. George Frederic Burroughs, surgeon, of Queen's Road, Battersea, said that on Wednesday the 9th inst., he saw the deceased and the other men brought up from the sewer. He believed the deceased had inhaled some noxious vapour, but could not say what it was. He might have become stupefied and falling into the sewage water been drowned. The most common gas generated in sewers was sulphuretted hydrogen, but he could not say how it was generated. The sensation mentioned by the last witness would not, however, be produced by that. His attention had been many times called to the foul gases coming from the sewer. Patients in St. George's Road, New Road, and Sussex Street had complained of illness and inflammation of the throat caused by the brimstone smell from the sewers and drains. The ventilators in the road near the chemical works were frequently emitting dense hot vapour in the evening, and he himself had felt its ill effects when driving over the spots.

John Scott said he had worked in the sewers. At the time in question the lanterns suddenly went out and witness felt a choking sensation in his throat and a smell like burning brimstone. He staggered back and fell down senseless. In reply to Mr. Besley witness said that just before the lights went out he noticed black froth coming down the tideway of the sewer. It made no noise, and the smell was like that of burning brimstone matches. On coming to his senses he saw a man in the employ of Messrs. Wallace standing at the window. He said to witness, "Well, Jack, they have put it on you three quarters of an hour too soon this time." The flushers were not able to go near the outfall from Messrs. Wallace's premises in consequence of the foul smells and the steam. They had another narrow escape two months ago, and he went up to the works and said to Mr. Wallace, jun., "Are you aware that you are putting that hot stuff in again?" The fireman said "No!" Mr. Wallace ordered some cold water to be turned on to cool it, but there was none to send down the pipe. Witness showed him the hot steam coming out of the sewer through the ventilator in the street and the manhole. In consequence of there being no cold water the men were unable to continue their work in the sewer that night. They always worked in safety except when the stuff was sent into the sewer from the chemical works. About Christmas last he assisted Prester to clean out a communication pipe and drain of Messrs. Wallace; but it was filled up with a hard deposit of lime and a blue substance, which burnt their hands fearfully, and turned them all sorts of colours. When put into water the pain increased. The smell from that drain was similar to that which pervaded the sewer when the deceased was killed. Mr. Pettengill cross-examined the witness with the view of showing that the deadly gas had escaped from the deposit in the bed of the sewer; but the witness said that he had no doubt that it came from the works. In reply to the jury, witness said Messrs. Wallace never gave the sewer men any warning when they were about to turn on the hot refuse. The inquiry was again adjourned for a fortnight.—*Times*.

Poisoning by Cyanide of Potassium.

On Friday August 18, Mr. W. J. Payne, held an inquiry at the Workhouse, Mint Street, Southwark, into the cause of the death of Edward Holmes, aged 39, hairdresser, who, it was alleged, died from the effects of poison, in a coffee-house in St. George's Circus, Blackfriars, on the morning of Tuesday last, under somewhat suspicious circumstances. The first witness was Mrs. Jane Holmes, wife of the deceased, who said that her husband suffered greatly in his head, and also from heart disease. He was in pecuniary difficulties, owing to his business not prospering. He took great interest in the Bravo case, and said it was a mistaken idea that poison could not be procured easily. He once remarked that the easiest death was from cyanide of potassium. On Sunday last he was greatly excited, owing to the outbreak of a fire at his shop, but it was only a slight one. On Monday morning he vomited a great deal, but, after partaking of a little brandy, he seemed to recover. Mr. Irving, a clerk, said he met the deceased on Monday last, when he appeared rather excited. Their conversation turned upon the Bravo case and the easiest methods of committing suicide. Dr. T. M. Donahoo, said he had made a *post mortem* examination of the body of the deceasad. He assigned the cause of death to an overdose of cyanide of potassium, as all the organs smelt strongly of that drug. He found a tumbler in the room containing a large quantity of this poison; and in a packet handed to him by the police was seven ounces of the poisonous drug. His death must have taken place within three minutes after partaking of it. He believed that the packet contained eight ouuces of the drug, and the word "poison" was marked upon it. Fanny Smith, 25, who stands charged on suspicion of having caused the death of the deceased, said she met the deceased on Monday night last, at about half-past eleven, in the Westminster

Bridge Road, after which he accompanied her to the coffee-shop in question. He was quite sober, but she was not. About a quarter to five she shook hands with him, and the deceased told her to tell the landlady not to call him until nine o'clock. She never saw anything of the poison. The jury returned a verdict of "Suicide while of unsound mind."

Poisoning by Phosphorus Paste.

On Friday, August 18, Mr. W. J. Payne held an inquiry at the City Arms, Old Kent Road, into the death of Eliza Mayberry, aged 70, who had destroyed her life by poison.

It appeared that deceased lived with her son. She became very querulous and unhappy, and said she was a burden to every one about her. On the previous Thursday week she told her son she had taken poison, having purchased two bottles of phosphorus paste, used for killing vermin, at an oil shop close by, and taken the whole quantity, as she was tired of her life. She succumbed to the poison on Thursday.

It came out in the course of the inquiry that a cabman, whose wife recently poisoned herself with phosphorus paste, frequented the son's shop, and the circumstance of the poisoning had frequently been the the theme of discussion in the family, the deceased having heard the facts detailed in the accounts of the inquest.

A verdict of "Suicide while of unsound mind" was returned.—*Standard.*

Poisoned by Paraffin.

On Wednesday an inquest took place in reference to the death of Captain Morgan Davies, of the ship Ocean Child, of Portmadoc. On Monday Captain Davies was assisting in superintending attempts made to float the Turkestan, a large iron vessel stranded on Harlech beach in February last. Tired and thirsty, he went into the cabin and incautiously seized a jar, believing it contained water. He hastily drank a quantity of the contents, which proved to be paraffin oil. Deceased became insensible, and expired within a few hours.—*Standard.*

Notes and Queries.

[523]. INDIAN BAEL SHERBET.—For notices of "Indian Bael Sherbet," S. W. should refer to Ainslie's 'Materia Indicæ,' vol. ii., p. 189; Pereira's 'Materia Medica and Therapeutics,' vol. ii., pt. ii. (1857), p. 550; Waring's 'Manual of Practical Therapeutics,' 2nd ed., p. 42; and 'Pharmacopœia of India,' p. 46. Waring gives the following formula for its preparation:—

"Take of the soft gummy substance from the interior of the fruit two fluid ounces, mix this with three to four fluid ounces of water, sweeten to the taste, and add—if procurable—a lump of ice."—R. B.

Obituary.

Notice has been received of the death of the following:—

On the 3rd of August, 1876, Mr James Wright, Pharmaceutical Chemist, Chesterfield. Aged 66 years. Mr. Wright had been a Member of the Pharmaceutical Society since 1853.

On the 7th of August, 1876, Mr. Reuben Madge Milton, Chemist and Druggist, 246, High Street, Exeter.

On the 14th of August, 1876, Mr. Charles Septimus Gibson, Chemist and Druggist, Haydon Bridge, Northumberland. Aged 60 years.

On the 24th of May, 1876, at his residence, East St. Kilda, Mr. William Ford, Chemist and Druggist, of Swanston Street, Melbourne. Aged 50 years. Mr. Ford was a native of Macclesfield, Cheshire, but had been nearly thirty years in business in Victoria. We gather from the local newspapers that the deceased gentleman was held in great respect in the colony, which was evinced by the attendance of leading citizens who followed his remains to the St. Kilda Cemetery, the procession being one of the largest which has followed any old colonist for some years. Though the funeral did not pass through Melbourne, a large number of the principal places of business partially closed their premises during the afternoon.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Impurities in Sulphur Præcipitatum.

Sir,—It appears from the experiments made by Mr. Miller, and described in his letter published in your issue of the 12th inst., that sulphur præcipitatum contains other impurities besides that which I alluded to in the discussion of the subject at a meeting of public analysts, and that I was probably wrong in representing as persulphide of hydrogen the dark coloured mud that subsides after dissolving the sulphur in bisulphide of carbon. I should, perhaps, have said that it afforded evidence of that impurity in the sulphur. Mr. Miller found that after washing and drying the mud it consisted chiefly of calcium, iron, chlorine, and sulphur. If he had traced the reaction a little further he might have ascertained that sulphuretted hydrogen was given off. I considered the escape of this gas on allowing the solution to stand, and the presence of sulphur in the insoluble residue left, sufficient to justify the conclusion that persulphide of hydrogen existed in the mud, and gradually broke up into those products. Professor Rose came to the conclusion, many years ago, that precipitated sulphur contained persulphide of hydrogen, which was persistently retained there until broken up by the application of heat. I have found evidence of its being similarly broken up when the sulphur is dissolved in bisulphide of carbon.

The most important result of this inquiry, however, is, that precipitated sulphur contains impurities that are not present in milk of sulphur, and especially that when dissolved in bisulphide of carbon sulphuretted hydrogen slowly escapes and a residue of electropositive sulphur is left. Under similar circumstances milk of sulphur yields a clear solution of sulphur free from impurity, leaving a residue of a white and satiny crystalline salt of lime. A minute quantity of sulphuretted hydrogen escapes when the solution is made, but the result in this respect is very different from that which occurs when precipitated sulphur containing the same quantity of sulphur is similarly treated. Pure bisulphide of carbon should of course be used in this experiment.

I advise those pharmacists who are accustomed to lecture their customers on the folly of using what they are pleased to call impure milk of sulphur in preference to the so-called pure precipitated sulphur, to make themselves acquainted with the state in which the sulphur exists in those two preparations, by the simple experiments I have indicated. If they fairly represent the case and can induce the public to prefer the sulphur mixed with black mud which breaks up with evolution of sulphuretted hydrogen, to the comparatively pure, tasteless, and easily administered milk of sulphur, by all means let them do so. For my own part, having had some experience in the use of both, I prefer the latter and consider it quite as efficacious as the other, and far more agreeable.

I hope it will not be considered that anything I have said here or elsewhere has been intended in the slightest degree to justify or excuse the substitution of milk of sulphur for precipitated sulphur, when the latter is asked for or ordered. I should be glad to see the two names always similarly applied, the latter to the preparation ordered in the British Pharmacopœia, and the former to the more generally used and popularly appreciated article prepared in accordance with instructions given in the London Pharmacopœia of 1721. If pharmacists acted consistently in this respect, it would facilitate the supplying of the public with the articles they prefer or require, and relieve druggists from an imputation which has been frequently cast upon them unjustly.

T. Redwood.

17, *Bloomsbury Square.*
August 21, 1876.

Chemists and Druggists' Trade Association.

Sir,—From the remarks expressed at the last meeting of the Council I consider it fair to infer that the President regards the new trade association as in some degree antagonistic to the Society; I therefore beg to state that so far as I can learn no such feeling animates the minds of the members. Our object is to establish a large and compact association to protect and advance the trade interests of chemists and druggists. I would ask are there not questions to be considered which may affect us in a pecuniary point of view, such as the working of the Adulteration Act and other matters which I need not here specify? Every one, will, I think, answer in the affirmative. "Making up one's mind" is an operation that takes different durations of time in various individuals, but as the meeting of the Chemists and Druggists' Trade Association convened to meet in Glasgow on Friday, September 8, will welcome any member of the trade, I trust that all who have the opportunity will come and ascertain for themselves whether our objects are desirable, and if the proposed plans of obtaining them are reasonable.

S. U. Jones.

4, *Upper Parade, Leamington,*
August 21, 1876.

"Spoonfuls."

Sir,—The untimely death of the child, Ernest Ward, reported in your issue of last week, by an overdose of medicine, apparently through its being measured in an ordinary household spoon, causes me to pen these few lines in the belief that the suggestion therein contained will be of some practical value. In the early days of my apprenticeship I well remember a medical man coming into the shop in a terrific rage declaring he would never order medicines by tablespoonfuls as long as he lived, as his patient for whom he had prescribed some powerful drug had swallowed in five doses what should have made him three more. Fortunately no unpleasant result followed, but it might have done. From the circumstance I learnt a lesson which I have constantly borne in mind. I have always been educated that in medical use the terms tea, dessert, and tablespoonfuls represent one, two, and four drachms respectively; there can be no doubt that this is the general acceptation of the terms, both in the trade and the profession; there may be a few exceptions, but I think a dispenser would never be censured for adhering to this rule. I do not think the term spoonfuls can be discarded with any advantage. When practical I always use well graduated bottles and translate "spoonful" with an explanation in brackets, thus: coch. mag. duo—two tablespoonfuls (*i.e.*, one-eighth part). This division into parts, however, becomes inconvenient when dessert and teaspoonful doses are ordered; thus one thirty-second part of a 4 oz. mixture would require a skilled hand to pour out correctly. The following label is one I have long used and I think gets over all difficulties:—"Household spoons should not be used for measuring medicines. This bottle contains —— doses." It gives a caution; and if it does not give the whole information required, it gives sufficient to cause the individuals to seek the remainder at the proper source and if they do not then choose to supply themselves with correct measures the dispenser has shown his carefulness and exonerated himself from all blame.

What we have need to do is to impress upon the public the fact that a medicinal spoon and a household spoon are two distinct measures, and not for us to alter a custom which has worked well for ages; for to try and adapt our directions to spoons of such variable capacity as those found in general use would only make matters much more complicated than they are at present.

John Ingham.

Upper Tooting, August 22, 1876.

Sir,—A most striking case of the danger attending physicians ordering teaspoonful doses came under my notice on Friday, the 18th inst.—viz.: a prescription was brought to me to be dispensed containing the following:—

℞	Quinæ Disulph.	ʒj
	Aqua Dest.	℥iij
	Acid. Sulph. Dil.	ʒ
	Syr. Aurant.	℥j

Sign. One teaspoonful twice a day in a wineglass of water.

Knowing the great difference in teaspoons I asked the person to let me see the teaspoon she was going to use, which she did, and it measured just 120 minims, equivalent to two medicinal teaspoons; so instead of the patient getting not quite 4 grains, she would get over 7 grains of quinine a day.

Harry Hyne.

132, *Seymour Place. Bryanston Square.*

"*Syrupus, P. B.*"—(1) *Epilobium montanum;* (2) *Hypericum perforatum;* (3) *Galium verum;* (4) *Achillea Millefolium;* (5) *Pastinaca sativa.* We cannot recommend you a better book for the price mentioned. The leading characters are italicised in Babington.

W. J. Lewis.—(a) *Scrophularia aquatica;* (b) *Cynoglossum officinale;* (g) *Geranium Robertianum;* (d) *Epilobium parviflorum;* (e) *Lychnis diurna.*

"*Iota.*"—(1) *Verbascum Thapsus;* (2) *Odontites rubra;* (3) *Medicago sativa;* (4) *Reseda luteola;* (5) *Lychnis Vespertina;* (6) *Calamintha Clinopodium;* (7) *Poterium Sanguisorba;* (8) *Bryonia dioica.*

"*Pleurenchyma.*"—(1) *Inula Conyza;* (2) *Stachys Betonica;* (3) *Erythræa Centaurium;* (4) Send specimen with better leaves; (5) *Scabiosa Columbaria;* (6) *Calluna vulgaris.*

A. Mitchell.—*Hypericum perforatum.*

"*Modified.*"—We believe a translation is published by Allman, Holborn.

"*Alpha*" (Saltaire).—Mr. J. R. Upton, Apothecaries' Hall, Blackfriars, E.C.

W. M.—(1) *Senecio Jacobæa;* (2) *Campanula latifolia;* (3) *Valeriana sambucifolia;* (4) *Knautia arvensis;* (5) *Malva sylvestris;* (6) *Centaurea nigra.* The Curator of the Museum would be glad to receive a good specimen of No. 2.

"*Juvenis.*"—*Vapor Pini sylvestris* (T. H. P.)—

Oil of Scotch Pine (Fir-wool oil) .	2 fl. drachms.
Light Carbonate of Magnesia . .	60 grains.
Water to	3 fl. ounces.

Mix. A teaspoonful in a pint of water at 150° F. for each inhalation.

J. B. W. (who should have sent his name and address).—We do not recognize the book you describe. Perhaps Beasley's 'Chemist's Receipt Book,' published by Churchills, would meet your requirements.

J. Arnold.—(1) The sulphate containing two molecules of quinine to one molecule of sulphuric acid is the true neutral sulphate corresponding to sodium sulphate Na_2SO_4. For a description of the Sulphates of Quinine, and their formulæ see Dr. Hesse's 'History of the Cinchona Alkaloids,' *Pharm. Journ.*, 3rd series, vol. iv., p. 570. (2) The formula of cellulose is now usually represented as $C_6H_{10}O_5$. See Watt's 'Dictionary,' vol. i., p. 818.

Communications, Letters, etc., have been received from Mr. Courtenay, Mr. J. Garrett (Leicester Association), Mr. Wilkinson.

THE WATER OF CRYSTALLIZATION IN QUININE SULPHATE.

BY A. J. COWNLEY.

Whilst the quantity of water of crystallization existing in freshly prepared and uneffloresced quinine sulphate is enveloped in some doubt, owing to the efflorescent character of this salt of quinine, and the question whether it contains 7 molecules of water according to Regnault, 7½ as given by Jobst and Hesse, or 8 molecules as stated by Schorlemmer, has still to be determined, it seems to be very generally stated that the anhydrous sulphate is only obtained at a temperature exceeding 110° C.

Jobst and Hesse, as quoted by Watts, state that at 110° to 120°C. the salt loses the whole of its water of crystallization, and the same temperature is given by Millon and Coumaille as well as in Husemann's 'Pflanzenstoffe' for 1870, with the additional statement that at 100° C. the sulphate contains 2 molecules of water. This latter view and the opinion that the salt is then identical with the air dried salt as regards hydration, seem to have been adopted as correctly representing the condition of quinine sulphate at that temperature.

The following experiments show that quinine sulphate really becomes anhydrous at 100° C., and when freely exposed to the air in this condition it rapidly absorbs water until it has the composition of a sulphate with two molecules of water, but when the access of air is retarded the water of crystallization is of a varying quantity and bears no constant relation to the salt until 2 molecules have been absorbed; also that freshly prepared quinine sulphate probably does contain, as stated by Jobst and Hesse, 7½ molecules of water, and that the salt in this condition when freely exposed to air rapidly effloresces until it attains the composition of a sulphate with 2 aq.

(1) Quinine sulphate dried at 100° becomes anhydrous. No further loss ensues when the temperature is increased to 120°.

Sample (*a*)

(1) ·2765 grm. gave ·0865 grm. SO_4Ba = ·03638 grm. SO_4H_2 = 13·15 per cent. SO_4H_2.

(2) ·287 grm. gave ·090 grm. SO_4Ba = ·03715 grm. SO_4H_2 = 13·18 per cent. SO_4H_2.

Sample (*b*)

(1) ·2475 grm. gave ·077 grm. SO_4Ba = ·03238 grm. SO_4H_2 = 13·08 per cent. SO_4H_2.

(2) ·3955 grm. gave ·1245 grm. SO_4Ba = ·05193 grm. SO_4H_2 = 13·13 per cent. SO_4H_2.

Sample (*c*)

(1) ·26325 grm. gave ·08225 grm. SO_4Ba = ·03459 grm. SO_4H_2 = 13·13 per cent. SO_4H_2.

(2) ·32425 grm. gave ·10175 grm. SO_4Ba = ·04279 grm SO_4H_2 = 13·19 per cent. SO_4H_2.

	Theory.		Found as mean of six experiments.
$(C_{20}H_{22}N_2O_2)_2$ =	648 =	86·86	
SO_4H_2 =	98 =	13·14 =	13·15
	746	100·00	

(2) Freely exposing to air on watch glasses—(*a*) the anhydrous sulphate; (*b*) the sulphate containing 7½ aq.:—

(*a*) The anhydrous sulphate—

1·269 grm. in 3 hours became constant, and – 1·333 = ·064 gain, or 4·8 per cent. of water contained in air-dried salt.

	Theory,		Found,
$(C_{20}H_{24}N_2O_2)_2$ =	648 =	82·81 . . .	——
SO_4H_2 . . . =	98	12·53 . . .	——
$2OH_2$ . . . =	36	4·60 . . .	4·80
	782	100·00	

(*b*) The sulphate containing 7½ molecules of water as determined in Experiment 4—

1·015 grm. required 28 hours to become constant, and gave ·9045 = ·1105 loss = 10·88 per cent. lost by the fully crystallized salt.

Theory requires 11·24 per cent. to be lost for the salt to contain 2 molecules of water.

(3) Not freely exposing to air the salt which has been dried at 100° C., but exposing it in an unstoppered tube. The same quinine sulphate was taken as in Experiment 2:—

(*a*) 1·37975 grm. constant at 100° in 4 hours = 1·393 gram = ·01325 gain = 0·96 per cent. of water in hydrated salt.

1·37975 grm. constant at 100° in 19 hours = 1·421 gram = ·04125 gain = 2·96 per cent. of water in hydrated salt.

(*b*) A smaller quantity was taken—

·9015 grm. constant at 100° in 4 hours = ·9175 gram = ·01575 gain = 1·71 per cent. of water in hydrated salt.

·9015 grm. constant at 100° in 19 hours = ·94225 gram = 0·4075 gain = 4·32 per cent. of water in hydrated salt.

It appears, therefore, that when quinine sulphate which has been rendered anhydrous is exposed to the air it very slowly absorbs the quantity of water corresponding to normal air-dried sulphate, that is to $(C_{20}H_{24}N_2O_2)_2SO_4H_2 + 2Aq$.

In Watts' 'Dictionary' it is stated that the anhydrous sulphate on exposure to moist air absorbs 4·87 to 5·1 per cent. of water, a statement which is borne out by my experiments, but it is stated in a note that "4 atoms = 4·82 per cent."; but inasmuch as the formula for quinine sulphate is given in the new notation at the head of the article, this evidently should be 2 atoms = 4·82 per cent., a result theoretically required. I am induced to refer to this point as it was assumed in some quinine experiments published a short time since, and on which certain conclusions were based, that the air-dried salt contains 4 atoms of water of crystallization.

(4) The composition of freshly prepared and uneffloresced quinine sulphate—

(*a*) 1·49775 gram lost 0·22875 = 15·27 per cent.

(*b*) 2·32275 grams lost 0·3555 = 15·3 per cent.

No further loss at 120° C.

(*c*) Dried at 120° C. 1·061 gram lost 0·16 = 15·08 per cent.

(*d*) ·2485 gram gave 0·066 SO_4Ba = ·02776 SO_4H_2 = 11·17 per cent.

(*e*) ·35375 gram gave 0·095 SO_4Ba = ·03995 SO_4H_2 = 11·29 per cent.

	Theory,		Found,		
			Water determined at 100° C,		Water determined at 120°
$(C_{20}H_{24}N_2O_2)_2$ =	648 =	73·56			
SO_4H_2 . . =	98 =	11·12	11·17	11·29	——
$7\frac{1}{2}OH_2$ . . =	135 =	15·32	15·27	15·30	15·08
	881	100·00			

These last experiments also give additional evidence that quinine sulphate is rendered anhydrous at 100° C.

NOTES ON INDIAN DRUGS.

BY W. DYMOCK.

(*Continued from p.* 172.)

BOSWELLIA SERRATA.—*Local name in Khandesh,* GUGAL.

The gum resin, Gugal. I am indebted to Dr. Jones, Civil Surgeon, Dohud, for specimens of this tree and its produce, which corresponds exactly with the Gugal of commerce—viz., irregular lumps, covered more or less with dirt and hair, to which portions of papery bark as well as the thick inner bark sometimes adhere; of a greenish yellow colour, with an occasional tinge of red; consistence waxy; odour peculiar and balsamic; taste bitter and balsamic. Gugal forms a greyish-white emulsion with water. In the Indian Pharmacopœia and other works it appears to have been confounded with Indian Bdellium, or as it is sometimes called, Bysabol Gugal. This has a peculiar mushroom odour, and is in appearance much like African Bdellium; it is the produce of a Balsamodendron. Through the kindness of Dr. Holmsted I have received a specimen from Sind as the produce of *B. Mukul,* which exactly corresponds with the commercial article; when fresh it is moist and of waxy consistence, but by keeping it becomes quite dry and brittle, and loses much of its peculiar odour. Gugal is used as an incense principally, and has on this account probably been confounded with olibanum. I know of no Indian olibanum.

POGOSTEMON PURPURICAULIS.—*Local name,* PHAUGLA.

A tall suffruticose perennial plant, about six feet high, with a purplish smooth stem; leaves often six inches long, broadly ovate, acuminate, serrated, smooth; flowers very small, pale purple, in axillary and terminal panicles; seeds very small, black and shining. The whole plant has a strong black currant odour; it is common in the Kokun. The fresh leaves have a slightly pungent taste. When bruised they are applied as a cataplasm in order to clean wounds and stimulate healthy granulation.

RHINACANTHUS COMMUNIS. — *Local name,* GUJKARNEE.

A shrubby perennial plant, 3—4 feet high, generally cultivated in gardens as a domestic remedy. The leaves are 2—3 inch s long, ovate oblong; the inflorescence is in axillary and terminal panicles, bitrichotomous and spreading, flowers insignificant, white, tube of corolla long, slender and compressed. The leaves are a popular remedy for what is called Indian Ringworm; they are applied bruised and mixed with lime juice; when chewed they taste like fresh cassia bark. The roots, which are small and fibrous, are said to have aphrodisiacal properties, but I have not seen them used in Bombay.

CONVOLVULUS Sp.?

The Tukm i Nil of Persia, imported into Bombay. These seeds are much larger than the Indian Kala Dana. They are imported in considerable quantities and have to a great extent displaced the native drug. The seeds grow freely in Bombay. The following is a description of the plant: Annual, herbaceous, climbing; root small, tapering, with many thin rootlets; stem branched, covered with aerial rootlets, not hairy; leaves broadly cordate, acuminate, smooth, on long petioles; flowers axillary; peduncle long having rootlets like the stem, 2—4 flowered; calyx divided; sepals 5 broadly ovate, mucronate, smooth, persistent; pedicel large, fleshy and pearshaped, of a light green colour, 1½ inches long; corolla purple, about 2 inches in diameter, expanding at sunset, and closing before sunrise, Capsule two celled, composed of four segments which separate from the central partition; cells two-seeded; seeds dark brown, smooth, the shape of the segments of an orange, but with rounded angles, average length $\frac{5}{16}$ of an inch, breadth ¼ of an inch, weight three grams each. Tukm i Nil can readily be distinguished from the Indian varieties of Kala Dana by their larger size, lighter colour, and thick testa; their action as a medicine seems to be the same, but acurate observations are required. For a full account of Indian Kala Dana see 'Pharmacographia' page 402 and the appendix to the Pharmacopœia of India by Moodeen Sheriff.

PLUMBAGO ROSEA.—*Local name,* LAL CHITRA.

The root bark is reddish brown externally, transversely fissured, thick and suberous; internally it is white when first removed, but soon turns red upon exposure to the air. It has a rancid heavy odour. A section of the root shows a central woody column, with a very large vascular system, surrounded by a bark almost entirely made up of thin-walled parenchymatous cells loaded with large oil globules and containing some starch. There is a good summary of the medicinal uses of this drug in the Pharmacopœia of India. I think it might be used in this country as a substitute for Mezereon in the Lin. Sinapis Comp. and in Decoct Sarzæ Comp. The active principle Plumbagin being soluble in ether an ethereal extract might be made.

CLITOREA TERNATA.—*Local name,* KAJALEE.

The root and seeds.

The root is large, fleshy, branched, and spreading, often one inch or more in diameter, white, with an acrid bitter taste; the root bark is soft and thick and easily separated. Under the microscope it is seen to consist of a thin-walled cellular tissue, containing a little granular matter and here and there a few small starch cells. The central portion of the root is composed of very large dotted vessels, easily visible with the naked eye. The seeds are rather more than ⅜ of an inch long and resemble vetch seeds; they are mottled green and black. The testa is hard and contains two cotyledons made up of elongated thin-walled cells full of large starch granules; they have an acrid bitter taste. The seeds exhausted with spirit yield a light brown resin with an odour exactly like Jalap. The medicinal uses of both root and seeds are noticed in the Indian Pharmacopœia and its supplement by Mr. Moodeen Sheriff. I would suggest a trial of the resin.

Bombay.

(*To be continued.*)

THE BEHAVIOUR OF SOLUTIONS OF SOME SUBSTANCES TO POLARIZED LIGHT.*

BY O. HESSE.

For some years past the author has been induced to make experiments to ascertain whether the optical behaviour of solutions of cinchona alkaloids would allow of this property being used in determining their quality. The results were not very satisfactory, and the author has therefore sought to investigate the causes to which the irregularities in the behaviour of different solutions might be due.

That many liquids are capable of diverting a ray of polarized light has been known since 1815. Biot, and almost simultaneously Seebeck, then recognized this property in oil of turpentine, solution of camphor, and several other substances. Later, in 1832,† Biot enunciated the law, according to which a ray of polarized light is deviated by quartz (rock crystal) in the same manner as by liquids possessing similar property. Biot was of opinion that this power of deviating a ray of polarized light not only had its seat in the molecule, but that it was inseparable from it and therefore characteristic of it.

The amount of this molecular power can evidently only be determined by the intensity of its action. If therefore a represent the amount of curve through which the ray of light is deviated by a substance, λ the length or thickness of the active layer, and δ the quantity of the active substance contained in the mass ($=1$), the amount of the molecular power may be represented thus—

$$(a) = \frac{a}{\lambda \cdot \delta}$$

For λ Biot took 1 mm. of quartz. But as the liquids which he examined caused a relatively small deviation, he considered it more convenient in these cases to use a thicker layer of the active material. He fixed upon 100 mm., and established that length as unity in the above formula, and used (a) to represent the molecular or specific rotatory power of a body.

When an inactive body is present simultaneously in the same volume with the active body, as in a solution, the relation of the quantity of the active body to the entire weight—*i.e.*, the degree of concentration must be taken into account. If ϵ represent the concentration the rotatory power of a body occurring in solution will be represented by the following formula:—

$$(a) = \frac{a}{\lambda \cdot \epsilon \cdot \delta}$$

The same result is attained by the calculation of the rotatory power of the active substance which is contained in the unity volume. If p indicate the weight of this substance, and P that of the menstruum, then—

$$\epsilon = \frac{p}{p + P}$$

On the other hand, δ or the specific weight of a solution is obtained by comparing its weight with an equal volume of water ($=$V) at 4° C. Consequently—

$$\delta = \frac{p + P}{v}$$

From this it follows that—

$$\epsilon \cdot \delta = \frac{p}{p + P} \cdot \frac{p + P}{v} = \frac{p}{v}$$

Therefore—

$$(a) = \frac{a}{\lambda \cdot \epsilon \cdot \delta} = \frac{a \cdot v}{\lambda \cdot p}$$

According to the first formula the specific weight of the solution will be required. But the ascertaining of this is often a difficult matter, especially if the menstruum be very volatile. By using the second formula it is only necessary to weigh the substance in a small vessel the capacity of which is accurately known and then to fill the vessel up to the mark which represents the volume with the menstruum.

More recently Biot's way of indicating the rotatory power has been declared to be inconsequent, and now a distinction is made between the specific and the molecular rotatory powers of a body. According to this arrangement, by the specific rotatory power is understood the amount which is indicated for a certain body by the before mentioned method, whilst the molecular rotatory power of a body is the value which it gives when the specific rotatory power of the body is brought into relation with its molecular weight. Assuming the molecular weight of a body to be m the relation between its molecular figure and its absolute weight is represented by $\frac{p}{m}$

Accordingly the molecular rotatory power of a body (m) will be found by the following formula:

$$(m) = m\,(a) = \frac{a \cdot v \cdot m}{\lambda \cdot p}$$

Since, however, the molecular weight of most of the substances coming under consideration is very high, a very high figure would be obtained as the expression of the molecular rotatory power with a relatively small deviation. At the same time unavoidable experimental error is correspondingly magnified. To obviate this inconvenience, Krecke* took the molecular rotation of a column 1 mm. long, or what amounted to the same thing, divided m by 100, calculating according to the formula:

$$(m) = \frac{a \cdot v \cdot m}{100 \cdot \lambda \cdot p}$$

In this way Krecke made calculations of (m) for a large number of bodies, and believed that he had discovered two laws which determine the behaviour of bodies to polarized light. These "laws of simple relations," as he called them, were asserted to extend to all known bodies, with the exception of tartaric acid, and were to the following purport:—

1. When an optically active body enters into combination with an optically inactive one, or when it becomes modified by chemical agents, either the molecular rotatory power remains unaltered, or it is so modified that the molecular rotatory power of the new body is a simple multiple of that of the mother substance.

2. Isomerous bodies possess molecular rotatory powers which are multiples of one and the same number.

These laws presume that the rotatory power of the body when used in different quantities is of constant magnitude; but as this presumption does not turn out to be correct, as the author proceeds to show, no value can be attributed to them.

The author's experiments were made with an excellent Wild's polaristrobometer. a represents the mean value of a large number, about twenty, of observations; $v = 100$ c.c.; p expresses the quantity by weight of the so-called active substance contained in 100 c.c. The use of these terms the author finds advantageous, as compared to those in which the weight of active substance is in relation to 1 c.c. For λ 0·1 m. is taken; l on the contrary is given in mm. The unity λ is therefore $= \frac{l}{100}$

At first, with the object of better comparing the results, the whole of the experiments were made at one temperature, 15°C. But as in summer time this temperature was difficult to obtain, it was determined to carry out a series of experiments at a higher temperature in order to avoid delay in the investigation. As a source of light the

* Abstract of a paper in the *Annalen der Chemie*, vol. clxxvi., p. 95.

† *Mémoires de l'Académie*, vol. xiii., p. 39.

* *Jour. f. prakt. Chem.* [2], v., 6

sodium flame was used. This, however, excluded the use of strongly coloured yellow solutions, as through their intensity of colour the extinguishment of the fringes could only with difficulty be observed. In such cases the use of the red light was indicated. But as the relation of the yellow light, in consequence of concentration, temperature, and other conditions, is not always as 30 : 23, the situation is variable, and the author has therefore reserved estimation by means of the red light for future comparisons with the yellow light.

Sometimes, in consequence of the internal dispersion of the light, the disappearance of the interference rays cannot be well recognized. This inconvenience the author dealt with, either by examining a smaller layer of the substance or diminishing the quantity of the active substance; for this dispersion of light increases both with the length of the layer and the concentration of the solution. The solvents used in the author's experiments exercised no influence upon the ray of polarized light.

The chemical condition of a body has an important influence upon its rotatory power. An extremely small quantity of a foreign substance, adhering to that to be examined, often notably modifies its behaviour. Special caution was therefore taken that the substances used were absolutely pure.

Cane Sugar.

Seebeck found in 1816, that a solution of cane sugar exercised an influence upon polarized light, and thereby laid the basis for the optical saccharimetry afterwards announced by Biot. Crystallized cane sugar exercises scarcely any circular polarization. Nevertheless, Biot thought it could be assumed that this property still existed within the molecule, though, in consequence of the special building up of the molecule in the crystallization, an expression of it could not be obtained; but, as soon as the hindrances were removed by fusion or solution of the substance, the property could again be made manifest.

Biot* found for cane sugar $\alpha r = +52 \cdot 46°$ (mean); but Dubrunfaut† thought that Biot had used for his observations impure sugar, and gave for his own asserted quite pure material $\alpha j = +73 \cdot 84°$. Clerget ‡ afterwards indicated that this figure was too high, and gave $\alpha j = +65 \cdot 91°$. But this figure also eventually proved not quite correct, and had to be slightly raised, so that at present, almost generally, the rotary power of cane sugar is taken $\alpha j = +66 \cdot 4°$. According to the recent observations of Tuchsmid § it is, $\epsilon = 0 \cdot 294$ and $t = 10°$, $\alpha j = +66 \cdot 417°$. According to Oudemans, jun., ‖ with $\epsilon = 0 \cdot 056$, $t = 17°$, $\alpha j = +66 \cdot 9°$ for an aqueous solution, and for a solution of almost equal strength in 50 per cent. alcohol $\alpha j = +66 \cdot 4°$. Bakhoven¶ found $\alpha j = +66 \cdot 42°$ and L. Weiss** $\alpha j = +66 \cdot 064°$.

According to Tuchsmid the rotatory power of cane sugar does not alter with the temperature, and the small differences which are observed at different temperatures are entirely dependent upon the expansion of the solution, and consequently the alteration in its concentration. Notwithstanding that Biot†† and Arndtsen‡‡ made observations according to which the rotatory power of sugar would alter with the concentration of the solution, Biot was of opinion that the small differences in his experiments might be attributed to errors of observation. Therefore there is a disposition at present to ascribe to cane sugar a rotatory power invariable in all cases.

The author's experiments, however, do not favour this latter view. The sugar used by him was ordinary loaf sugar of the best quality. After having been repeatedly recrystallized from strong alcohol, the crystals were pulverized and dried in an exsiccator. The solution of the sugar was effected in the cold, although heating of the solution did not affect injuriously its rotatory power. With this sugar the following observations were made:—

Solvent.	Temp.	l	p	$\alpha° +$	$\alpha j° +$	Mean for $\alpha j° = +$
Water	15°	220	1	1·49	67·72	67·95
Water	15°	220	1	1·50	68·18	
Water	15°	220	2	2·96	67·27	67·39
Water	15°	220	2	2·97	67·50	
Water	15°	220	3	4·42	66·97	67·05
Water	15°	220	3	4·43	67·12	
Water	15°	200	6	8·00	66·67	66·67
Water	15°	100	10	6·65	66·50	66·50
Water	25°	200	10	13·30	66·50	
Water	15°	100	20	13·29	66·45	66·45
Water	25°	100	20	13·30	66·50	—
50 per cent. Alcohol	15°	200	5	6·67	66·70	—
Water and 1 mol. SO_3	15°	200	6	8·00	66·67	—
Water and 1 mol. Na_2O	15°	200	5	6·00	60·00	—

For the solution of cane sugar at 15° C. the rotatory power for 0 to 10 p inclusive may be calculated according to the following formula:—

$$\alpha j = +68 \cdot 65 - 0 \cdot 828p + 0 \cdot 115415p^2 - 0 \cdot 00541666p^3$$

This gives for —

	αj	Found.
1 p	+67·94°	+67·95°
2 p	+67·42°	+67·32°
3 p	+67·06°	+67·05°
6 p	+66·67°	+66·67°
10 p	+66·50°	+66·50°

Above 10 p the rotatory power of the sugar remains almost constant, the decrease for each 1 p between 10 and 20 p amounting to only 0·005. With still greater concentration this difference presumably would become still smaller.

It further appears that, compared with water, 50 per cent. alcohol exercises no influence upon the rotatory power of sugar. Sulphuric acid of the indicated strength behaved in a similar manner, provided that the solution was freshly prepared, and was not heated. On the other hand, soda lowered the rotatory power of sugar to a considerable degree.

(To be continued.)

REMARKS ON THE PRIORITY OF THE ANCIENT SYSTEMS OF MEDICINE.*

BY THOMAS A. WISE, M.D., F.R.C.P., F.R.S. EDIN.,

Late of the Medical Staff of the Bengal Army.

Both sacred and profane history render it probable that when mankind emerged from their primitive home they possessed great energy and organic activity, accompanied with a corresponding degree of intellectual force. This enabled them to select a fruitful country as their home, where they soon became rich and powerful, and at an early period assigned a particular class for the acquisition of knowledge. These individuals, distinguished for their power of observation and sound reasoning, opened a vast and interesting field for the exercise of their mental faculties, in the region of abstract speculation. Their knowledge and progress in civilization was aided by their possessing the advantage of high rank in a regular and peaceable government, and a religion abounding in moral precepts.

The most ancient traditions and records of the Western nations refer to the "learning and wisdom of the East,"

* *Comp. Rend.*, xv., 625 and 706.
† *Comptes Rendus*, xlii., 900.
‡ Liebig's *Annalen*, lxxii., 145.
§ *Journal f. Prakt. Chemie*, [2], ii., 235.
‖ *Annalen*, clxvi., 69.
¶ *Journal f. Prakt. Chemie*, [2], viii., 277.
** *Chem. Centralblatt*, 1874.
†† *Mém. de l'Acad.* xiii., 125.
‡‡ *Compt. Rend.*, xlii., 738.

* From the *Medical Press and Circular*.

without any distinct mention of the race or nation. Modern investigations tend to prove that the original seat of the Indo-Germanic, or Aryan family of man was the high table-land contiguous to the lofty range of mountains extending eastward from the Caspian Sea.

Thence they descended to the fruitful plains in a southern and eastern direction, and at an early age another portion of the Aryan race commenced their wanderings towards the mysterious West. In both countries they distinguished themselves by their knowledge of the medical profession, and each prepared systems of medicine, the priority of which remains still an undecided question.

The age in which the ancient Hindu system was arranged cannot be directly stated, in consequence of their despising dates, as they considered life a transitory state of trial and suffering, and history of too little importance to occupy the attention of rational beings.

It is hoped that the following deductions will aid us in arriving at an approximate date when the two great works on Hindu medicine were composed, and enable us to compare them with the Greek system. The perishable material on which the ancient Hindu MSS. were written, rendered it necessary to have them frequently copied, in the course of ages, by scribes, often ignorant of the subject, and sometimes, perhaps, careless in their transcriptions. In ancient times the sources of error were to a certain extent avoided. The MSS. were regarded as of a sacred character, and only a limited few were permitted to copy them.

The sacred Hindu Vedas were more studied than the ancient Hindu medical shastres; as the latter were not considered sacred, greater liberties were taken with them, interpolations and clerical errors were introduced by illiterate transcribers. These causes render it very difficult to discover the age of the writings, except by comparing them with other Sanscrit works, the age of which is known. The ablest Sancript scholars allow that Charaka and Susruta, the two great commentators of the Ayur Veda, the supposed sacred revelation regarding medicine, are more recent than the grammarian Panini,* as neither work is mentioned by him, while both are noticed several times in the Mahâbhârata. Professor Wilson supposed this great epic was written in the second century before Christ; and, like Panini, was added to, in the course of centuries. Hessler, in his work on Susruta, considered that it was written a thousand years before Christ.†

We have, at this early period, two systems of Hindu medicine, complete in all their parts, founded on anatomy, exhibiting an extensive knowledge of materia medica and the practice of medicine, an expertness in the manipulations of pharmacy, and a bold and skilful knowledge and practice of surgery. We find the Hindu systems of medicine were originally written on the ancient form and construction of the Sanscrit language, so old, as to be considered the production of the Deity, when there was no prejudice of caste, before Polytheism was introduced into the Hindu religion, and in the heroic age, previous to the Mahâbhârata.

In considering the Greek system of medicine, we find their physicians and philosophers were indebted to the East for a portion of their knowledge. Pythagoras and Plato obtained many of their philosophical ideas from the Hindus, and the internal evidence of the Greek works proves that the schools of Hippocrates derived a considerable share of their knowledge from the East. Galen mentions that Hippocrates was often at Smyrna in Asia Minor,‡ and Mercurialis believed that he travelled in Lybia in Africa, and Scythia in Asia.§ Hippocrates may have visited this northern country to examine the enlightened and skilful Indo-Scythian people, whom Alexander the Great found so expert in the cure of diseases; and in these northern parts of Asia he may have consulted the Hindu sages, and studied their drugs and medical records. The learning he was in search of was there, and the following statements prove his acquaintance with their writings:—

1. The systematic works of the Hindus were most probably prepared from the third to the sixth century B.C.; and long before the age of Hippocrates the original Ayur Veda existed from which the other classical works were derived.

2. As medicinal plants have their properties developed in particular soils and climates, they indicate the nations among which they were first used for medicinal purposes, and explain the antiquity of the cultivation of medicine by certain races. The names and medicines recommended in the medical works of Hippocrates often indicate the schools of medicine from which they were borrowed. We find that Hippocrates used in his practice a number of Indian plants, imported from that country into Greece, for their well-known properties, such as *Sesamum Indicum*, Lin., *Hyperanthera morunga*, *Cardamomum Amomum*, *Laurus cinnamomum*, *Valeriana Jatamansi*, *Boswellia thurifera*, *Galbanum ammoniacum*, *Sagapenum assafœtida*, etc.* He also used black and long pepper, ginger, cassia, spikenard, *Calamus aromaticus*, etc., which are all the products of India or neighbouring countries.

3. The internal evidence of the works of the school of Hippocrates proves them to have been compilations, derived in part from nations further advanced than the Greeks in the knowledge of particular departments of the healing art. The ancient Hindu physicians considered dissection as a necessary part of the education of the medical practioner. Their method was rude and imperfect, but many of their conclusions were correct, as we have proved by the result of their osteological enumeration, and the accuracy of their description of the internal organs, and of the large vessels of the body.†

The ancient Hindu surgeons performed the most difficult operations; such as the Cæsarean section, embryotomy, lithotomy, etc. The first description of the last-named operation was given by Susruta, and was afterwards made known by Celsus,‡ who derived his information from Egyptian surgeons, and they again acquired their knowledge from the East. Hippocrates, the judicious surgeon and benevolent practitioner, allowed, it is incorrectly stated, the performance of this operation only by uneducated quacks.§

From these facts it would appear that at an early age the Hindus had made very considerable progress in the healing art, which enabled them to prepare systematic works on medicine, based on their own practical knowledge of anatomy, to which, at that time, the prejudice of mankind in general was so much opposed. Susruta informs us that an accomplished physician must possess an acquaintance with books, or theoretical knowledge, with the dissection of the human body, or anatomy, and a familiarity with the appearance of disease, or practice of medicine. This knowledge explains how the ancient system of Hindu medicine was so complete in all its parts, and warrants the inference that several centuries were required to complete them.|| While the nations of the

* He died 593 B.C. See Goldstucker's learned history on 'Panini's Place in Sanscrit Literature,' p. 13 *et seq.* He lived before Sakea Muni, the founder of the Buddhist religion, who died about 543 B.C.

† A. F. Hessler, 'Comment. et Annot. Susr. Ayur Veda,' 1852, p. 4.

‡ In Lib. de Artical. Comment. 1.

§ Variar Lection, lib. 2, ch. 18.

* Royle's Essay on the 'Antiquity of Hindu Medicine,' d. 111 *et seq.*

† 'History of Medicine among the Asiatics,' vol i., s. 1, p. 131, and 158 *seq.*

‡ De Re Med., lib. v., ch. 26.

§ This injunction in the oath that was taken before entering upon the practice of the medical profession among the Greeks was most probably a Mahommedan interpolation.

|| See Professor Wilson, *l.c.*; and note on 'Mill's Hist. of India,' vol. ii., p. 232.

West have been slowly advancing, and mutually aiding one another, during the last two thousand years, the Hindus, by the depressing influence of Brahmanical intolerence and internal warfare, are now in a lower social condition than they were three or four centuries before the Christian era.

AMBER.*

BY M. REBOUX.

Amber was known to the ancients, who made from it ornaments and graven images of their divinities. It was called by the Assyrians *Electra* (*i.e.*, Stone of the Sun), from which the Greeks formed the word *Electron.* The name *Ambre*, from the Arab word *Ambar*, was introduced into France by the Crusaders. This name is less significant than that given to it by the Romans—*Lapis ardens.* The Germans call it *Bernstein.* Amber has been met with in many localities; formerly it was found upon the sea-shore after storms, and it has also been obtained from the earth. Sicily has produced a large quantity of it, but at the present time the borders of the Baltic supply the entire world.

During the eocene epoch the site of the Baltic Sea was occupied by an immense forest, which covered nearly the whole of the northern continent. There have been obtained by dredging thirty-two species of conifers, a poplar, an alder, two willows, a chestnut, and some junipers. From these conifers there exuded a resin which underwent a transformation in the bosom of the earth and became amber. More than a dozen different kinds of objects,—animal, vegetable, and mineral,—have been found in amber, such as insects, reptiles, pyrites, shells, salt water, plants, leaves, seeds, fruits, etc.

Amber can be distinguished from copal, or factitious amber, by the following characters:

Copal is of a yellow colour, more or less dark, but always of one colour; at some points of its surface it presents the appearance of crystallized sulphur. Pieces of amber have a different shade at their two extremities.

Amber rubbed upon the palm of the hand exhales a strong aromatic odour. Copal and factitious amber are inodorous.

Amber can be bent under the influence of heat, which is not the case with copal or factitious amber. Copal crumbles under the teeth like dried bread, and can be penetrated by the finger nail. Amber presents more resistance and can be cut, sawn, or polished. Two pieces of amber cannot be soldered together like two pieces of copal. Amber will scratch copal.

Heated to 100° C. copal gives off the vapour of water in abundance, then it becomes liquid, preserving its yellow colour. Amber does not melt below 400° C., when it becomes black and gives off a penetrating odour of succinic acid. If 33 per cent. of linseed oil be added, amber melts at 130° C.

A pinch of powdered amber thrown into the light of a candle inflames like gunpowder, giving a bluish flame. Copal gives a pale yellow flame.

Natural amber yields to distillation crystals of succinic acid, which the different copals do not.

The specific gravity varies from 1·09 to 1·11; that of copal is 1·04; that of factitious amber is 1·05.

An analysis of natural amber by Schrotter gave—C, 78·82; H, 10·28; O, 10·90. An analysis of copal from Elæocarpus yielded—C, 79; H, 10·40; O, 9·90.

---

* Extract from a memoir read before the French Academy (*Comptes Rendus*, vol. lxxxii., p. 1374).

THE INDIARUBBER ACCLIMATIZATION EXPERIMENT.

The following extracts are quoted in the *Gardeners' Chronicle* from Mr. Cross's report on the collection of seeds and plants of the indiarubber (*Castilloa elastica*) in the forests of the Isthmus of Darien. The original is given at length in the last number of the *Indian Forester*.

"I remained at Panama for fifteen days in order to gain all information regarding the size and yield of the rubber trees of the various districts. The tree is found growing from 1° S. latitude to 20° or more north of the equator, but in such a wide expanse of country there are probably several varieties, most of which, however, may bear a close resemblance to each other, although some may be of more robust habit than the rest, and attain to a greater size. Experience has proved that such is the case with most families of wild plants when brought under cultivation. Of late years a good deal of indiarubber has been brought from the forests on the Pacific coast, south of Panama, near to a scattered village called Darien. The Indians in this region have been rather hostile to the collectors, and the export has in consequence been much reduced. The greater portion of the interior of the isthmus has been explored, and the largest trees have been cut down. North of Panama, in the district of Chorera, there were once considerable numbers of trees, but these have been to a great extent demolished by the natives who usually cut down the trees in order to tap or bleed them more easily. The replies to my inquiries respecting the size to which the indiarubber trees grow in the forests about the village of Darien did not fully satisfy me; therefore I proposed to examine the woods on the confines of the larger tributaries of the river Chagres, where trees of large dimensions were formerly met with. The period of my arrival at Panama happened to be the wet season of the year, which in the region of swamp and forest is considered particularly unhealthy. Indeed, on this account Captain Mallet, H. M.'s Consul at Panama, thought I should await the return of the dry season. I afterwards found that his remarks concerning the climate were quite correct, and, except for the experience I had previously obtained while travelling in the hot valleys in the interior of New Grenada, I should in all likelihood have been prostrated with fever. But the seeds ripened during the rainy season, so that it was important to examine the forests for seed-bearing trees at this period.

"*Journey to the Forests.*—On June 9, I left Panama by the railway, and stopped at a place called Gatun, about 8 miles from Colon; leaving the railway tract, I crossed the Chagres and took up my quarters in the village of Gatun, which is built on the northern bank of the river. The town is formed of two streets 150 yards long, with rows of houses on both sides thatched with palm leaves. In most instances the walls of these houses are patched up in a miserable manner. Alligators swarm in the river, and any one who might attempt to bathe in it would soon be devoured. Water is obtained for domestic purposes from barrels sunk in the ground in low situations; they are provided with lids, and must be kept constantly covered to prevent toads and snakes from entering. The village contains about 300 inhabitants, the greater number of whom are of negro extraction. The situation is so low that during high floods the streets are inundated, and people ply about from house to house in canoes. On both sides of the river the country is swampy, although in great part clothed with forest. Penetrating into these woods I found the place swarmed with mosquitos, frogs, and uncountable millions of ants, and the snakes, instead of getting out of the way, raising their heads in a position of defence, ready to strike at any one who approached. These swamp forests present a dismal aspect and reminded me of the mangrove forests (*Manglares*) which grow in the flat deposits of fetid mud that occur on the margin of the Gulf of Guayaquil, and other places along the Pacific coast. The native with whom I was located at Gatun was a good fellow, but the greater number of the inhabitants were disobliging and uncivil. They were positively the worst class of people I have yet met with in any country. Everywhere the land, if cultivated, produces abundantly, but such is the indolence of these people that bananas, rice, and mandiocas are raised in limited quantity, scarcely, indeed, sufficient to maintain them. I found on inquiry that no indiarubber trees existed in the swamp forests, and that to find them it would be necessary for me to ascend the river for some distance, and then travel up to the dry land of the interior. The person with whom I lived collected indiarubber, and he had a hut in the heart of the forest, where the collectors often stayed for the night. A few days after my arrival he proposed going to this place, and, although the weather was unfavourable, I resolved to accompany him, as I was anxious to become well acquainted with the habitat of the tree, and also to ascertain if any seeds were to be found. Leaving at early morn in a canoe we ascended the river Chagres for a number of miles and then entered a small river called Vino Tinto, which rises from a large swamp in the interior. The water of this river was full of decayed vegetable matter, appearing as if vast quantities of the trunks and leaves of trees had been systematically ground up and mixed with it. On the banks, which were high, grew an astonishing rank growth of large trees and bamboos, and many of these had fallen into the water and lay partially submerged, thus forming serious obstacles for even the navigation of a canoe. Beyond the landing point a short distance of swamp land was travelled over, on which grew principally thickets of palm trees and bamboos; then the way ascending led to drier land, with some flat undulations, the greater portion of which had an elevation of about 50 feet above sea level. An indiarubber tree (*Castilloa*) was first seen in this locality growing near to a little stream in a very moist situation. Saplings or young rubber plants were subsequently met during the rest of my journey. After passing the flat land, we ascended a ridge of low hills, and undulating inequalities, which were clothed with the stateliest forest I have ever witnessed. Many of the trees, belonging to the order *Lauraceæ*, had straight smooth stems, which rose often to a height of 150 feet without a branch, and a massive species of bombax, called by the Indians *quipo*, grew mostly on the summits of the hills, and had frequently a clear trunk of 200 feet high, with a flat crown of green foliage like an umbrella, giving to these hills a grandly-imposing and majestic appearance. Palms of various species were tolerably abundant, and in places the undergrowth was composed of extensive thickets of a species of bromelia, which had formidable prickly leaves 10 feet in height. Both the trunk and branches of the trees were destitute of mosses (*Selaginellas*), although a robust species interwoven with *Adiantums* formed luxurious clusters on the ground. A species of Cacao (*Theobroma Cacao*) grew wild on the hill sides and in the ravines; its short slender trunk and branches were adorned with many fruits, each of which encloses a number of Cacao beans. However, these, on ripening, are duly visited by monkeys, hundreds of which were jumping about and screaming among the tops of the trees. The rubber saplings always appeared to grow most freely on the banks of little cool clear streams, the roots often running down to the edge of the water; they abounded also in deep rich soil along the base of the hills, and in both deep and shallow ravines. Plants were likewise met with on the summits of the ridges, and in fact in all localities where there was no swamp or marsh land. Some plants were observed growing among masses of volcanic rock, where there was not much soil but plenty of decaying leaves and particles of *débris*. Prostrate trunks were observed on the way, some of which had attained to a great size. We reached the rubber hut rather late, having travelled two days' journey in one. The hut was situated on an eminence between two ridges of hills. A stream of water flowed past the dwelling; it swarmed with incredible numbers of little fishes about the size of needles. A small portion of forest had been cut down, and a little Indian corn and a few roots had been planted. The trunks of some of the felled forest trees were 5 feet in diameter. Formerly a great many large rubber trees were found at this spot, which had yielded to the collectors a rich harvest; probably for this reason they called the place La Providencia. In the surrounding forest grew some young rubber trees, a few of which averaged from 50 to 70 feet in height; one of these bore a considerable number of unripe fruit. It was evident the fruit would take from ten to fifteen days to ripen.

"Meanwhile I resolved to search for some young plants to experiment with. An Indian who was employed to take care of the hut and its stores lent me one of his sons, a lad about fifteen years of age; he came away with me completely naked, and entering the forest we succeeded in collecting forty good plants. Returning to Gatun I rested a few days, and made two more journeys without finding any quantity of seeds. But the fruit of the tree already alluded to was approaching maturity, and it was necessary that these should be watched. Revisiting the place on July 18 I found the seeds had ripened. To facilitate the work of collection the tree was cut down and all the mature fruit was gathered. The fruit has a short stalk and springs from the axils of the leaves; it resembles in some measure a Jargonelle pear, but is shorter and is diversified with rough scales. The crown is flat, and, when ripe, assumes a beautiful scarlet colour, while all the rest of the fruit remains green. The seeds in size and appearance resemble coffee beans, and are immersed in an orange-coloured pulp; the soft pulpy matter was washed away, and the seeds were put to dry. I was disappointed on observing that some of the seeds had already begun to germinate; this, indeed, was to be expected, for they have no hard covering, and when ripe are nearly as easy to bruise as green peas. In fact it seems natural for these seeds enveloped in a soft juicy mass to begin to grow whenever the fruit falls to the ground, or even sooner. I now resolved to go on to Gatun without delay, and dispatch the seeds as early as possible from Panama. On the 5th the seeds, amounting to upwards of 7000, were kindly forwarded by Captain Mallet, H. M.'s Consul at Panama.

"*Return to the Forest for Indiarubber Plants.*—I now made arrangements for bringing home some plants. On my return to Gatun the rains came on with increased violence, and the river was greatly swollen; yet, even with the unfavourable weather a collection of plants was got together from various localities around La Providencia. Although found growing in varied aspects the plants were not met with very plentifully, but in one locality upwards of 100 plants were found growing under a good sized tree; the seeds had fallen on a bed of decaying leaves and germinated in great numbers, so thickly indeed that many of the plants had smothered each other. In all 600 plants were collected, but a good number were bruised while being carried through the forest, or during the journey to Gatun. A quantity of the milk of the tree was also secured.

"I next turned my attention to the plants, and dressed them very carefully. These were young saplings cut down, and the tap-roots, which were often of great length, were also much shortened. The roots were packed in three boxes with dry leaves, a process which facilitated transport but demanded an extraordinary amount of attention. Shortly after my first arrival I collected a few plants, which, with some stout pieces of the stems of saplings cut into lengths, I planted to experiment with. The greater number prospered wonderfully, and some natives were surprised at the quickness of the result. I put the most advanced of these plants into a small box, and although some lost a few leaves, yet I brought the best portion home alive. Thus I saved sufficient plants from this little collection for the formation of stock for the plantations in India.

"*Method of Collecting Rubber practised by the natives on the Isthmus of Darien and other places.*—One of the oldest rubber collectors of the district where the plants were procured assured me that at first they sometimes met with a tree at which three or four axemen could go to work at once to cut down. Such a tree would probably be about 8 feet in diameter, 200 feet in height, and yield at least 150 lb. of indiarubber. In general full grown trees do not much exceed 160 to 180 feet, with a diameter of 5 feet, and a produce of 100 lb. of rubber. The bark of the trunk is thicker than that of most trees of the same dimensions; the wood is spongy and soft, and decays rapidly wherever injured. The slender branchlets that crown the trunk terminate with four or five large leaves alternately arranged and thickly covered with short brown hairs. Many of the leaves measure 14 inches in length and 7 inches in breadth, and exceed in size those of any other tree of tropical America. According to the natives, the leaves fall off the trees in January, after which they begin to flower. In April the new leaves push, and attain their full size in May; but I was assured that young plants and saplings retained their leaves throughout the year. The milk-like juice of the tree, which, when congealed, forms indiarubber, is obtained by cutting out a groove or ring of bark around the base of the trunk; the milk exudes from the bark into the channel thus formed, and large leaves are placed so as to receive it as it trickles down. The tree is then felled, and rings or channels are cut out around the prostrate trunk, at about 12 or 14 inches apart. Beneath these leaves the vessels are placed into which the milk flows. The contents of all the vessels are afterwards put in a hole previously dug in the ground. The milk left in this way becomes curdled in about two weeks. In the Republic of Ecuador most collectors use the soft green stem of a climber—a species of *Ipomœa*—which when bruised and stirred about in the milk congeals it in a few minutes. By this last process the milk takes up all the watery particles it may contain, and the produce seemed to be of an inferior kind, possessing a strong peculiar smell, and continually sweating a black, ink-like water. Soap is resorted to by some collectors, and also wood ashes which contain potash. Collins mentions that alum is used in Brazil, and salt in the East. It seems to me that whatever method is adopted the rubber ought to be prepared rapidly, and to be perfectly dry and free from impurities. Powerful presses might no doubt expel the moisture, but I should expect that the goodness of the article would by this operation be depreciated. My own opinion is that the quality of the milk-like rubber juice obtained from various species of plants—some of which are climbers and shrubs, while others become large trees —is at first exactly the same, and that the difference in value of various parcels is explained by a different mode of preparation. The collectors, indeed, always aim to keep it as wet as possible, as it is bought by weight. At Nicaragua, and some other places of Central America, the trees are not usually felled; the practice is to cut winding channels in the bark leading to the base of the trunk, where the milk is collected. But I was informed by an intelligent person from that region that this operation is so rudely and carelessly performed that a tree invariably dies after it has been bled or tapped a second or third time. This would never take place if the thin filmy lining of the inner bark (cambium) which covers the wood was not bruised or injured.* Not only do the natives cut through the cambium, but they also make large notches in the living wood of the tree, and these under no possible class of circumstances or conditions can ever be healed. In collecting the milk the cambium need not be hurt, as the vessels which contain it really occur in the middle of the bark; such, at least, is the case with the Darien rubber tree. The employment of any simple implement so formed as to make a groove in the bark to about one-half its thickness is all that is required. Such an operation would require to be directed by an intelligent, careful person, who thoroughly understood how much success depends on the proper performance of the work. In this way not one single tree in a thousand would be lost, and the trees might, in my opinion, be operated on annually, instead of once in three years, which I have been informed is the practice at Nicaragua.

"*Climatic Conditions of the Indiarubber Regions.*—The temperature of the forest in the interior of the Isthmus ranged from 75° to 88° Fahrenheit. Frequently I have observed the thermometer standing 80° at eleven o'clock at night, and the same on various occasions at one or two o'clock in the morning. When there occurred a shower of rain accompanied by a north wind the thermometer went down to 74° for one or two hours; but this was the lowest point to which it fell. I have not been able to ascertain to what altitude the tree grows, as no high hills exist on the Isthmus, but I am pretty confident, from observations made while travelling on the Pacific coast, that it ascends at most to an elevation of about 1500 feet. At this height the lowest temperature experienced at any time throughout the year would be 62° or 60° Fahrenheit. As regards moisture, I happen to have lived and travelled in various rubber districts, where the rainfall varied considerably. On the Pacific coast the tree grows near the Gulf of Guayaquil, on flat or gently sloping land, in deep deposits of a very sandy loam. The vegetation is moistened by humid fogs, but showers of rain very rarely occur. On the whole the atmosphere is unusually dry.

"At Esmeraldas the soil is a heavy loam or clay. There are about five months of dry or summer weather, and the remaining months are rainy.

"In the neighbourhood of Buenaventura the tree is found dispersed over a broken and dislocated region of narrow ridges of nearly naked conglomerate, with steep shelving ravines more than 1000 feet in depth. Where there is soil it is loam or a kind of clay, or made up of vast heaps of decomposing *débris*. The rains here are almost unceasing, day and night, throughout the year. This part of the coast, and on as far as the river San Juan, has been considered by intelligent travellers as the most unhealthy tract of country in the world.

"The region proper of the Isthmus of Darien lying farther northward, and including Portobello, Colon, Chagres, and Panama, is very wet, with an excessively damp atmosphere, although the weather is generally better, with some sunshine, during the months of January, February, March, and April. The deposit of the low flat hills is more or less of a clay character, but along the banks of streams or rivers the deposit is mostly of rich but deep sandy loam.

"Many of the localities bordering on the Magdalena possess deep beds of sand and loam resting on a stratum of yellow gravel. The climate is often parched and dry. Rain falls in May, June, July, and August.

"It will thus be seen that this rubber-producing tree is subjected to a variety of climatic conditions, which might have been expected from the wide extent of country over which the species extends. These circumstances appear to me to present a favourable prospect for its successful cultivation in India.

"*Growth of the Plants.*—On arriving at Kew (early in October, after experiencing shipwreck in the West Indies) with the plants, I had every facility afforded me by Mr. Smith, the Curator of the Botanic Gardens, for getting them re-established. On being sorted out I found fully one-half had been injured or dried up; the remaining plants were put in a proper place to make growths, but these at first pushed very slowly, as the season at which

* Experience with *Ficus elastica* has raised serious suspicions with us that the trees will die if tapped repeatedly, whether the operation is performed carelessly or not.—ED. *Indian Forester*.

they arrived is the worst in the year for the development of most kinds of tropical plants. At this time also the temperature in the warmest hothouse in Great Britain is generally 10° or 15° below the natural heat in the forests of the Isthmus of Darien. Besides this there is a diminished amount of light, which is an item of importance. On the whole, everything considered, I have thought myself extremely fortunate."

LIEBIG—HIS LIFE AND WORK.

The following interesting notice of the life and works of the great German chemist is taken from the address of the President at the annual meeting of the Royal Society:—

Justus Liebig was born at Darmstadt on the 13th of May, 1803. He went to school at the Gymnasium of that town. His father was a dealer in drugs and colours. Experiments in the production of colours and chemical products undertaken by his father early excited in the youthful Liebig a fondness for chemistry, which was further developed by the study of the chemical works in the Darmstadt Library. It is stated that in the fourteenth year of his age there was not a volume of a chemical journal in this large library that he had not read through, and that there was no chemical experiment which he had not repeated when his means permitted. The ease with which he obtained all that was requisite for experimenting procured for him early great dexterity in the art of analysis.

His was one of those fortunate natures which early becomes conscious of its power, and he soon made up his mind to be a chemist. His father yielded to his wish to devote himself wholly to chemistry; and Liebig took the only means then available of cultivating the science and placed himself under the tuition of a druggist at Heppenheim. He remained there, however, for only ten months. His taste for analysis found there no scope, and at last an explosion of fulminating silver in the house of his master suddenly terminated his pharmaceutic career. He then returned to Darmstadt, where he passed half a year in further study. At the age of eighteen we find him at the University of Bonn, and he afterwards studied at Erlangen, where he took a degree, and where he published his first chemical paper in 1822.

This paper first appeared in Büchner's 'Repertorium für die Pharmacie,' Band xii., under the title "Ueber die Bereitung und Zusammensetzung des Brugnatellischen und Howard'schen Knallsilbers, von Herrn Liebig, der Chemie Beflissenen aus Darmstadt." Professor Kastner accompanies this paper with the following notice:—"The readers must receive with indulgence this first attempt of a young chemist. The author has already studied chemistry zealously in Bonn, and has pursued his studies here in Erlangen in the same spirit."

Liebig had felt while at Erlangen the necessity of going to Paris to complete his education; and he was fortunate enough to obtain from the Grand Duke of Darmstadt a travelling stipend for that object. In 1823 we find him in Paris. It was his earnest wish to be admitted to Gay-Lussac's Laboratory; this, however, could not be as Gay-Lussac at that time admitted no young people. He succeeded, however, in entering Thénard's Laboratory, and there he resumed his investigation of fulminating silver.

This research brought him to the meeting of the French Academy of Sciences, in July, 1823, which was to form an era in Liebig's life. He read a paper "On an Analytical Examination of Howard's Fulminating Silver and Mercury Compounds." At the conclusion of the meeting, as he was engaged in packing up his preparations, a Member of the Academy came forward and entered into conversation with him. With the most captivating friendliness the stranger made inquiries about Liebig's studies and other occupations and plans, and invited him to dinner at the Palais Royal. They separated without Liebig having had courage to inquire who the stranger was. It was Alexander von Humboldt, who had returned to Paris the day before from Italy after a long absence. Humboldt now recommended his young countryman, who had so quickly and completely won his heart, to his friend Gay-Lussac, for Humboldt knew too well from his own experience the value of working under Gay-Lussac.

The time which Liebig spent with Gay-Lussac is indisputably the most interesting part of his student life. We may imagine the pleasure these two men must have had in their intercourse; the one 45 years of age and at the summit of his fame, the other scarce 20 years old, but full of promise of future greatness. It is related by Liebig that when they had accomplished some difficult work, such, for instance, as satisfactorily finishing a difficult analysis, Gay-Lussac would often take him by the hand and the two would dance together around the laboratory table.

The result of Liebig's study under Gay-Lussac was that the latter recommended the youth so strongly to the Grand Duke Ludwig, that the Grand Duke on his own responsibility appointed him Professor Extraordinary of Chemistry at the University of Giessen. It will easily be understood that Liebig was regarded with jealousy by the majority of his elder colleagues, and found but little support and sympathy in his endeavours for the reform of chemical instruction.

Liebig, however, was able to overcome all obstacles. Two years afterwards he was promoted to the Professorship of Chemistry. He made every arrangement within his power, even at his own personal expense and risk, for his own and his students' work. His reputation rapidly increased; and when it had at last spread to such an extent that young chemists came from all parts of Europe to work under him, the State at length resolved to build him a large chemical laboratory outside of Giessen.

Liebig's scientific activity may be divided into two periods, the first from 1824 to about 1829, which was specially devoted to pure chemistry, and the second from 1840, when his labours in the department of applied chemistry began to be prominent.

There is scarcely a branch of chemistry into which Liebig's activity did not extend. Perhaps no other chemist excepting Berzelius had accomplished so many difficult ivestigations. The 'Annalen der Chemie und Pharmacie,' which he edited conjointly with others, contain more than 200 papers on various branches of pure and applied chemistry.

Great as were Liebig's service in all branches of the science, that of organic chemistry is chiefly indebted to him, and he is accordingly called the founder of organic chemistry. There may be a difference of opinion as to how far its foundation was already laid, but it cannot be denied that Liebig contributed more than any other chemist of his time to the edifice.

The so-called organic substances originating in plants and animals, had, at the period when Liebig entered on his scientific career, been already the subject of many chemical researches, and it was already known that all, unlimited as they are in number, contained carbon combined with hydrogen, and sometimes oxygen or nitrogen in regular proportions; but just as it was supposed that they owed their origin to other than chemical forces, it was imagined that their relation to each other was something quite different from that subsisting between inorganic mineral substances.

But Liebig soon came to the distinct conviction that even if there were a generic difference between organic and inorganic substances, no chemical difference could be assumed. He was convinced that there could be only one chemistry, and took upon himself the task of effecting a scientific connection between the two branches. His investigation of fulminic acid had already carried him in this direction. He and Gay-Lussac had found it to be a compound of carbon, nitrogen, and oxygen, and he then discovered the corresponding compound of cyanogen with sulphur, and investigated melam and its other products of decompostion.

After Graham had established the tribasic character of the common phosphates, Liebig showed that some organic salts had a similar constitution. But peculiar difficulty was presented by the constitution of certain neutral organic substances, such as alcohol, ether, essential oils, etc. Liebig endeavoured to get a key to their constitution by investigating the action of simple materials upon them, such as chlorine and bromine, etc., and often led his students into this line of work.

In this way a great number of the most remarkable substances were discovered, some of which in future years were of practical use, though the object of the investigator was purely scientific. Thus Liebig discovered chloral long before Liebreich discovered its medicinal qualities.

These labours of Liebig appeared at first to the masses as a useless toying with chemistry, and were often laughed at. To this the very unusual names selected may possibly have contributed: as an instance we may mention the following:—When he found out the composition of a to him most important compound, which he looked upon as alcohol which had parted with some of its hydrogen, he named the new substance aldehyde, an abbreviation of alcohol dehydrogenisatus. This strangely sounding word excited the astonishment or even the derision of those who had been accustomed to hear new mineral substances named either after the places where they had been discovered or after their inventors, or after distinguished or influential persons, or to hear people speak of Scheele's and Schweinfurt green or Berlin blue.

For Liebig the chief difference between organic and inorganic substances was that the former contain compound radicals, whereas the latter are similarly built up of elements. A joint research of Liebig and Wöhler on the subject of compound radicals was fruitful of important results. They examined oil of bitter almonds and benzoic acid, and discovered the radical benzoyl, a group of three elements, which was capable of combining like an element with chlorine, hydrogen, etc.

Berzelius was greatly interested in this discovery, and declared that it was the dawn of a new day in vegetable chemistry. He went so far as to say that he would like to see the first radical discovered, which consisted of more than two simple substances, named Proin and Orthrin.

No man is infallible; and Liebig, of course, made occasional mistakes. It is said by Dr. Pettenkofer that if he thought a substance was this or that, or contained some particular body, he would frequently ask a student in whom he had confidence to examine the substance. If the student failed to find at once what Liebig expected his confidence in the skill of the student always fell much more quickly than his confidence in the justice of his original idea. He would even naïvely say, "But you must find it." If the student still failed to find it he would sink still lower in Liebig's opinion, but would be sure to raise himself again if he took an independent tone and gave indisputable proofs that Liebig's idea was erroneous, and suggested a better explanation of the phenomena. Of course it was natural that this habit of adherence to an idea once taken up increased on Liebig with years.

But what furthered Liebig's progress so much alongside with his unusual mental gifts and quickness of comprehension was his methodical way of working. He saved himself and others an immense amount of time in research by adopting good methods.

Liebig had learnt elementary analysis with Thénard and Gay-Lussac; but when he set to work with such intensity at Giessen to determine the carbon, hydrogen, and nitrogen of organic bodies, it must have been most annoying to him to require so much time and apparatus. Just as he had in his early years at Erlangen made up his mind that he must go to Paris to complete his education, so he now saw that he must contrive a simpler method of elementary analysis if organic chemistry was to be developed. This important task occupied him for some years, but he accomplished it at last. By degrees he got the apparatus into such a simple and sure form that it surpassed in quickness and accuracy the ordinary methods of mineral analysis. This being accomplished, the questions about the quantitative composition of organic bodies could now be easily answered.

The five-bulb apparatus which Liebig contrived to make out of glass tubing enabled him to absorb with facility and accuracy the carbonic acid formed by the combustion of organic bodies. It has become an emblem of the Giessen school. Probably the most important service rendered by Liebig to science was the establishment of the Giessen School of Chemistry. He had experienced in his own person the difficulty of getting a training in the higher branches of the science from the lack of chemical schools. This difficulty had at length been overcome in his case; but only his individual wants were thus satisfied by his accidental meeting with A. von Humboldt, by whose means he was admitted to Gay-Lussac's laboratory. What he had obtained by a happy accident he made accessible to all in Germany. The founding of the chemical laboratory in Giessen, for purposes of public and practical instruction, was quite an epoch in the history of science. What unexampled activity reigned in those chemical halls! There met and worked from morning to evening the future professor of chemistry, the future manufacturer. All the dialects of Germany might be heard there—nay, every European language, and in one hall, somewhat predominating, the English language—all mixing and yet in order, for every one felt that he was striving for a noble object—he was serving science; in other words he was a pupil of Liebig. And how inspiriting was this meeting together of earnest youths under such a master! Many a noble and lifelong friendship was founded by community of work and aims. And Liebig had mostly a bit of good advice or a happy thought, which helped one who had got into either a scientific or an experimental difficulty, and which would float him again in the right direction.

All who know what this school of Liebig on the Lahn was, and what other opportunities there existed for chemical study, will easily comprehend that there was a time when any one who had a longing for thorough chemical study felt an irresistible call to Giessen. Liebig is much to be applauded and admired in that he knew so clearly the kind of school he must make in order to effect real good. Others before him had felt that chemical students ought to do practical work in the laboratory; but they had not the support of public opinion, or of the governing bodies of educational institutions, and were not strong enough to break through the hindrances around them. It is even told that when one professor at a small university attempted to have a little practical school of chemistry his colleagues regarded it as a useless squandering of reagents and coals; and the few students who went to this class were quite pitied by the rest for their credulity in fancying the professor would be so foolish as to show them the right operations and make them professors too.

From the very first Liebig went on the principle of teaching his pupils chemistry without any reference to special applications, and of putting them in possession of the knowledge which they were afterwards to apply. The application he left to themselves. Just then many so-called technical schools were being founded where it was intended that only such parts of natural science should be taught as were useful for some branch of industry. In such a school the future brewer should study malt and hops, the dyer colours, the agriculturist soils and manures, and so on, but not be burdened with subjects of which the pupil in his future career was not likely to make any practical application. Liebig stedfastly opposed this unintelligent utilitarianism.

People in great technical businesses soon began to see how perfectly in the right Liebig was in this idea; and he was constantly applied to, not merely for chemical teachers, but even for chemists; and not merely for chemists to assist in chemical works and soda manufactories, but for paper manufactories, colour works, breweries, etc.

In this way not merely eminent investigators and teachers came forth from Liebig's school, but many very distinguished practical men. Two other subjects yet remain to be mentioned to complete the picture of Liebig's scientific activity—'The Annals of Chemistry and Pharmacy,' and his 'Letters on Chemistry.'

Before Liebig's time there was no periodical which was exclusively devoted to chemistry. Chemistry was then more nearly connected with pharmacy; and as in the practice of pharmacy the results of chemistry came so closely into application, Liebig's first researches were published in the 'Magazine for Pharmacy,' founded by the apothecary Hänle, and afterwards continued by the apothecary Geiger, in Heidelberg.

In the year 1832 Liebig founded, in conjunction with Geiger, the 'Annalen der Pharmacie,' which now became entirely his organ. With the publication of the 33rd volume, Wöhler became one of the editors, and the title was changed to 'Annalen der Chemie und Pharmacie,' in order, as Liebig said, to bring the title and the contents more into unison. Later on, Kopp, and still later, Erlenmeyer and Volhard, all pupils of Liebig, joined in the editing.

The 'Chemical Letters,' as is well known, originated in a series of essays published in the *Augsburg Gazette*. These letters were remarkable specimens of exact science popularized for educated people.

Liebig's active mind led him to an earnest consideration of the chemical processes involved in agriculture and physiology. Having paid more attention to the study of organic bodies than any other chemist, he naturally felt a desire to consider these substances in connection with their functions, and the circumstances under which they were developed. How fruitful his labours were in this direction is already well known.

What is called Liebig's agricultural chemistry was developed in two periods. The first period from 1840 to 1846 in Giessen, and the second from 1856 to 1862 in Munich, whither he migrated in 1852. His views on vegetable and animal physiology were first expounded in a work which was published by Vieweg, in Brunswick, in 1840, with the title 'Die Chemie in ihrer Anwendung auf Agricultur und Physiologie.'

This book originated in the following manner:—The British Association for the Advancement of Science, at its Liverpool meeting in 1837, requested Liebig to publish a report of the present state of knowledge in the department of organic chemistry. He expressed his willingness to do so, but proposed that Dumas should share the task with him. Dumas seemed disinclined, and Liebig brought out his 'Agricultural Chemistry.' The result of its publication was astonishing. It went through no less than six important editions in six consecutive years, and excited an immense amount of interest. The stir made by this book was so great that Dumas, as the first chemical authority in France, felt it necessary one year later to publish a somewhat similar work in the French language, and formally to claim for France on this occasion the main principles enunciated in Liebig's work—'Elles appartiennent à notre école dont l'esprit est venu s'exercer sur ce terrain nouveau.'

Many of Liebig's countrymen expressed strong dissent from his views; and Berzelius at first expressed himself as very doubtful about them, and after some years got into actual hostility with Liebig about this application of chemistry, which he called 'Probabilitäts-Theorien.' In his 'Jahresbericht,' of 1841, Berzelius said that Liebig's book was executed with all the talent which one would expect of so distinguished an author, but he does not conceal his opinion that Liebig had erected an edifice which was but too insecure. He said that Boussingault was working in the same field as Liebig, but was taking the long and difficult road, answering every inquiry by one or more experiments, that he did not give his answers so quickly, but they might be relied on.

This partly cautious, partly dissentient, and partly actually hostile attitude of the agriculturists, physiologists, and chemists seemed only to tune to a louder key the enthusiasm and applause of the general public; but this was probably no satisfaction to Liebig, for all of the applauding crowd who besides his own pupils surrounded him, not one was able to bring Berzelius over to different views, to weaken the experiments of Braconnot, and the objections of Boussingault, or to convince the sceptical agriculturists and controversial physiologists.

Then, perhaps, for the first time in his life, Liebig may have oft felt right lonely, despite the homage of the masses; for even his best friends and scholars saw too well that Liebig in his high flight (this book) had often maintained more than he had proved, that the proof was in many points still wanting.

At no time did Liebig profess to be the first who had made chemical experiments in agriculture. In fact, in the dedication of this book to Alexander von Humboldt he says, "I hardly know whether even a part of the little work which I make bold to dedicate to you is my own."

What, then, was it which caused so much excitement? It was the idea which Liebig brought so prominently forward, that plants alone are capable of assimilating inorganic materials, such as carbonic acid, water, and ammonia, and of building up complex substances such as albumen, starch, and fat, etc.; while animals live upon these complex products and reduce them to simpler ones.

Liebig undertook the determination of the ashes in several parts of many varieties of plants and from different localities. He cared little for analyses of soils hitherto considered so important, especially how much humus an earth contained, but he wanted specially to know what each plant did with the earth on which it grew.

It soon appeared that all plants leave qualitatively the same mineral constituents in their ashes, but that every kind of plant, so to say, yields its own peculiar ash, inasmuch as different kinds, even when growing on the same soil, take up its mineral constituents in very different proportions. It was soon found that wheat, rye, barley, etc., have their distinct ashes, also the grains of a corn compared to the corresponding straws.

As it was not enough to know the ashes of a particular plant grown in a particular region, but was desirable to get them from as many different plants, fields, and regions as possible, so Liebig procured ashes from all possible localities. Just as a merchant writes letters of business to all parts, so Liebig sent about letters everywhere for analyses of ashes.

In order to make the work of analysis as easy as possible, his pupils Will and Fresenius had worked out and published an excellent method of ash-analysis; and in a short time thousands of analyses were made of the most different plants and parts of plants in very different localities. He found that each plant takes an exact quantity of mineral matter and in an exact proportion, which may be recovered again from its ashes; and he concluded that whatever else the plant requires for the formation of its combustible constituents is derived from the carbonic acid, water, and ammonia of theair. From these views Liebig laid down the rule that to keep a wheat or corn-field fertile one has only to return to it the mineral constituents which have been taken out by the crops, and in the proportions in which those minerals are present in the ashes of each crop.

Liebig induced the distinguished alkali manufacturer Muspratt, in Liverpool, to prepare mineral manures for wheat, rye, oats, clover, potato, and other fields. The different manures were manufactured according to a method invented by Liebig, which consisted in melting together the necessary substances, so that salts easily soluble in water were brought into an almost insoluble form that the rain might not carry them off out of reach of the germinating seed. Liebig was as much convinced of the soundness of his mineral theories as of the working power of his mineral manure. But matters turned out differently from what he anticipated, and a heavy trial was in store for his great genius.

The English agriculturists saw no result from his artificial manure, ceased to buy it, and again had recourse to dung and other substances, and the factory in Liverpool ceased to work. Nay, even Liebig was himself convinced by his unsuccessful experiments in agriculture in Giessen that his mineral manure could not make a barren soil more fertile. One single ray of hope came to cheer him after years of failure. It turned out that after a length of time those fields when no longer manured at length became more fertile. But here again was a new riddle for him.

Meanwhile adversaries rose up, not merely to expose the uselessness of his manure, but also to show that new methods must be adopted in order to reach a practical end.

In the foreground stood an English agriculturist, Lawes, who soon joined with an excellent chemist, Gilbert, and made on one of his estates experiments with all sorts of manures, which they manufactured and tried in many different ways. It was shown that the more soluble a substance is, the more effect it has; that the yield of a field is often increased merely by the addition of bone-ash rendered soluble by sulphuric acid (so-called superphosphate); but that above all ammonia and ammoniacal salts, or, as they at last boldly stated it, combined nitrogen must be added to the fields in order to secure good crops; and for a while the value of a manure was simply estimated by the amount of nitrogen it contained, whereas Liebig's theory had pointed out the atmosphere as a sufficient source of supply of ammonia.

Liebig's adversaries were at this time banded together under the application of Nitrogenists (*Stickstöffler*). They thought they had driven Liebig for ever from the field.

In spite of all Liebig remained true to his theory and would not yield. He controverted the conclusions of Lawes and Gilbert, but without success. The President of the English Agricultural Society, Pusey, ranged himself distinctly on the side of Lawes and Gilbert. As the masses only judge by results, the sale of the book 'Chemie in ihrer An wendung auf Agricultur und Physiologie,' which at first could not be printed fast enough, became smaller and smaller, and after 1846 no new edition appeared.

In his latest writings on the subject of the mineral theory Liebig acknowledged that ammonia may with advantage be supplied to cereal and some other crops in the manure: but contended at the same time that it was naturally included among "mineral substances" which he had originally referred to. As, however, he had clearly explained that the ashes of a plant contain the mineral substances which ought to be added to the soil for the growth of such plant, the statement that ammonia is really a mineral compound, and ought to be included in his rule regarding mineral substances, really conceded in substance the argument of his opponents.

Since the year 1845 Liebig had paid more and more attention to the second part of the task which he had set himself in 1840, the application of chemistry to animal physiology, and was in full work at this time when King Maximilian II. entered into a correspondence with him with the view of calling him to Munich. Liebig had in the course of his distinguished career declined so many calls (shortly before this one a brilliant call to Heidelberg), that they had little hope of persuading the eminent man to come to Munich, but they induced him nevertheless. To his honour be it said he did not in the least render the task more difficult by great pretentions, merely stipulating that he should not be required to conduct so large a laboratory as he had done at Giessen, so that he might have more time for his own work. His migration took place in the autumn of 1852, when in his 49th year.

After some time he resumed at Munich his agricultural experiments, and at last found out why his mineral manure had not the desired effect, and why dung and even mere ammoniacal salts alone had so great an effect.

In the year 1862 appeared his great work, in two volumes, 'Der chemische Process der Ernährung der Vegetabilien und die Naturgesetze des Feldbaues.' This was the crowning work of Liebig's agricultural labours, and his doctrine is now universally recognized; and no thoughtful agriculturist ever now supposes that he need but add superphosphate or nitrogen or guano and his fields will be for ever fertile. It is now in agriculture but a question of the best appliances necessary to do justice to the theory of Liebig. In Germany agriculturists have thankfully acknowledged this by the foundation of the Liebig Stiftung.

In close connection with the subject of nutrition is Liebig's work on flesh, which first gave us a more exact idea of the chemical composition of muscle, that is by far the greatest and most massive part of our bodily organs. One result of this work is the Liebig Meat Extract, now well known in the whole world, of which so much has been said, and whose value has been as often over- as underrated.

Liebig spent the remainder of his life at Munich, where he died on the 10th of April, 1873.

THE OIL OF ELÆOCOCCA AND ITS SOLID MODIFICATION PRODUCED BY THE ACTION OF LIGHT.*

BY S. CLOEZ.

The action of the more refrangible rays of light causes the neutral liquid oil of *Elæococca* to solidify into a buttery substance, the melting point of which is 32° higher than that of the oil. When saponified with potash, and acidified with phosphoric acid, this fat decomposes into glycerin, and a mixture of two acids, one solid and the other liquid; they were separated by pressure between bibulous paper. The solid acid was purified by crystallization from alcohol, and combined successively with potassium, barium, lead and silver. Instead of acidifying with phosphoric acid, the solution of the potassium salt of the new solid acid, which the author names *margarolic acid*, may be cooled; the potassium salt crystallizes out in a nearly pure state, and may be completely purified by recrystallization from alcohol of 0·85 specific gravity. The acid may be prepared from potassium margarolate by addition of phosphoric acid. Margarolic acid crystallizes in rhomboidal plates; it melts at 48°, is insoluble in water, soluble in ether, carbon disulphide, liquid hydrocarbons, and aqueous alcohol; it rapidly absorbs oxygen, and is converted into a soft transparent body, which gradually becomes hard and assumes a resinous appearance. The acid gains 8·5 per cent. in weight on exposure to air for a fortnight. It may be kept without alteration in a sealed tube, or under water.

The analysis of the acid and of its salts led to the formula $C_{17}H_{30}O_3$ for the acid, and $C_{17}H_{29}O_3R$ for the salts.

On addition of water to the potash salt, an acid margarolate crystallizes in small nacreous scales.

The liquid acid separated from margarolic acid by pressure, is purified by formation of the calcium salt, which is treated with ether, and the portion which has dissolved is decomposed with hydrochloric acid. The author gives it the name *elæolic acid*. Lead oleate is soluble in ether, whereas lead margarolate dissolves. These acids appear to indicate two glycerin ethers in the elæococca, viz., *elæolin* and *margarolin*.

The solid product formed by the action of light gives, when saponified, a mixture of fatty acids, from which one melting at 72° was separated, containing less oxygen than margarolic acid. The author names it stearolic acid.

* From the *Journal of the Chemical Society* for July. (*Compt. Rend.*, lxxxii, 501—504.)

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 2, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

EXCISE PROSECUTION OF CHEMISTS.

THE recent prosecution of chemists and druggists in Glasgow for selling wine without a licence forcibly illustrates the necessity of exercising some caution in regard to the articles sold in pharmaceutical establishments. In addition to the Food and Drugs Act, which requires the retailers of drugs to satisfy themselves as to the purity of their wares, the various excise regulations affecting the sale of alcoholic liquids bear very closely upon certain features of the retail drug trade, and are capable of being so interpreted as to cause considerable trouble and inconvenience.

Most of our readers will remember that in the Hull morning tonic case the excise authorities manifested some readiness to contest the question whether the sale of a mixture consisting chiefly of tincture of gentian and tincture of cardamoms was a legitimate part of the chemist and druggist's trade, or a specious infringement of the law relating to the sale of spirituous liquors as beverages.

On that occasion, however, the scientific advisers of the excise were not particularly successful in the support they gave to the prosecution, and the outcome of the case was not satisfactory to either party, inasmuch as it left the entire question at issue undecided.

The vigilance of the excise officials is now directed into a different channel, and the sale of an article designated LIEBIG'S Liquid Extract of Meat has been selected as constituting a breach of the law relating to the sale of alcoholic beverages. This preparation has already appeared in court, and a report of the circumstances under which it did so was published in this Journal last October twelvemonth. According to the account then given of it by the Borough Analyst of Bradford it is a concoction of Tarragona wine, sweetened with sugar, flavoured with pimento or allspice, and containing only a very small portion of extract of beef, but about 15 per cent. of pure alcohol. Consequently the seller of this preparation was prosecuted under the Sale of Food and Drugs Act for selling an article which was different from what it was described to be by the vendor, who represented that it was composed chiefly of pure extract of beef, together with wine and a small quantity of fine old brandy and quinine. This representation was contradicted by the Bradford Borough Analyst, who declared that the preparation in question contained only a trace of extract of beef, no quinine and no brandy.

The defence in this case was merely the plea of ignorance of the composition or character of the article sold, and a disclaimer of any intention to mislead; but although this view of the case might not unreasonably have been accepted by the magistrates, they formed a different opinion, and fined the defendant forty shillings and fifty shillings expenses, or in default one month's imprisonment, and refused to grant a case for appeal.

We have stated thus much of the details of this case chiefly in order to make known what was the nature of the preparation it referred to; there was, however, another point put forward which bears upon the more recent case at Glasgow—viz., the opinion of the Bradford public analyst that the use of this preparation appeared to him to be merely "a sly way of drinking." This does not seem very consistent with the account given of the composition of the article, but it has been adopted by the excise officials, and it is upon this ground that the prosecutions have been instituted at Glasgow.

It must no doubt be admitted that there are persons whose appetite for alcoholic stimulants is sufficiently strong to induce them to have recourse to the drinking of articles which the majority of mankind would regard merely as physic to be taken under compulsion and as being far too unpalatable for purposes of indulgence. At the same time circumstances may exist which will so far counterbalance the distastefulness of such preparations as to lead to their being used as beverages. This however is only exceptional, and it seems an unfair proceeding to make the vendors of such preparations amenable for the misuse to which they may be put by persons who purchase them. We have known cases where nominal teetotallers have been in the habit of consuming, under medical advice, large quantities of pharmacopœia tinctures and there was no doubt that they did so to supply the place of an abandoned habit of drinking ordinary alcoholic liquors.

Without going into the question of the propriety of such a proceeding we cannot fail to perceive on what ground a chemist should be made the sufferer for it. The sale of medicated tinctures is not subjected to the excise regulations applying to the sale of ordinary alcoholic beverages, and it is a great hardship on the chemist and druggist to be placed in the position of a wilful offender when these preparations are used in such a way as we have mentioned. At any rate if restrictions are to be placed upon the sale of medicinal alcoholic preparations such as tinctures, it should not be done in an arbitrary way according to the caprice or officiousness of some particular excise officer but should apply alike to all persons similarly engaged in the trade.

In America this has been done, druggists being there required to take out licences for the sale of alcoholic drinks, and being in this respect placed on a level with the publican. We are far from admitting that this course is justifiable though we must confess it is at least rational, if druggists are to be made accountable for the misuse of medicinal preparations by those who purchase them.

Moreover the Liquid Extract of Meat to which the Glasgow prosecution relates was avowedly sold as a medicinal preparation, whatever may have been its value in this respect, and if its sale was in any way a contravention of the law we take it that the ends of justice would have been more logically served if the makers had been prosecuted for selling it without the patent medicine licence.

In any case this prosecution affords support to the suggestion we have thrown out that chemists and druggists will do well to consider how far their interests may be compromised by selling articles of this description, and we venture to think it would be better to refrain from selling them than to incur the risk of prosecution.

Before leaving the subject it will be as well to mention for the information of those who may have been misled by the newspaper reports of this case, that the Liquid Extract of Meat is a totally distinct thing from LIEBIG's Extract. We have received several letters on this point which show that considerable alarm exists among chemists and druggists lest they should be pounced upon by excise officers for selling LIEBIG's Extract of Meat, and therefore we take this opportunity of stating that the apprehension is groundless.

THE CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

SOME objection is expressed to the doubt we suggested last week as to whether the development of this Association is progressing so rapidly as will be necessary if it is to effect any benefit to the trade. In a letter which appears in our correspondence columns Mr. HUMPAGE controverts to a certain extent the inference that the trade is for the most part indifferent, and he supports his objection to this inference by a statement of his own experience. We admit the force of the facts he mentions as proving that so far as they go there is no apparent ground for suspecting indifference. The Association has reason to be thankful to Mr. HUMPAGE for the good offices by which he has secured the support of fourteen members, and probably if there were in the trade many more like himself, who took a lively interest in the well-being of the body to which they belong, we should have no opportunity for doubting as we have done whether the roll of members of the new Association is growing as it should do.

The letter from a member of the Committee, though no doubt intended to convince us of the error of our views, nevertheless fails to do so, and we venture to believe that it will also fail to convince many of his colleagues on the Committee that the Association can be regarded as a success unless it comprises among its members a large proportion of the 14,000 registered chemists and druggists in the country. The figures which he gives rather confirm than remove the doubts we have expressed. It may be that the result of the Glasgow meeting will be to bring a very large accession of members, but until that result is realized we shall be under the necessity of preferring our own estimate of the situation to that of the "Member of the Committee."

But, whatever be the result of the attempt to form this trade association we cordially concur with the opinion expressed in the concluding sentence of Mr. HUMPAGE's letter that there need not, and should not, be any antagonism between existing societies and the one recently started, since there are ample fields for both to exercise their influence in the particular directions they are intended to work. We believe that the Committee of the new Association possesses such a preponderance of wise men as will fully ensure the observance of this principle.

MEDICAL SHOPKEEPING IN TORONTO.

THE druggists of Toronto rejoice in a Pharmacy Act that has been of "incalculable advantage," but like all human workmanship, it has its defects. Whilst on the one hand a rigid law prevents the druggist from taking the position of prescriber, on the other the doctors are exempt from the operation of the Pharmacy Act. The consequence is a state of affairs as bad or worse than that which is reported to exist in the West of Scotland.

"Cœlum, non animum, mutant, qui trans mare currunt".

The *Canadian Pharmaceutical Journal* states that unsuccessful candidates who fail to pass the pharmaceutical examinations sometimes "manage to borrow the name of some unscrupulous doctor," and thus evade the spirit of the law. Drug stores are also said to be kept by young doctors and so-called medical men, who are not capable of practising their profession. That accidents occur under such conditions is not surprising, and we quote from our contemporary an account of one that has recently happened.

A man went into the drug store of a certain "Dr. RICHARDSON and Co.," and asked for a dose of salts. The "assistant" in the store said that they were out of that drug, but that the applicant could be supplied with "distilled salts," which would answer the same purpose. An ounce of the "distilled salts" was therefore bought by the man, and a few days after, feeling unwell, he prepared to take a dose. The salts were placed in a tumblerful of water, but this not being sufficient to effect solution, a considerable quantity more water was added and the whole swallowed. Shortly afterwards the victim was seized with a severe attack of vomiting, followed by cramps in the stomach and legs. Medical assistance was called in, but for several days the man hovered between life and death from the effects of the poison he had swallowed, which is supposed to have been oxalic acid.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The opening meeting of the sixteenth session was held at the rooms, Halford Street, on the 10th inst., Mr. Hammond occupying the chair. After the numerous company had partaken of a substantial tea, the President was called upon to deliver the customary inaugural address.

The President (Mr. Baron), in complying, stated that he intended to take as the basis of his remarks—Knowledge, what it is? How it may be acquired? How it should be valued? Walker defines knowledge thus: certain perception, learning, illumination of the mind, etc. This the speaker said was perfectly correct. Yet, if we rest satisfied with nothing higher than this we shall not make any very distinguished mark in life. A savage fulfils all the requirements of this definition, the wants of his animal nature have prompted his mind to the acquirement of a certain amount of learning, impressions have been made on his sensorium by the things outside him, and using the powers of inductive reasoning he has learnt how to defend himself against his foes, has discovered how to chase and capture the game that is necessary for his subsistence, and he may perchance have acquired some knowledge, albeit very crude, of the natural phenomena by which he is surrounded. So far his mind has been illuminated. A certain amount of knowledge we are bound to acquire, we cannot escape from it, we learn it, as it were, automatically. Men stand to some extent on a level in one thing, viz., that the mind is a blank, an entire blank, on entry into this world. But there comes the stage in which, our will becomes the mainspring of our action. When we feel the consciousness of our existence, and that we were made for higher, nobler ends than the mere satisfaction of our animal necessities, and when we feel that we can satisfy those nobler purposes, then we determine that our mind's needs shall be satisfied, that it shall be illuminated, that its perceptive powers shall be awakened and made certain; then we determine that whatever may be the branch or branches of learning we pursue, that we will never rest satisfied with half measures, but that we will push on towards the acquirement of perfection.

As to how knowledge might be obtained? The speaker reminded his hearers that there is "No royal road to learning." No method has been or ever will be invented by human ingenuity, by which we can dispense with trouble and toil in its acquirement. If they wished to reap a rich harvest they must rise early and work late and hard, carefully till the soil, and as carefully sow good seed in that soil. The habit of systematic study once acquired would never desert them, it would become as it were a part and parcel of their nature. We all know the force of habit. We see manifestations of its power for good and evil every day. This tendency to habitual action is so universally recognized as an important part of our physical nature, that man is not unfrequently said to be a bundle of habits. When the habits have been judiciously formed in the first instance, this tendency is a most useful one, often prompting us to do spontaneously what would otherwise require a strong exercise of will. Then a second thought in connection with this subject was the time for study. He considered it extremely desirable that his hearers should work before their brains were jaded. They would make much more satisfactory progress if they studied when their perceptive powers were clearest, consequently they should make an effort to seek knowledge when she can most easily be found, either by rising earlier in the morning, or otherwise, for the sake of the high pleasure that accompanies her possession.

The speaker concluded by asserting that knowledge is to be valued for its own sake, and not merely for the adventitious advantages that might be associated with its acquirement, and he urged his hearers to make the most of the faculties with which they had been endowed.

After a unanimous vote of thanks had been accorded to the President for his instructive address, and responded to by Mr. Baron, songs, readings, and addresses were given by several members of the Association during the remainder of the evening,

Proceedings of Scientific Societies.

ROYAL SOCIETY.

On the Gaseous State of Matter.*

BY PROFESSOR T. ANDREWS, LL.D., F.R.S.,

Vice-President of Queen's College, Belfast.

The following is an abstract:—

"After referring to certain modifications in his former method of working at high pressures, the author describes some preliminary experiments which were undertaken to determine the change of capacity in the capillary bore of the glass tubes under the pressures employed. From these experiments it appears that, on raising the pressure from 5 to 110 atmospheres, the capacity was increased for each atmosphere by only 0·0000036, and that this change of capacity was chiefly due to compression of the internal walls of the glass tube. Another set of experiments was made to ascertain whether air or carbonic acid gas is absorbed at high pressures to any appreciable extent by mercury. For the method of operating and other details reference must be made to the original memoir: but the general result is that no absorption whatever takes place, even at pressures of 50 or 100 atmospheres. The pressures are given according to the indications of the air-manometer in the absence of sufficient data (which the author hopes will be soon supplied) for reducing them to true pressures. In the meantime it is probable, from the experiments of Cailletet, that the indications of the air-manometer are almost exact at 200 atmospheres, and for lower pressures do not in any case deviate more than $\frac{1}{80}$th from the true amount.

In a note which was published last year in the 'Proceedings' of the Society (No. 163), it was stated that the coefficient of expansion (α) for heat *under constant pressure* changes in value both with the pressure and with the temperature. The experiments on this subject are now completed, and are described at length in this paper. The final results will be found in the two following Tables. In the first Table the values of α are referred to a unit volume at 0° and under one atmosphere. In the first column the pressure p in atmospheres is in terms of the air-manometer.

p.	α (0°–7°·5).	α (0–64°).	α (64°–100°).
17·09	.. .	0·005136	0·004747
20·10	0·00607	0·005533	0·004958
22·26	....	0·005811	0·005223
24·81	0·00700	0·006204	0·005435
27·69	0·00782	0·006737	0·005730
31·06	0·00895	0·007429	0·006169
34·49	0·01097	0·008450	0·006574

For higher pressures than 35 atmospheres a different unit volume must be taken, on account of the liquefaction of the carbonic acid. The next Table contains the value of α, *referred to the unit volume at* 64°, between 64° and 100° at constant pressures up to 223 atmospheres.

* From the 'Proceedings of the Royal Society.'

p	α (64°–100°).	p.	α (64°–100°).
17·09	0·003572	46·54	0·004946
20·10	0·003657	54·33	0·005536
22·26	0·003808	64·96	0·006512
24·81	0·003892	81·11	0·008033
27·69	0·004008	106·90	0·013150
31·06	0·004187	145·50	0·018222
34·49	0·004266	223·00	0·008402
40·54	0·004596		

As the value of α changes with the temperatures, the coefficients given above are average coefficients for the ranges of temperature specified. It will be observed that the value of α increases with the pressure until a very high pressure is attained, when it changes its direction and diminishes. This apparent anomaly depends upon the carbonic acid at the high pressure having passed from the gaseous state proper to the intermediate conditions, which the author has formerly described as establishing a continuity between the gaseous and liquid states of matter.

If we designate by α' the coefficient of elastic force when a gas is heated under a constant volume, we shall have in the case of a perfect (ideal) gas

$$\alpha = \alpha'.$$

In the ordinary gaseous state the value of α' diverges widely at high pressures from that of α, as will appear from the two following tables. In the first table the values of α' are referred to a unit pressure at 0°, and p is the initial pressure in atmospheres :—

p.	α′ (0°-6°·5).	α′ (0°-64°).	α′ (64°-100°).
16·42	……	0·004754	0·004607
21·48	0·00537	0·005237	0·004966
25·87	0·00588	0·005728	0·005406
30·37	……	0·006357	0·005861
33·53	0·00734	0·006973	0·006334

In the next table the value of α' between 64° and 100° referred to a unit pressure at 64° is given for a large range of pressure. Both the initial and final pressures are given.

p,	α′ (64°-100°),	p.	α (64°-100°).
21·42, 24·19	0·003526	48·40, 56·16	0·004387
28·65, 32·60	0·003718	67·65, 80·99	0·005392
35·29, 40·44	0·003956	94·27, 118·60	0·007018
42·74, 49·25	0·004166		

As the general result of this investigation it follows that in the ordinary gaseous state the law of Gay-Lussac does not hold good, either in the case of α or of α', and that the dilatation *by heat of a body in the ordinary gaseous state, whether measured by its expansion under constant pressure or by the increase of elastic force under constant volume, is not a simple function of the initial volume or initial-elastic force, but a complex function changing with the temperature.*

In the second part of the paper the general properties of the ordinary gaseous state are considered. As the basis of this inquiry the following table of the compressibility of carbonic acid at 6°·5, 64°, and 100° is given, in which ϵ is the ratio of the observed volume of the carbonic acid at the pressure p and temperature t' to its volume under one atmosphere at the same temperature t'.

p.	t′=6°·5, ε.	p,	t′=64°, ε.	p.	t′=100°, ε.
12·01	$\frac{1}{12{\cdot}05}$	17·60	$\frac{1}{18{\cdot}57}$	20·17	$\frac{1}{20{\cdot}98}$
13·22	$\frac{1}{14{\cdot}37}$	20·36	$\frac{1}{21{\cdot}05}$	22·37	$\frac{1}{23{\cdot}35}$
14·68	$\frac{1}{16{\cdot}13}$	22·56	$\frac{1}{24{\cdot}18}$	24·85	$\frac{1}{26{\cdot}09}$
17·09	$\frac{1}{19{\cdot}12}$	25·06	$\frac{1}{27{\cdot}08}$	27·76	$\frac{1}{29{\cdot}32}$
20·10	$\frac{1}{23{\cdot}03}$	28·07	$\frac{1}{30{\cdot}64}$	31·06	$\frac{1}{33{\cdot}05}$
22·26	$\frac{1}{25{\cdot}96}$	31·39	$\frac{1}{34{\cdot}07}$	34·57	$\frac{1}{37{\cdot}09}$
24·81	$\frac{1}{29{\cdot}62}$	34·92	$\frac{1}{39{\cdot}08}$	40·09	$\frac{1}{43{\cdot}54}$
27·69	$\frac{1}{34{\cdot}03}$	40·54	$\frac{1}{46{\cdot}34}$	45·99	$\frac{1}{50{\cdot}63}$
31·06	$\frac{1}{39{\cdot}}$	40·56	$\frac{1}{54{\cdot}57}$	53·81	$\frac{1}{60{\cdot}30}$
34·49	$\frac{1}{45{\cdot}80}$	54·33	$\frac{1}{65{\cdot}97}$	64·27	$\frac{1}{73{\cdot}97}$
		64·96	$\frac{1}{83{\cdot}44}$	80·25	$\frac{1}{96{\cdot}65}$
		81·11	$\frac{1}{114{\cdot}0}$	105·69	$\frac{1}{137{\cdot}6}$
		106·88	$\frac{1}{185{\cdot}5}$	145·44	$\frac{1}{218{\cdot}0}$
		145·54	$\frac{1}{325{\cdot}9}$	223·57	$\frac{1}{370{\cdot}3}$
		222·92	$\frac{1}{446{\cdot}4}$		

If we put $\rho = \epsilon p$, and calculate the values of ρ for each of the above experiments, it will be found that these values diminish regularly as the pressure increases at each temperature, with the exception of the last observation at 64°, where the value of ρ is greater than at the preceding observation. This change of direction in the value of ρ is explained by the circumstance already mentioned, that the carbonic acid at the higher pressure has been reduced to the liquid volume (although no liquefaction has taken place) in passing through the conditions of matter intermediate between the gaseous and liquid states.

The relations between the volumetric curves in the ordinary gaseous state for different temperatures are determined by means of what the author calls the homologues or homologous points of those curves—that is, the points in any two isothermals where the values of ρ are equal, or—

$$p\,v = p'\,v' \quad . \; . \; . \; . \; . \; . \; . \; . \; . \; . \quad \text{(A)}$$

From a careful analysis of the experiments described in this communication and in his former Bakerian lecture, the author shows that the ordinary gaseous state is characterized by the ratio of the external pressures for all the homologues of any two given temperatures being constant, or—

$$\frac{p}{p'} = \mathfrak{m} \quad . \; . \; . \; . \; . \; . \; . \; . \; . \; . \; . \; . \quad \text{(B)}$$

where $\mathfrak{m}$ is a constant. It must be carefully observed that v and v' in equation (A) are the volumes of the gas on different isothermals.

It follows from these results that, in the case of a body in the ordinary gaseous state, if the relations of pressure and volume are known at any one temperature, the corresponding relations at any other temperature can be calculated from the observation of a single homologue at the second temperature. Thus the whole relations of volume and pressure will be known from a set of primary observations at a fixed temperature and the determination of one homologue for each of the other temperatures.

The general form of the primary curve itself, or curve exhibiting the relations of pressure and volume at a given temperature, is next investigated; and the author finds as the result of all his experiments under very varied conditions of temperature and pressure, that the value of $\epsilon\,(1-\rho)$ is constant for the same temperature. Hence we have for the third equation of the ordinary gaseous state—

$$v\,(1 - pv) = c \quad . \; . \; . \; . \; . \; . \; . \; . \; . \; . \quad \text{(C)}$$

From this last equation the relations of homologous points as defined by equations (A) and (B) may be deduced.

The author concludes with some general observations on the action of the internal attractive forces in the ordinary gaseous state, and also on the resistance to diminution of volume which, under certain conditions, modifies largely the effects both of external pressure and of internal attraction.

FRENCH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The annual congress of this association for the present year commenced at Clermont-Ferrand, Auvergne, on the 18th of August, under the presidency of M. Dumas, the permanent Secretary of the French Academy of Sciences. The session included sectional meetings in which questions in various branches of science were discussed; general sittings in which scientific questions bearing upon the natural features and industries of the district were brought forward, and public conferences, at one of which M. Wurtz dealt with the new colours. During the Congress the meteorological observatory at the Puy de Dome was inaugurated.

M. Dumas, President, in his opening address, said:—"In 1851 I was present in London at the first Exhibition, and I soon found that among my fellow-members of the different juries, the great number and importance of the French articles exhibited in the industrial arts were quickly acknowledged, especially in those which depend upon Science. England had the largest chemical works in the world, and there was no lack of able, practical men. But France had long possessed schools like the Ecole Polytechnique and the Ecole Normale, affording the highest class of chemical instruction, and whose pupils, in their after life, imparted to the various manufacturing works the benefit of the lessons taught at them. A very eminent English juror acknowledged this superiority in the following terms:—'England has erred so far in doing too little for science, which is money; henceforth let us follow the example set us by France.' Similar also was the expressed opinion of one of the English juries—that on the silken and other fabrics of Lyons. This fact once acknowledged, and there arose at once schools of Science and Art throughout the British Isles. There exists in that country a body—the British Association for the Advancement of Science—always in the van, leading and guiding the efforts of Science. To us, with its lengthened existence of nigh half a century, it affords a model. Under its auspices has English Science assumed and preserved its high position. It contains among its members not merely the men of Science, but also those bearing noble names long known and respected throughout the land, many of whom, together with the late Prince Consort, it has placed upon the list of its Presidents. The British Association at its very commencement marked out for itself its course, which it has unhesitatingly and unremittingly followed ever since—to stimulate, without in the slightest degree interfering with existing institutions, in all parts, the efforts of the votaries of Science, to urge on and aid the efforts of individual research. One striking contrast exists between the world of Science in France and in England. In the latter, until of late years at least, all the universities and important seats of learning were away from the capital, while in France all Science centred in Paris, the provincial schools and universities being deemed but of secondary importance. To remedy this, to extend the domain of Science and to restore to the Provinces some of their ancient scientific eminence, is one of the objects of the French Association for the Advancement of Science. France must not forget that Science is a great power, and that its effects are visible in every branch of social and domestic life. When the Revolution of 1792 isolated us from the rest of Europe, and left us at once destitute of all those external products upon which we had so much depended, it was to our men of science that we looked to remedy these wants, and persons of such eminence as Lavoisier, Bertholet, and Chaptal laboured with their own hands to fill the void. To Science are due those terrible engines of war and likewise the steam-engine, which has peaceably revolutionized all our manufacturing and domestic life. Science also it is that causes the noisome tar, the refuse of our gasworks, to afford us some of our brilliant dyes and some of our most delicate perfumes, and shows that in the production of a stearin candle there also lies a substance so terrific in its effects as is nitro-glycerine. Science follows us everywhere, whether we like or not. It must be our companion, to possess it or to be possessed by it. If ignorant of it we are its slave, if learned it obeys us."

The Mayor of Clermont, M. A. Moinier, in a few well-chosen expressions, welcomed the Association to Clermont.

The Report of the Council, which was extremely satisfactory, was read by the General Secretary, M. Cornu. It announced that Government had recently decreed that the Association was of public utility, this Decree being equivalent to a charter in England, and gave details of the rapid progress of the Association. The Treasurer's statement was likewise very satisfactory.

In the evening the Mayor gave a reception, which was numerously attended, at the Hôtel de Ville, to the members of the Association and many distinguished officers, Clermont being the centre of a military division. It is supposed that about 600 members attended the Association meeting, but the town was also full of strangers and quite *en fête*, many of the public buildings being decorated.

On the 20th. the Association paid a visit to Vichy, during which, M. Daubrée, a member of the Institute, gave "The Health of Lord Houghton, Vice-President and Representative of the British Association, the elder sister of the French."

Lord Houghton, in returning thanks, congratulated the Association on extending to the Provinces the benefits of Science. He would not speak of decentralization, as he was speaking in the centre of France. They were assembled in the grand Republic of Science, on the platform of truth, on which liberty, equality, and fraternity were to be found. His own life had been rather that of a man of letters than of a *savant*; but even profound science did not exclude the warmest imagination. Lord Houghton concluded his speech, which was delivered in excellent French and much applauded, by toasting the "Universal Republic of Letters."

FRENCH PHARMACEUTICAL CONGRESS.

The fourteenth session of the French Pharmaceutical Congress was commenced at Clermont-Ferrand on the 17th of August. The greater part of the local pharmaciens appear to have held themselves aloof from the proceedings, but there was a fair attendance, delegates being present from about twenty societies. M. Perrens, of Bourdeaux, was elected as president.

One of the principal questions before the Congress was the proposed establishment of a society called the General Association of the Pharmaciens of France. This was approved of, and a code of rules suggested by the Seine Society was with a few slight alterations adopted. It was agreed that it would be necessary to preserve still to local societies complete autonomy and independence. Other questions that were considered were the proposed impost upon pharmaceutical specialties, the organization for medical relief in the country, and the revision of the law relating to the sale of mineral waters. Of the scientific memoirs submitted to the Congress, there were three "*couronné*," viz:—"An Anatomical Study of the Cinchonas," by M. Collin.; "A Study of *Calophyllum inophyllum*," by Professor Heckel;" and "A History of Poisons," by M. Gilbert.

The Congress was brought to a close on the 19th by a "*banquet confraternel*."

Parliamentary and Law Proceedings.

Liebig's Liquid Extract of Beef a Wine.—Prosecution of Druggists.

On Thursday August 24, several druggists were brought before the Justice of Peace Court, at the instance of the Excise, on the charge of having sold wine without a licence. Messrs W. W. Watson and John White were on the bench, with the assistance of Mr. Gray as assessor. Mr. Douglas, the Procurator-Fiscal, appeared for the Board of Trade.

The first case called was that of Thomas Davision, 126, Buchanan Street, who was charged with having, on the 13th of April, 1876, sold spirits without a licence; and there was a second charge of having, on the same day, sold foreign wine without a licence, the penalty in each case being £50.

Mr. Lindsay, who appeared for Mr. Davison, lodged a plea of guilty to the second charge.

Mr. Douglas accepted the plea.

In mitigation of sentence,

Mr. Lindsay said that Mr. Davison sold this article in ignorance that it required a license. It was sold on the understanding that it was a proprietary medicine, as it was sealed and capsuled. It was not sold in bulk, and it was advertised in the usual way as other medicines, as "Liebig's Liquid Extract of Beef." It had been recently introduced as a medicine, and had been sold by Mr. Davison on the order of medical men who had recommended its use to their patients. It was sold at the price of 3*s.* per bottle, which was equivalent to about double the ordinary price of the quantity of wine, so that the price precluded its having been sold as a beverage, for there was no one who wanted a beverage who would pay double the price for such a wine. There was a number of medicines such as that sold by chemists and druggists, and as they were all sealed up it could scarcely be expected that every medicine which a druggist sold was to be analysed by him. Mr. Davison acted on the general understanding that it was a proprietary medicine, and sold it on the understanding implied and expressed by the sellers in positive terms that it was not a medicine which required any licence to sell. The medicine had been found really to be a medicated substance, and although he had not got it analysed yet its taste was proof enough to him that it was medicated, and that there were other substances in it. According to the bill issued it contained besides wine, quinine or Peruvian bark, glycerine, syrup, spices, etc. It was true that the liquid was not unpleasant to the taste, and that it could be drunk not unpleasantly; but that was not an argument to prove that it was a breach of the Act to sell it. There were a good many other things used as beverages for the purposes of intoxication, and all these were daily sold under the authority of the British Pharmacopœia, such as sal volatile and tincture of cardamoms. Another article named methylated spirits was medicated with shellac for the purpose of preventing it being used as a beverage. Coming back to the case of the Liebig's liquid extract of beef, Mr. Lindsay said that Mr. Davison did not wish to sell it at all, and he understood the Excise authorities objected to its being sold without a licence. The makers had led the retailers on the ice, and the latter would be entitled to reparation for any damage or fine inflicted by the Court; but unfortunately the makers were now in liquidation, and the retailers were thus deprived of any remedy against them. He believed the Excise authorities could not come upon the makers, because they held a licence for selling it, but to show that the retailers would have no remedy against them their agent in Glasgow had received a card that morning which stated "Being now in liquidation, can do nothing to help anyone." He had, therefore, to submit to their honours that there was no intentional infringement of the law. It was done entirely in ignorance, and in the belief that it was no infringement of the law, and he thought that the end of the Excise authorities would be served by the justices cautioning Mr. Davison not in future to sell it, and to dismiss the case.

Mr. Douglas said the object of the prosecution was certainly not with the view of stopping this or any other wine, or any other compound. It was merely with the view of compelling people who sold wine or spirits under any guise to take out the usual licence. If their honours were curious to know the ingredients of this compound the analyst was present in court, and it would be shown that it was simply a wine—a wretched wine—what was called Tarragona wine—the lowest species or imitation of port, with almost no appreciable—indeed he might say no appreciable quantity whatever of quinine in it, and very little if indeed any of the extract of beef. The bill says, "This liquid extract has most invigorating and strengthening qualities. Railway travellers unable to obtain regula meals, and travellers by sea, will find it most beneficial." Indeed, there was 84 per cent. of wine in it.

Mr. W. West Watson said the Bench had no alternative but to impose a penalty on account of Mr. Davison's having pleaded guilty. The highest penalty was £50, and they had only power to mitigate it to one-fourth—to £12 10*s.*; but they would recommend that the Inland Revenue Commissioners should further modify the penalty.

Mr Heathwood was charged with having on the 2nd of May last retailed spirits and foreign wines without a licence. When asked to plead,

Mr. Heathwood said—I gave a bottle to the exciseman when he called—that's all I ever sold.

The Clerk—Did you sell it to him?

Mr Heathwood—I gave it to him, and he gave me the money. (A laugh.) I was the agent for the makers, and I made it as public as possible. I did not know anything about a licence.

The Bench imposed the modified penalty of £12 10*s.*, with a recommendation to the Inland Renvenue Commissioners to still further modify the penalty.

There were other five cases—Messrs John Currie, James Macconnochie, James Macdonald, Daniel Frazer, and William Greig, all of which were continued for a fortnight.

Poisoning by Chloral Hydrate.

An inquest was held at Silloth, Cumberland, on Thursday, August 24th, upon the body of the Rev. John Mitchell Harvey, D.D., who, until the beginning of the present year, was minister to a large congregation in Edinburgh. In March failing health compelled him to resign and he has since been seeking rest in England. On reaching Allomby, about seven miles from Silloth, on Tuesday, he had a slight refreshment. On arriving at Silloth he complained of being exhausted. He rested for an hour or so, and at half-past nine went to bed. He could not sleep, and at midnight got up and took a narcotic, consisting of 60 grains of bromide of potassium, and what he considered would be a teaspoonful of hydrate of chloral, though he did not measure it. About five o'clock next morning his wife became alarmed by his breathing, and found he was unconscious. Medical aid was sought, and Dr. Leitch, the local medical practitioner, was soon in attendance. He found the patient in an almost comatose state and took measures to try and rouse him, and succeeded so far that he induced him to walk about the room. His physical powers, however, soon failed him, and, on lying down, he again became unconscious, in which state he remained until his death at eight o'clock. Dr. Leitch was of opinion that death had resulted from a dose of hydrate of chloral, not in excess of what the deceased had been the habit of taking, but so large that his weakened physical condition had been unable to resist its action. The jury found that Dr. Harvey met his death through taking a dose of chloral for the purpose of procuring sleep.—*Times.*

Poisoning by Laudanum.

An inquest was held on Tuesday, Aug. 29, before Mr. W. Emsley, Leeds deputy-coroner, on the body of William Taylor, 33 years of age. Deceased, who was a master brickmaker, was addicted to drinking, and some time ago Dr. Hopkins advised that he should be taken to the asylum. This was not done, and last week he was drinking for several days. On Saturday he was in a low desponding state, and about half-past eleven that night called at the shop of Mr. Longley, druggist, North Street, and asked for eight ounces of laudanum and four ounces of turpentine mixed. He was told it would be 4s., and he then said he would have half that quantity. It was given to him and the bottle marked poison. About twelve o'clock he was found on Roundhay Road, with the bottle in his hand empty. He was removed home, and died on Sunday.—Dr. Hopkins said the quantity of laudanum was sufficient to have poisoned a dozen people.—The Coroner inquired of Mr. Longley, the druggist, if it was usual to supply such a large quantity of poison to a person who was not known; to which Mr. Longley replied that when a person ordered laudanum and turpentine mixed it was understood to be as a medicine for horses, and it was regularly supplied by druggists as such. There was nothing in the Act regulating the sale of poisons which required the druggist to ascertain the names of persons to whom laudanum was sold.—The Coroner said he could not understand a law which required a druggist, when he sold a penny packet of Battle's vermin-killer, to have the same entered in a book and the purchaser identified, because the powder contained strychnine, and yet required no such caution if the sale was of any quantity of laudanum.—Dr. Hopkins said very few persons had any idea of the quantity of laudanum that was drunk, and for some years he had thought the law as to the sale of it was not strict enough.—The jury returned a verdict "That deceased committed suicide when in an unsound state of mind, caused by excessive drinking."

Poisoning by Carbolic Acid.

Mr. Humphreys, on Tuesday, held an inquest at the London Hospital on the body of Timothy McCarthy. Deceased was an inmate of St. George's Union, and on Saturday was on a visit to his son. The latter kept carbolic acid in a bottle, to kill vermin with, and during his son's absence deceased seems to have reached down the bottle, which was a precisely similar one to that in which the son used to bring his father wine to the union, and supposing it to contain wine he drank a quantity from it. As soon as the accident was discovered deceased was conveyed to the London Hospital, but he died from exhaustion from the effects of the acid on the following day. A verdict of "Poisoning by inadvertence" was delivered.

Review.

Étude sur les principaux produits résineux de la famille des Conifères par A. Herlant. Bruxelles: H. Manceaux.

A great deal of confusion exists in many works on materia medica concerning the various medicinal products of the Coniferæ, their exact botanical source, and the means of distinguishing one from another. In the little work before us the author has endeavoured to arrange these particulars in something like order, so that it will be an easy matter to refer to any particulars required either by the scientific or the commercial man. The pamphlet is divided into three parts, the first giving the author's idea of the best method of classifying the medicinal products of the Coniferæ, the second treating fully of the products themselves, and the third part consisting of a list of the principal coniferous plants yielding products useful in the arts or in domestic economy.

The author bases his classification of the produce upon the principle that the resins or oleoresins are the result of the more or less complete oxidation of essential oils existing in the plants; the unoxidized oils being volatile, and the oxidized oil or resin being fixed. He accounts for the variation in consistence by pointing out that the volatile oils vary much according to circumstances; the period of collection, temperature, etc., having considerable effect in modifying their tendency to oxidation.

The coniferous products are arranged in the following groups—Turpentines, pitches, tars, resins, and essential oils; and these groups are again subdivided according to their natural or artificial production, and their drying or non-drying properties. Under each article is given a list of its synonyms in different countries, its botanical source and botanical synonyms, an account of the way in which it is obtained, its chemical and physical characteristics, its composition and uses.

The text is written in a very clear and readable style, and the paragraphs are well arranged. The information given is much more condensed than is now usually the fashion in French works; and references are given so that those who wish for fuller information may know where to find it. Although the author does not advance much that is new, yet the information which he has grouped together is of so practical a nature that it cannot fail to be useful to the analyst or tradesman who has occasion to test or otherwise examine coniferous products, as well as to the student who is in a "fog" as to the source of the resins or turpentines of commerce.

Among the English synonyms we notice a few which show that the author is not well acquainted with the familiar names for some of the fir trees cultivated in this country—thus the larch is said to be called the larch fir in England; *Abies excelsa*, the common pitch fir, whereas it is commonly known as the Norway spruce; huile de cade as cade oil, although in English commerce it generally goes either by its French name or by that of juniper tar oil; the resin of *Dammara alba*, Rumph., as Catseye resin, instead of gum dammar. We notice also that the essential oils of *Pinus sylvestris* and *P. Pumilio* appear to have been forgotten. Several pages are devoted to amber, which the author considers to be of coniferous rather than of leguminous origin, for the following reasons:—(1) Because it is rich in succinic acid, a body not found in copals; (2) because it is not attacked by alcohol; (3) because when heated it burns and does not melt drop by drop like copal.

In this part twenty-two substances in all are treated of.

In the third part eighty-six coniferous plants are enumerated which yield useful products; and their botanical synonyms, a description of the part used, and its uses, with occasional references, are given.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Chemists and Druggists' Trade Association.

Sir,—Allow me to say a few words in reference to your remarks in last week's Journal on the Chemists' Defence Association.

You infer because the trade has not come forward to a great extent to support the movement, they are indifferent to it.

I give the following facts which may convey a different impression:—

A week after the Conference at Birmingham, I, in company with a neighbouring chemist, called on all our brethren in Hammersmith, Turnham Green and Shepherd's Bush, to ask them their opinions on the movement. Three were from home, two leaving the trade, the remaining fourteen cordially approved of the step, signed a paper to that effect, became subscribers and several also gave a donation.

Not one of them had taken action individually (and probably would not have done so), and therefore, may have been regarded as indifferent had not my friend and I called upon them, whereas, the very courteous manner in which they received us proved how pleased they were to aid the cause.

I may just add that about half who subscribed are members of the Society,—who hold the Council in high esteem, but who think there is work to be done for the trade generally, which in detail is incompatible with their position as the Council of a Society whose object is to raise the scientific and educational status of its members.

There need not and should not be any antagonism, but the one regarded as the scientific and the other as the commercial branch of the institution.

BENJ. HUMPAGE.

Turnham Green.

Sir,—Some who have followed in imagination the disembodied soul to its final judgment, have told us that it is there confronted by a ghostly shade charged with the duty of public accuser, who scruples not to lay against the prisoner some charges which are only too true, and also others lacking the quality of truth.

Now, Sir, since you have in your leader of the 26th ult., goodnaturely undertaken the office of "Advocatus Diaboli" in the matter of the Chemists and Druggists' Trade Association, I can promise that the promoters will not hesitate to confront their accuser, and make those confessions as to the numbers of their accomplices which you point out as not yet furnished to the public. One might perhaps raise some objection to the scales of justice used for our assessment; their owners are numerous, and the least bias given to the centre of gravity may have disturbed the equilibrium; but let that pass, we now come to the counterpoise which you have put into the opposite scale, and which you say must be overbalanced by the Trade Association under the penalty of being weighed in the balance and found wanting.

You reiterate the opinion that such an association cannot exist permanently unless representative "of the greater part, if not of the entire trade," and you add, that when so much as a month (! !) has elapsed since the association was formed "it seems to us unpromising, to say the least, that we find no mention of the enrolled members being at all in approximation" to the members of the trade.

Taking as a datum the trade to number 14,000, it appears that you will have no hopes for the new association until its numbers exceed 7000. This estimate of "ayes" and "noes" overlooks altogether the mass of indifferentism which is known to students of social economy as the condition of the average of mankind.

Let us look at the way the same body of men acted in relation to two other Societies; did they supply 7000 members to the Pharmaceutical Society? No, nor much more than one-third of 7000, and yet here is the Society, which injudicious friends declare has for 30 years past striven to remove every trade grievance and is doing so now with all its powers. Would your scales declare the Pharmaceutical Society to have no *raison d'être* because it is not "representative of the greater part if not of the entire trade?" How did the same set of men receive the British Pharmaceutical Conference?

Well, after a year's work, its treasurer reported to the Bath meeting that 153 persons had paid their subscriptions of membership.

In another year, at Birmingham, the total was 117, and after three years the Nottingham meeting reached a total of 258 members. How would your test figure of 7000 have affected that most flourishing Society?

And now for the promised confession as to both men and money belonging to the Chemists and Druggists' Trade Association. It has 752 enrolled members, and the list of donations (irrespective of annual subscriptions) amounts to £505 2s.

The handsome way in which the members of the wholesale trade have met the appeal made to them deserves special recognition; there has been no such unanimity of support from the wholesale houses to a trade object during the present generation.

Your renewed expressions of good wishes for the Trade Association will be most acceptable to its members. Its promoters may fairly ask that the Glasgow meeting shall be held before they are charged with too slow progress, and having confidence that success will ultimately bring them its usual crowd of friends, they will recollect that the present is the best opportunity for those who have any genuine friendship to bestow.

A PHARMACEUTICAL CHEMIST AND MEMBER OF THE COMMITTEE.

PHARMACEUTICAL CHEMISTS AND THE JURY LISTS.

Sir,—Pharmaceutical chemists, although exempt from serving on juries, often find their names inserted in the jury lists; when such is the case they cannot claim their exemption, and it would be well therefore for every one to examine the list of jurors placed on the door of his church or chapel on the first three Sundays in September, and if he find his name included therein, he should at once inform the churchwardens and overseers (in writing) of his exemption, and attend when the lists are revised by the Justices in Petty Sessions, and see that his name is omitted.

I hope the day is not far distant when all registered chemists will be exempt from this service.

FREDERICK ANDREWS.

23, *Leinster Terrace, W.*

A DANGEROUS PRESCRIPTION.

Sir,—The following is a copy of a prescription left with my firm to be dispensed a day or two ago:—

℞ Pulv. Arsen. Alb. ʒx.
Gr. ij pro dosi
Pulv. i at 12 and 4 o'clock.
Mitte xxiv. pulv.

Fortunately the assistant into whose hands it fell, knew more posology than the *Lancet* considers, or did consider, necessary in dispensers. On examining the prescription I found that it bore the stamp of a London homœopathic chemist, and at once suspected that it had been accidentally left with us instead of with a neighbour of that persuasion.

This proved to be correct, and I was afterwards informed by the homœopathic chemist that the ʒx meant "3 x," and denoted the extent to which the "Arsen. Alb." was to be diluted.

This is only another illustration of the reckless way in which prescriptions are often written, and of the extent to which the public safety is dependent on the knowledge and intelligence of dispensers.

F. BADEN BENGER.

7, *Exchange Street, Manchester.*

J. Garrett.—We do not think it would be correct to term a balance in hand at the commencement of the half-year a receipt during the half year.

"*Galen.*"—(1). The subscription to *The Analyst* is 3*s.* 6*d.* annually, and should be sent to Mr. Wigner, 79, Great Tower Street, E.C. (2). The 'Annuaire de la Pharmacie,' edited by Dr. Méhu, is published at 12, Rue de Buci, Paris.

A. L. F. B.—If you will send better specimens we will do our best to name them. We cannot undertake to name fragments. Leaf, flower, and fruit of each plant should be sent.

W Thirlby.—We have no recollection of such a proposition, and have failed to discover any trace of it in the Journal.

"*A Plymouth Student.*"—See vol. v., pp. 425 and 25.

"*Macdui.*"—The information may be obtained by applying to the Secretaries of the respective Societies.

G. H. P.—A stamp should be used with the label sent, as it relates to a proprietary article which it also recommends for the relief of disease.

H. S.—A method of proceeding that probably might be modified to meet your requirement will be found described in the Journal for March 27, 1875, p. 770.

"*Syrupus.*"—*Artemisia vulgaris.*

COMMUNICATIONS, LETTERS, etc., have been received from Dr. Morel (Ghent), Mr. Kinninmont, Mr. Barclay, Mr. Benger, Mr. Finch, W. F. C.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 9, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE MEETINGS AT GLASGOW.

IT may appear to be but a repetition of what has been said in former years to announce that the latest meeting of the British Pharmaceutical Conference, held at Glasgow during the past week, has been at least as successful as that of any former year. But this is not a mere formal statement. Glasgow pharmacists may even boast of having been able to secure for this year's scientific meetings larger and more evenly sustained audiences than have supported the readers of papers on any previous occasion, whilst it is no wonder that with the beauties of the Clyde,—to say nothing of other inducements,—they were able to tempt a large company to take part in the excursion. But to the serious business first.

It will be seen that the Executive Committee was again able to present a favourable report, showing an income during the year in excess, by about £240, of the expenditure, including the cost of the Year-Book and the grants in aid of research. With respect to this latter branch of the operations of the Conference, we are informed that the Executive Committee has made the following fresh grants: £5, extended, if necessary, to £10, to Mr. J. C. THRESH, F.C.S., for the purchase of materials in connection with an extended research on the active principle of capsicum fruit; £10 to Dr. ARMSTRONG, F.R.S., for the purchase of strychnine, etc., with which to conduct a research on the oxidation products and bromo-derivatives of that alkaloid; £20 to Dr. TILDEN, F.C.S., for the purchase of essential oils; and £50 to Dr. C. R. A. WRIGHT, F.C.S., Mr. J. WILLIAMS, F.C.S., and Mr. T. B. GROVES, F.C.S., to defray expenses in connection with extended researches on the aconitines.

The President's address is printed on another page, and amply justifies the cordiality with which it was received. In it Professor REDWOOD sets forth in an extremely clear and definite manner his views respecting the position that can be taken justifiably by pharmacists in respect to giving advice as to the use of the drugs they handle daily, and this portion of the address forms a valuable contribution to the literature of a subject which has been too frequently discussed under a cloud of self-interest. Good service in another direction is done by the interesting illustration of our comparative ignorance respecting much of the history of the materia medica, and there can be no doubt that the suggestion as to the application of some of the scientific energy and the funds of the Conference for the testing and comparing of results already obtained by various investigators, if effectively carried out, would at least clear the ground of some of the confusions and contradictions with which it is now covered. During the reading of the address the large room of the Royal Hotel was filled with an evidently much interested audience, nor was the President less successful when in inviting discussion upon the several papers he showed in a few lucid and suggestive sentences the bearing which each had on pharmacy.

Twenty-eight papers were read. In the first, Mr. B. S. PROCTOR described the strength of four samples of liquid extract of pareira as varying between one and six. This result he attributed to the vagueness of the words "coarse powder," used for indicating the degree of comminution, although it might well be due to the crude materials not having had an identical origin. During the discussion the President expressed an opinion in favour of a clearer definition of the degrees of fineness of powders in the next edition of the British Pharmacopœia. The next note was by Mr. STODDART, on the action of hydrochloric acid on the colouring matter of *Crocus sativus* in the presence of sugar. Five papers on opium followed. Mr. DOTT, induced by variations he had met with in the morphia strength of opium preparations, expressed himself strongly in favour of the use of definite chemical principles instead of crude drugs; Messrs. PROCTOR and CLEAVER gave some valuable information respecting the assay of opium; Dr. WRIGHT described his continued research on the opium alkaloids; and Mr. BROWN announced the presence of free acetic acid in opium. Next the use of gum tragacanth and glycerine for a pill excipient was advocated by Mr. WELBORN; afterwards Mr. HAFFENDEN described his method of making phosphorus pills. Jaborandi this year furnished but one paper, that in which Mr. GERRARD described the action of various solvents upon "some salts of pilocarpine;" these he appeared to look upon as compounds of the alkaloid to which Mr. KINGSETT recently attributed a definite formula, but Mr. KINGZETT hardly acquiesced in the assumption. The next paper, by Dr. WRIGHT, showed that with respect to the aconite alkaloids also there still exists considerable haziness. In the last paper read on Tuesday, Mr. THRESH gave some further information respecting the active principle of capsicum fruit and described some painful physiological experiments he had performed upon—himself.

The second day's proceedings opened with Mr. KINGZETT's fourth report on the oxidation of essential oils, a research which the author indicates will probably eventuate in the manufacture commercially of a valuable antiseptic. Mr. MUIR made a preliminary report on oil of sage. A preliminary report was also made on the chemistry of ivy, by Mr. DAVIES. Dr. TILDEN summarized the results obtained from the administration of the varieties of aloin to patients in the Bristol Hospital, an account of which has already been published in this Journal. Mr. ANDREWS suggested a formula for a Glycerinum Cinchonæ. Mr. GERRARD recommended the substitution of Canada balsam for the resin and suet in the B.P. cantharides plaster, which he considers to be insufficiently adhesive and flexible. Mr. BROWN proposed a solution of citrate of iron and quinine, to be preserved by addition of chloroform. Such an addition, however, was generally disapproved of, and it was stated that a strong solution could be kept without it. Mr. HOWIE, whose recent valuable paper on the compound syrup of the phosphates will be fresh in the memories of our readers, now submitted to the Conference the importance of deciding what should be considered the standard strength of this preparation. Mr. GREENISH described the constituents met with in various filtering papers, and exhibited a specimen of Japanese filtering paper, prepared from the liber tissue of the paper mulberry (*Broussonetia papyrifera*). Three papers had for their subject salicylic acid. In consequence of the impurities met with in commercial salicylic acid, and the difficulty experienced in purifying, by recrystallization, salicylate of soda prepared from it, Mr. WILLIAMS's attention has been turned to the sulphosalicylate of soda. This salt gives with perchloride of iron the purple colour characteristic of salicylic acid, from which Mr. WILLIAMS infers that the salicyl radicle remains in it unchanged. Mr. HUNTER has confirmed by fresh experiments the antiseptic properties of salicylic acid. Some experiments made by Mr. BENGER to ascertain the condition in which salicylic acid is excreted by patients seemed to indicate that it then was no longer in an active or uncombined state. Mr. SIEBOLD sent two papers, one on the preparation of a pure sulphur præcipitatum by only partial precipitation; the other, on the strength of tincture of nux vomica. Mr. GROVES exhibited a specimen of so-called Pekoe "Flower," concerning the origin of which Mr. GREENISH contributed some information. This was the last of the papers.

The Conference then proceeded to the election of officers. Professor REDWOOD was re-elected President. and it was decided to accept an invitation to meet next year at Plymouth. Enthusiastic votes of thanks to the local committee and to the President closed the proceedings.

On Tuesday evening, an interesting gathering took place at the Royal Hotel, where many visitors to the Conference sat down to supper with a large number of the junior pharmacists of the city. The Chairman in a few well-chosen words introduced successively to his young friends the representative pharmacists present, and they in their turn addressed the company in words that will be found briefly reported on p. 226. The plain speaking of Professor REDWOOD will no doubt be relished in many quarters and equally disliked in others.

Soon after six o'clock on Thursday morning pharmacists and their friends began to make their way to Glasgow Bridge, near where the *Eagle* lay at her moorings. By seven a numerous company was on board and to the music of the band and the pipers of the Cameronian regiment the boat made her way down the Clyde to the Western coast, visiting successively the beautiful lochs that lay in her way. If anything could have repaid the local committee for their unbounded kindness during the whole meeting it must have been the manifest appreciation on the part of their visitors of this crowning hospitality. And when the company met in the cabin after dinner there could be no mistaking the enthusiasm with which they toasted the health of their hosts, and especially of those upon whom the work had principally fallen, Messrs. DAVISON, FRAZER, KINNINMONT, STANFORD and FAIRLIE.

We have but little space left to speak of the other meetings of the week, but we must not omit to call attention to the admirable address, printed in another part of this Journal, with which on Wednesday evening Professor ANDREWS inaugurated at the Glasgow University the meeting of the British Association for the Advancement of Science. It is true that one of the local journals ventured to stigmatize it as "bald disjointed chat about science," unsuited for a Glasgow audience; but we venture to say that the motive for such an attack must be sought for outside the Address itself. At any rate the passage where Dr. ANDREWS speaks of the clouds of smoke which darken the atmosphere of our manufacturing towns, and even of whole districts of country, as indications of waste arising from imperfect combustion, and alludes to the depressing effect of this atmosphere upon the working population, is a passage which appears to us to be worthy of the particular attention of the citizens of Glasgow. The remarks of Dr. ANDREWS respecting the endowment of research are well worth pondering. He is not so enthusiastic as some are as to the benefit to be derived from endowing a body of men devoted exclusively to scientific research, without the duty of teaching or other occupation, and he confesses that after careful consideration he fails to discover how such a plan could be worked so as to secure the object in view. Moreover, he thinks that great injury would be done by thus separating the influence of the master intellects of the country as teachers from the flower of its youth.

On Friday morning a meeting of the newly-formed Chemists and Druggists' Trade Association was held in the Royal Hotel, Glasgow, when it was announced that the Society now numbers twelve hundred members. A Secretary and Solicitor have been appointed. The Society aspires to be thoroughly representative and claims the support of the whole trade. Some of the speakers pointed out that a difficulty in this respect had prevented the Pharmaceutical Society from exercising protective functions. The task which the Association undertakes is that of uniting the trade in regard to trade interests, and thus supplementing the efforts of the Pharmaceutical Society and Conference. We hope to give a fuller report of the proceedings next week.

THE MEETING OF THE COUNCIL.

THE Meeting of the Council which should have taken place on Wednesday last was postponed in consequence of a *quorum* not having been formed.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

The thirteenth annual meeting of the British Pharmaceutical Conference commenced on Tuesday last, September 5, in the hall of the Royal Hotel, Glasgow. Professor Theophilus Redwood, Ph.D., F.C.S., London, presided.

Reception of Delegates.

The first business was the reception of Delegates to the Conference from provincial associations of pharmacy.

Professor Attfield said that delegates had not hitherto brought formal communications from their associations, nor had the Conference up to the present year ordered them officially to represent to their associations the work that was done at the Conference. There had been no occasion for their doing more in that way than what was implied by their presence. Many good results had been experienced from that position of the delegates in relation to the Conference. It was to be hoped that in future years every association for the promotion of pharmacy throughout the country, and every Pharmaceutical Society, for there were now more than one, would be represented at these annual gatherings.

Professor Attfield then read the following list of delegates:—

North British Branch of the Pharmaceutical Society.—Mr. William Ainslie, Mr. H. C. Baildon, Mr. William Gilmour, Mr. John Mackay, F.C.S., Mr. J. R. Young.

Bristol Pharmaceutical Association.—Mr. G. F. Schacht, F.C.S., Mr. W. W. Stoddart, F.G.S.

Glasgow Chemists and Druggists' Association.—Mr. Daniel Frazer, Mr. A. Kinninmont, Mr. James M. Fairlie.

Liverpool Chemists' Association.—Mr. Alfred H. Mason, F.C.S., Mr. Robert Sumner, Mr. John Shaw.

Nottingham and Notts Chemists' Association.—Mr. J. H. Atherton, F.C.S.

Sunderland Chemists' Association.—Mr. J. Harrison, Mr. J. J. Nicholson, F.C.S., Mr. Robinson, Mr. D. B. Sharp.

Wolverhampton Chemists and Druggists' Association.—Mr. W. Y. Brevitt, Mr. F. J. Barrett.

Hull Chemists' Association.—Mr. C. P. Bell, Mr. F. Earle.

Manchester Chemists' Association.—Mr. Brown, Mr. Darling, Mr. Johnson, Mr. Benger.

Mr. Benger read the following—

Report of the Executive Committee.

In this their thirteenth annual report your Committee have endeavoured to lay before the members of the Conference an outline of the work which has occupied them since the annual meeting at Bristol last year, and of the various questions on which it was necessary for them to deliberate and act, on your behalf, during that period.

Meetings of the Executive Committee, chiefly to entertain applications for grants of money in aid of chemical and pharmaceutical research, were held on the first Wednesdays of November and December of last year, in the rooms of the Pharmaceutical Society of Great Britain (by the kind permission of the Council of that Society), at 17, Bloomsbury Square, London.

After the confirmation of the minutes of the previous meeting, which included a resolution raising the salary of the Editor of the Conference 'Year-Book' from £100 to £150 per annum, the following applications from members for grants were read, several being sent in response to requests or suggestions from the Committee:—

1. From Mr. A. W. Gerrard, £10 to cover cost of extraction of pilocarpine from jaborandi, with a view to its further chemical and pharmaceutical investigation.

2. From Dr. C. R. A. Wright, £20 to defray expenses in connection with the extended researches on the aconitines. Respecting this application Messrs. Hopkin and Williams had stated that they would gladly furnish Dr. Wright with concentrated extracts of the raw material for the mere cost.

3. From Mr. M. M. Pattison Muir, £5, with which to purchase the required quantity of essential oil of sage, for a research.

4. From Mr. C. T. Kingzett, £10, to pay a portion of the cost of materials necessary for continued researches on the oxidation of essential oils.

5. From Mr. E. L. Cleaver, £10, with which to purchase opium for a thorough examination of the methods of ascertaining the proportion of morphia in the drug, and a report on a trustworthy mode of assaying opium.

6. From Mr. R. H. Davies, £5, to defray part of the cost of an investigation of the definite proximate principles of ivy berries.

7. From Dr. H. E. Armstrong, £10, for the purchase of strychnine with which to conduct a research on the oxidation products and bromo-derivatives of that alkaloid.

8. From Dr. W. A. Tilden, £5, to be expended in carrying on further investigations of the aloins.

Total number of applications, 8.

Total amount of grants, £75.

On the motion of the President it was resolved unanimously to grant to the gentlemen named the sums mentioned, to thank them for undertaking the several researches, and to request them to communicate results to the next general meeting of the Conference at Glasgow, on the 5th and 6th of September, 1876.

The Treasurer was ordered to invest in Consols the balance he had in hand, pending the consideration of the best mode of dealing with surplus income.

A letter was read from a member suggesting that the Conference should nominate a travelling professor of pharmacy, who should lecture in the provinces at different centres, and that the Conference should contribute towards his remuneration £150 per annum. After thoroughly discussing the proposal, the Committee were unanimous in the opinion that at present it would be unwise to include direct pharmaceutical education among the objects of the Conference.

At a meeting of the Executive Committee, held at 17, Bloomsbury Square, on July 5th, 1876, thirteen candidates were elected to membership. The names of several members whose subscriptions were more than two years in arrear, and to whom repeated applications had been made by the Secretaries, were removed from the list of members.

Twenty-six subjects proposed for research were received and considered.

Professor Attfield suggested that some competent member should be employed to revise and somewhat elaborate the "subjects for papers" in the current list issued by the Conference. In the course of thirteen years the Conference had proposed some two hundred subjects for research, of which nearly one hundred had been investigated, resulting papers forming about one-third of the three hundred papers which had been read at the twelve annual meetings of the Conference. The remaining subjects on the list, especially the fifty or sixty which had been down for several years, required careful revision, information concerning any work already accomplished being added to each subject, and some hints given as to the direction which further investigation should take. Probably a few of the subjects might now be excluded from the list altogether. The Secretaries were ordered to give effect to the suggestion.

Professor Attfield reported that since the previous meeting he had issued about 2500 copies of the current 'Year-Book.'

It will be gratifying to those members of the Conference who have, rightly, regarded its mission to promote pharmaceutical research as all-important, that there should have been so many applications for grants in aid of this object, and that those applications should have been made by such eminent investigators of pharmaceutical and chemical problems as are included in the list of names just read. The Conference has been largely indebted to one gentlemen for the means at its disposal to furnish "encouragement" in this very practical form,—but the Bell and Hills Library and Research Fund will in a few years be exhausted, and it rests with the pharmacists of Great Britain—principals and pupils—to sustain what has been so generously established by Mr. Hills. Our membership roll of between 2000 and 3000 names includes less than 20 per cent. of those engaged in pharmacy in this country, it may, therefore, be reasonably hoped that the British Pharmaceutical Conference does not yet include all those who feel an interest in its objects, and whose interest, will, ere long, assume the active form of application for membership. An increased number of subscriptions might enable the Conference to give still more substantial aid to research.

During the first eleven years of the existence of the Conference its annual income only sufficed for its annual expenditure. Last year the income was nearly £240 in excess of expenditure. This year income is again in excess by about £225, of which £35 has been already expended in grants to aid research. There is now, therefore, a total balance in favour of the Conference of about £430, nearly the whole of which is temporarily invested in Government securities, until the Conference shall decide on its disposal. The Committee fully anticipate an excess of income of at least £200 or £225 in the year just commencing. Of this excess a portion, however, will be absorbed by the addition to the salary of the editor, while most of the remainder will probably be appropriated as grants in aid of research. The Committee expect, therefore, that in the coming year the whole of the income of the Conference will be devoted to the leading object of the Conference, namely, the encouragement of pharmaceutical research. The major part will, as heretofore, be expended in the printing and publishing of that annual collection of all European and American researches, termed the *Year-Book of Pharmacy*—a copy of which it will be remembered, is presented, post free, to each of our members; a not inconsiderable part will be expended in the direct payment of expenses incurred by some of our members in carrying on costly researches; while a third portion will defray the cost of necessary printing, postage, etc., in connection with books and meetings.

At a meeting of your Committee held last evening, forty-five candidates for membership were elected. The MS. of the 'Year-Book for 1876,' was laid on the table by the editor, Mr. Louis Siebold. About two months will be occupied in passing this through the press, and in the preparation of the report of the transactions of the Conference at the forthcoming meeting. The volume will, therefore, be issued as usual in December.

Mr. G. F. SCHACHT, Treasurer, read the financial statements:—

The General Fund.

Dr. 1875-76.

	£	s.	d.
To Cash in Hand	239	1	2
„ Sale of Year-Books by Secretary	20	3	6
„ Sale of Year-Books by Publisher	20	5	0
„ Advertisements in '74 vol.	43	0	6
„ Ditto '75 vol.	134	16	6
„ Subscriptions from Members	826	18	4
„ Dividend on £200 Consols (Jan.)	2	19	6
„ Cash from Bell and Hills Fund for Grants	30	0	0
	£1,317	4	6

1875-76. *Cr.*

				£	s.	d.
By Expenses connected with 'Year-Book'—						
Butler and Tanner for Printing, Banding, and Binding	£452	2	0			
Editor's Salary	100	0	0			
Messrs. Churchill, Commission on Advertisements	44	9	3			
Messrs. Churchill, Advertising 'Year-Book'	2	2	0			
Delivery to Members	71	12	7			
Foreign Journals (Nutt)	3	0	0			
				673	5	10
„ General Printing:—						
Butler and Tanner	19	17	2			
Stevens and Richardson	3	1	6			
Parkins and Gotto	4	4	4			
Arrowsmith (Bristol)	2	19	0			
				30	2	0
„ Directing Circulars and Envelopes				5	13	0
„ Assistant-Secretary's Salary and Expenses at Bristol				45	0	0
„ Postage of 10,000 Letters				42	14	2
„ Sundries, including Expenses of the Meeting at Bristol, etc.				24	13	2
„ Grants in Aid of Research				65	0	0
„ Purchase of £200 3% Consols, at 94¼. Commission, 5/-; Power of Attorney, 5/-				189	0	0
„ Balance in hand, July 1st, 1876				241	16	4
				£1,317	4	6

Examined and found correct,

J. PITMAN,
J. MACMILLAN, } *Auditors.*

Mr. N. SMITH (Cheltenham) said he had much pleasure in moving the adoption of the report of the Executive Committee and the report of the Treasurer.

Mr. RIMMINGTON (Bradford) seconded the motion, which was adopted.

THE BELL AND HILLS FUND.

Mr. SCHACHT read the report of the Bell and Hills Fund:—

The Bell and Hills Library and Research Fund.

Dr.

	£	s.	d.
To Cash in hand	39	0	4
„ Dividends on Russian Bonds, September, 1875, and March, 1876	7	7	9
	£46	8	1

Cr.

	£	s.	d.
By Grant of Books to Glasgow	10	10	0
„ Grants in Aid of Research	30	0	0
„ Balance	5	18	1
	£46	8	1

Examined and found correct,

J. PITMAN,
J. MACMILLAN, } *Auditors.*

Mr. BENGER then read the following letter having reference to this Fund:—

"Dear Dr. Attfield,—

"In 1872 the Executive Committee of the British Pharmaceutical Conference, with my entire concurrence, devoted part of the money I then gave (£200) to purposes of research as well as to the continuance of the Library Fund I started in 1869.

"During the last three years, however, I notice that the Conference income has considerably exceeded expenditure, and that although grants in aid of research have been freely made from the Conference Fund as well as from the Bell and Hills Fund the Conference is still growing richer.

"Under these circumstances I venture to propose that grants in aid of research be drawn from the income of the Conference alone, and that the £150 of the Bell and Hills Fund still in hand, together with another £50 Russian Bond which I will present to the Conference, be permanently retained as the source of an annual income of £10, which £10 be, as heretofore, devoted to the purchase of books for presentation to the library of the pharmaceutical association of the city or town in which the Conference meets from time to time.

"If the Committee will adopt the suggestion and offer I now make and thus convert the Bell and Hills Fund from a temporary to a permanent institution I will purchase and send the £50 Russian Bond as soon as possible.

"With best success to the Conference,

"I remain, yours sincerely,

"Professor ATTFIELD, "T. H. HILLS.
Hon. Gen. Sec."

Professor ATTFIELD said: This letter almost explains itself, but I may state for the information of some of the members present the history of this Bell and Hills Fund. At Exeter in 1869, Mr. Hills presented the Conference with £50, suggesting that annually £10 should be expended in purchasing books to present to the library of the pharmaceutical association of the town visited by the Conference; if there was no library then the books should be presented with the view of starting a library. In 1872 when the fund was getting low, Mr. Hills presented £200 to the Conference, telling the Committee he should be satisfied if it did what it pleased with that amount. The Committee accepted this money and continued the practice of giving £10 worth of books annually to the town visited; but in addition, a proportion of the sum was set apart to aid gentlemen who were engaged in costly researches. That practice has been continued now for three years. Now, although the Conference was perfectly in order in accepting Mr. Hills' aid for research, I should say so long as it had no funds of its own to perform this most obvious duty, it seems to me, as Secretary, it was perhaps scarcely in order when once the Conference began to get rich. I represented this view of the matter to Mr. Hills. He agreed, and at once set himself to solve this problem—how to make the Conference do what his fund had done before, and that his fund should do no less. He solved that problem in the very generous and ingenious way which you have heard described in this letter. He converts what was a diminishing fund into a permanent fund, by adding positively to his previous gifts; the interest of that permanent fund thus enabling the Conference to do what he always desired it should do—to present £10 worth of books annually to the library of the town visited.

THE PRESIDENT'S ADDRESS.

The PRESIDENT then delivered the following address:—

Gentlemen,—In accordance with the usual practice on these occasions I purpose bringing under your notice, as an introduction to the business we are about to enter upon, some of the evidences of pharmaceutical progress which events of recent occurrence afford, and some of the questions which appear to have special claims upon our attention. It is to me a source of much gratification to find myself surrounded and supported by the members of an association in which there are so many able and earnest workers seeking the attainment of an object which is worthy of our highest ambition. We meet here as pharmacists anxious to promote the improvement of the art of pharmacy. All whom I have the honour of addressing are interested in the cultivation of this art, and desire by every available means to increase its usefulness and elevate it as an essential department of the practice of medicine. It would be difficult to select a more worthy object than that we have before us, or one which more largely partakes of a benign and philanthropic character, affecting as it does the well-being not only of man but also of those sentient beings which, while they are made subservient to the wants and contribute to the happiness of man, are entitled to his sympathy, care and protection. The power of alleviating the sufferings of disease by the use of material remedies places the art of medicine in the highest rank among human occupations and gives to the physician a claim to respect and gratitude which has ever been freely conceded by every class of every people throughout the world. It is our privilege to be humble ministers in the work of healing the sick. We do not pretend to that high qualification which enables the physician to search out and determine the nature, the seat, and the cause of disease; nor do we profess to be able to indicate what are the agents best suited for the relief of those who suffer from its effects. Diagnosis and therapeutics are among the highest attainments in medical knowledge, and require for their successful exercise and application an intimate acquaintance with the mechanism, the physiology and pathology, of the animal body. We make no pretensions to such knowledge; but we have a province and sphere of action which is specially ours, and the fulfilment of its requirements is as essential to the successful practice of medicine as is the exercise of what we may concede to be, as compared with ours, the higher mental qualifications of the skilled physician. It belongs to our province to produce, to collect and prepare for administration, and supply to the public, the various remedies which medical men prescribe. These are the legitimate duties of the pharmacist, and when performed as they should be, by those who possess the requisite qualifications for them, they involve the application of much scientific knowledge, and of cultivated faculties both of body and mind.

But while pharmacy is designed thus to occupy a position of great importance and usefulness in relation to the practice of medicine, the highest fulfilment of its mission involves a certain amount of submission to, and dependence upon, those who constitute the medical profession. The physician and the pharmacist are indeed each dependent one on the other, for while the physician relies upon the compounder of medicines for the exercise of the knowledge and skill required for producing the remedies which medical experience approves, the pharmacist must be guided by those who possess that experience, in directing his efforts to the attainment of required results. The exercise of too much independence on either side would be fraught with evil, and could not fail to retard the progress of improvement which so prominently characterizes the state of medical practice in the present day.

Fortunately the most friendly relations exist between the medical profession and the body which this Conference represents. We are anxious to fulfil our mission, and they are willing and ready to afford encouragement and aid, not only by the expression of approval when such is merited, but by active co-operation in furthering the objects in which we are mutually most interested.

That there should be, or appear to be, to some extent, a clashing of interests at or near to the border line which separates the respective domains of the prescriber and dispenser of medicines, is inevitable, so long as the requirements of the public and the regulations relating to medical practice remain as they are. The pharmacist occupies a position in which there cannot fail to be frequently occurring conflicts between the temptation to prescribe and the restraint which sound judgment would impose on the exercise of a function for which he is at least but imperfectly qualified. It is often difficult to define the limit at which the dealer in drugs and medicines should cease to advise those who purchase and intend to use such articles without consulting a qualified medical man. If every individual were so circumstanced as to be able to place his health under the constant supervision and care of a skilled physician who was ready to attend to all his ailments, and able to interpret and treat them correctly, he might, no doubt, by adopting such a course, contribute to his comfort, and perhaps to his longevity. But this would involve a concurrence of circumstances that falls to the lot of comparatively few, and even among those who might command the conditions there are not many who think it worth while to do so. Men are prone to think that they are sufficiently able to gauge the extent and purport of slight and often occurring sensations, which although unpleasant are not considered to imply anything more than a mere passing disturbance of the functions of some of the organs, which may be easily restored to their natural state by resorting to the use of simple popular remedies. It is so among those who can afford to pay for skilled advice in trivial cases; but how much more so among the far more numerous class who study economy from necessity, and seek the cheapest method of attaining their object. The family medicine chest is an essential department of every household, although it may consist only of a glass of cold water to be taken at bed time. That mistakes are sometimes committed in this system of home treatment is certain, but the amount of evil resulting from it is probably small as compared with the benefits, real or imaginary, and the satisfaction arising from a sense of independence, which a judicious exercise of knowledge founded on such experiences as most intelligent individuals have the means of acquiring, may and generally do produce. The extent to which medicines are thus administered, may be inferred from the fact that of the 14,000 chemists and druggists in Great Britain, the greater part have but little to do with the dispensing of physicians' prescriptions, while all are engaged, and most are principally engaged, in supplying medicines to be used by the public on unprofessional responsibility. If individuals and the heads of families are justified in thus treating slight ailments by the use of remedies which they have seen used in the same way by others similarly circumstanced, it would be unreasonable to object to their extending or improving their knowledge of the use of such remedies by information obtained from those who being engaged in the preparation and sale of medicines are supposed to have a general acquaintance with their properties and uses. I hope and believe there are not many among the class of men thus appealed to who travel beyond the bounds required for the safety and at the same time the convenience of the public, under the circumstances prevailing in different localities; but it is essential that there should be some control exercised over the assumption of a duty which so obviously affects the interests of the public as does that of the treatment of diseases. There must be a limit to the extent to which unqualified pretenders may be allowed to claim the confidence and impose upon the credulity of those whose sufferings often make them easy victims to imposition. And then comes the question, where shall we draw the line and say, 'Thus far, but no further'?

With reference to this question I would venture to suggest that the responsibility of the pharmacist in prescribing for those who apply to him in cases of sickness is far greater than that of an individual unconnected with any department of medicine who may prescribe either for himself or for others. The pharmacist is supposed to possess—and, indeed, he ought to possess—a certain amount and kind of medical knowledge—that is, a knowledge of medicines and their properties; but beyond this, the public, judging, perhaps, from the insignia by which he is surrounded and the atmosphere he lives in, often credit him with other knowledge than that which he can justly lay claim to. Founded, it may be, on credit thus acquired, they place confidence in his power to advise, not only with regard to the properties and doses of medicines, but also in the treatment of diseases, with regard to which he possesses no real qualification. In this direction, from simple questions and trivial cases, he may be led on step by step; and unless he has strength of mind and firmness enough to resist the temptation which a desire to satisfy customers, to retain and not to discredit or weaken the favourable opinion previously formed of his knowledge, experience, and judgment, with other considerations natural to a man of business, he may be drawn almost imperceptibly into a habit of prescribing, for which no sound justification can be advanced.

It has been urged by the advocates and promoters of the improved system of pharmaceutical education from which this association has sprung, that as pharmacists and druggists become better qualified for their legitimate duties they will be less disposed to engage in those for which they have no real qualification. This is a result that would be naturally looked for; and impartial observers of the state both of medical and pharmaceutical practice and the changes they have undergone during the last thirty or forty years will readily admit that while much yet remains to be accomplished, much has been done towards defining the limits within which pharmacy on the one hand and medical practice on the other should be restricted, not only with a view to the interests of practitioners in each of these departments, but with the broader view of advancing the knowledge and improving the practice both of medicine and pharmacy.

We may look to the Pharmaceutical Conference—which seeks to lead its members into habits of scientific research—for efficient aid in raising and maintaining a high standard of ethics with reference to what is called counter practice. Those who have learnt to appreciate the importance in scientific pursuits of having a sufficient groundwork on which to base their theories and practice, and have acquired the habit of cautiously and logically connecting cause and effect, will be naturally disinclined to speculate in the empirical treatment of diseases of which they have no thorough fundamental knowledge.

Materia medica and pharmacy are our legitimate subjects and they offer ample scope for study, research, and application. Diligent search has already been made among natural objects for those which possess therapeutical properties, but can it be said that the resources of nature have been exhausted, and that there are no other drugs to be found than those we have which may either be used in their natural state, or from which valuable medicinal agents may be extracted? It is true that the past year has not been prolific of new medicines of any importance, but we have jaborandi among those of recent introduction, and we have yet to learn something of this drug and its active principle.

It is chiefly from the vegetable kingdom that our most valuable drugs are derived, some of which by simple processes of pharmacy afford to the physician the means of modifying in a variety of ways the condition and the action of animal organisms, while others afford scope for the exercise of chemical knowledge and skill in extracting their more active constituents. Intimately associated with, and closely allied to, many of the drugs of vegetable origin are some of the substances used as food, indeed it would not be easy to draw a line that should indicate sharply the distinction between alimentary and medicinal substances. Medical knowledge may be and to some extent is brought to bear upon the selection and preparation both of alimentary and medicinal substances, but it is especially required in regard to the latter. If we broadly represent as articles of food those which are intended to support vital action, to afford the means of development, and to reproduce what is daily passing and wearing away in our bodies; and as medicines those which affect the organs and their functions when in an abnormal state, or which alter their normal condition, it will be readily admitted that our sensations more clearly and safely indicate and assist us in selecting the former than the latter. Articles of food must comprise the constituents of every part of the body, and if there be a pressing want of any particular constituent beyond the daily supply, nature soon indicates the want by a craving desire for that which is deficient. The same kind of natural selection applies to a certain extent, no doubt, to medicinal agents, but the same liberty of choice in meeting the wants as they arise cannot be safely admitted here as in the case of food. With agents of so much power as these often possess it cannot be left to the unaided judgment of those who have no medical or pharmaceutical knowledge to undertake their selection, preparation, and use. Special education is required for the safe and successful performance of these duties. Until scientific and practical knowledge in botany, materia medica, and chemistry, was recognized as the ground work on which alone pharmaceutical qualifications and reputations could be based, some of the most important duties relating to pharmacy were necessarily performed by medical men who possessed those qualifications. Medical botany, materia medica, and pharmaceutical chemistry have had no representatives among the class of pure pharmacists in this country until recently. Happily the time has arrived when we may look, and already we have not looked in vain, for worthy disciples and followers of Lindley, Pereira, Christison, Anthony Todd Thomson, and Fownes, among those who have been trained and educated as pharmacists, and who are satisfied to devote themselves to the cultivation and extension of pharmaceutical knowlege. With such subjects as those I have named offering the reward of credit and renown to successful cultivators and explorers, no one need say that pharmacy is barren of profitable work, even of a high intellectual character, for those who are able and willing to work. We have only to look at what has been done and is now doing with reference to cinchona bark, ipecacuanha, and opium, to be satisfied that much yet remains to be done in those departments, and much of a similar description to be undertaken in connection with the cultivation of jalap, scammony, rhubarb, and other drugs, of which the supplies are imperfect and uncertain. We are no longer dependent on the precarious supplies of cinchona bark from the forests of South America, and may probably look forward to the time when our possessions in India will yield us all and more than all the bark we require. Hitherto we have been dependent on China for the production of our medicinal rhubarb, although it is grown in this country, and some samples of English rhubarb are hardly distinguishable from Chinese. May we not look forward to the improvement of English-grown rhubarb by cultivation or change of species, so that we may be independent of foreign importation and unaffected by changes such as that caused by the breaking up of the Russian monopoly in the trade?

It is often a subject of complaint by those who are interested in the use of good drugs, and sometimes it is urged as an excuse for dealing in such as are of inferior quality, that many of these articles are collected and prepared for sale by the native inhabitants of countries remote from advanced civilization, where much control cannot be exercised by merchants, who are therefore obliged to take what they can get. But admitting the force of this excuse as applied to some cases, it ought not to prevent our doing what is possible towards securing a supply of good drugs. We have seen what can be done by the combined influence of a body of pharmacists in that direction in the case of senna. About thirty years ago all the Alexandrian senna was mixed with a large proportion, often a fifth of its weight, of argel leaves, but a vigorous protest judiciously advanced by pharmacists in the early days of the Pharmaceutical Society, and supported by the wholesale dealers and merchants, induced those engaged in collecting the drug to supply it in a pure or less adulterated state. Improvement of a similar description has also been brought about in a similar way in the quality of much of the scammony and some of the varieties of opium, as well as of less important drugs, which are brought from distant countries.

But not only may the expression of opinion be thus brought to bear upon the improvement of our drug supplies, there is scope for the profitable application of chemical and pharmaceutical knowledge, both at home and abroad, in practically producing drugs and medicines. The Conference may take credit for having supplied in the person of one of its late officers a successful investigator and operator who is carrying out the objects of the Government by the production of cinchona alkaloids, in a partially purified state, from the acclimatized bark trees of India. The mixed alkaloids so obtained would hardly be received with favour in this country, and they are not, I believe, intended for exportation, but for use among the inhabitants of India, where they will supply an important want at a low price, and at the same time afford the means of fully testing the efficacy of the mixed as compared with the isolated alkaloids and their salts. There are other cases in which the question occurs as to whether the active constituents of vegetable substances are more advantageously used in the state in which they naturally occur or in an isolated and purified condition. The discovery and introduction of morphia has not superseded the use of opium and its preparations, and a similar remark may be made with reference to other drugs which yield definite chemical compounds to which their efficacy has been ascribed, but to which it probably is not wholly due.

The search for alkaloids in drugs of vegetable origin has been actively pursued since the early part of this century, and has resulted in many important discoveries by which the names of Sertürner, Pelletier, Caventou, Robiquet, and others have acquired well merited distinction. This search is still no less active than ever. No sooner is a new vegetable drug introduced than it is made the subject of an investigation with a view to the discovery of its active constituents, that is, of such as can be isolated as definite chemical compounds with marked therapeutical properties. The inquiry is sometimes attended with difficulty, and the results obtained are, not unfrequently, of doubtful practical value. Take, for instance, the case of ergot of rye. There has been a long standing inquiry with many experiments from time to time made, for the purpose of ascertaining what is the active therapeutical constituent of this drug. The ergot yields to ether about thirty per cent. of a fatty substance, partly consisting of fixed oil, partly of volatile fatty acids, and partly of resinous matter. This ethereal extract was considered by Dr. Wright to be the efficacious part of the ergot, but Neidhardt ascribed the efficacy it possessed to the resin, while others have represented that the fatty matter not only is devoid of hæmostatic properties but possesses others which are poisonous. From the part of the ergot insoluble in ether but soluble in alcohol, Wiggers extracted his ergotine, which Ludwig represents as modified albumin, insoluble in water, but soluble in alcohol and in caustic alkalies. Bonjean again denied the medicinal efficacy of Wiggers' ergotine, and claimed that property and the name for an extract made by percolation with cold water, and evaporation to the solid state after removal of albumin by heat and precipitation of other inert matter by means of alcohol. Subsequently Wenzell obtained two alkaloids which he has named ecboline and ergotine, both of which are described as soluble in water, with an alkaline reaction, and bitter taste. More recently still Tanret, in a paper read before the Academy of Sciences of Paris, claims to have discovered another alkaloid in ergot, which for distinction he has named ergotinine. It exists only in very small quantity, is strongly alkaline in its reaction, and capable of neutralizing acids. The presence of methylamine at one stage of the process by which this alkaloid is obtained and the further development of the same amine by the action of potash on the ergotinine are suggestive facts which will no doubt lead to further investigation. Lastly, we have the announcement, by Dragendorff, that the active principle of ergot is not an alkaloid but an acid which he names sclerotic acid, and which is present in ergot to the extent of two or three per cent. of its weight. Now, in the face of these various, and to some extent discrepant results of the attempts made to discover and isolate the active principle of ergot, we may be satisfied for the present to rely on the use of less definite preparations, such as the powder, decoction, or liquid extract.

Some difficulties have been experienced in obtaining in a state of purity the active principles of ipecacuanha and foxglove, but important improvements have been recently made in the processes for the preparation of both these bodies. For practical use emetine is perhaps hardly required, but if it should be, the process of Glenard seems to leave nothing to be desired. He obtains hydrochlorate of emetine in colourless crystalline nodules, from which pure emetine may be separated by an alkali. With regard to digitalin, the discovery of a good practical process yielding the active principle of digitalis in a pure, crystalline, definite and stable condition has long been an important desideratum in medicine. The various processes that have been recommended have yielded under the same name products that have differed in composition and properties, and none of which have been of such a definite nature as to ensure in different samples perfect uniformity of effects. The digitalin of the British Pharmacopœia is obtained by a process for which we are indebted to Homolle, but it cannot be looked upon as the pure active principle of the foxglove, and in an article of so much potency, the fact of its being amorphous leaves some doubt with reference to any sample of it as to the amount of care and skill that have been exercised in its preparation. Some years ago Nativelle succeeded in getting digitalin in a crystalline state for which, in 1872, the Orfila prize of 6000 francs was awarded; but the process by which the product was then obtained was considered troublesome and difficult. More recently the process has been simplified, and we may shortly look for the substitution of pure crystalline digitalin for the less definite preparation now ordered in the Pharmacopœia.

No doubt, I believe, is entertained that digitalin possesses all the valuable medicinal properties of the plant from which it is extracted. It is strictly, therefore, the active principle of the foxglove, but it cannot be classed among the alkaloids because in common with picrotoxin it lacks that essential constituent of an alkaloid, nitrogen. We thus have two powerful organic poisons digitalin and picrotoxin, forming remarkable exceptions to what would otherwise appear to be an almost universal law, that the element nitrogen, which in its isolated state is the most harmless of all the elements and apparently incapable of mischief, is nevertheless, when in combination, the fomenter of evil and a constant element of things vile and poisonous. There are problems to be solved with reference to nitrogen which have hitherto baffled the efforts made for their solution by our most able chemists. We live at the bottom of an immense ocean four-fifths of which consists of this tame and toothless nitrogen which is here inert and indisposed to union, but when united it becomes not only a fertilizer of the land and a constituent of our nutritious food, but also the fruitful source of diseases and the cause of many human miseries. We have boundless supplies of it ready to our hands, but we cannot turn it to its most required purpose of yielding ammonia, with which we might greatly increase the produce of the earth and thus feed many hungry mouths. We cannot by artificial means produce the alkaloids containing it which nature elaborates in the recesses of vegetable organs, leaving man by the exercise of his chemical and other knowledge to extract and isolate them, and to discover and control their useful applications for the relief of suffering humanity.

Morphia was the alkaloid first discovered, yet even now, after a lapse of sixty years, we are not only dependent upon nature for its elaboration, but avail ourselves of her further aid in supplying us by a process of natural elimination with the milky juice from which alone we extract the alkaloid. The collection of the opium seems a slow and labour-wasting process, in which at last we probably but imperfectly exhaust the poppies of their valuable constituents, and the question naturally arises, if the morphia be in the capsules before the incisions are made, why do we not resort to some process for its extraction more direct and exhaustive than that of partial exudation, more mechanical and at the same time more in accordance with modern manufacturing operations?

We are indebted to Mr. Groves, my predecessor in this chair, for some interesting experiments made many years ago on the direct separation of alkaloids from poppy capsules. I have referred on several occasions to Mr. Groves' paper in the *Pharmaceutical Journal*, and have always risen from its perusal with a feeling of the importance of the subject and of the desirableness of further investigation with reference to it. I must add, however, that experiments which I have seen conducted on a large scale with the same object have not afforded encouraging results.

In another case, under somewhat similar circumstances, the direct method of extraction from the vegetable source has been attended with good success. Resin of scammony is now produced from the root much more economically than it can be indirectly through the process of natural elimination.

But how long shall it be said that man, with all his boasted knowledge which has enabled him to outstrip Nature herself in the number of organic compounds he can make, including many of the natural products known to us, has nevertheless proved powerless to produce the vegetable alkaloids, with perhaps a single exception? It is the more surprising since we have every reason to believe that we have the right clue to their constitution as compound ammonias, a class of substances that has been largely and successfully investigated by Wurtz and Hofmann, who, with Fownes and others, have produced many bodies resembling the natural alkaloids. This is a field of investigation that may be looked upon as the future El Dorado of pharmacy, the successful exploration of which may possibly be reserved for some fortunate member of this Conference.

Chemistry has hitherto failed to unlock the secret of the mode of producing by artificial means the vegetable alkaloids, but she has to some extent made amends by supplying valuable therapeutical agents, some of which are efficient substitutes for them. There have been no recent additions made to our chemical materia medica, but among articles of modern introduction, hydrate of chloral, with croton-chloral—or, as it is now found to be, butyl-chloral—nitrite of amyl, and salicylic acid, occupy prominent positions.

The increased attention which has recently been given to the use of antiseptics and disinfectants in connection with surgical operations and the treatment of diseases has tended to bring many substances belonging to those classes into notice, and to afford occasion for testing their respective powers when applied under various circumstances. Several additions have thus been made to the substances used for those purposes, both by the introduction of new agents, such as salicylic acid, and the discovery of new applications of those which had previously been used for other purposes, such as chromic and boracic acids and borax.

In the discussions which have taken place respecting spontaneous generation, and the germ theory of the propagation of diseases, it has been shown by Tyndall that the atmosphere in which we live swarms with minute vital organisms and other floating particles, the presence of which is indicated by their power of scattering a beam of light, and that these bodies, some of which are too small to admit of their being individually examined or detected with the most powerful microscopes, may, nevertheless, be removed from the air by filtration through various media, such as cotton-wool—especially if this be moistened with glycerine. The investigations of Pasteur tend, like those of Tyndall and others, to show that in air and other denser forms of matter freed from these and similar vital organisms, no living beings, either animal or vegetable, can be developed; while, on the other hand, if the vital organisms or germs be present, together with the elements of nutrition, and conditions favourable to life and its development, living beings speedily appear, the propagation and growth of which are necessarily attended with the destruction of other forms of matter. It is to the breaking up in this way of one kind of matter to provide for the development of other forms of it that we may ascribe most of the changes affecting the health and well-being of man. In our living bodies the transformations caused by the development of minute and unseen forms of life produce various sorts of diseases, while in dead matter similar transformations cause putrefactive decomposition attended with its repulsive effects. This view of the way in which diseases are propagated has induced Pasteur to express the opinion that it may be possible to exterminate parasitic diseases from the earth, and it has given an impetus to the inquiry after the most efficient disinfectants, antiseptics, and deodorizing agents, and the best means of using them for the desired purposes. The subject is one the investigation of which pharmacists may engage in without subjecting themselves to the charge of poaching in other men's preserves. The inquiry belongs to the departments of physics, materia medica, and chemistry, as well as to that of pathology. Appeal is frequently made to the pharmacist for his aid not only in supplying but suggesting the agents that may be most relied upon for preventing the outbreak or spread of disease, and for destroying offensive effluvia. It is important as a basis on which alone sound judgment can be exercised in advising or acting in such cases, that there should be a clear and correct apprehension as to the objects to be sought and the means of attaining them. There is not unfrequently found to be a confusion of ideas with reference to the application of the terms deodorizer, antiseptic, and disinfectant. A closer connection is sometimes thought to prevail than we have good grounds for assuming the existence of, between things that are offensive to the senses, and those which are injurious to health. That many offensive gases possess deleterious properties when inhaled is unquestionable, but it would not be safe to conclude that a gas is injurious to health simply because it is not agreeable to the sense of smell. The sensations resulting from the action of external objects on our senses depend to some extent on habit and education, as forcibly illustrated by the practice of the retired tallow-melter who always returned to his former place of business on melting days.

But misapprehension is liable to exist not only with reference to the efficacy of deodorizing agents in relation to health, but also with reference to the peculiar action of antiseptics and disinfectants. An antiseptic is a substance that prevents or retards putrefaction, and putrefaction is the decomposition of animal or vegetable bodies accompanied with the evolution of offensive gases. The putrefactive change occurs only in dead matter, and requires the presence of water, heat, and a ferment. There is no putrefaction in the absence of water, nor at very low temperatures, nor in the absence of those minute vital organisms to which I have referred, and which constitute the ferment from which the decomposition originates. At one time it was thought that complete exclusion of air and oxygen from moist animal or vegetable substances was essential for their preservation from putrefactive decomposition, but that theory has been exploded, and it has been shown that although oxygen and atmospheric air may conduce to other changes, yet if free from the germs of the class of organisms alluded to, they do not favour but rather tend to retard putrefaction.

The substances used as antiseptics act either directly on the bodies in which putrefaction is occurring or might occur, forming with them combinations that are not susceptible of the decomposing action of a ferment, or they act indirectly by destroying the vitality or otherwise preventing the development and propagation of the organisms of which the ferment is composed. In this respect antiseptics are distinguished from disinfectants; the action of the latter being directed only towards the exciting causes and offensive or deleterious products of a class of changes which are themselves more comprehensive than those implied by the term putrefaction.

Disinfectants are agents possessing the property and employed for the purpose of destroying the contagia of infectious diseases, or depriving them of their specific infective power. The influence of these contagia being exerted only in living bodies the products of their action are distinct from those of putrefactive decomposition, and they are not necessarily perceptible to the senses. With a wider signification of the term, disinfectants may be said to act on, and render harmless, the products of putrefactive and other changes when these are capable of injuring health or inducing disease. There is thus a marked difference between the objects contemplated in the use of disinfectants and antiseptics, but the agents used for these purposes are for the most part the same, and differ only to the extent to which their actions are required to be adapted in one case to living and in the other to dead matter. Disinfection, also, may attend and result from, but is not a necessary consequence of deodorization, for not only may there be infection without a bad smell, but there may be odours that are not agreeable and yet are not injurious to health.

Much has been done towards defining the special objects to be attained by the use of these three classes of substances, and several new and efficacious agents suitable for such uses, have been added to the lists of those previously known or thus employed, but there is still room for the exercise of practical knowledge and judgment, in classifying, adapting, and preparing, these various agents with proper instructions for their use in cases in which they are required. Errors are often committed and the attainment of required objects frustrated, from the want of information on these points. Among the mistakes made in connection with the use of deodorizing and disinfecting agents, is that of covering one smell by another, that is of concealing instead of destroying the source of evil. It may even in some cases be an error to destroy a bad smell by an agent that is not capable at the same time of destroying imperceptible miasms which accompany it, and which of the two may be the only real source of danger to health. In the use of disinfectants there is often a great want of judgment manifested in the selection of those adequate to the production of the required effect. Who, for instance, with thorough knowledge of the subject, would think of using Condy's fluid for purifying a cesspool, or Sir William Burnett's disinfecting solution for destroying the contagion of a fever-stricken apartment. There is ample room for study and research with reference to subjects such as these, and if any one doubts it I would commend to his notice the experiences of Faraday many years ago in connection with the purification of the infected wards of the Millbank Penitentiary.

The use of disinfectants and antiseptics lies at the foundation of the treatment of some of the most inveterate diseases which medical men have to contend against, and it appertains to the pharmacist as well as the physician to be conversant with all that relates to the preparation, the mode of action, and the use of these important agents. They are comprised in our materia medica et hygienica. Some of them are included in our Pharmacopœia, but others are not. As pharmacists it devolves upon us to assist in the study and selection of members of this and other classes of articles that are contained, or may be thought worthy of being admitted among the officially recognized agents employed in medicine.

The Pharmacopœia is the standard of orthodoxy, with reference to medicines. It is supposed to contain all the most valuable therapeutical agents, and many of those required for hygienical purposes in connection with the treatment of diseases and the maintenance of health. These agents being intended for the use of medical men the success of whose practice depends upon the production of the expected results of their administration, those who prescribe them and who, of all the parties concerned, are the most deeply interested in their proper selection and preparation, are held to be the first and highest authorities in determining what they should be and how they should be defined. But prescribers of medicines may be, and indeed they mostly are, inexperienced in the commerce of drugs and the arts by which manufactured medicines are produced. The knowledge relating to these departments of pharmacology lies within the province of the pharmacist, and a large amount of this knowledge is required for the successful production of a pharmacopœia. That in former days those exclusively engaged in the practice of pharmacy were not ostensibly employed or consulted in the preparation of our national Pharmacopœias, necessarily resulted from the then undeveloped and generally unsatisfactory state of pharmacy as an occupation distinct from the practice of medicine. Since pharmacy with a scientific basis, and the Pharmaceutical Society which has furnished that basis, have simultaneously sprung into existence and rapidly grown to maturity in this country, the claims of pharmacists to be consulted by those to whom the legislature has committed the responsibility of preparing, and from time to time modifying, our national Pharmacopœia, have been practically recognized, by the appeals which have been made directly to individuals, and generally through the Pharmaceutical Society, for such assistance as could be obtained in that way. Much of the value of the British Pharmacopœia may be ascribed to the use made of information obtained from these sources, which has so far enhanced the estimation in which the work is held by members of the medical profession that even now, after a lapse of nearly ten years and the sale of 30,000 copies, very little disposition, or perhaps I should rather say a decided indisposition, is manifested to have any alteration made in its matter or form. Hence the frequent appearance of reprints instead of new editions. But in a work of this description, additions and alterations must be sometimes made to adapt it to the existing state of knowledge and of medical practice, and members of this Conference are furnishing matter which will facilitate the preparation of a new edition of the Pharmacopœia when such is called for.

If I might venture to suggest to the Conference what I conceive would be a valuable application of some of the scientific energy and the funds at its command, it would be to appoint one or two committees, not for original research, but for the practical testing and comparing of results which have been already obtained in the investigation of subjects relating to the preparation of medicines. There is a vast amount of work of this description that is much wanted, and is more suited for a committee acting under instructions from a public body than it would be for an individual voluntarily engaging in it. Work of this kind partakes to some extent of an invidious character as affecting other investigators, and while it necessarily involves the expenditure of much labour, it is not calculated adequately to enhance the scientific reputation of those engaged in it. When such work is undertaken by individuals there is a tendency generally to branch off somewhere into original research and leave the projected investigation imperfectly performed, with results which are of little practical value; whereas if delegated to a committee the inquiry would be deprived of much of its invidiousness, the work rendered less onerous, the temptation to depart from the original design greatly weakened, and the conclusions arrived at, being the result of combined action with unity of purpose, followed by a concurrence of opinion, would carry increased influence and command a greater amount of the confidence of those for whose use they were intended.

Among subjects which appear to me most urgently to call for this kind of inquiry I would place the preparation of digitalin and aconitine in the most forward rank; but there are others of less importance, such as the preparations of ipecacuanha, ergot of rye, and opium, which have strong claims for similar investigations. Any one of these subjects fully worked out would form a contribution from the Conference in its corporate capacity that would greatly enhance the credit it derives from the separate work of its members. In the investigation of these subjects reference would of course be made to processes used abroad as well as in this country, and comparisons would thus be made of the pharmacopœias of different nations. Such comparisons, accompanied with a desire, for which there are obvious reasons, to assimilate the composition of medicines bearing the same name but emanating from different authorities, would no doubt tend gradually to remove the more important discrepancies which now exist in that direction. How far it may be possible or even desirable to make one pharmacopœia serve for all nations, is a question I do not propose to discuss, beyond simply expressing the opinion that such a result, if attainable, could only be reached at some far distant period. But there is an object more within our reach, and at the same time of less questionable utility, which is the assimilation of the strength and composition of the more powerful medicines ordered under the same names in the pharmacopœias of different nations. For the accomplishment of this object it would be necessary to study the various processes, to freely discuss their relative merits, to ascertain what reasons there are for the adoption of special processes in particular localities, and finally to consider how far it is possible by an international convention of medical authorities, and possibly accompanied by mutual concessions, to agree to a standard of strength and composition that should be applied to all. It would be useless to attempt this with reference to more than a very small number of medicines at a time, and the value of its adoption would principally apply to powerful medicines. What we want is the gradual step by step introduction of a sort of international copyright in the use of names as applied to officially recognized medicines. This, of course, must be founded upon a convention to which the bodies legally authorized to issue pharmacopœias would be parties, that a distinctive name once accepted by general consent as applied to a medicine shall be used by all in the same sense. Such a convention might, in the first instance, apply only to a small number of the medicines now in use, with reference to which the parties to it may be able to agree in fixing their strength and composition, and subsequent additions might be made to the list as the result of further agreement. It might be also stipulated with reference to new forms of medicine that the names first officially applied to such by any member of the convention should not be used by other members to represent medicines differing from those in strength or composition. This obviously would be the easiest part of the arrangement to carry out.

And now, gentlemen, I must draw these discursive remarks to a conclusion. I have endeavoured to bring under notice some of the subjects which appear to me to have strong claims upon our attention and to present to the mental vision a fertile field for the application of those powers of cultivation by which nature and art may be made to bring forth "a balm for every ill that flesh is heir to." This field is committed to our special charge, and it is worthy of all the pains we can devote to the hedging in of its boundaries, the rooting out of all that is rank and uncongenial to the objects to which it should be exclusively devoted, and the formation of a garden, rich in those treasures which nature presents in the vegetable kingdom, and which man is striving, but vainly or with partial results, to imitate. In this field we have things that are lovely and those that are loathsome, yet all are applicable to some wise and beneficent purpose for which they are designed. It is our duty to discover their useful applications, and to adapt them for their proper uses.

Mr. DANIEL FRAZER said: It is my pleasing duty as I also consider t my privilege to ask you to return a vote of thanks to our Chairman for his able, clear, practical, and seasonable address. We in the north, I think, have great reason to be proud of the presence of such a man as Professor Redwood. He has been long known to us pharmacists in the capacity of author and as editor of the old household book, 'Gray's Supplement.' All of us know how valuable it is on account of the minute details in it—details which are not found in the ordinary Pharmacopœia. As professor of pharmacy, appointed by the Pharmaceutical Society, Professor Redwood has proved himself to be the round man in the round place, his previous training having admirably fitted him for the office. As a public analyst, appointed as he is by two of the largest districts in London, we may well say that in this case we honour ourselves in honouring Professor Redwood. The honour shown to him by London is refracted upon us when we have him as our head. The paper read is valuable from the seasonableness of the remarks offered, particularly regarding the line to be drawn between prescribing and dispensing. There was one point mentioned as to private prescribing not being so dangerous as prescribing by us intermediate men. I feel that strongly. I may say in a sentence that I never shared this dread of medical men interfering with us. They cannot do it. They cannot prevent John Smith prescribing for John Brown. But we ourselves ought to feel a responsibility attached to us on that account. Then the only other thing I would remark upon is that this meeting, I believe, is about the most successful that has ever been held. But it is a rebuke to us in the north when I see such a number of men from the south. Indeed I could name more gentlemen from the south than I could from the north as being present. I cannot but feel that a debt of gratitude is due to them. Many of them have been at all our meetings since 1870 and when the meetings have been in England, I shall not say how few of us from the north were present. I hope the result of the visit of the gentlemen from the south will stimulate the Scotch members to attend the meetings in the south, even that which is to be held next year at Plymouth. I propose a hearty vote of thanks to Professor Redwood for his able and valuable address.

Mr. E. C. C. SANDFORD: I have great pleasure in seconding that resolution. In common with many here I have had many opportunities of listening to Professor Redwood, but I never listened to him with so much pleasure as on the present occasion. There is one portion of his address to which I must take a slight exception. He stated there were many men in this room and elsewhere in the Pharmaceutical Society, who had derived their training from a number of eminent men, the names of whom he gave. But he did not mention among these his own name. I venture to say the students of Professor Redwood would outnumber the whole of the students of those gentlemen to whom he has referred. I am sure his remarks on nitrogen, deodorizers, antiseptics, and disinfectants, will be widely read, and much appreciated. They show to us, who know him, that his freshness and originality have not decreased with his increasing years. I was struck too with his remarks about the advantage of a family medicine chest. I had once to go to one of the outside Hebrides to introduce a new industry. I was almost the only English-speaking man amongst the Gaelic race. I had a medicine chest, about which I could tell many curious stories. It was very useful, but it had its disadvantage. I was pestered by half of the people of the place. They would not have the doctor. They would come to me. You may imagine how little I understood about their complaints when I tell you they were generally translated into English by an interpreter. There was one man who came late at night and told me his daughter was "nearly dead." That was all I could get out of him, I asked him what medicine he would suggest for that complaint. He thought whiskey would do. It occurred to me it might be judicious to ascertain the age of the young lady. When I found that she was only ten months old, I did not prescribe that remedy. I may state the medicine I most used was not in the Pharmacopœia. It did not contain that poisonous element, "nitrogen." It was labelled "usquebah," which is the Gaelic" for sudden death." There was another portion of Professor Redwood's address with which I was much pleased, that was the able manner in which he touched the delicate subject of prescribing. I hope that the result of this Conference may be to considerably reduce the proportion of Englishmen, and considerably increase the proportion of Scotchmen attending these annual meetings. I do trust that in this city there will be a change in another respect. I consider that pharmacy is in wrong hands. I do hope when I next drive through the streets of Glasgow I shall cease to see painted up "Medical Hall," but I shall see in place of that designation "Pharmaceutical Chemist."

Mr. STODDART: As our Chairman cannot put this motion I shall do so. I am sure it will be carried unanimously and heartily.

The PRESIDENT: I beg to thank Mr. Frazer and Mr. Stanford for the far too favourable terms in which they have alluded to me in proposing this vote of thanks. I also beg most emphatically to thank you for the manner in which you have received the proposal. I will not further take up your time, as I fear I have already too lengthily trespassed upon your patience, and I will only say I am very much obliged to you.

(To be continued.)

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The meeting of the British Association for the Advancement of Science took place on Wednesday, September 6, at Glasgow, under the presidency of the distinguished chemist and physicist, Professor Thomas Andrews, LL.D., F.R.S., of Belfast, who, according to usual custom, delivered the following opening address:—

THE PRESIDENT'S ADDRESS.

Six and thirty years have passed over since the British Association for the Advancement of Science held its tenth meeting in this ancient city, and twenty-one years have elapsed since it last assembled here. The representatives of two great Scottish families presided on these occasions; and those who had the advantage of hearing the address of the Duke of Argyll in 1855 will recall the gratification they enjoyed while listening to the thoughtful sentiments which reflected a mind of rare cultivation and varied acquirements. On the present occasion I have undertaken, not without anxiety, the duty of filling an office at first accepted by one whom Scotland and the Association would alike have rejoiced to see in this chair, not only as a tribute to his own scientific services, but also as recognizing in him the worthy representative of that long line of able men who have upheld the pre-eminent position attained by the Scottish schools of medicine in the middle of the last century, when the mantle of Boerhaave fell upon Monro and Cullen.

The task of addressing this Association, always a difficult one, is not rendered easier when the meeting is held in a place which presents the rare combination of being at once an ancient seat of learning and a great centre of modern industry. Time will not permit me to refer to the distinguished men who in early days have left here their mark behind them; and I regret it the more as there is a growing tendency to exaggerate the value of later discoveries, and to underrate the achievements of those who have lived before us. Confining our attention to a period reaching back to little more than a century, it appears that during that time three new sciences arose—at least, as far as any science can be said to have a distinct origin—in this city of Glasgow—experimental chemistry, political economy, and mechanical engineering. It is now conceded that Black laid the foundation of modern chemistry; and no one has ever disputed the claims of Adam Smith and of Watt to having not only founded, but largely built up, the two great branches of knowledge with which their names will always be inseparably connected. It was here that Dr. Thomas Thomson established the first school of Practical Chemistry in Great Britain, and that Sir W. Hooker gave to the chair of botany a European celebrity; it was here that Graham discovered the law of gaseous diffusion and the properties of polybasic acids; it was here that Stenhouse and Anderson, Rankine and J. Thomson, made some of their finest discoveries; and it was here that Sir William Thomson conducted his physico-mathematical investigations, and invented those exquisite instruments, valuable alike for ocean telegraphy and for scientific use, which are among the finest trophies of recent science. Nor must the names of Tennant, Mackintosh, Neilson, Walter Crum, Young and Napier be omitted, who, with many others in this place, have made large and valuable additions to practical science.

The safe return of the "Challenger" after an absence of three and a half years is a subject of general congratulation. Our knowledge of the varied forms of animal life, and of the remains of animal life which occur, it is now known, over large tracts of the bed of the ocean, is chiefly derived from the observations made in the "Challenger" and in the previous deep-sea expeditions which were organized by Sir Wyville Thomson and Dr. Carpenter. The physical observations, and especially those on the temperature of the ocean, which were systematically conducted throughout the whole voyage of the "Challenger," have already supplied valuable data for the resolution of the great question of ocean currents. Upon this question, which has been discussed with singular ability, but under different aspects, by Dr. Carpenter and Mr. Croll, I cannot attempt here to enter; nor will I venture to forestall by any crude analysis of my own the narrative which Sir W. Thomson has kindly undertaken to give of his own achievements and of those of his staff during their long scientific cruise.

Another expedition, which has more than fulfilled the expectations of the public, is Lieutenant Cameron's remarkable journey across the continent of Africa. It is by such enterprises happily conceived and ably executed that we may hope at no distant day to see the Arab slave-dealer replaced by the legitimate trader, and the depressed populations of Africa gradually brought within the pale of civilized life.

From the North Polar Expedition no intelligence has been received; nor can we expect for some time to hear whether it has succeeded in the crowning object of Arctic enterprise. In the opinion of many the results, scientific or other, to be gained by a full survey of the Arctic regions can never be of such value as to justify the risk and cost which must be incurred. But it is not by cold calculations of this kind that great discoveries are made or great enterprises achieved. There is an inward and irrepressible impulse—in individuals called a spirit of adventure, in nations a spirit of enterprise—which impels mankind forward to explore every part of the world we inhabit, however inhospitable or difficult of access; and if the country claiming the foremost place among maritime nations shrink from an undertaking because it is perilous, other countries will not be slow to seize the post of honour. If it be possible for man to reach the poles of the earth, whether north or south, the feat must sooner or later be accomplished; and the country of the successful adventurers will be thereby raised in the scale of nations.

The passage of Venus over the sun's disk is an event which cannot be passed over without notice, although many of the circumstances connected with it have already become historical. It was to observe this rare astronomical phenomenon, on the occasion of its former occurrence in 1769, that Captain Cook's memorable voyage to the Pacific was undertaken, in the course of which he explored the coast of New South Wales, and added that great country to the possessions of the British Crown.

As the transit of Venus gives the most exact method of calculating the distance of the earth from the sun, extensive preparations were made on the last occasion for observing it at selected stations—from Siberia in northern, to Kerguelen's Land in southern latitudes. The great maritime powers vied with each other to turn the opportunity to the best account; and Lord Lindsay had the spirit to equip, at his own expense, the most complete expedition which left the shores of this country. Some of the most valuable stations in southern latitudes were desert islands, rarely free from mist or tempest, and without harbours or shelter of any kind. The landing of the instruments was in many cases attended with great difficulty and even personal risk. Photography lent its aid to record automatically the progress of the transit; and M. Janssen contrived a revolving plate, by means of which from fifty to sixty images of the edge of the sun could be taken at short intervals during the critical periods of the phenomenon.

The observations of M. Janssen at Nagasakin, in Japan, were of special interest. Looking through a violet-blue glass he saw Venus, two or three minutes before the transit began, having the appearance of a pale round spot near the edge of the sun. Immediately after contact the segment of the planet's disk, as seen on the face of the sun, formed, with what remained of this spot, a complete circle. The pale spot when first seen was, in short, a partial eclipse of the solar corona, which was thus proved beyond dispute to be a luminous atmosphere surrounding the sun. Indications were at the same time obtained of the existence of an atmosphere around Venus.

The mean distance of the earth from the sun was long supposed to have been fixed within a very small limit of error at about 95,000,000 miles. The accuracy of this number had already been called in question on theoretical grounds by Hansen and Leverrier, when Foucault, in 1862, decided the question by an experiment of extraordinary delicacy. Taking advantage of the revolving mirror, with which Wheatstone had some time before enriched the physical sciences, Foucault succeeded in measuring the absolute velocity of light in space by experiments on a beam of light, reflected backwards and forwards, within a tube little more than thirteen feet in length. Combining the result thus obtained with what is called by astronomers the constant of aberration, Foucault calculated the distance of the earth from the sun, and found it to be one thirtieth part, or about 3,000,000 miles, less than the commonly received number. This conclusion has lately been confirmed by M. Cornu, from a new determination he has made of the velocity of light according to the method of Fizeau; and in complete accordance with these results are the investigations of Leverrier, founded on a comparison with theory of the observed motions of the sun and of the planets Venus and Mars. It remains to be seen whether the recent observations of the transit of Venus, when reduced, will be sufficiently concordant to fix with even greater precision the true distance of the earth from the sun.

In this brief reference to one of the finest results of modern science, I have mentioned a great name whose loss England has recently had to deplore, and in connection with it the name of an illustrious physicist whose premature death deprived France, a few years ago, of one of her brighest ornaments—Wheatstone and Foucault, ever to be remembered for their marvellous power of eliciting, like Galileo and Newton, from familiar phenomena the highest truths of nature!

The discovery of Huggins that some of the fixed stars are moving towards and others receding from our system, has been fully confirmed by a careful series of observations lately made by Mr. Christie in the Observatory of Greenwich. Mr. Huggins has not been able to discover any indications of a proper motion in the nebulæ; but this may arise from the motion of translation being less than the method would discover. Few achievements in the history of science are more wonderful than the measurement of the proper motions of the fixed stars, from observing the relative position of two delicate lines of light in the field of the telescope.

The observation of the American astronomer Young, that bright lines corresponding to the ordinary lines of Fraunhofer reversed, may be seen in the lower stata of the solar atmosphere for a few moments during a total eclipse, has been confirmed by Mr. Stone, on the occasion of the total eclipse of the sun which occurred some time ago in South Africa. In the outer corona, or higher regions of the sun's atmosphere, a single green line only was seen, the same which had been already described by Young.

I can here refer only in general terms to the observations of Roscoe and Schuster on the absorption-bands of potassium and sodium, and to the investigations of Lockyer on the absorptive powers of metallic and metalloidal vapours at different temperatures. From the vapour of calcium the latter has obtained two wholly distinct spectra, one belonging to a low, and the other to a high temperature. Mr. Lockyer is also engaged on a new and greatly extended map of the solar spectrum.

Spectrum analysis has lately led to the discovery of a new metal—gallium—the fifth whose presence has been first indicated by that powerful agent. This discovery is due to M. Lecoq de Boisbaudran, already favourably known by a work on the application of the spectroscope to chemical analysis.

Our knowledge of aerolites has of late years been greatly increased; and I cannot occupy a few moments of your time more usefully than by briefly referring to the subject. So recently as 1860 the most remarkable meteoric fall on record, not even excepting that of L'Aigle, occurred near the village of New Concord in Ohio. On a day when no thunderclouds were visible, loud sounds were heard resembling claps of thunder, followed by a large fall of meteoric stones, some of which were distinctly seen to strike the earth. One stone, above 50 pounds in weight, buried itself to the depth of two feet in the ground, and when dug out was found to be still warm. In 1872 another remarkable meteorite, at first seen as a brilliant star with a luminous train, burst near Orvinio in Italy, and six fragments of it were afterwards collected.

Isolated masses of metallic iron, or rather of an alloy of iron and nickel, similar in composition and properties to the iron usually diffused in meteoric stones, have been found here and there on the surface of the earth, some of large size, as one described by Pallas, which weighed about two-thirds of a ton. Of the meteoric origin of these masses of iron there is little room for doubt, although no record exists of their fall. Sir Edward Sabine, whose life has been devoted with rare fidelity to the pursuit of science, and to whose untiring efforts this Association largely owes the position it now occupies, was the pioneer of the newer discoveries in meteoric science. Eight and fifty years ago he visited with Captain Ross the northern shores of Baffin's Bay, and made the interesting discovery that the knifeblades used by the Esquimaux in the vicinity of the Arctic highlands were formed of meteoric iron. This observation was afterwards fully confirmed; and scattered blocks of meteoric iron have been found from time to time around Baffin's Bay. But it was not till 1870 that the meteoric treasures of Baffin's Bay were truly discovered. In that year Nordenskiöld found, at a part of the shore difficult of approach even in moderate weather, enormous blocks of meteoric iron, the largest weighing nearly twenty tons, imbedded in a ridge of basaltic rock. The interest of this observation is greatly enhanced by the circumstance that these masses of meteoric iron, like the basalt with which they are associated, do not belong to the present geological epoch, but must have fallen long before the actual arrangement of land and sea existed,—during, in short, the middle Tertiary, or Miocene period of Lyell. The meteoric origin of these iron masses from Ovifak has been called in question by Lawrence Smith; and it is no doubt possible that they may have been raised by upheaval from the interior of the earth. I have indeed myself shown by a magneto-chemical process that metallic iron, in particles so fine that they have never yet been actually seen, is everwhere diffused through the Miocene basalt of Slieve Mish in Antrim, and may likewise be discovered by careful search in almost all igneous and in many metamorphic rocks. These observations have since been verified by Reuss in the case of the Bohemian basalts. But, as regards the native iron of Ovifak, the weight of evidence appears to be in favour of the conclusion, at which M. Daubrée, after a careful discussion of the subject, has arrived—that it is really of meteoric origin. This Ovifak iron is also remarkable from containing a considerable amount of carbon, partly combined with the iron, partly diffused through the metallic mass in a form resembling coke. In connection with this subject, I must refer to the able and exhaustive memoirs of Maskelyne on the Busti and other aerolites, to the discovery of vanadium by R. Apjohn in a meteoric iron, to the interesting observations of Sorby, and to the researches of Daubrée, Wöhler, Lawrence Smith, Tschermak, and others.

The important services which the Kew Observatory has rendered to meteorology and to solar physics have been fully recognized; and Mr. Gassiot has had the gratification of witnessing the final success of his long and noble efforts to place this observatory upon a permanent footing. A physical observatory for somewhat similar objects, but on a larger scale, is in course of erection, under the guidance of M. Janssen, at Fontenay in France, and others are springing up or already exist in Germany and Italy. It is earnestly to be hoped that this country will not lag behind in providing physical observatories on a scale worthy of the nation and commensurate with the importance of the object. On this question I cannot do better than refer to the high authority of Dr. Balfour Stewart, and to the views he expressed in his able address last year to the Physical Section.

Weather telegraphy, or the reporting by telegraph the state of the weather at selected stations to a central office, so that notice of the probable approach of storms may be given to the seaports, has become in this country an organized system; and considering the little progress meteorology has made as a science, the results may be considered to be on the whole satisfactory. Of the warnings issued of late years, four out of five were justified by the occurrence of gales or strong winds. Few storms occurred for which no warnings had been given; but unfortunately among these were some of the heaviest gales of the period. The stations from which daily reports are sent to the meteorological office in London embrace the whole coast of Western Europe, including the Shetland Isles. It appears that atmospheric disturbances seldom cross the Atlantic without being greatly altered in character, and that the origin of most of our storms lies eastward of the longitude of Newfoundland.

As regards the velocity of the wind, the cup-anemometer of Dr. Robinson has fully realized the expectations of its discoverer; and the venerable astronomer of Armagh has been engaged during the past summer, with all the ardour of youth, in a course of laborious experiments to determine the constants of his instrument. From seven years' observations at the Observatory of Armagh, he has found that the mean velocity of the wind is greatest in the S.S.W. octant and least in the opposite one, and that the amount of wind attains a maximum in January, after which it steadily decreases, with one slight exception, till July, augmenting again till the end of the year.

Passing to the subject of electricity, it is with pleasure that I have to announce the failure of a recent attempt to deprive Oerstedt of his great discovery. It is gratifying thus to find high reputations vindicated, and names which all men love to honour transmitted with undiminished lustre to posterity. At a former meeting of this Association, remarkable for an unusual attendance of distinguished foreigners, the central figure was Oerstedt. On that occasion Sir John Herschel in glowing language compared Oerstedt's discovery to the blessed dew of heaven, which only the master-mind could draw down, but which it was for others to turn to account and use for the fertilization of the earth. To Franklin, Volta, Coulomb, Oerstedt, Ampère, Faraday, Seebeck, and Ohm are due the fundamental discoveries of modern electricity—a science whose applications in Davy's hands led to grander results than alchemist ever dreamed of, and in the hands of others (among whom Wheatstone, Morse, and Thomson occupy the foremost place) to the marvels of the electric telegraph. When we proceed from the actual phenomena of electricity to the molecular conditions upon which those phenomena depend, we are confronted with questions as recondite as any with which the physicist has had to deal, but towards the solution of which the researches of Faraday have contributed the most precious materials. The theory of electrical and magnetic action occupied formerly the powerful minds of Poisson, Green, and Gauss; and among the living it will surely not be invidious to cite the names of Weber, Helmholtz, Thomson, and Clerk Maxwell. The work of the latter on electricity is an original essay worthy in every way of the great reputation and of the clear and far-seeing intellect of its author.

Among recent investigations I must refer to Professor Tait's discovery of consecutive neutral-points in certain thermo-electric junctions, for which he was lately awarded the Keith prize. This discovery has been the result of an elaborate investigation of the properties of thermo-electric currents, and is specially interesting in reference to the theory of dynamical electricity. Nor can I omit to mention the very interesting and original experiments of Dr. Kerr on the dielectric state, from which it appears that when electricity of high tension is passed through dielectrics a change of molecular arrangement occurs, slowly in the case of solids, quickly in the case of liquids, and that the lines of electric force are in some cases lines of compression, in other cases lines of extension.

Of the many discoveries in physical science due to Sir William Grove, the earliest and not the least important is the battery which bears his name, and is to this day the most powerful of all voltaic arrangements; but with a Grove's battery of 50 or even 100 cells in vigorous action, the spark will not pass through an appreciable distance of cold air. By using a very large number of cells, carefully insulated and charged with water, Mr. Gassiot succeeded in obtaining a short spark through air; and lately De la Rue and Müller have constructed a large chloride of silver battery giving freely sparks through cold air, which, when a column of pure water is interposed in the circuit, accurately resemble those of the common electrical machine. The length of the spark increasing nearly as the square of the number of cells, it has been calculated that with 100,000 elements of this battery the discharge should take place through a distance of no less than eight feet in air.

In the solar beam we have an agent of surpassing power, the investigation of whose properties by Newton forms an epoch in the history of experimental science scarcely less important than the discovery of the law of gravitation in the history of physical astronomy. Three actions characterize the solar beam, or, indeed, more or less that of any luminous body—the heating, the physiological, and the chemical. In the ordinary solar beam we can modify the relative amount of these actions by passing it through different media, and we can thus have luminous rays with little heating or little chemical action. In the case of the moon's rays it required the highest skill on the part of Lord Rosse, even with all the resources of the observatory of Parsonstown, to investigate their heating properties, and to show that the surface of our satellite facing the earth passes, during every lunation, through a greater range of temperature than the difference between the freezing- and boiling-points of water.

But if, instead of taking an ordinary ray of light, we analyse it as Newton did by the prism, and isolate a very fine line of the spectrum (theoretically a line of infinite tenuity), that is to say, if we take a ray of definite refrangibility, it will be found impossible by screens or otherwise to alter its properties. It was his clear perception of the truth of this principle that led Stokes to his great discovery of the cause of epipolic dispersion, in which he showed that many bodies had the power of absorbing dark rays of high refrangibility and of emitting them as luminous rays of lower refrangibility, of absorbing in short, darkness and of emitting it as light. It is not, indeed, an easy matter in all cases to say whether a given effect is due to the action of heat or light; and the question which of these forces is the efficient agent in causing the motion of the tiny disks in Crookes' radiometer has given rise to a good deal of discussion. The answer to this question involves the same principles as those by which the image traced on the daguerreotype plate, or the decomposition of carbonic acid by the leaves of plants, is referred to the action of light and not of heat; and applying these principles to the experiments made with the radiometer, the weight of evidence appears to be in favour of the view that the repulsion of the blackened surfaces of the disks is due to a thermal reaction occurring in a highly rarefied medium. I have myself had the pleasure of witnessing many of Mr. Crookes' experiments, and I cannot sufficiently express my admiration of the care and skill with which he has pursued this investigation. The remarkable repulsions he has observed in the most perfect vacua hitherto attained are interesting, not only as having led to the construction of a beautiful instrument, but as being likely, when the subject is fully investigated, to give valuable data for the theory of molecular actions.

A singular property of light, discovered a short time ago by Mr. Willoughby Smith, is its power of diminishing the electrical resistance of the element selenium. This property has been ascertained to belong chiefly to the luminous rays on the red side of the spectrum, being nearly absent in the violet or more refrangible rays and also in heat-rays of low refrangibility. The recent experiments of Professor W. G. Adams have fully established the accuracy of the remarkable observation, first made by Lord Rosse, that the action appeared to vary inversely as the simple distance of the illuminating source.

Switzerland sent, some years ago, as its representative to this country the celebrated De la Rive, whose scientific life formed lately the subject of an *éloge* from the pen of M. Dumas. On this occasion we have to welcome, in General Menabrea, a distinguished representative both of the kingdom of Italy and of Italian science. His great work on the determination of the pressure and tensions in an elastic system is of too abtruse a character to be discussed in this address; but the principle it contains may be briefly stated in the following words;—"When any elastic system places itself in equilibrium under the action of external forces, the work developed by the internal forces, is a minimum." General Menabrea has, however, other and special claims upon us here, as the friend to whom Babbage entrusted the task of making known to the world the principles of his analytical machine—a gigantic conception, the effort to realize which it is known was one of the chief objects of Babbage's later life. The latest development of this conception is to found in the mechanical integrator of Professor J. Thomson, in which motion is transmitted, according to a new kinematic principle, from a disk or cone to a cylinder through the intervention of a loose ball, and in Sir W. Thomson's machine for the mechanical integration of differential equations of the second order. In the exquisite tidal machine of the latter we have an instrument by means of which the height of the tide at a given port can be accurately predicted for all times of the day and night.

The attraction-meter of Siemens is an instrument of great delicacy for measuring horizontal attractions, which it is proposed to use for recording the attractive influence of the sun and moon, upon which the tides depend. The bathometer of the same able physicist is another remarkable instrument, in which the constant force of a spring is opposed to the variable pressure of a column of mercury. By an easy observation of the bathometer on shipboard, the depth of the sea may be approximately ascertained without the use of a sounding-line.

The Loan Exhibition of Apparatus at Kensington has been a complete success, and cannot fail to be useful, both in extending a knowledge of scientific subjects and in promoting scientific research throughout the country. Unique in character, but most interesting and instructive, this exhibition will, it is to be hoped, be the precursor of a permanent museum of scientific objects, which, like the present exhibition, shall be a record of old, as well as a representation of new inventions.

It is often difficult to draw a distinct line of separation between the physical and chemical sciences; and it is perhaps doubtful whether the division is not really an artificial one. The chemist cannot, indeed, make any large advance without having to deal with physical principles; and it is to Boyle, Dalton, Gay-Lussac, and Graham that we owe the discovery of the mechanical laws which govern the properties of gases and vapours. Some of these laws have of late been made the subject of searching inquiry, which has fully confirmed their accuracy, when the body under examination approaches to what has not inaptly been designated the ideal gaseous state. But when gases are examined under varied conditions of pressure and temperature, it is found that these laws are only particular cases of more general laws, and that the laws of the gaseous state, as it exists in nature, although they may be enunciated in a precise and definite form, are very different from the simple expressions which apply to the ideal condition. The new laws become in their turn inapplicable when, from the gaseous state proper, we pass to those intermediate conditions which, it has been shown, link with unbroken continuity the gaseous and liquid states. As we approach the liquid state, or even when we reach it, the problem becomes more complicated; but its solution even in these cases will, it may confidently be expected, yield to the powerful means of investigation we now possess.

Among the more important researches made of late in physical chemistry, I may mention those of F. Weber on the specific heat of carbon and the allied elements, of Berthelot on thermo-chemistry, of Bunsen on spectrum analysis, of Wüllner on the band-and line-spectra of the gases, and of Guthrie on the cryohydrates.

Cosmical chemistry is a science of yesterday; and yet it already abounds in facts of the highest interest. Hydrogen, which, if the absolute zero of the physicist does not bar the way, we may hope yet to see in the metallic form, appears to be everywhere present in the universe. It exists in enormous quantity in the solar atmosphere, and it has been discovered in the atmospheres of the fixed stars. It is present, and is the only known element of whose presence we are certain, in those vast sheets of ignited gas of which the nebulæ proper are composed. Nitrogen is also widely diffused among the stellar bodies, and carbon has been discovered in more than one of the comets. On the other hand, a prominent line in the spectrum of the aurora borealis has not been identified with that of any known element; and the question may be asked:—Does a new element, in a highly rarefied state, exist in the upper regions of our atmosphere? or are we with Angström to attribute this line to a fluorescent or phosphorescent light produced by the electrical discharge to which the aurora is due? This question awaits further observations before it can be definitely settled, as does also that of the source of the remarkable green line which is everywhere conspicuous in the solar corona.

I must here pause for a moment to pay a passing tribute to the memory of Angström, whose great work on the solar spectrum will always remain as one of the finest monuments of the science of our period. The influence, indeed, which the labours of Angström and of Kirchhoff have exerted on the most interesting portion of later physics can scarcely be exaggerated; and it may be truly said that there are few men whose loss will be longer felt or more deeply deplored than that of the illustrious astronomer of Upsala.

I cannot pursue this subject further, nor refer to the other terrestrial elements which are present in the solar and stellar atmospheres. Among the many elements that make up the ordinary aerolite, not one has been discovered which does not occur upon this earth. On the whole we arrive at the grand conclusion that this mighty universe is chiefly built up of the same materials as the globe we inhabit.

In the application of science to the useful purposes of life, chemistry and mechanics have run an honourable race. It was in the valley of the Clyde that the chief industry of this country received, within the memory of many here present, an extraordinary impulse from the application by Neilson of the hot blast to the smelting of iron. The Bessemer steel process and the regenerative furnace of Siemens are later applications of high scientific principles to the same industry. But there is ample work yet to be done. The fuel consumed in the manufacture of iron, as, indeed, in every furnace where coal is used, is greatly in excess of what theory indicates; and the clouds of smoke which darken the atmosphere of our manufacturing towns, and even of whole districts of country, are a clear indication of the waste, but only of a small portion of the waste, arising from imperfect combustion. The depressing effect of this atmosphere upon the working population can scarcely be overrated. Their pale, I had almost said etiolated, faces are a sure indication of the absence of the vivifying influence of the solar rays, so essential to the maintenance of vigorous health. The chemist can furnish a simple test of this state of the atmosphere in the absence of ozone, the active form of oxygen, from the air of our large towns. At some future day the efforts of science to isolate, by a cheap and available process, the oxygen of the air for industrial purposes may be rewarded with success. The effect of such a discovery would be to reduce consumption of fuel to a fractional part of its present amount; and although the carbonic acid would remain, the smoke and carbonic oxide would disappear. But an abundant supply of pure oxygen is not now within our reach; and in the meantime may I venture to suggest that in many localities the waste products of the furnace might be carried off to a distance from the busy human hive by a few horizontal flues of large dimensions, terminating in lofty chimneys on a hillside or distant plain? A system of this kind has long been employed at the mercurial mines of Idria, and in other smelting-works where noxious vapours are disengaged. With a little care in the arrangements, the smoke would be wholly deposited, as flue-dust or soot, in the horizontal galleries, and would be available for the use of the agriculturist.

The future historian of organic chemistry will have to record a succession of beneficent triumphs, in which the efforts of science have led to results of the highest value to the well-being of man. The discovery of quinine has probably saved more human life, with the exception of that of vaccination, than any discovery of any age; and he who succeeds in devising an artificial method of preparing it will be truly a benefactor of the race. Not the least valuable, as it has been one of the most successful, of the works of our Government in India, has been the planting of the cinchona-tree on the slopes of the Himalaya. As artificial methods are discovered, one by one, of preparing the proximate principles of the useful dyes, a temporary derangement of industry occurs, but in the end the waste materials of our manufactures set free large portions of the soil for the production of human food.

The ravages of insects have ever been the terror of the agriculturist, and the injury they inflict is often incalculable. An enemy of this class, carried over from America, threatened lately with ruin some of the finest vine districts in the south of France. The occasion has called forth a chemist of high renown; and in a classical memoir recently published, M. Dumas appears to have resolved the difficult problem. His method, although immediately applied to the *Phylloxera* of the vine, is a general one, and will no doubt be found serviceable in other cases. In the apterous state the *Phylloxera* attacks the roots of the plant; and the most efficacious method hitherto known of destroying it has been to inundate the vineyard. After a long and patient investigation, M. Dumas has discovered that the sulphocarbonate of potassium, in dilute solution, fulfils every condition required from an insecticide, destroying the insect without injuring the plant. The process requires time and patience; but the trials in the vineyard have fully confirmed the experiments of the laboratory.

The application of artificial cold to practical purposes is rapidly extending; and, with the improvement of the ice-machine, the influence of this agent upon our supply of animal food from different countries will undoubtedly be immense. The ice-machine is already employed in paraffin-works and in large breweries; and the curing or salting of meat is now largely conducted in vast chambers, maintained throughout the summer at a constant temperature by a thick covering of ice.

I have now completed this brief review, rendered difficult by the abundance, not by the lack of materials. Even confining our attention to the few branches of science upon which I have ventured to touch, and omitting altogether the whole range of pure chemistry, it is with regret that I find myself constrained to make only a simple reference to the important work of Cayley on the mathematical theory of isomers, and to elaborate memoirs which have recently appeared in Germany on the reflection of heat- and light-rays, and on the specific heat and conducting-power of gases for heat, by Knoblauch, E. Wiedemann, Winkelmann and Buff.

The decline of science in England formed the theme, fifty years ago, of an elaborate essay by Babbage; but the brilliant discoveries of Faraday soon after wiped off the reproach. I will not venture to say that the alarm which has lately arisen here and elsewhere on the same subject will prove to be equally groundless. The duration of every great outburst of human activity, whether in art, in literature, or in science, has always been short, and experimental science has made gigantic advances during the last three centuries. The evidence of any great failure is not, however, very manifest—at least, in the physical sciences. The journal of Poggendorff, which has long been a faithful record of the progress of physical research throughout the world, shows no signs of flagging; and the Jubelband by which Germany celebrated the fiftieth year of Poggendorff's invaluable services was at the same time an ovation to a scientific veteran who has perhaps done more than any man living to encourage the highest forms of research, and a proof that in Northern Europe the physical sciences continue to be ably and actively cultivated. If in chemistry the case is somewhat weaker, the explanation—at least, in this country—is chiefly to be found in the demand on the part of the public for professional aid from many of our ablest chemists.

But whatever view be taken of the actual condition of scientific research, there can be no doubt that it is both the duty and the interest of the country to encourage a pursuit so ennobling in itself and fraught with such important consequences to the well-being of the community. Nor is there any question in which this Association, whose special aim is the advancement of science, can take a deeper interest. The public mind has also been awakened to its importance, and is prepared to aid in carrying out any proposal which offers a reasonable prospect of advantage.

In its recent phase the question of scientific research has been mixed up with contemplated changes in the great universities of England, and particularly in the University of Oxford. The national interests involved on all sides are immense, and a false step once taken may be irretrievable. It is with diffidence that I now refer to the subject, even after having given to it the most anxious and careful consideration.

As regards the higher mathematics, their cultivation has hitherto been chiefly confined to the Universities of Cambridge and Dublin, and two great mathematical schools will probably be sufficient for the kingdom. The case of the physical and natural sciences is different, and they ought to be cultivated in the largest and widest sense at every complete university. Nor in applying this remark to the English universities must we forget that if Cambridge was the alma mater of Newton and Cavendish, Oxford gave birth to the Royal Society. The ancient renown of Oxford will surely not suffer while her material position cannot fail to be strengthened by the expansion of scientific studies and the encouragement of scientific research within her walls. Nor ought such a proposal to be regarded as in any way hostile to the literary studies, and especially to the ancient classical studies, which have always been so carefully cherished at Oxford. If, indeed, there were any such risk, few would hesitate to exclaim, "Let science shift elsewhere for herself, and let literature and philosophy find shelter in Oxford!" But there is no ground for any such anxiety. Literature and science, philosophy and art, when properly cultivated, far from opposing, will mutually aid one another. There will be ample room for all, and, by judicious arrangements, all may receive the attention they deserve.

A university, or studium generale, ought to embrace in its arrangements the whole circle of studies which involve the material interests of society as well as those which cultivate intellectual refinement. The industries of the country should look to the universities for the development of the principles of applied as well as of abstract science; and in this respect no institutions have ever had so grand a possession within easy reach as have the universities of England at this conjuncture, if only they have the courage to seize it. With their historic reputation, their collegiate endowments, their commanding influence, Oxford and Cambridge should continue to be all that they now are; but they should, moreover, attract to their lecture halls and working cabinets students in large numbers preparing for the higher industrial pursuits of the country. The great physical laboratory in Cambridge, founded and equipped by the noble representative of the house of Cavendish, has in this respect a peculiar significance, and is an important step in the direction I have indicated. But a small number only of those for whom this temple of science is designed are now to be found in Cambridge. It remains for the university to perform its part and to widen its portals so that the nation at large may reap the advantage of this well-timed foundation.

If the Universities, in accordance with the spirit of their statutes, or at least of ancient usage, would demand from the candidates for some of the higher degrees proof of original powers of investigation, they would give an important stimulus to the cultivation of science. The example of many continental universities, and among others of the venerable University of Leyden, may here be mentioned. Two proof essays recently written for the degree of Doctor of Science in Leyden, one by Van der Waals, the other by Lorenz, are works of unusual merit; and another pupil of Professor Rijke is now engaged in an elaborate experimental research as a qualification for the same degree.

The endowment of a body of scientific men devoted exclusively to original research, without the duty of teaching or other occupation, has of late been strongly advocated in this country; and M. Fremy has given the weight of his high authority to a somewhat similar proposal for the encouragement of research in France. I will not attempt to discuss the subject as a national question, the more so as after having given the proposal the most careful consideration in my power, and turned it round on every side, I have failed to discover how it could be worked so as to secure the end in view.

But whatever may be said in favour of the endowment of pure research as a national question, the Universities ought surely never to be asked to give their aid to a measure which would separate the higher intellects of the country from the flower of its youth. It is only through the influence of original minds that any great or enduring impression can be produced on the hopeful student. Without original power, and the habit of exercising it, you may have an able instructor, but you cannot have a great teacher. No man can be expected to train others in habits of observation and thought he has never acquired himself. In every age of the world the great schools of learning have, as in Athens of old, gathered around great and original minds, and never more conspicuously than in the modern schools of chemistry, which reflected the genius of Liebig, Wöhler, Bunsen, and Hofmann. These schools have been nurseries of original research as well as models of scientific teaching and students attracted to them from all countries became enthusiastically devoted to science, while they learned its methods from example even more than from precept. Will any one have the courage to assert that organic chemistry, with its many applications to the uses of mankind, would have made in a few short years the marvellous strides it has done, if science, now as in mediæval times, had pursued her work in strick seclusion,

> Semota ab nostris rebus, seiunctaque longe,
> Ipsa suis pollens opibus, nil indiga nostri?

But while the Universities ought not to apply their resources in support of a measure which would render their teaching ineffective, and would at the same time dry up the springs of intellectual growth, they ought to admit freely to university positions men of high repute from other universities, and even without academic qualifications. An honorary degree does not necessarily imply a university education; but if it have any meaning at all, it implies that he who has obtained it is at least on a level with the ordinary graduate, and should be eligible to university positions of the highest trust.

Not less important would it be for the encouragement of learning throughout the country that the English Universities, remembering that they were founded for the same objects, and derive their authority from a common source, should be prepared to recognize the ancient universities of Scotland as freely as they have always recognized the Elizabethan University of Dublin. Such a measure would invigorate the whole university system of the country more than any other I can think of. It would lead to the strengthening of the literary element in the northern, and of the practical element in the southern universities, and it would bring the highest teaching of the country everywhere more fully into harmony with the requirements of the times in which we live. As an indirect result, it could not fail to give a powerful impulse to literary persuits as well as to scientific investigations. Professors would be promoted from smaller positions in one university to higher positions in another, after they had given proofs of industry and ability; and stagnation, hurtful alike to professorial and professional life, would be effectually prevented. If this union were established among the old universities, and if at the same time a new university (as I myself ten years ago earnestly proposed) were founded on sound principles amidst the great populations of Lancashire and Yorkshire, the university system of the country would gradually receive a large and useful extension, and, without losing any of its present characteristics, would become more intimately related than hitherto with those great industries upon which mainly depend the strength and wealth of the nation.

It may perhaps appear to many a paradoxical assertion to maintain that the industries of the country should look to the calm and serene regions of Oxford and Cambridge for help in the troublous times of which we have now a sharp and severe note of warning. But I have not spoken on light grounds, nor without due consideration. If Great Britain is to retain the commanding position she has so long occupied in skilled manufacture, the easy ways which (owing partly to the high qualities of her people, partly to the advantages of her insular position and mineral wealth) have sufficed for the past, will not be found to suffice for the future. The highest training which can be brought to bear on practical science will be imperatively required; and it will be a fatal policy if that training is to be sought for in foreign lands, because it cannot be obtained at home. The country which depends unduly on the stranger for the education of its skilled men, or neglects in its highest places this primary duty, may expect to find the demand for such skill gradually to pass away, and along with it the industry for which it was wanted. I do not claim for scientific education more than it will accomplish, nor can it ever replace the after-training of the workshop or factory. Rare and powerful minds have, it is true, often been independent of it; but high education always gives an enormous advantage to the country where it prevails. Let no one suppose I am now referring to elementary instruction, and much less to the active work which is going on everywhere around us, in preparing for examinations of all kinds. These things are all very useful in their way; but it is not by them alone that the practical arts are to be sustained in the country. It is by education in its highest sense, based on a broad scientific foundation, and leading to the application of science to practical purposes—in itself one of the noblest pursuits of the human mind—that this result is to be reached. That education of this kind can be most effectively given in a university, or in an institution like the Polytechnic School of Zürich, which differs from the scientific side of a university only in name, and to a large extent supplements the teaching of an actual university, I am firmly convinced; and for this reason, among others, I have always deemed the establishment in this country of Examining Boards with the power of granting degrees, but with none of the higher and more important functions of a university, to have been a measure of questionable utility. It is to Oxford and Cambridge, widely extended as they can readily be, that the country should chiefly look for the development of practical science; they have abundant resources for the task; and if they wish to secure and strengthen their lofty position, they can do it in no way so effectually as by showing that in a green old age they preserve the vigour and elasticity of youth.

If any are disposed to think that I have been carrying this meeting into dream-land, let them pause and listen to the result of similar efforts to those I have been advocating, undertaken by a neighbouring country when on the verge of ruin, and steadily pursued by the same country in the climax of its prosperity. "The University of Berlin," to use the words of Hofmann, "like her sister of Bonn, is a creation of our century. It was founded in the year 1810, at a period when the pressure of foreign domination weighed almost insupportably on Prussia; and it will ever remain significant of the direction of the German mind that the great men of that time should have hoped to develop, by high intellectual training, the forces necessary for the regeneration of their country." It is not for me, especially in this place, to dwell upon the great strides which Northern Germany has made of late years in some of the largest branches of industry, and particularly in those which give a free scope for the application of scientific skill. "Let us not suppose," says M. Wurtz in his recent report on the artificial dyes, "that the distance is so great between theory and its industrial applications. This report would have been written in vain, if it had not brought clearly into view the immense influence of pure science upon the progress of industry. If unfortunately the sacred flame of science should burn dimly or be extinguished, the practical arts would soon fall into rapid decay. The outlay which is incurred by any country for the promotion of science and of high instruction will yield a certain return; and Germany has not had long to wait for the ingathering of the fruits of her far-sighted policy. Thirty or forty years ago, industry could scarcely be said to exist there; it is now widely spread and successful." As an illustration of the truth of these remarks, I may refer to the newest of European industries, but one which in a short space of time has attained considerable magnitude. It appears (and I make the statement on the authority of M. Wurtz) that the artificial dyes produced last year in Germany exceeded in value those of all the rest of Europe, including England and France. Yet Germany has no special advantage for this manufacture except the training of her practical chemists. We are not it is true, to attach undue importance to a single case; but the rapid growth of other and larger industries points in the same direction, and will, I trust, secure some consideration for the suggestions I have ventured to make.

The intimate relations which exist between abstract science and its applications to the uses of life have always been kept steadily in view by this Association, and the valuable reports, which are a monument to the industry and zeal of its members, embrace every part of the domain of science. It is with the greater confidence, therefore, that I have ventured to suggest from this chair that no partitition wall should anywhere be raised up between pure and applied science. The same sentiment animates our vigorous ally, the French Association for the Advancement of Science, which rivalling, as it already does, this Association in the high scientific character of its proceedings, bids fair in a few years to call forth the same interest in science and its results, throughout the great provincial towns of France, which the British Association may justly claim to have already effected in this country. No better proof can be given of the wide base upon which the French Association rests, than the fact that it was presided over last year by an able representative of commerce and industry, and this year by one who has long held an exalted position in the world of science, and has now the rare distinction of representing in her historic Academies the literature as well as the science of France.

Whatever be the result of our efforts to advance science and industry, it requires no gift of prophecy to declare that the boundless resources which the supreme Author and Upholder of the Universe has provided for the use of man will, as time rolls on, be more and more fully applied to the improvement of the physical and, through the improvement of the physical, to the elevation of the moral condition of the human family. Unless, however, the history of the future of our race be wholly at variance with the history of the past, the progress of mankind will be marked by alternate periods of activity and repose; nor will it be the work of any one nation or of any one race. To the erection of the edifice of civilized life, as it now exists, all the higher races of the world have contributed; and if the balance were accurately struck, the claims of Asia for her portion of the work would be immense, and those of Northern Africa not insignificant. Steam-power has of late years produced greater changes than probably ever occurred before in so short a time. But the resources of Nature are not confined to steam nor to the combustion of coal. The steady water-wheel and the rapid turbine are more perfect machines than the stationary steam-engine; and glacier-fed rivers with natural reservoirs, if fully turned to account, would supply an unlimited and nearly constant source of power depending solely for its continuance upon solar heat. But no immediate dislocation of industry is to be feared, although the turbine is already at work on the Rhine and the Rhone. In the struggle to maintain their high position in science and its applications the countrymen of Newton and Watt will have no ground for alarm so long as they hold fast to their old traditions, and remember that the greatest nations have fallen when they relaxed in those habits of intelligent and steady industry upon which all permanent success depends.

BRITISH PHARMACEUTICAL CONFERENCE.

The Supper.

On Tuesday evening, the 5th inst., the members of the British Pharmaceutical Conference met with the local pharmacists and their assistants at a supper in the Royal Hotel. The hall was crowded. Mr. Daniel Frazer presided, supported by Professor Redwood and a number of the office-bearers of the Conference. The cloth having been withdrawn,

Mr. Frazer, as chairman of the local committee, explained that, at first, it was intended to have a conversazione, but circumstances occurred which had caused the entertainment to assume the form of a supper. It was intended on that evening to give up the old routine system of toast drinking, as it was desirable to get quickly to the real business of the meeting. He was very much indebted to the Pharmaceutical Conference for bringing them together. He believed that the present Conference included the largest attendance of distinguished pharmacists that had ever met together in that country. He considered it a very high compliment paid to Scotland that the Conference should be held there, and that gentlemen should come from such distances in the south to attend. It was thought that this opportunity of asking them to speak a few words of advice, especially to their younger friends, should not be missed. With regard to their friend Professor Redwood, his career should be an incentive to all the young men present. He was once an assistant pharmacist in Cardiff, and had worked on steadily until now he had attained the position of President of the British Pharmaceutical Conference. Professor Redwood had rendered great assistance to their profession in his capacity of editor of the British Pharmacopœia, and editor of the old-fashioned 'Gray's Supplement,' which was one of their right-hand books. As had been stated in the morning their President was also analyst for two of the largest districts in London. As Professor Redwood was at the head of the Conference, the honour which he enjoyed was reflected upon the members.

Professor Redwood, said he had come into that room with feelings of gratification. Although he had been in Glasgow before, he never spent any time in it until the present. He had come to that city with the hope of finding in the great emporium of Scottish commerce evidence that pharmacy was highly prosperous; but his anticipations had been completely destroyed, because he observed when passing through the streets that pharmacy, so far as he could make out, was nowhere. He saw many establishments designated Apothecaries' Hall, or Surgeons' Hall, representing those places which he had been accustomed to regard as the establishments of pharmacists, but which he was informed were nothing of the sort as they all belonged to the medical profession. He learned this with great regret, and he concluded perhaps too hastily that pharmacy must indeed be at a very low ebb in Glasgow; but on entering that room his anticipations were again greately revived. He had felt gratified at seeing the many young men and men of mature age who he understood were all engaged in pharmacy. This led him to the consideration how important was the duty which devolved upon them. But it was as President of the Pharmaceutical Conference that he had been called upon to address them. What did such a Conference imply? It implied pharmaceutical progress. How was this advancement to be effected? It devolved upon them to solve that question. Now the Pharmaceutical Conference had originated in pharmaceutical union. But one of the first duties which devolved upon them in carrying out the great objects of the Conference, so far as they related to that part of the country, was to effect a pharmaceutical divorce of the pharmaceutical union. What did the pharmaceutical union mean in that part of the country? It was an unnatural union—a union of medical practice with that which did not properly and legitimately belong to the medical practice, and was derogatory to the medical practice. In his part of the country it would be considered highly derogatory for three-fourths—for such appeared to him to be the state of the case in that country—of the medical men to be keeping open shops, dealing in all the etceteras which were usually associated with the practice of pharmacy. He held, then, that the great object to be attained here was to effect a divorce of the union of two unnatural and inappropriate associations—of a profession on the one hand and a trade on the other. But how was this divorce to be effected? how to set about it in a spirit not of antagonism to those engaged in medical practice? He would address himself to that section of the community who were designated in his country as young England, but there he must call the "young Scotland." The duty devolved upon them of accomplishing the divorce of the unnatural union referred to. To attain that end they must qualify themselves for the position they were called to occupy. In proportion as they became highly qualified as pharmacists this unnatural union would cease.

The CHAIRMAN then called on Mr. Groves.

Mr. GROVES said he had hardly been twenty-four hours in Glasgow, and as this was his first visit he could not be supposed to know much about the state of pharmacy in Scotland; but he must say he was pained to see the vast number of spurious pharmacists preying upon the vitals of true pharmacy and injuring the prospects of those whom he saw before him. Such a condition of affairs stood in the way of that advancement which the Conference was intended to promote. He hoped they would take the advice of Professor Redwood and concert together to bring about the divorce which he had recommended. There had been in that city a gross intrusion on the part of surgeons and doctors—an interference with the practice and the profession of a trade of which they could know so little. It would benefit themselves to discontinue the prevalent mixed practice. He hoped that the coming of the Conference would make the pharmacists less isolated, and induce them to direct their efforts to the mitigation of the evil. In the south they knew a little about it; but in Glasgow pharmacists had every reason to put their shoulders to the wheel, to bring about a reform.

Mr. WILLIAMS, President of the Pharmaceutical Society, having been called upon to address the meeting, expressed the pleasure he felt at being present, and remarked that the want which should be met was that pointed out by Professor Redwood. They should endeavour in Glasgow, and elsewhere, to place pharmacy in that position which it should occupy. It was not until that object had been attained, that pharmacy would be able to advance. He had been glad to see how well the young men who came up to London and Edinburgh passed their examinations, and he hoped that after they had passed, they would join the Pharmaceutical Society, which could better advance the real interests of their trade than isolated efforts could do.

Mr. GREENISH said, if he had to give his opinion of the condition of pharmacy in Glasgow, he thought he should lose many a friend to whom he could now hold out the hand. But if he did not mistake the earnestness which he had witnessed in that room, he thought, if he waited for a year or two and then had to speak of the condition of pharmacy in Glasgow, it would be very different from what it now was.

The CHAIRMAN said they all regretted the absence of Mr. Sandford, who had had more to do with the Pharmacy Acts than any one. As to their friend Mr. Hills, he was a man of generosity. In every part of the country, testimony was borne to his large-heartedness. He also regretted very much the absence of Mr. Bottle, who had been unable to attend the Conference. He would now ask Mr. Savage to tell them something about matters in Brighton, which, he believed? were worse in some respects than in Glasgow. He was in that town two months ago and he observed close to the premises of Mr. Savage things that he never saw in Glasgow.

Mr. SAVAGE said he had been exceedingly amused with the remarks of the Chairman. He talked a great deal about civilization, and now he came to the Savage. But as previous speakers had spoken about the Pharmaceutical Society, he would only add "ditto, ditto," to their remarks.

Mr. E. BREMRIDGE, Secretary and Registrar of the Pharmaceutical Society, having been called upon, said he had great pleasure in attending these annual meetings. He never came to Glasgow without receiving the greatest kindness, and experiencing the greatest pleasure. He believed this was the case with all the strangers present. The President of the Conference had recommended to the young men present a divorce; he (the speaker) would recommend matrimony, and as a registrar he would not only register them all upon passing their examination, but he would like to register them as members of the Pharmaceutical Society. He believed there was nothing like union, and it was only by union that any great object whether social or parliamentary could be accomplished.

The CHAIRMAN said, that as the Pharmaceutical Conference was indebted for its organization and progress to the able way in which the Secretary carried on the details of the work, he was sure that they would be glad to hear what Dr. Attfield and Mr. Benger had to say to them. The former gentleman in particular had devoted a great deal of time and labour to the work of pharmaceutical education.

Professor ATTFIELD said he had been taken somewhat at a disadvantage in being asked (he a Southerner) to come to Scotland and say something about education, for he should like to know what an Englishman could tell a Scotchman about education? Was he to instruct them in the art of hospitality? Certainly not, after the experience they had had; nor could he teach the Scotchman anything in the matter of large-heartedness. He could not educate Scotchmen as regards the organization of local gatherings, for, though he knew something about organization in connection with this Conference, still he could not tell Scotchmen about organization. He need not tell gentlemen that pharmaceutical education up to the present time was education divorced from examination. There was a pharmaceutical compulsory examination. A man was not asked where he received his knowledge so long as he had it. That involved an erroneous assumption, namely, that a man's education could be tested by examination.

It was thought, twenty or thirty years ago, this could be done. Now it was known it could not. It was scarcely six weeks since that one of the greatest of English colleges, Owens College, Manchester, set forth a scheme by which it expected to become not only an educating but an examining body. The authorities were tired of sending men to be examined because education divorced from examination led not to real education but to the superfluity commonly called cram. He had learned something of education in Scotland. There he found that education and examination were married and not divorced. He looked on the medical profession in England and there he found the so-called examining boards asking a man first of all not what he knew, but where he had been educated; show them he had been recognized by an eminent school for so many years, and then they put a few questions to him to see whether he had done his duty and whether his teachers had done theirs. Now he wanted to see in pharmacy such a system as prevailed with regard to the medical profession; in a word, he wanted to see education married to examination. He was interested in the question because he loved pharmacy. He was an apprentice to pharmacy and had the good fortune to be the student of the men of whom he was now the colleague. The anxiety of his life was to see pharmacy prosper in Great Britain. He was convinced it would never prosper as it did in other countries until the system of mere examination was done away with, and until there was a real education married to examination.

Mr. Benger said that every year they were more and more indebted to the local committees for the success of the Conference. He also referred to the hospitality shown to members during their present visit.

Mr. Reynolds, having been requested to speak, alluding to provincial education, said there was no great encouragement to be derived from the view of its prospects, the progress it made seeming to be slow. It was well known there was a variety of unfavourable influences at work. They would need to maintain their privileges against foreign attack, but the whole question was mixed up with that of secondary education in this country. With respect to that matter, Englishmen had no reason to boast. At one of the meetings of the Conference in London two years ago, his friend Dr. De Vrij, of Holland, told him that in a few weeks there would be celebrated at Leyden, the tercentenary of the university of that town. A university had been conferred upon the town in consequence of its successful defence against its Spanish enemies. The greatest boon which it could ask from the Government was to have a university. That was an instance of what education had done for Holland. Of course they congratulated themselves upon the progress which their institution had made, but he was afraid they had to recognize still more the importance of secondary education in this country before they came up to such a standard as existed in Holland. If he were a Glasgow man he should feel proud of its splendid streets, noble warehouses, iron works, and shipping, but he should be still more proud of its university set upon a hill. Such institutions were calculated to spread scientific education throughout the country. Last year Mr. Forster said that England had entered upon this task of supplying secondary education. Manchester was always to the front; Bristol was not far behind; and Nottingham had received a great development. He hoped when these movements were taking place that pharmaceutical chemists would play their part in developing natural science, because their own art depended upon natural science for its scientific treatment.

Mr. Schacht, having been introduced to the meeting, said it was the duty of every member of their trade to forward the progress of their common calling, and this he personally had endeavoured to do. He was free to confess, in common with his friend Mr. Reynolds, that they had felt some disappointment at the meagre success which had attended their efforts in the provinces. Perhaps they were a little too sanguine, and it was not right for him to utter a word of complaint because they had not everywhere found the same amount of enthusiasm that they possessed themselves. Perhaps they had a little over-reached their own powers of stirring the enthusiasm of others. However, they could console themselves with the reflection that the seed had been sown, and that it would bring forth fruit even in their own time. The whole business rested with the young. He perfectly agreed that examination without education was valueless. No one should think that examination would qualify, although it was a test of qualification.

Mr. John Mackay having been called upon by the Chairman to make a few remarks, said how much pleased he was to meet so many pharmaceutical friends at this social gathering. Referring specially to what had fallen from Professor Redwood, he said he had heard the word divorce with something like a feeling of trembling and shame, because it was a word seriously disliked in Scotland; but he was glad to find in the remarks of Mr. Bremridge, which had almost immediately followed, that the word union had been brought forward; and therefore he felt satisfied that while the separation of medical practice from practical pharmacy was one that could be desired, the union spoken of in regard to chemists and druggists joining the Pharmaceutical Society would form a means of strength that would ultimately prove of the greatest assistance in furthering the progress of the true interests of the pharmaceutical body. He also made some allusion to the remarks of Professor Attfield on compulsory education, and said that he had for some time had the same feeling in this matter as that which Professor Attfield had so strongly enunciated, with this difference, that Professor Attfield was actuated by a feeling which he might denominate high pressure, or, in other words what was rather in advance of the present state of matters, although he had had no hesitation in stating that many in this room would live to see the day when a regular curriculum would be impending, and when chemists and druggists as well as pharmaceutical chemists would be compelled to attend certain classes, and produce such evidence before they could be admitted to their examinations. This, however, he felt was not for the present but for the future. In closing he asked the meeting to allow him to express his strong regret that Mr. Sandford and Mr. Hills had not been able to attend this successful meeting of Conference in Glasgow. In regard to the former he might well be styled the Attorney-General, for few men knew more intimately the legal aspect and working of anything connected with the existing Acts of Parliament, while the good work he had done on behalf of the Society during the six years he was President, could never be known or fully estimated. Of his old and true friend Mr. Hills words could not convey to the meeting his own feelings towards him or express how much the Society, as well as pharmacy in general, was indebted to him. Kind, sincere, and generous in all his dealings, he well deserved to be recognized in every meeting connected with pharmacy, and he felt most unwilling that this great meeting should separate without showing by a very hearty round of applause, how much and how truly they all appreciated the labour and the time both these gentlemen had for many years expended in forwarding the interests of pharmacy in this country. This was most enthusiastically responded to by the whole company joining in three hearty rounds of applause.

*** Through the pressure upon our space we are compelled to defer answering several correspondents until next week.

Communications, Letters, etc., have been received from Mr. Botham, Mr. Howie, Mr. Carr, Mr. Kingzett, Mr. Williams, Mr. Muir, Mr. Stoddart, Mr. Leay, Messrs. Fritz, Mr. Prebble, Litmus, A. M. M., J. H. L., A. W., C. J. S., G. and T., J. W. S. and Co.

NOTE ON ACETATE OF MORPHIA.*

BY M. MERCK.

Complaints are sometimes made as to the solubility of this salt, it being generally expected that this substance should be easily and completely soluble in water. But acetate of morphia only answers to this condition when it contains sufficient acetic acid for its saturation, which is the case only when it is freshly prepared. The combination of morphia and acetic acid, as is known, is not very stable. There is a continual, although slow, elimination of acetic acid from the preparation, which leads to the formation of a basic salt, and eventually of pure morphia, so that the salt that was at first soluble becomes thus insoluble. The acetic acid that separates accumulates under the stopper of the vessel containing the salt, its presence becoming manifest by the odour when the bottle is opened. This fact causes the preparation to be sometimes looked upon as being acid, and as at the same time the salt is found to be not completely soluble in water, it is considered to be a proof of a mechanical adulteration, or an alteration arising from foreign alkaloids. This cause of incomplete solubility is not generally taken into consideration; but in the testing of acetate of morphia, the precaution ought to be taken of judging the amount of acid by noting the behaviour of a solution to test paper. Afterwards the eventual residue should be examined for pure morphia before the preparation is condemned as impure.

Several pharmacopœias, the German, for instance, allow an acetate of morphia that contains a small quantity of basic salt or pure alkaloid, since they permit the addition of a few drops of acetic acid to obtain a complete solution. Besides, as the separation of acetic acid cannot be avoided during a prolonged keeping, it is recommended to employ the preparation as fresh as possible, and not to lay in too large a stock. The unjust reclamations which sometimes originate in the formation of an extractive substance, and the tendency of the salt to become yellow, or even brown after a time, would be thus avoided.

As the cause of this decomposition is inherent to acetate of morphia, it cannot be prevented even by the complete exclusion of air and light, but in the most favourable conditions it would be a little retarded.

Among the reactions for recognizing the purity of morphia the German Pharmacopœia mentions the colourless solution that this alkaloid should give with concentrated sulphuric acid and also utilizes this test for the salts of morphia. With respect to the application of this test to pure morphia, the author merely remarks that a solution after being allowed to stand for some time, and especially if it has been heated, always has a faint violet red colour. But when the test is applied to the acetate, according to the author's experience, it may, in certain cases, give false results.

A perfectly pure acetate of morphia, which shortly after its preparation is without reproach, will at the end of a few weeks give a faintly coloured solution, as has been proved by repeated experiments. The author concludes from this fact that the tendency of this salt to decompose is in close relation with the phenomenon of coloration. The colour does not become visible to the eye until after a long time, but in reality it exists much earlier. This is the reason why a preparation which is not fresh, but appears to be still colourless, cannot stand the delicate test with sulphuric acid. The author has arrived at the conviction, based upon numerous experiments, that commercial acetate of morphia will not dissolve without coloration in sulphuric acid, especially of the strength prescribed (sp. gr. 1·840).

Experience has shown that acetate of morphia undergoes no loss of its medicinal properties through the decomposition referred to, unless an intense yellow colour shows that the decomposition has proceeded too far. The author thinks that the test by means of sulphuric acid may be abandoned without disadvantage, and the more so as it may sometimes lead to the impression that narcotine is present.

* From the *Pharmaceutische Zeitung*.

ACTION OF HYDROGEN SULPHIDE ON ALKALOIDS.*

BY E. SCHMIDT.

Almost all the known vegetable bases are acted upon by hydrogen sulphide. The substances thereby formed, though in some cases definite compounds, appear for the most part to be mixtures which cannot be separated, owing to the facility with which they are decomposed. The author has examined more particularly the compounds formed with strychnine and brucine.

Strychnine.—When an alcoholic solution of strychnine is saturated with hydrogen sulphide and left at rest for some time, it gradually deposits fine orange-red needles of a substance to which Schmidt attributes the formula $2C_{21}H_{22}N_2O_2, 3H_2S_2$. This substance differs in colour and crystalline form from that which Hofmann obtained by the action of ammonium sulphide on strychnine, but cannot be distinguished therefrom by analysis. When kept for a day or two, it gives off hydrogen sulphide and slowly changes colour, whereas Hofmann's compound keeps for months without alteration. It was ascertained by direct experiment that this compound is formed only in presence of oxygen, not when the air is completely excluded. Its formation may be represented by the equation—

$$2\,C_{21}H_{22}N_2O_2 + 6\,H_2S + 3\,O = \begin{matrix} C_{21}H_{22}N_2O_2 \\ C_{21}H_{22}N_2O_2 \end{matrix} \left\{ \begin{matrix} H_2S_2 \\ H_2S_2 \\ H_2S_2 \end{matrix} \right. + 3H_2O$$

The compound is decomposed by mineral acids, with separation of oily drops of hydrogen bisulphide and formation of strychnine salts.

Brucine.—When hydrogen sulphide is passed into a strong solution of brucine in alcohol, freely exposed to the air, the liquid immediately assumes a yellow colour, and after a time deposits yellow needles, which, on prolonged standing, become covered with a yellowish-red layer of another sulphur compound. The yellow needles gave, on analysis, numbers agreeing with the formula $C_{23}H_{26}N_2O_4H_2S_2 + 2H_2O$, which is that of a compound of 1 mol. of brucine with 1 mol. of hydrogen bisulphide. This formula, however, is of no value, for the substance after drying possesses altered properties, and its composition is not represented by the formula $C_{23}H_{26}N_2O_4H_2S_2$. The crystals are prismatic, insoluble in the ordinary solvents, and undergo partial decomposition when kept. They are decomposed by mineral acids, with separation of hydrogen bisulphide and formation of brucine salts. The melting point is about 125°.

A second derivative of brucine is easily obtained by passing hydrogen sulphide into a dilute alcoholic solution of the alkaloid (1 in 100), till the liquid assumes a deep yellow colour and allowing it to stand in loosely-covered vessels.

* From the *Journal of the Chemical Society* for July. (Liebig's *Annalen*, clxxx., 287—304.)

In the course of twenty-four hours there is formed a deposit of ruby-red crystals, which, after washing with alcohol and ether, have the composition represented by the formula $C_{23}H_{26}N_2O_4{H_2S_2 \atop H_2S_2}$. The crystals belong to the triclinic system. In their behaviour they closely resemble the foregoing yellow compound.

The formation of these brucine compounds is dependent, like that of the strychnine compound, on the presence of oxygen, for if the air be perfectly excluded not a trace of them is produced. The following equations may, perhaps, represent their formation:—

$$C_{23}H_{26}N_2O_4+2H_2S+O = H_2O+C_{23}H_{26}N_2O_4H_2S_2;$$
$$C_{23}H_{26}N_2O_4+4H_2S+O_2=2H_2O+C_{23}H_{26}N_2O_4 \left\{ \begin{matrix} H_2S_2. \\ H_2S_2. \end{matrix} \right.$$

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

Meeting at Glasgow.

This Association met in the large hall of the Royal Hotel, George Square, Glasgow, on Friday, 8th Sept., at half-past ten a.m. There were about a hundred persons present, the principal towns in England and Scotland being represented. Mr. S. U. Jones, of Leamington, President of the Association, occupied the chair, and after a few introductory remarks, Mr. Barclay, of Birmingham, and Mr. Fairlie, of Glasgow, intimated that they had received a large number of letters from all parts of the country, from chemists and druggists, expressing regret at being unable to attend the meeting but heartily approving of the object of the Association.

The Honorary Secretary (Mr. Holdsworth, of Birmingham) was then called upon, and read a report of the meetings of the General Committee, of which the following is an abstract—

At a Committee Meeting held September 6th, 1876, in the Central Hall, Royal Hotel, Glasgow, the President, Mr. S. U. Jones, in the chair,—It was unanimously resolved—

"That the Honorary Secretary's and Honorary Treasurer's reports are hereby approved of, and that they be entered on the minutes and be read at the General Meeting on Friday."

"That Mr. T. W. Holdsworth be appointed Honorary Secretary for the present year."

"That Mr. W. F. Haydon be appointed Paid Secretary to the Association, security to be given to the satisfaction of the Committee."

"That Mr. H. Glaisyer, Bachelor of Laws of the University of London, Birmingham, be appointed Solicitor to the Association."

"That Professor Attfield be appointed Analytical Referee to the Association."

"That Messrs. Launday, Harrison and Harris, Accountants, Birmingham, be appointed Auditors to the Association."

"That Messrs. Lloyds' Banking Company (Limited), Birmingham, be the Bankers of the Association."

"That the Executive be authorized to take Offices in Birmingham, and to provide the requisite office furniture."

"That the Rules 1 to 12, now read, be and are hereby approved of, as the Constitution of the Association."

"That the scheme for organization now before the Committee be received and recommended to the General Meeting."

"That the following gentlemen form the Executive Committee for the present year:—Mr. S. U. Jones (Leamington), President; Mr. Thomas Barclay (Birmingham), Vice-President; Mr. W. Southall (Birmingham), Honorary Treasurer; T. W. Holdsworth (Birmingham), Honorary Secretary; Mr. F. W. Andrews (London); Mr. C. J. Arblaster (Birmingham); Mr. W. Y. Brevitt (Wolverhampton); Mr. W. J. Churchill (Birmingham); Mr. W. Cross (Shrewsbury); Mr. George Delves (Exeter); Mr. Francis Earle (Hull); Mr. J. M. Fairlie (Glasgow); Mr. A. Graves (Chesterfield); Mr. Thomas Greenish (London); Mr. Robert Hampson (London); Mr. W. Jervis (Sheffield); Mr. T. S. Johnson (Manchester); Mr. William Laird (Dundee); Mr. W. Matthews (London); Mr. J. McKenzie (Edinburgh); Mr. Richard Reynolds (Leeds); Mr. J. Shaw (Liverpool); Mr. G. Walker (Coventry); Mr. R. Walker (Birmingham)."

"That the following gentlemen be added to the General Committee:—Mr. A. P. Balkwill (Plymouth); Mr. F. B. Benger (Manchester); Mr. T. Blanchard (Edinburgh); Mr. T. Davison (Glasgow); Mr. T. G. Gibbons (Manchester); Mr. T. Glaisyer, (Brighton); Mr. W. Greig (Glasgow); Mr. T. Haffenden (Brighton); Mr. E. P. Hornby (Stockport); Mr. R. Howden (London); Mr. R. Humpage (London); Mr. Charles Kerr (Dundee); Mr. G. H. Laird (Edinburgh); Mr. A. McNaught (Greenock); Mr. J. Owen (London); Mr. George Passmore (Exeter); Mr. Tom Redfern (Penrith); Mr. J. Schweitzer (London); Mr. George Shepperley (Nottingham); Mr. G. F. Steele (Plymouth); Mr. A. Strachan (Aberdeen); Mr. W. W. Urwick (London); Mr. W. Woods (Plymouth)."

The Honorary Secretary's report stated that, in compliance with the request of the Birmingham Conference, he had forwarded on the 13th of July to the Secretary of the Pharmaceutical Society the resolution then passed, to the effect that the Conference of Chemists and Druggists urged upon the Pharmaceutical Society the necessity of testing the legality of cooperative traders selling and dispensing poisons. The receipt of the communication had been duly acknowledged by the Secretary, who promised that it should be submitted to the Council at its next meeting. Since then he had received another letter, saying that the resolution had been submitted to the Council at its last meeting and had been referred to the Law and Parliamentary Committee for consideration. A general circular had been issued to every chemist and druggist on the register, and the result had been gratifying. At the close of the Conference there were 377 members enrolled, and at the present time there were upwards of 1200 on the books, 150 of whom were London chemists. The amount of donations promised had risen from £260 at the close of the Conference to upwards of £620.

The Honorary Treasurer's report stated that at the close of the Birmingham Conference about £260 had been promised in donations; this included a number of subscribers of sums larger than 5s. In order to obtain the difference in donations a circular had been issued to these gentlemen asking them to allow the difference in the amounts to be placed as donations to the funds. The result was in nearly every case a ready compliance with the request. Mr. Churchill undertook to see the proprietors of the London wholesale houses and the result of his one day's canvass was most satisfactory. The general circular issued on the 24th ult. had proved financially a great success, as from the day it was issued till that time some £450 had been added to the funds, and every post continued to bring accessions of members and money.

Mr. Reynolds (Leeds) then moved the adoption of the reports. In the course of his remarks he said: I rather claim that this city should afford one illustration more of the utility of such an organization. Associations have been established by no fewer than two bodies with whom we are liable to be brought into conflict. The public analysts have their union; and on the other hand, a Medical Defence Association has been formed almost entirely to take from persons engaged in pharmacy some of their rights. It is quite possible that there are gross offenders and we should be very sorry to defend them, but on the other hand, we would far better trust to our sense of what is right and our own power to defend our actions if right than to the discretion and good feeling of an association about which we know nothing. If associations are found by these various bodies to be needed certainly a body which, like ours, is liable to encroachment from so many quarters, especially requires union. I believe the progress made the last two months has been very great. The work of organization has been as rapid as was possible, especially when it is considered that it is amongst persons far removed from one another. I now beg to move that the reports read be adopted.

Mr. Laird (Dundee) seconded the resolution, which was carried unanimously.

Mr. Greaves (Chesterfield): On the formation of the Birmingham Association we at once took steps at Chesterfield for the establishment of a local association, which we considered would be a great advantage and assistance to the general association as well as to the neighbourhood in which I reside. As a great many things arise locally which do affect the body generally, a good understanding is requisite to do away with the petty jealousies which cause such mischief to the trade. As we have experienced so great a benefit from our association, I was requested to bring the resolution of Chesterfield to be submitted to the consideration of the present meeting. It seems the scheme has been pretty well discussed at Birmingham by the committee. I mean the one propounded by Mr. Barclay. We purpose dividing our counties into hundreds, each district having an association. Our association embraces twenty members in a small area. We have no doubt we shall get every one in the districts, and we will have an organization which will assist very materially in collecting subscriptions, and making the duty of the secretary less costly to the general association, as well as doing ourselves a large amount of good. The resolution that is proposed by our committee is with respect to the desirability of forming local chemists' associations in each district throughout the country, and I have great pleasure in submitting the same.

Mr. Barclay said: The scheme we have the pleasure of presenting to you is very large and comprehensive. We think it is necessary that it should be so because this Association is not intended to embrace a few chemists here and there, but is intended to cover Great Britain. We hope that the Association will so commend itself to the sympathies of chemists generally that it will not be long before our highest expectations in that respect are thoroughly realized. We have confidence in going forward with this scheme from the progress that has already been made. We find wherever a canvass has been entered upon that the result has been most astounding. There were on all sides many jealousies, and previous efforts at union had failed. Reports have been given in by Mr. Cross, of Shrewsbury; Mr. Balls, Macclesfield; Mr. Dawson, York; Mr. March, Newark; Mr. Robinson, Dewsbury; Mr. Cooper, Leicester; Mr. Bell, Hull; Mr. Jones, Leamington; Mr. Prior, Oxford; Mr. Taylor, Leeds, etc. These gentlemen found almost without exception that all the chemists of their districts had been brought into the Association. Mr. Jones, of Leamington, gives an illustration of every chemist in a district having become member. I have a letter from Mr. Bell, of Hull, in which he writes: "I may just mention that my canvass was not a general one, or no doubt I would have been able to send you more names. But I can say this, that I had only one refusal to join the Defence Association, and the reason assigned to me was that the Pharmaceutical Society's bill of 1868 had done the trade no good, but made it worse for the chemists by reason of the grocers now selling so many drugs; that the privilege held by druggists of selling poisons did not pay for the trouble and care required in the sale of them, and that his son who had been in the trade for some time now would not follow it up." I could read many other letters, but the very fact that we have within two months 1200 gentlemen joining this Association, is sufficiently conclusive to warrant us in going forward with this large scheme. As to the need of organization, we all know that union is strength, and that if we are to have such a large number of members we must organize our forces to get the benefit of numbers. We have no organization that will touch the chemists of the country. The Pharmaceutical Society which we love so much only takes in the fringe of the trade, having only between 2000 and 3000 members, whereas there are 14,000 chemists on the register. Now, supposing there are parliamentary proceedings and that we had introduced during the past session, or have introduced, the bill of Sir W. Fraser, what should we have been able to do? I have endeavoured to ascertain his views. Mr. Mundy tried to see him, but he did not succeed. I wrote to one of Sir William's constituents, who has got a letter which may be of interest. It is in the following terms:—"In reply to your note received this evening, I have to say that before framing a bill on the subject of the sale of poisons and poisonous drugs, I shall consult many physicians, surgeons, druggists, and lawyers, and be able to do some good in a matter which calls for immediate attention.—W. Fraser." I think we may take encouragement from this letter that Sir W. Fraser's mind is at present a blank and that he is ready to receive impressions. If we go forward with our Association I think we shall be able to produce an effect in the direction in which chemists desire. The Pharmaceutical Council will give their greatest attention to this matter when it is introduced by Sir William. They will want help, for hitherto they never have had it in carrying forward any measure, the reason being that there was no organization. But if the proposed organization is put in force we shall be able in our various towns to bring pressure to bear upon our members of parliament and help the Council of the Pharmaceutical Society in carrying out their views. That is one of the objects we have in initiating this movement. We are not in antagonism to the Pharmaceutical Council or the Society. We think our movement is intended to benefit the Society to the greatest extent. We would not, I am sure, lift a finger to injure it in any way. I say this because it has been said we propose to do so. When we speak to some of our London, Glasgow, and Manchester friends with regard to the Adulteration Act, and the necessity of mutual protection, they say they can protect themselves, and state that they have their local organization, and can put their hands upon a local analyst and obtain his services. We say in reply, you have not a strong association with a large capital fund at your back and you cannot adequately protect yourselves as you would be able to do if you belonged not only to the local association, but were confederated with the great organization which we intend to form. But if the chemists in country places are considered, those in towns will see this is a selfish way of looking at the matter. How, again, are there to be local organizations in small towns or villages, and how can our brethren there engage a local analyst if they should be charged with selling a pennyworth of spirit of nitre, which, in consequence of evaporation, was not up to the standard? If an analyst wished to be crotchety, he could bring forward a prosecution in connection with the sale of such an article. In this way chemists in the country might, on account of their helpless position, be made to suffer. But if they belonged to this proposed organization there would be no chance of their suffering unjustly. We do not intend to defend cases of wilful adulteration. We would not soil our fingers by taking up cases which would in any way damage the reputation of the chemists of the country. I think our friends in Glasgow are capital illustrations of the necessity of a trade organization. Scotchmen are well known to be careful; this was shown within these few days, when it was tried to get them into this organization. I think their carefulness will lead them to join us. If they had been members they would have been told that Liebig's Liquid Extract of Meat would render them liable to the penalties of the excise, and they might not have been prosecuted. At any rate they would have been forewarned for the outlay of five shillings. It must have been extremely annoying to our Glasgow brethren to have been brought before the magistrates on the charge of acting as licensed victuallers. There is not only the annoyance, but there is also the fine, which might have been prevented if this Association had been in existence and those gentlemen members of it. Another result of this scheme would be the organization of the local association, which is of the greatest importance. We have had from Mr. Greaves a report from the Chesterfield Association. That association has resulted from the meeting at Birmingham. Indeed, when this large Association is fairly launched, we shall find associations springing up in all parts of the country, and we shall have instead of local jealousies gentlemen meeting in a united and friendly manner for their own protection. By the scheme it is intended that every county shall be divided into districts; that each district shall have one or more representatives on the general committee, that each representative shall *ex officio* be the local secretary in cases where there is only one. Where there is more than one representative appointed, then one of these shall be appointed local secretary. These local secretaries or representatives shall act for something like 120 districts. They shall form the general committee of this Association with not more than 30 others who shall be elected quarterly. It may be when the 120 gentlemen are assembled, they shall find there are some of the leading men of the trade that ought to be present. They shall look around and say so-and-so is not here, and ought to be upon this committee. They shall therefore proceed to add to that committee gentlemen who should be included, and so they shall bring up their number to not more than 150. Having sketched further what the committee might do, he said the secretary should be able to go on circuit when necessary, and deputations can be appointed to go to places where their services might be required. The general committee might meet within a week of the time when the annual general meeting of the Association will be held, and arrange the business to be considered. The railway expenses of the executive should be paid out of the funds of the Association. In that way, I think we should be able to get a representative executive, and bring pressure to bear upon Sir Wm. Fraser, and help the Pharmaceutical Council in promoting necessary legislation. There would thus be a power for good that was never possessed before. I move that the scheme for organization recommended by the general committee be adopted.

Mr. Greig (Glasgow): I have the greatest pleasure in seconding the motion. I am certain our brethren in the south will have a large measure of support from their brethren in the north. I come much into contact with the retail traders in Scotland, and know that the want of such an association is much felt ever since Mr. Freeland, of Bathgate, was hauled into the Court of Session and fined £12, not for any fault committed by him, but simply as a warning to druggists to keep proper assistants in their shops. This prosecution cost Mr. Freeland £100, which was defrayed by the druggists of England and Scotland. Again, in Glasgow, we are pounced upon by the excise. I suppose they think us better natured than people elsewhere, because they prosecute us for the thing manufactured in the south and not here. We should never have agreed to pay the penalty. The plea tendered by Mr. Davison was inadvertently done and misunderstood — Mr. Davison pleaded guilty to selling Liebig's Liquid Extract, but not to selling port wine—and the case was never tried on its merits as agreed upon. A case comes on at Hamilton, on Monday, and we have almost decided to have it tried. The thanks of the druggists of Glasgow are due to the editor of the *Mail* for the manner in which he has taken up this case. He is one of the Members of Parliament for Glasgow and has had two leaders favourable to our view of the case.

Mr. Preston (London): I hope it will not be considered intrusive if I, coming from London, should make a few remarks, especially as I feel a deep interest in the movement. I think this scheme at the present time is not put in print. I do not know whether it may occur to the gentlemen here, but I must confess that I could hardly take in exactly all the scheme that was placed before us by Mr. Barclay, although he spoke very clearly. But I think we should not pledge the executive or this meeting to the absolute scheme which that gentleman has indicated, but leave the resolutions so open that the executive may modify that scheme as may be found desirable. I have been connected with many associations and have very frequently found there has been great difficulty arising from first pledging the council to a definite scheme. You may indicate clearly what is desired, but as to details there should be considerable scope given. I heartily coincide with the desirability of forming some such association, because I know from my own experience that great hardship has been felt in various parts of the country in connection with the Adulteration Act. In London several cases have occurred of troublesome persecutions of chemists, and the practical effect is that generally speaking the retail chemist applies to the wholesale druggist as to what course he should pursue, and the latter feels in honour bound to protect, so far as he can, the chemist. I am sorry to say these prosecutions have arisen in a majority of instances with those who have been little able to defend themselves. I cannot say that analysts as a rule have carried out a generous policy with respect to this Adulteration Act. I hope it is not supposed I am starting anything in the shape of a defence of adulteration; but I think it is necessary to form an association, because various statements have been made in Parliament which affect the honour of the trade. I hope both the wholesale and the retail traders are as honourable men as those who sit in the House of Commons. I know a statement was made by the member for the Universities of Edinburgh and St. Andrews—Dr. Playfair—that it was customary to send a certain article to be ground up in the expectation that a larger quantity would be brought back. I do not know where the right hon. gentleman got his information. I know that Dr. Lyon Playfair was informed there was no truth in this statement, and that books were offered to him to show that nothing of the kind occurred. I spoke to one or two Members of Parliament, and urged them to bring this matter before the house, because, although it might be known to be false by the trade generally, still the statement goes before the public, who take little trouble to inquire into the accuracy of the statement. They only conclude that if such a man as Dr. Lyon Playfair says so it must be true. If an association were formed, pressure might be brought to bear upon the gentlemen who make in the House of Commons such random statements. I do not wish to cast any slur upon the Pharmaceutical Society for not having taken any action in this matter, but I feel that in the interests of the trade they might have done something. At all events, if they did not see their way clear to take some notice of it, it seems to me clear that it is the duty of the trade generally to form an association by which they might strengthen the hands of the Pharmaceutical Society to meet any false statements that may be made affecting the honour of the trade. Reverting to the fact that a chemist might be prosecuted for a liquid which had lost strength from the removal of the stopper, the conduct of the analysts reminds me of the fable of the boys and the frogs; it may be interesting to them to study this question, but it is anything but fun to those who have stones thrown at them. I think Birmingham is a proper place where a central organization of this kind may be formed. I think if formed it will be of material benefit to the trade.

The Chairman: The resolution has been amended, in consequence of the suggestion of Mr. Preston, to the satisfaction of the mover and seconder. The motion is "that the scheme for organization recommended by the General Committee be adopted subject to such modifications as the executive may deem desirable."

The resolution was then unanimously adopted.

The Secretary then read the following rules as suggested by the General Committee:—

RULES.

1. This Society shall be called the Chemists and Druggists' Trade Association.

2. Its objects shall be the protection of the legitimate interests of chemists and druggists from unfair attacks and encroachments, and the promotion of their common welfare.

3. The annual subscription shall be five shillings, due in advance on the 1st day of July in each year. Members whose subscriptions are in arrear will be disqualified from voting at any General Meeting.

4. The Annual General Meeting shall be held at some time within the months from May to September inclusive, at such place and time as the Executive Committee may determine. Notice shall be sent to each member by the Secretary not less than ten days previous.

5. The General Committee shall consist of representatives to be elected from the various districts throughout the country in accordance with the scheme and resolution which have been adopted. In the event of a district failing to elect a representative the Executive Committee shall fill the vacancy.

6. The Executive Committee shall consist of a president, a vice-president, a treasurer, an honorary secretary, and twenty other members, to be elected by ballot at each annual meeting. Five members to form a quorum. It shall be the duty of the General Committee to prepare and recommend to the annual meeting a list of the names of members to serve on the executive committee for the ensuing year.

7. The votes at all meetings, where not otherwise provided for, shall be taken by a show of hands, but any two members may demand that the votes be taken by ballot, and, in case of the numbers being equal, the chairman shall have a second or casting vote.

8. The railway expenses of the Members of the Executive Committee shall be repaid by the Association.

9. The duties of the paid secretary shall be determined by the Executive Committee, who shall control them unreservedly.

10. The Association will retain, within the discretion of the Executive Committee, the right of determining whether action shall be taken in any cases that may be suggested to it either for prosecution or defence, but it will consider its members to have superior claims to those of chemists and druggists who are not members. When it is desirable that information shall be promptly given to members upon any question affecting trade interests, a private circular shall be issued to each.

11. The Rules shall not be altered or rescinded, nor shall any new ones be added excepting at an Annual General Meeting, or at a special one called for the purpose. At least ten days' notice of such meeting must be given, and also of the alteration proposed.

12. A Special General Meeting may be called either by the Executive Committee or on the demand in writing of any twenty-one Members of the General Committee.

Mr. Matthews (London): I move that you adopt the rules from one to twelve as the constitution of this Association.

Mr. McKenzie (Edinburgh), in seconding the motion, was glad that the scheme had been extended to North Britain, where there was no union. The strength of their friends in the south would materially encourage chemists in the north. The recent prosecutions showed there was a necessity for union, which rubbed off angular corners and removed all causes of jealousy. He confessed he looked upon the Poisons Act as being but half of what they ought to get for the annoyance they were put to in registering the sale of poisons; and they were not remunerated by the profit obtained by the transaction, and they ought to have more than what the Act gave them. In prosecuting measures in Parliament, and in obtaining amendments, a Parliamentary Committee of the Executive would always be in readiness to proceed to the lobby of the House of Commons; as much could be done in this way as by individual members of the Association writing to their Members of Parliament in London. He had had experience of this in the past, and the senior member for Edinburgh had told him that deputations had as great weight with their Members of Parliament as with the Government, whoever they might be.

The motion was then put to the meeting and carried unanimously.

Mr. James M. Fairlie (Glasgow) then read the following memorial, signed by upwards of twenty-five Scotch chemists who were present at the meeting.

SCOTCH MEMORIAL.

"To the President and Members of the Chemists and Druggists' Trade Association.

"Gentlemen,—The undersigned Pharmaceutical Chemists and Chemists and Druggists of Glasgow and other towns in Scotland, approving as we do, the formation of a Chemists and Druggists' Trade Association, the objects of which shall in no way conflict with the operations of the Pharmaceutical Society of Great Britain, desire to enrol ourselves as members of such an organization, but as the trade in Scotland differs in many respects from that in England, and as we believe the arrangement will be of benefit to the Association generally, we respectfully request that the Executive consider the propriety of establishing a Branch Association for Scotland, and would suggest that the Scottish Executive might consist of the Members of the General Committee residing in Scotland, with powers relegated to them by the Executive Council of the Association."

(25 *Signatures.*)

Mr. Fairlie said that no programme of the business having been issued, they in Glasgow were not aware what was to be the order of procedure that day, and it was only late the night before that they had been able to decide as to what action should be taken by the Scotch members of the Association present. The memorial had, therefore, only been drafted that morning; hence the small number of names attached to it. He could safely say, however, that it represented several hundred chemists in Scotland. During the past few weeks he had had a great deal of correspondence with chemists in Scotland in reference to this meeting and the trade association, and with a single exception, every one had expressed himself as thoroughly in favour of some such organization. That one declined to take any action in the matter. He (Mr. Fairlie) had then written another gentleman on the subject; that gentleman had called on a number of chemists in the town, and he had found all he had spoken to in favour of the Association. Every town in Scotland had taken some action with regard to this matter, and there were representatives present from the far north, and the east, and he could confidently assure their English friends that they would have able support from Scotland. In nearly all the letters he had received, however, there was one thing indicated, and that was that Scotland should be specially recognized by the Association. There were some arguments which our English friends might make in opposition to this, as for instance, that we sent our M.P's to a common Parliament, that not only would Scotland be largely represented on the General Committee, but also on the Executive. On the other hand, some Scotchmen say, why not have an organization of our own in Scotland? It appeared, therefore, that a compromise between these two opinions must be made, and if the Executive can see their way to comply with the petition of the memorial, they will find that the arrangement will greatly strengthen them, and that any Scotch business will be greatly facilitated. It is but a carrying out of the principle of the scheme sketched out by Mr. Barclay—namely, to localize organization, and at the same time have a central head to operate from. The principle had already been carried out by the Pharmaceutical Society in establishing the North British Branch. He could see, for instance, that in the drafting of this scheme a Scotch committee would do much to make it complete, in so far as Scotland was concerned. Thus, in regard to Scotch legal cases, they would require to be watched by a Scotch committee, as the law in nearly every case operated differently in Scotland from what it did in England. Then, again, very often Scotland received a separate Act of Parliament, and in such cases attention would be paid more readily to a Scotch committee than otherwise. He must not say anything regarding the necessity for a strong union of chemists and druggists; they had had several examples of it of late there. He was strongly of opinion that the recent excise prosecution would never have taken place had this organization been in operation six months sooner. In London some time ago there was what was known as the citrate of magnesia case; there was no one to help the druggist who was prosecuted on that occasion, and he lost his case. They had a similar case at Greenock; the Glasgow chemists united with their Greenock brethren, and they defended successfully that prosecution. Had it been every man for his own hand at Greenock, as it was in London, the probability is that that case would have been lost too—another druggist ruined in business and in character, and the whole trade stigmatized as deceivers of the public. Mr. Fairlie concluded by expressing his opinion that both England and Scotland have much to gain and nothing to lose by the plan suggested in the memorial.

The Chairman said that this important memorial would strengthen the movement very much, and he was sure that their best thanks were due to Mr. Fairlie for the trouble he had taken. He might say to that gentleman that it was a good morning's work, indeed.

Mr. Andrews (London), moved—

"That the memorial of the members of the Association resident in Scotland be received and referred to the Executive for its best consideration."

Mr. Gibbons seconded the motion.

Mr. Kerr (Dundee) said that he signed the memorial in some doubt, but after hearing the reports which had been read and the speeches that had been made at the meeting, he was quite pleased at what he had done. He was glad that this trade association was not in opposition to the Pharmaceutical Society. From the discussions that had taken place he believed that this movement would be a great help to that Society, for it would gather in more members. He did not see why the members of this Association should not be members of the Pharmaceutical Society as well. He was convinced himself that even in the matter of trade grievances the Pharmaceutical Society had done much and deserved credit for what it had done. It, however, required encouragement and support, and he could see it would get much from this Association.

Mr. Kinninmont (Glasgow) said he thought he was one of the cautious men Mr. Barclay had referred to. He was quite prepared to concede that if the organization kept within its proper limits it would do great good. He believed they would never take action to defend adulteration. He quite knew the importance of union and he was surprised Mr. Fairlie had omitted to refer to the fight they had over the Poisons Bill in 1871, one of the most obnoxious attempts at legislation he had ever known. It was their pulling together at that time that saved them from the terrors of the policeman as their inspector, and he hoped that the objects indicated by the promotors of this organization would be fully realized. He had signed the memorial after some consideration and he believed that their friends from the south would find their hands greatly strengthened by carrying Scotland with them in their plans.

The Chairman said—We are no friends of adulteration, but we don't want a chemist who sells a genuine article to be pulled up for adulteration; neither have we any hostile feelings towards the Pharmaceutical Society, but we feel as a trade organization that we can take up matters which the Pharmaceutical Society cannot.

Mr. Anderson (Musselburgh) said that the whole of the chemists in the town he had come from had agreed to join the Association, and as stated by Mr. Fairlie, had expressed the opinion that Scotland would require an executive to manage Scotch affairs. He was glad there was a likelihood of such being carried out. The Association had his hearty support, and he knew that in most small towns it was just some such association that was required to bring the members of the trade more together, that they might work for each others' welfare.

After some remarks from others present, the motion was put from the chair and carried unanimously.

Mr. Jones (Leamington) then moved that the best thanks of the meeting be given to Mr. Fairlie and the local committee for the admirable manner in which they had arranged this meeting, which was seconded by Mr. Mason of Liverpool, and agreed to with acclamation.

Mr. Fairlie, in reply, said their work had been very light in so far as the Trade Association was concerned, but taken in connection with the British Pharmaceutical Conference meetings, they had been amply repaid for their labours in witnessing the happy faces of their friends from England. They had wrought for this end, and their object had been obtained without a single hitch. Personally he had experienced the hospitality of their friends from the south in their own country, and to his brother Scots he would say, go next year and see whether you have done anything more than your duty.

On the motion of Mr. Brown, Manchester, seconded by Mr. Jaap, Glasgow, a most cordial vote of thanks was passed to Mr. S. U. Jones for his conduct in the chair.

Mr. Jones, in reply, expressed his gratification at the manner in which the business has been gone through, especially at the excellent arrangements that had been made for them by the local committee.

At the request of the local committee the members present afterwards partook of luncheon in the Royal Hotel, at the close of which Mr. Greig, on behalf of the local committee, thanked the English members of the Association for their presence at the meeting, and wished the Association just started every success.

Mr. Barclay proposed the health of the Local Committee, coupled with the name of Mr. Fairlie, and expressed his personal appreciation of the efforts that had been made to make their meeting a success. This having been enthusiastically responded to, Mr. Fairlie briefly replied and the meeting broke up.

Test for Sugar.—Vidau has observed that a mixture of equal parts of hydrochloric acid and oil of benne (*Ol. Sesami*), either in the cold, or when slightly heated, assumes a distinct rose-colour in the presence of cane or grape sugar, provided not less than 0·001 gm. ($\frac{1}{64}$ gr.) of sugar is present for every cc. (16·3 min.) of mixture.—*Journ. de Ph. et d. Chim.*

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 16, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE SALE OF LAUDANUM.

IT might have been thought, after upwards of seven years' experience, that there was little probability of a fresh reading of the 17th section of the Pharmacy Act being set up which would materially differ from the construction hitherto unexceptionally put upon it. But the report on p. 247 shows that the expectation would not have been warranted. A gentleman holding the responsible position of a Coroner, belonging also, we believe, to the legal profession, has construed the law as to the sale of laudanum and other poisons contained in Part 2 of the poison schedule in a sense that, if it proved to be correct, would probably make dealing in these articles impracticable.

Many extraordinary statements, betraying profound ignorance of the subject, have before now been made respecting the Pharmacy Act by similar functionaries, but hitherto these have done little harm, and we should have thought it only necessary to put this fresh opinion on record, were it not that it has received a quasi-professional endorsement, and we have been informed that there is a probability that an attempt will be made to enforce it by the police authorities of the locality. We therefore at once enter a protest against any hasty proceedings being taken in the matter.

It will be seen by the report that a witness having stated that it was not necessary to register sales of laudanum, the Coroner interposed with the remark that he was clearly of opinion that it was necessary to register the sale of all poisons specified in both Schedules A. and B. [so reported, but no doubt meaning Parts 1 and 2 of Schedule A.]; and further, that if there was a sale of poison to any stranger, it must be made only after an introduction by some person known to the chemist, and after obtaining the signatures of both parties. To enable our readers to guess as to how the Coroner came to this conclusion, by which he applies the more stringent regulations as to registration and signatures to the whole of the poisons in the schedule, we reproduce the commencement of the 17th Section of the Act:—

"It shall be unlawful to sell any poison either by wholesale or retail, unless the box, bottle, vessel, wrapper, or cover in which such poison is contained, be distinctly labelled with the name of the article and the word poison, and with the name and address of the seller of the poison; and it shall be unlawful to sell any poison of those which are in the first part of schedule (A) to this Act, or may hereafter be added thereto under section II. of this Act, to any person unknown to the seller, unless introduced by some person known to the seller; and on every sale of *any such article* the seller shall, before delivery, make or cause to be made an entry in a book to be kept for that purpose," etc.

It will be seen that the first clause of the sentence, applies to "*any poison*" under the Act. The second clause then goes on to say respecting poisons included in the first part of the schedule *only* that they must not be sold to a person unknown to the seller without an introduction, and that the sale of any such article shall be registered. The Coroner for Spalding appears to wish to apply the words, "*any such article*," in the second clause of the sentence, to all that has gone before, although the construction of the sentence evidently limits their application to the latter clause of the sentence in which they occur. Moreover, if this point were doubtful, there is no doubt as to what has been the custom, and the custom has been in accordance with the tabulated schedule drawn up some time since by the Council of the Pharmaceutical Society, a copy of which was sent to every chemist and druggist for his guidance. That schedule, which no doubt represents the intentions of the legislature respecting the conditions under which poisons are to be sold, interpreted by the body to whom Parliament has entrusted the carrying out of those intentions, limits, and we believe correctly, the provisions as to knowledge of buyer and registration of sale to the poisons in the first part of the schedule. In fact, were it otherwise, there does not appear any sufficient reason for the division of the schedule into two parts.

Still we are free to confess that Mr. CALTHORP has found an endorsement of his opinion. The question seems to have been submitted by some one to the editors (three barristers) of the *Justice of the Peace*, a professional paper of good standing, and in the issue for last Saturday they give their opinion that the words "sale of any such article" apply to the whole of the previous part of the 17th section.

We understand that steps are being taken to bring the matter before the Council at its next meeting, and meanwhile we hope that local officials will be restrained from commencing vexatious proceedings against unoffending chemists and druggists.

PATENT MEDICINES IN THE STATES.

IN this country one "crying evil" in connection with so-called patent medicines is that some retailers supply them to their customers at a considerable discount from the advertised prices. In the United

States this bad habit appears to have extended to the manufacturers. In the words of a speaker at a meeting of wholesale druggists, recently called together in New York to consider the subject, the branch of the business known as proprietary medicines has become demoralized by excessive and unbusiness-like competition extending through many years, and has finally become a source of positive loss to jobbers. The wholesale druggists have therefore resolved to "impress" upon manufacturers of proprietary goods the necessity of maintaining regular prices, and that even when a parcel is supplied on special terms it is the duty of the parties to the bargain to maintain schedule prices. The practice of delivering proprietary goods throughout the country without freight or other charges has also been condemned as not in accordance with sound commercial usage or good business principles. A committee of wholesale druggists has been appointed to confer with the manufacturers upon the subject.

PRESERVATION OF SYRUPS BY SALICYLIC ACID.

M. Lajoux, a Paris pharmacien, has been making some experiments with the object of ascertaining the minimum quantity of salicylic acid by which the fermentation of syrups can be prevented during the summer. The syrups experimented upon were red-currant, cherry, mulberry, capillaire, gentian and compound ipecacuanha. It was found necessary to add a quantity of salicylic acid equal to one thousandth part of the weight of the sugar in the syrup. Syrups thus prepared were kept simply covered with a sheet of paper at a mean temperature of about 17°C. At the end of two months they were intact, whilst the same syrups, placed in the same conditions, but without salicylic acid, were completely altered.

MANCHESTER SCHOOL OF PHARMACY.

A programme of the arrangement for the session 1876 7, of the Manchester School of Pharmacy in connection with the Manchester Chemists' Association has just been issued. From it we learn that three courses of lectures, to be delivered by Mr. Louis Siebold, are to commence early next month. Chemistry, including the elements of Physics, is to be dealt with in a course of thirty lectures, illustrated fully by experiments, on Friday evenings, from 7·30 to 9 o'clock. The Materia Medica course is to consist of twenty-five lectures, to be delivered on Tuesday evening, from 7·30 to 8·45 o'clock. The Analytical Chemistry course is to consist of twenty lectures, delivered on Tuesday evenings, from 8·45 to 9·45. It is also announced that a course of lectures on Botany will be commenced by Mr. Leo H. Grindon early after Christmas. Students attending these courses must be Associates of the Manchester Chemists' Association. Further particulars respecting fees, etc., may be obtained from the Honorary Secretary to the Association, Mr. F. Baden Benger, 7, Exchange Street, Manchester.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE

Tuesday, September 5, 1876.

After the close of the President's address the reading of papers was proceeded with. The first paper read was a—

Note on Liquid Extract of Pareira.

BY B. S. PROCTOR.

I make no pretension of having such knowledge or experience of this preparation as would justify me in assuming any tone of authority in what I am about to say.

I recently had application for liquid extract of pareira, and not having any in stock procured some from one of my neighbours; it struck me as being very weak, but there was not another sample to be had in Newcastle for comparison, so I commenced making some, and at the same time sent to two makers in London for samples.

The first point of interest is the great disparity in the strength of the four. I do not wish to mention the names of makers so have indicated the samples by letters. It is only fair, however, to remark that they all came from large firms of good repute.

The first (which had struck me as weak) is marked R; those from London are indicated as M and D; and my own as Proctor's No 1 and No 2.

Judging by the quantity of Proctor's No. 1 which was required to be added to a given volume of water to make mixtures equal in taste to that of each of the other samples, it would appear that D is nearly double the strength of R, Proctor's No. 2 just double, and M nearly thrice the strength, while Proctor's No. 1 is six times the strength. It is very unsatisfactory that so great a disparity should occur in cases where we have no reason to suppose that in any of the four there had been any intention but to carry out the instructions of the Pharmacopœia.

It suggests the consideration, what is the actual intention of the instructions, and what change would be desirable to make in them with the view to uniformity?

The Pharmacopœia directs us to take a pound of *coarse powder* of pareira root, *digest* it in a pint of boiling water for twenty-four hours, pack it in a percolator, and adding more of the water, allow the liquor to pass *slowly* until a gallon has been collected, or the pareira is *exhausted*, etc.

I think we may assume that the intention is that the pareira should be exhausted as nearly as practicable, and that if this be accomplished, the degree to which comminution and percolation is carried, is comparatively of little moment. But if this be the intention, the expression is not so precise as it should be, for the words used imply that percolation is to cease when a gallon is obtained, whether exhaustion be complete or not, and that percolation may cease before a gallon is obtained if exhaustion be accomplished with a smaller quantity.

If exhaustion could be completely effected with any moderate quantity of water, the formula might be improved by omitting the limit of one gallon and simply defining that percolation should be continued till water ceased to extract anything, but we know that this is not practicable with ordinary vegetable powders; the degrees of exhaustion are only comparative, and the judgment of the operator is the only guide as to when the process should be considered complete; and from the evidence quoted it is clear that this judgment is a blind guide.

The quantity of water requisite for obtaining a given degree of extraction must vary with the degree to which comminution has been carried, and if we were to adopt fine powder, as directed in the U.S. Pharmacopœia, probably no great discrepancy would occur. The powder which I used in making my experiment was almost what would be called a very fine powder, and was ordered and supplied to me simply as "Powdered Pareira Root"* (for when I order rough powders I always find the wholesale druggists supply the materials in much too coarse a condition for satisfactory work). The 1lb. of powder was mixed with 1 pint of boiling water but not digested, *i.e.*, it was allowed to become cold, it was then packed in a wide conical percolator, and a pint of boiling water put upon it: percolation was slow and the liquor came through loaded with extractive matter. The first ten ounces, mixed with three ounces of rectified spirit, were kept separate from the subsequent portions of percolate. When a pint of percolate had been obtained percolation became more rapid and the liquor evidently weaker, so much so that when a total of three pints was obtained it was considered that a fair approximate exhaustion had been obtained, consequently this second portion was evaporated down to three ounces so as to make up 16 fluid ounces with the first percolate and spirit. This total is what I have indicated as Proctor's No. 1.

Percolation was then continued as before, with the view of ascertaining if much more extract would be obtained by using the whole of the gallon as named in the Pharmacopœia. The percolate became very weak towards the end though not by any means either tasteless or colourless. The five pints thus obtained were evaporated down to 6½ fluid ounces and 1½ fluid ounce of rectified spirit added. This constitutes what I have marked Proctor's No. 2.

A comparison of the series by taste was made as follows:—

℥i water required the addition of,—

12 minims	of Proctor's No. 1 to equal	R
25	" " " "	D
30	" " " "	P.'s 2
45	" " " "	M

Or estimating the strength of each compared with P.'s No. 1 from the above calculation.—

R	is equal	16·6 per cent.
D	" "	29·4
M	" "	42·8
P.'s 2	" "	33·3

A further comparison by weighing the dry residue of 100 grains of each of the five is subjoined, together with their specific gravities.

R	sp. gr. 0·9888†	left 3 gr.
D	" " 1·0108	" 6 gr.
M	" " 1·0226	" 10 gr.
P.'s 1	" " 1·0504	" 15·5 gr.
P.'s 2	" " 0·9930	" 3·5 gr.

These residues exposed to the air absorbed moisture, and, what is noteworthy, the hygroscopic quality was in inverse order to the quantity of the residue, except in the case of P.'s 2, which continued powdery while P.'s 1 and M became pilular (M the softer of the two), and the others became semifluid. These residues were all much alike in taste.

This comparison suggests that in the commercial samples the process has only been carried so far as to extract those portions of matter most soluble, and to leave large portions of extractive matters equally sapid and probably equally active. No doubt the coarse comminution is the root of the evil, as it would readily allow a gallon to pass through (we could scarcely say to percolate), but to wash through, simply superficially washing from off the particles the liquor and extractive matter loosened by the first pint of water, and the weakness of the last pint or two of liquor thus produced might lead the operator to the conclusion that exhaustion has been nearly perfect. Thus it has the double disadvantage of being difficult to exhaust and liable to deceive.

To keep up a digesting heat may be advantageous, but certainly adds something to the trouble, and is probably not important. In my experiment the liquor ceased to be hot long before it passed through.

If it were found necessary to add a further security against imperfect work, it might be desirable, instead of defining the quantity of liquor to be obtained from a pound of root, to define the *density* to which it should be raised by evaporation, before adding the spirit, as adopted in the case of liquid extract of cinchona; or as another alternative to direct evaporation to a pilular consistence, and then solution of a given weight of the extract thus obtained in spirit and water, as now adopted in the case of liquid extract of opium. I incline to the latter mode as there is less probability of any great error.

The root when well exhausted yields about 17 per cent. of *dry* extract or about 25 per cent. of a soft pilular consistence. Four ounces of this pilular extract with three fluid ounces of rectified spirit and water sufficient to make up 16 fluid ounces would make a satisfactory preparation, little liable to vary in strength, and corresponding pretty closely with the best that can be prepared by the present official process. To confirm this, a portion of Proctor's No. 1 was evaporated to an extract, and then dissolved again in spirit and water, and made up to its original bulk. Though it had deposited a brown precipitate, the clear liquor had the same intensity of colour and taste as the original sample.

In conclusion I would again urge the importance in a future Pharmacopœia of adopting some system of indicating in all cases the degree of comminution to which vegetables and other substances are to be reduced when used in making preparations. The system adopted in the U. S. Pharmacopœia appears to be worthy of imitation.

The PRESIDENT said he was sure all present were desirous to express their thanks to Mr. Proctor for the very practical and useful communication that gentleman had just made. He himself entirely concurred in the last paragraph of the paper, where reference was made to the importance of indicating in the Pharmacopœia the degrees of comminution to which vegetable and other substances were to be reduced in making preparations. He did not at present entirely go with Mr. Proctor in the earlier part of his remarks, namely, that in the process given in the Pharmacopœia the indication of the quantity of water to be used in exhausting the pareira might with advantage be omitted. He thought there was an advantage in having an average quantity mentioned, whilst it was clearly indicated that if the pareira could be exhausted with less than a gallon, the process should be stopped, or if the gallon was not sufficient, something more should be used. But there was an advantage in giving an indication of the quantity that should be used, as it suggested to the operator that he must so arrange his conditions as to cause exhaustion to be effected as nearly as possible with the gallon, and this was an indirect indication to him of what the degree of comminution should be, and of the packing of the material in the percolator. However, that was a trifling matter as compared with other points that Mr. Proctor had brought forward in his paper. He was quite sure that the known experience and skill which Mr. Proctor possessed and had been accustomed to exercise in pharmaceutical operations would engender confidence in the results obtained, and would place the paper among those to which he had alluded as greatly aiding hereafter in the preparation of a new edition of our Pharmacopœia.

* It could be almost entirely passed through a sieve having 120 wires to the linear inch.

† As the sp. gr. of the mixture of spirit and water used in the preparation of this liquid extract is about ·980 there is probably an excess of spirit as well as a deficiency of extractive in the sample R. In the other samples the relation between the density and the residue is nearly concordant.

Mr. H. B. BRADY (Newcastle) said that the paper was a very important one, not only for its matter, but also for the manner in which the subject had been treated. But there was one important point to which the author had not called attention. A man might be perfectly honest in intention and work with what looked like pareira brava but was not, and even with a knowledge of what pareira root should be, there was a difficulty in obtaining it. The wood and the old roots did not yield the same proportion of extract as the younger roots did. One got sometimes a batch of roots running from one inch to an inch and a half in thickness, and from these a tolerably uniform product could be obtained. The liquid extract might thus be well made, pharmaceutically speaking, and still not give the quantity of extractive which the preparation should contain. He wished Mr. Proctor had powdered the roots himself, because he thought that although the matter of comminution was no doubt a very important element in the success of the process it was by no means the only one. With regard to what Professor Redwood had said, it was certainly important that a sort of maximum volume of fluid should be stated; it not only affected the mode of exhaustion, but in reality the amount of heat to which the material was subjected in the subsequent evaporation.

Mr. PROCTOR said he agreed with Professor Redwood as to the quantity of water. There must be a limit and the smaller that limit the better. He would rather use three pints if with that quantity the roots could be satisfactorily exhausted. He thought that three pints almost effected a satisfactory exhaustion of the root.

Mr. KINNINMONT said he thought Mr. Brady had touched the real point; it was necessary for the operator to make sure he had got hold of the right stuff. Knowing that Mr. Proctor was coming forward with his paper he had brought with him some specimens. (Mr. Kinninmont then proceeded to describe these.) Having got into difficulties with the pareira brava, he welcomed Mr. Hanbury's paper on the subject with great pleasure; for in getting various samples he found not one was right. He did not think any great quantity of the true pareira root could be got. He had found that the true root gave a thick decoction having a bitter and liquorice taste, and that in proportion as it possessed this taste, so it was efficacious as a medicine. Were any one to take the root in commerce he would condemn the product as Mr. Proctor has done.

Mr. PROCTOR said he always looked upon the use of the true root as of primary importance; but on this occasion he had simply prepared a short note upon the pharmacy side of the question.

Mr. GREENISH asked Mr. Proctor whether he had ascertained how long the preparations he had compared with his own had been kept. He had observed in this liquid extract, a great tendency in the preparation to become deteriorated by age.

Professor ATTFIELD said, that the paper referred to the question of the introduction of definitions of fine and coarse powder into the Pharmacopœia, and he drew attention to the important remarks in connection with this subject of the President, who, it would be remembered, was not only the President of the Conference, but the editor of the British Pharmacopœia. The President had agreed with the author of this paper. and the author of many other papers, that it would be desirable to introduce into the next Pharmacopœia some indication of the relative degrees of fineness into which vegetable substances should be powdered. Mr. Proctor had referred to what was given in the United States Pharmacopœia, and suggested that similar definitions should be introduced into the British Pharmacopœia. That definition in the American Pharmacopœia, under the head of "fineness of powder," was as follows:—

"As different degrees of fineness are necessary in powders, according to their nature and mode of treatment, the special degree required is designated in the several formulas. For this purpose the terms very fine, fine, moderately fine, moderately coarse, and coarse are used;—the powder passed through a sieve of eighty or more meshes to the linear inch being designated as *very fine;* through one of sixty meshes, *fine;* through one of fifty meshes, *moderately fine;* through one of forty meshes, *moderately coarse;* and through one of twenty meshes, *coarse.*"

In reply to Mr. Greenish, Mr. Proctor said he had no information as to when the preparations were made. He presumed they were not very old.

NOTES ON THE COLOURING MATTER OF CROCUS SATIVUS.

BY W. W. STODDART, F.C.S., ETC.

The well-known colouring matter of the saffron is no less interesting than puzzling. In many physical and chemical characters it differs from all the other yellow dyes, and when present in very minute quantity is somewhat difficult in its identification. Comparatively little is known of its composition and very little has been done towards the solution, so that it behoves the experimentalist to bring forward any matter of detail however trifling.

A short time ago I had some confectionery brought for analysis which was suspected of being coloured with orpiment or chromate of lead. The comfits in question were white, globular and composed entirely of sugar. Each had a nucleus about the size of a pea having a canary yellow colour. It was during this examination that I noticed what I think promises to be a good and delicate test for the colouring matter of saffron (*Crocus sativus*).

A small piece of the sugarplum was put into a test tube and dilute hydrochloric acid added. Instantly all the colour vanished, strongly resembling the reaction of a metallic salt. I then inserted a small piece of copper foil suspended by a platinum wire in the usual way for Reinsch's test, and boiled. To my surprise the yellow colour returned with a bright and extremely beautiful red fluorescence. This was especially noticeable because the yellow matter present in the comfit must have been infinitesimal.

This was repeated several times with the same result, so that it may be used as a safe and easy test. It is imperative that a weak solution of saffron be used for its proper working. Turmeric behaves in a somewhat similar manner, but is easily distiuguished by the powerful action of alkalies which do not affect the colour of saffron.

Of course this singular experiment led me to make an examination of the colour given by the stigmata of the crocus but the subject soon showed so many and unexpected difficulties that I have not been able to get ready the requisite number of analyses that must be performed before its nature can be fully explained.

The experiment was next repeated with a plain infusion of the stigmata, but utterly failed. The liquid was decolorized but remained obstinately colourless when boiled, nor could I get the fluorescent reaction in the slightest degree. At length the thought occurred that the original experiment was on a saccharine material, and a single crystal was dropped into the test tube, when to my great satisfaction the colour and fluorescence were instantly developed, so that the sugar had evidently something to do with their production.

The test is used by putting into a test tube a *very dilute* infusion of saffron on a suspected yellow colour. If no sugar be present add a crystal and as much dilute hydrochloric acid as will completely decolorize it. Bring the whole to the boil, and if the colour be due to saffron, the yellow tint will be restored in a few seconds and the beautiful fluorescence make its appearance on the surface of the liquid. To give some idea of the extreme delicacy of this reaction, an infusion was made containing only

$\frac{1}{3}\frac{1}{3}$nd part of its weight of the stigmata, when the characteristic appearances were shewn in the most decided manner.

The natural colouring matter of the leaves is called polychroite, but is evidently a compound of two colouring principles, a red and a yellow. It is very soluble in water, but insoluble in ether and absolute alcohol. Its aqueous solution is completely decolorized by chlorine, nitric and hydrochloric acids. A large quantity of the last is required. The colouring matter dissolved from the third of a grain of the stigmata requiring about thirty minims of strong hydrochloric acid for complete decolorization.

The stigmata of *Crocus sativus* are divided into three linear divisions joined together at the summit of the long style. When properly prepared they make good microscopic objects, showing their cellular structure in a most interesting manner.

In addition to the polychroite the stigmata contain both cane and grape sugars, with gum and a volatile oil, to which the peculiar odour of saffron is due.

The following is the mean result of several analyses :—

Colouring matter (Polychroite)	62·31
Volatile oil	1·32
Sucrose	·43
Glucose	·11
Gum and allied substances	7·50
Cellulose	9·64
Ash	6·82
Moisture	10·87
	100·00

The volatile oil is a bright yellow, and is said by Weiss (*J. pr. Chem.* 101, 65) to be isomeric with carvol ($C_{10}H_{14}O$) which is so universally present in most of the essential oils. It is worthy of remark that when this oil has been kept some time, it becomes changed into a white solid having the same elementary composition and resembling thymol.

When an infusion of saffron is boiled with hydrochloric acid it is decomposed and a copious flocculent red precipitate of crocin ($C_{16}H_{18}O_6$) separates. When dried it forms a bright red powder which is tolerably soluble in alcohol but quite insoluble in water, thus having exactly the opposite qualities than when it existed in combination as polychroite. One hundred grains of the stigmata yield from 9 to 10 grains of crocin. Crocin is extremely soluble in very dilute solutions of the various alkalies, forming a very pure and brilliantly yellow liquid, from which it may be reprecipitated by acids.

The liquid filtered from the crocin contains the yellow colour with a large quantity of glucose, and the same yellow volatile oil as previously found in the plant.

Weiss in his paper before mentioned gives the following formula for the decomposition of polychroite by acids :—

$$\underset{\text{Polychroite.}}{C_{48}H_{60}O_{18}} + H_2O = \underset{\text{Crocin.}}{2\,C_{16}H_{18}O_6} + \underset{\text{Carvol.}}{C_{10}H_{14}O} + \underset{\text{Glucose.}}{C_6H_{12}O_6}$$

But in all probability it is not quite correct, because he has not allowed for the colouring matter left after the separation of crocin, nor does it explain the action produced by the addition of a little more sugar than that existing in the stigma.

Moreover, according to the formula we ought to get more crocin than is found to be the case in practice.

The presence of more sugar than is naturally present appears to be necessary for the complete decomposition of polychroite, so that probably the following would be the more perfect rendering of Weiss's formula :—

$$\underset{\text{Polychroite.}}{C_{48}H_{60}O_{18}} + \underset{\text{Sucrose.}}{C_{12}H_{22}O_{11}} + 2H_2O =$$
$$\underset{\text{Crocin.}}{2C_{16}H_{18}O_6} + \underset{\text{Carvol}}{C_{10}H_{14}O} + \underset{\text{Glucose.}}{3\,C_6H_{12}O_6}$$

When crocin is precipitated by acids from an alkaline solution it is a dark brown instead of a bright red. It seems to be hydrated $2(C_{16}H_{18}O_6), 3\,H_2O$.

The determination of the percentage composition of perfectly dry crocin gave the following results of three trials which agree very closely with Weiss's formula of $C_{16}H_{18}O_6$:—

0·63 grm. gave 1·4469 grm. of CO_2 and 0·3384 grm. of H_2O
0·41 „ „ ·9416 „ „ 0·2203 „
0·44 „ „ 1·011 „ „ 0·2352 „

which would yield –

	I.	II.	III.
C	·3946	·2568	·2757
H	·0376	·0244	·0261
O	·1978	·1288	·1382
	·6300	·41	·44

The percentage of these would therefore be :—

	I.	II.	III.	Calculated.
C	62·64	62·63	62·67	62·745
H	5·97	5·97	5·94	5·882
O	31·39	31·40	31·39	31·373
	100·00	100·00	100·00	100·000

When polychroite is dissolved and mixed with sugar, it easily ferments and the crocin precipitates. This is often seen in the shops, forming the red deposit so troublesome at the bottom of the syrupus croci bottle when kept a long time, especially in warm weather. The ready solution of crocin in alkalies explains the reason why many pharmacists add a little potash to prevent the thickening of the syrup.

The very limited time at my disposal has prevented my pursuing the subject any further at present, but I am now engaged in more fully examining the subject both chemically and optically, so that at some future time I may have the pleasure of bringing before you more detailed results.

After a vote of thanks had been accorded to Mr. Stoddart for his paper, an adjournment was made till the afternoon.

Upon the Conference reassembling at two o'clock, the following communications upon the subject of opium were read :—

The Variation in Strength of the Opium Preparations.

BY D. B. DOTT.

In the following communication, the subject of which is one of those suggested for investigation by the Conference, I give the results of an examination of a number of the official opium preparations. It was not thought necessary to test samples of all these preparations, but only of the tincture, extract, and liquid extract; the morphia-strength of which will probably afford a sufficiently accurate idea of the quality of the opium preparations at present supplied to the public. All the samples examined were procured from druggists of good standing in London, Dublin, and Edinburgh.

In the first place I give the assays of a variety of opiums, with the amount of extract obtained from each. The percentage of extract was not found directly but by subtracting the percentages of water and insoluble residue from 100, the difference being the percentage of dry extract. The proportion of the morphia in the extract is calculated from the result of the opium assay.

It will be seen from this table that the richest extract obtained would contain 34·4 per cent. of morphia, while the poorest would contain 13·7 per cent. Whence it is manifest that two chemists, starting with opiums perfectly answering the Pharmacopœia tests, and strictly following the officinal process, might succeed in preparing extracts, one of which would be more than twice the strength of the other.

Description of Opium used.	Morphia per cent.	Water per cent.	Aqueous extract per cent.	Residue insoluble in water per cent	Morphia in extract per cent.
1. Turkey	10·75	19·6	47·80	32·60	22·4
2. "	12·30	20·0	51·15	28·85	24·0
3. "	10·20	26·0	48·05	25·95	21·2
4. "	7·57	21·2	54·90	23·70	13·7
5. "	9·60	22·0	47·05	30·95	20·4
6. "	11·69	18·4	56·15	25·45	20·8
7. "	12·30	19·2	54·90	25·90	22·4
8. "	12·30	20·4	45·40	34·20	27·0
9. "	6·76	27·2	37·00	35·80	18·2
10. "	9·80	21·2	40·00	38·80	24·5
11. "	8·85	22·8	47·50	29·70	18·6
12. "	6·93	31·2	20·10	47·90	34·4
13. Persian	6·00	14·0	59·20	26·80	10·1
14. "	8·50	12·0	60·60	27·40	14·0
15. "	2·10	16·0	58·10	25·90	3·6
16. " in sticks	traces	15·6	73·90	10·50	traces
17. Malwa	7·30	15·2	60·70	24·10	12·0
18. "	5·80	13·6	61·10	25·20	9·5
19. Egyptian	7·00	14·8	56·90	28·30	12·3

In the next table I give the estimation of several samples of *Extractum Opii.*

	Water per cent.	Morphia per cent.		Morphia per cent.
No. 1	19·2	19·4	No. 7	22·8
No. 2	21·2	19·7	No. 8	19·3
No. 3	26·8	16·2	No. 9	20·5
No. 4	18·4	19·6	No. 10	15·4
No. 5	23·2	19·7	No. 11	20·4
No. 6	22·0	18·2		

The difference between the maximum 22·8 and the minimum 15·4, is equal to a variation in the morphia-strength of about 3 to 4½. The average percentage is 19·7.

I next give a list of the samples of Extractum Opii Liquidum examined, with their specific gravities and the amount of morphia in the fluid ounce.

No.	Spec. Grav.	Grs. Morphia in fl. oz.			No.	Spec. Grav.	Grs. Morphia in fl. oz.		
		I.	II.	mean			I.	II.	mean
1	0·987	3·82	4·08	3·95	9	0·985	4·68	4·34	4·51
2	0·992	4·02	3·95	3·98	10	1·000	4·17	4·01	4·09
3	0·986	2·66	2·87	2·76	11	0·989	3·68	3·75	3·76
4	0·993	3·04	3·89	3·46	12		3·71		
5	0·996	3·73	3·12	3·42	13		2·28		
6	0·995	2·26	2·06	2·16	14		0·61		
7	0·992	1·78	1·63	1·66	15		2·22		
8	0·996	4·33	4·34	4·33					

It will be observed that in these fifteen samples the grains of morphia in the fluid ounce varied from 0·6 to 4·5, the average being 3·12. Only one estimation of the last four was made as these were examined some months ago, without any intention of publishing the results. In one or two cases it would have been advisable to repeat the determination of the morphia, but the quantity of each sample admitted of only two estimations being made.

In the following table I give the assays of eighteen samples of the Tinctura Opii, with their specific gravities.

No.	Spec. Grav.	Grs. Morphia in the fl. oz.			No.	Spec. Grav.	Grs. Morphia in the fl. oz.		
		I.	II.	mean			I.	II.	mean
1	·922	3·30	3·50	3·40	10	·960	3·50	3·57	3·53
2	·938	2·80	2·70	2·75	11	·953	3·04		
3	·955	2·10	2·10	2·10	12	·936	3·90		
4	·940	2·90	3·70	3·30	13		3·71		
5	·956	2·05	2·10	2·07	14		4·37		
6	·937	2·08	2·23	2·15	15		2·02		
7	·929	3·12	3·28	3·20	16		0·83		
8	·957	3·62	3·45	3·53	17		1·91		
9	·962	1·40	1·59	1·49	18		0·55		

In this, the most important of the opium preparations, the variation in morphia strength extends from 4·37 to 0·55 grs. in the fluid ounce; the average being 2·66.

The method employed in all the above noted assays, is a modification of that recommended in the British Pharmacopœia. I find that the precipitate of crude morphia obtained in that process is equal on an average to $\frac{7}{10}$ths of its weight of the pure base. It is a process, which, I have every reason to believe, gives at least as accurate results as those obtainable by any of the recognized methods.

I think the most obvious conclusion to be arrived at from the foregoing experiments, and from those of other observers, is that the opium preparations are not remedies to be relied on. When one considers that a physician who prescribes for his patient one drachm of laudanum, intending that the latter should receive thereby $\frac{1}{3}$ of a grain of morphia, may in reality be only giving him $\frac{1}{10}$ of a grain; it is manifest that this indicates a condition of things demanding amendment. It has been proposed by Dr. Squibb (reported in the 'Year-Book for 1870') to prepare a strong tincture, assay it, and then dilute to the proper strength, or at least to prepare the tincture, etc., from assayed opium. I am afraid, however, that there would be great, if not insuperable, difficulty, in getting this system brought into general use. The trouble involved in following such a plan would deter the majority of pharmacists from adopting it. For my own part, I believe the ultimate solution of the difficulty will be the abolition of all the galenical preparations of opium from the Pharmacopœia. Indeed,, unless opium possesses therapeutical properties which are not possessed by its alkaloids, there can be no reason for retaining it. That is a question, of course, to be decided by medical men. Still, I venture to think that our knowledge of the physiological effects of opium and its constituents is sufficiently complete to enable us to affirm that all the objects for which opium is prescribed can be attained equally well by the use of its alkaloids. Among these only three can be said to have any practical importance, viz., morphia, codeia and narceine, which are all hypnotics, and seem to differ from one another mainly in the amount required to produce the desired effect. The other bases are either inert in ordinary doses, or exist in such minute quantities that the proportion of them in a large dose of laudanum could only produce a physiological effect in the imagination of a homœopathist.

I believe that the chief work of pharmaceutical chemistry for a long time to come will consist in the perfecting of processes for the isolation of the active principles of the vegetable remedies, so that in due time all the mediæval tinctures and decoctions of the Pharmacopœia will become obsolete, and be superseded by preparations of definite and invariable strength. It is my sincere hope, that this paper, meagre and imperfect though it is, may in some small measure be the means of hastening such a desirable consummation.

Report on the Assay of Opium for Morphia.

BY EDWARD LAWRANCE CLEAVER, F.C.S.

In order to thoroughly criticize the different processes in present use for the estimation of morphia in opium it is necessary to have a thorough knowledge of the following points:—

1. What are the constituents of opium?
2. In what state of combination do they exist?
3. The action of solvents and reagents on these principles.
4. The action of solvents on opium.
5. The action of alkalies on solutions of opium.
6. The action of heat, acids, etc., on morphia.

This paper will therefore be divided into two parts. The first consists of remarks on the foregoing heads; the second of the application of these remarks to point out the advantages and disadvantages of the existing processes used for opium analysis.

PART I.

The principal constituents of opium are as follows:—morphine, narcotine, narceine, codeine, thebaine, papaverine, a substance resembling caoutchouc, probably two resins, meconic acid and calcium salts, and a substance we will designate by the name of extractive.

Of these the morphine in all probability exists combined with the meconic acid to form soluble meconate of morphine.

The narcotine is either entirely free or partly combined with acid.

The remaining alkaloids are probably in a state of combination.

The meconic acid is partly free and partly combined.

The action of different solvents and reagents on the principles of opium are as follows.

Water (distilled).—Morphine is soluble to the extent of one part in 1000; narcotine in 10,000; narceine is sparingly soluble though more so than morphine; the meconic acid is freely soluble; the resin, caoutchouc, etc., are insoluble.

Alcohol.—Morphine is sparingly soluble in cold alcohol, freely in boiling. The remaining alkaloids, resin, and caoutchouc are soluble.

Fusel oil.—All the alkaloids are freely soluble in fusel oil. The resin is also slightly soluble.

Ether, Benzol, Bisulphide of Carbon.—Morphine is soluble to the extent of one part in 2000; the remaining alkaloids are freely soluble. The resin is insoluble; caoutchouc soluble.

Acids—The whole of the alkaloids and resins are soluble in acids.

Fixed Alkalies.—Morphine is freely soluble in solutions of fixed alkalies, narcotine is insoluble. In the presence of morphine narcotine is dissolved by lime water; narceine is soluble. The remaining alkaloids are insoluble. The resin is partly soluble.

Ammonia.—Morphine is sparingly soluble in ammonia, a 1 per cent. solution dissolving five parts in 1000. The narceine and codeine are soluble. The remaining alkaloids and resin are insoluble.

Action of Solvents on Opium.

It follows from the foregoing remarks that when opium is treated with water the solution contains meconate of morphine, salts of narcotine and other alkaloids; resin, taken into solution by the free acid present; calcium salts, meconic acid and extractive.

An alcoholic solution will, in addition to the above, contain more narcotine, caoutchouc, fat and resin.

The question here arises as to whether water will thoroughly exhaust the opium of its morphine. Opinions on this point are divided, but I believe that, provided the solution produced be acid, water will effectually exhaust the marc.

It may be said that opium after prolonged treatment with water has a bitter taste, thus proving some constituent to be present; but that this bitterness is not due to morphine may be proved by treating the marc with benzol, ether, or bisulphide of carbon, when the bitterness is entirely removed. Preliminary treatment with one of the above mentioned solvents is recommended by some authors, and this plan has the advantage that the quantity of water required for the after treatment of the opium is much less than if the preliminary exhaustion be omitted, and also that the narcotine being nearly all removed, the point of exhaustion is more easily noticed by the solution dropping through devoid of bitterness. It must, however, be remembered that a slight loss of morphine is entailed by the preliminary treatment, but the amount may be calculated by adding ·005 gr. for every 10 c.c. of solvent used to the amount of morphine afterwards found.

Hot water is also recommended by some, but I do not think much advantage is gained by its use, as the following experiment will prove.

No. 1. 100 grains of dried powdered opium were treated with hot water. It yielded 69 per cent. of extract and 12·2 per cent. of brown crystalline morphine.

No. 2. 100 grains of the same opium were treated with cold water by percolators; five fluid ounces of water were used and then the solution had a very bitter taste. It yielded 54·3 per cent. extract and 11·9 per cent. of coloured crystalline morphine.

No. 3. 100 grains were treated first with boiling benzine and afterwards percolated with water. It required under 3 ounces of liquid to render the marc tasteless, whilst in the previous experiment 5 fluid ounces were required, and even then the solution obtained was slightly better. The liquid yielded 54·7 per cent. of extract and 12·2 of coloured crystalline morphine.

It will be seen from these experiments that although hot water dissolves more from opium than cold water yet the yield of morphine is not greater. The effect, however, of first using benzine is more marked and the increased yield of morphia I believe to be due to the fact that less water being used; less time was required to evaporate the solution, and thus destruction of the morphia by heat is avoided. I also tried the effect of mixing opium with chalk, and then adding water, and percolating.

100 grains of opium, as before, yielded 45 per cent. of extract, which gave 11·9 per cent. of brown crystalline morphine.

The difference in extract yielded by the plan is due to the fact that the free acid being neutralized by the chalk, the meconic acid, part of resin, the whole of the meconate of calcium, and part of narcotine are removed from solution and so diminish the weight of extract obtained. The results obtained by this process compared with others will be given further on.

Action of Alkalies on Infusion and Tincture of Opium.

Ammonia.—If excess of solution of ammonia be added to infusion of opium a precipitate is obtained, which consists chiefly of morphine, but contains small quantities of narcotine and other alkaloids, meconate of calcium, and resin. This precipitate is either crystalline or amorphous, accordingly as the solution was hot or cold when precipitated. If the solution be concentrated until about equal to twice the weight of opium employed, and ammonia added to the boiling liquid, with constant stirring, the resin is precipitated, melts and adheres firmly to the sides of the containing vessel or to the glass rod used for stirring. The liquid can then be poured off immediately, when the morphine, etc., will begin to be precipitated owing to the change of temperature. The crystals so obtained are free from the resin and light brown in colour. The morphine is not entirely precipitated by ammonia from infusion of opium, owing to the solubility of morphine in water and in ammonia. If the ammonia be added in slight excess only, and the liquid allowed to stand until the smell of the ammonia has disappeared, then the amount of morphine left in solution should correspond to the amount of liquid used, unless there be any constituent in the infusion of opium which prevents the complete precipitation of morphine. This, according to Professor Dragendorff, is the case. The following experiments, however, tend to prove that, provided the excess of ammonia be nearly driven off, the amount of morphine left in solution is in direct accordance with its solubility in water.

6·48 grams of dried Turkey opium were exhausted with water, and concentrated to 35 c.c. It yielded ·800 gram of of morphine. The solution, which with the wash water measured 70 c.c., was shaken repeatedly with fusel oil; fusel oil removed and evaporated. The residue was treated with dilute acid and precipitated with ammonia. This last operation was performed entirely with about 10 c.c. of liquid. It yielded ·067 gram of morphine, which with ·010 to be added for loss of morphine in the 10 c.c. of liquid gave ·077 or only ·005 gram in excess of the theoretical quantity, which may be accounted for, as the morphine was not quite free from colour.

Five grams of Persian opium treated as above yielded ·460 gram of morphine, and 50 c.c. of liquid was used. This treated by amylic alcohol gave ·053 gram of morphine.

6·480 grams of a very rich sample of Persian opium gave ·907 of morphine, 6·80 c c. of wash water were used. This by treatment with amylic alcohol yielded ·087 gram of morphine.

There is, however, one point in connection with the precipitation of morphine by ammonia to which special attention must be paid. It is that solutions of opium from which the morphine has been precipitated by slight excess of ammonia, if left to stand until the smell of ammonia has disappeared, redissolve a large quantity of the precipitate, so that care must be taken that the liquid should always have a *slight excess* of ammonia present. It is, I believe, to the neglect of this fact that Professor Dragendorff has made the statement that opium contains some ingredient which hinders the precipitation of the morphine.

When, however, ammonia in strong excess was allowed to remain in the liquid, the amount of morphine extracted by amylic alcohol was much greater, in one case as much as 3 per cent.

If the opium before treating with water has been mixed with chalk, then the precipitate obtained by ammonia consists of morphine, narcotine, and resin, the meconate of calcium being entirely got rid of. If the opium has been treated with boiling benzine, bisulphide of carbon or ether, previous to infusion, then the precipitate consists of morphine, meconate of calcium, resin, and minute quantities of other alkaloids. The following experiment will illustrate the difference in composition of the precipitate under these different circumstances.

No 1. 6·480 grams of dried opium treated with cold water, the solution evaporated to half an ounce, ammonia added in slight excess, and allowed to stand twenty-four hours, gave 1·695 gram of precipitate; of this 1·506 was soluble in boiling alcohol. The alcoholic residue, etc., treated with bisulphide of carbon lost ·358 gram. The remainder dissolved in dilute acid, and treated with slight excess of ammonia, yielded ·870 gram of morphine.

No. 2. 6·480 grams mixed with chalk, and treated as above gave 1·258 of precipitate by ammonia. Of this 1·200 was soluble in alcohol, ·267 soluble in bisulphide of carbon, and ·858 of morphine.

No. 3. 6·480 grams treated with bisulphide of carbon and afterwards exhausted with water yielded 1·332 gram of precipitate by ammonia, of which 1·137 was soluble in alcohol, and ·008 in bisulphide of carbon and yielded ·880 of morphine.

From this it will be seen--

	1	2	3	4
Precipitate by Ammonia .	26·06	19·6	20·5	18·3
Portion soluble in Alcohol.	23·08	18·5	17·2	16·1
" " $C.S_2$ . .	5·5	4·1	0·1	
Morphine contained in precipitate	13·28	13·25	13·59	13·7

That a large quantity of morphine escapes precipitation by ammonia is a point strongly to be remembered, as in the case of a bad opium containing only from 2 to 4 per cent. of morphine, more morphine might remain in the liquid than was precipitated.

It has been proposed to take the weight of the precipitate given by ammonia as a criterion of the goodness of opium, and good opium should certainly not give less than 14 to 15 per cent. of it, but it should be borne in mind that it does not contain more than half its weight of morphine.

If ammonia be added to infusion of opium (which has been acidified with hydrochloric acid) until exactly neutral, the resin and meconate of calcium are precipitated, whilst soluble hydrochlorate of morphine remains in solution; the precipitate can then be filtered off and then ammonia be added to the filtrate in slight excess; a light coloured precipitate is obtained, which consists of morphine and narcotine in a very pure form.

Potash, soda, and lime, added to infusion of opium, cause a precipitate of narcotine, and resin, and meconate of calcium, but the morphine is dissolved by the excess of alkali present. If the solution be filtered quickly the morphine soon separates out, and is in a very pure form, but there is some loss in the process, as I have never been able to recover by this means as much morphine as by other processes. Lime water also dissolves narcotine to some extent, provided morphia be present.

Action of Heat on Morphia.—If morphine or its salts be boiled with water for some time, the solution becomes coloured; if acids in excess be present the action is more marked, whilst with alkalies the action is stronger still, and a flocculent brown precipitate is soon formed. The following experiments may prove useful as showing that, provided allowance be made for the solubility of morphine in water, the precipitate is complete:—

I took ·583 gr. of pure morphine, dissolved in acid and treated with slight excess of ammonia. After twenty-four hours the precipitate was collected, dried and weighed; it gave ·552 gr. of morphine; the wash water was 30 c.c. equivalent to ·030 of morphine, thus making the total ·582 gr.

·113 gr. of pure morphine, treated as above, gave ·100 gr. of precipitate and 13 c.c. of liquid, which would correspond to ·013 gr. of morphine, thus making the total ·113.

Ammonia added to tincture of opium, or to an alcoholic solution of the precipitate produced by ammonia, produces a precipitate of part of the morphine and part of the narcotine present, the amount remaining in solution depending on the strength and quantity of the alcoholic liquid; if the liquid be tincture of opium, then the precipitate contains meconate of calcium.

PART II.

In commencing my criticisms on the processes in use I will begin with the most simple, and then proceed to describe others more complicated.

Arnoldi's process (*Journ. Chem. Soc.*, 1874). Opium is exhausted with water, the solution treated with animal charcoal, concentrated and precipitated by ammonia. The precipitate is collected, dried, and weighed as impure morphine. The author states that good opium should yield above 14 per cent.

The objections are—

1. That the morphine is not entirely precipitated by ammonia.

2. That the precipitate, though called impure morphine, does not contain much more than half its weight of morphine.

3. The use of animal charcoal ensures loss of alkaloid, as the undermentioned experiment will prove:—

2·435 grams of pure morphia were dissolved in acid and boiled with animal charcoal. The morphine was precipitated, and the amount obtained, allowing for loss by solubility, was 2·405 gr., thus indicating a loss of over 1 per cent.

A second experiment showed even a higher loss.

The process given by Professor Flückiger in the 'Pharmacographia' is better, but far from perfect. It is as follows:—Opium is exhausted by boiling ether, the residue dried, treated with water, and precipitated by ammonia. This precipitate recrystallized from boiling alcohol.

Professor Flückiger himself describes the process as imperfect, and gives his reasons. He is one of the very few who seem to have taken notice of the loss of morphine by virtue of its solubility and of its destruction by heat. The chief objections to the process are—

1. The long continued boiling with ether (twenty or thirty times repeated with fresh quantities) takes away some of the morphia, and care must be taken that the ether employed is free from alcohol and water.

2. The loss of morphia by virtue of its solubility.

3. In crystallizing from alcohol much morphia remains in solution, but the crystals deposited are very pure.

The small proportions of morphine found by Professor Flückiger tend to prove the correctness of these statements.

Guibourt's process (*Journal de Pharmacie et Chimie*) consists in exhausting opium with water, precipitating by ammonia, and washing the precipitate first with dilute alcohol to remove narcotine and colouring matter, and afterwards dissolving the morphine by means of strong alcohol. The alcoholic solution is evaporated, dried and weighed.

The objections to this process are loss of morphine by washing the precipitate with dilute alcohol, and in the precipitation with ammonia.

The residue obtained by the evaporation of the alcoholic solution is not pure morphine but contains narcotine and resin.

Schacht's process (*Archiv der Pharmacie*, 1863).—The process is an improvement on the last mentioned. It consists in exhausting opium with water by two or three macerations, treating with animal charcoal, concentrating, and adding ammonia. The precipitate is weighed, treated with ether and the ethereal solution evaporated and weighed. The portion insoluble in ether is treated with strong alcohol, the alcoholic solution evaporated, dried and weighed; or it is washed with water and dilute alcohol and again weighed, the weight being taken as pure morphia.

This process has the following objections:—

1. The amount of water used by macerating three successive times necessitates long applications of heat for evaporating, which tends to destroy the morphia. The meconic acid present is also split up and forms other coloured matters, which help to make the morphine impure.

2. The animal charcoal used retains alkaloid.

3. If the alcoholic solution be evaporated, the results are high, as it contains colouring matter and resin.

4. If washed with alcohol (dilute) and water, morphine is dissolved away.

5. No mention is made of the morphine lost in precipitating.

It is, however, the best of those processes in which water is used alone as a solvent, and by slightly modifying, as follows, can be made to produce very good results.

The solution from which the morphine has been precipitated by ammonia should either be measured and allowance made for the morphia dissolved, or it should be treated with amylic alcohol as before described.

1. The opium should be first treated with benzine, as by that means less water is required for exhaustion, and the marc should be percolated, not macerated.

2. The use of animal charcoal should be precluded, the morphia being purified by being dissolved in acid, made neutral, filtered, and then adding ammonia.

The process devised by Merck, consists in exhausting with water, and precipitating by means of carbonate of soda and heat. The precipitate is dissolved in acetic acid and made neutral, filtered, and excess of ammonia added.

This process has the following objections:—

1. The alkali and heat cause destruction of the morphine.

2. No account is taken of the loss by precipitation. It has the advantage that the method of purification proposed avoids loss of morphine.

Guillermond's process consists in treating opium with alcohol, and adding ammonia to the alcoholic solution. The morphine so produced is very pure, but as a large quantity remains dissolved in the alcohol, it is only a comparative method. The precipitate also contains meconate of calcium.

The process of Staples, which consists in adding alcohol to concentrated infusion of opium, then after filtration mixing more alcohol and ammonia, is also open to the same objections as the last.

The process of Mohr which has been adopted, with slight modifications, by the compilers of the B. P., consists in exhausting opium with water, mixing with milk of lime and boiling; the filtered liquid is mixed with hydrochloric acid and concentrated. It is then made exactly neutral with ammonia, filtered, and mixed with excess of ammonia. The precipitate dried and weighed. This process if properly and carefully carried out is one of the best, as, by the use of lime, the resin and meconate of calcium, also meconic acid, is removed from solution. The objections to it are—

1. That the large quantity of water used and the subsequent evaporations cause loss of morphine.

2. That no account is taken of the loss of morphia by non-precipitation.

The modifications I would introduce are as follows:—

1. The opium should be first treated with bisulphide of carbon or benzine.

2. The dried residue should then be mixed with its own weight of lime and two or three times its bulk of some inert powder, such as pumice or glass. It is then to be percolated with water, the first part of percolate being returned as fast as it runs through. By this means much less water will be required to exhaust the opium than would otherwise be the case. After the opium is exhausted, which will be known by the liquid dropping through devoid of taste, the solution should be exactly neutralized with dilute sulphuric acid and filtered and the precipitate washed. The clear solution is then to be evaporated over a water-bath until its bulk is about half an ounce, and again filtered if requisite; then ammonia is to be added in slight excess, and the liquid allowed to stand twenty-four hours. The precipitate can then be collected, washed with ether, and dried, and to the amount found must be added the amount corresponding to the quantity of water used in precipitating and washing. The morphia obtained by this process is of a dull white colour, crystalline, perfectly soluble in alcohol, acids, and alkalies.

In concluding these few remarks, which I hope may prove useful as indicating which methods are most likely to give correct results, I beg to state that I do not consider the subject in any way exhausted, and that I still intend to work upon opium analysis, and hope to communicate further results at another meeting of the Conference.

Table showing amount of morphine obtained by different processes on samples of dried powdered opium:—

	Arnoldi.	Flückiger.	Guibourt.	Schacht.	Schacht Improved.	Guillermond.	B. P.	B. P. Improved.
Turkish... ...	26	9·5	10·2	11·0	12·8	9·8	12·1	13·0
Persian... ...	25	8·0	9·0	11·0	13·0	8·7	12·3	13·4
Indian	13	3·0	3·6	4·0	5·2	3·2	4·9	5·6

Note on the Assay of Opium.

BY B. S. PROCTOR.

During the last six years I have had the estimation of morphia in opium pretty frequently under my consideration, and have accumulated numerous disjointed facts, which I have looked forward to bringing under the notice of this Conference so soon as I had arrived at a satisfactory conclusion. This I have not yet accomplished, and I should not now presume upon troubling you with a record of inconclusive experiments were it not that the announcement of Mr. Cleaver's report upon the same subject suggests the propriety of my putting on record a few experimental results and theoretical deductions while the subject is before you.

Experience soon taught me that me that it was useless to trust to any reaction, or series of reactions, based only upon a knowledge of the behaviour of the proximate constituents of opium in the separate state; and a more extended experience added the conclusion that a process acting satisfactorily with one sample of opium may not give results equally good with another.

Narcotine, we are taught to believe is not soluble in aqueous liquors free from acid reaction, but experiment shows that aqueous solutions of opium, having no acid reaction, contain it in notable quantity. We are also taught that narcotine is not soluble in lime water, yet experiment shows that this is not to be trusted to for separating morphia from narcotine when thrown down together. In like manner I find my record of experiments furnishes me with many statements apparently in contradiction to the teachings of the handbooks. I say apparently in contradiction, for we cannot say that there is any real contradiction, so long as the circumstances do not precisely coincide. Here lies the index to the whole difficulty. No two samples of opium are precisely alike, consequently in no two assays are the alkaloids presented under circumstances which precisely coincide; and any process contrived with the view of eliminating uncertainty can only be accepted as satisfactory when it has been proved by trial, upon every variety of opium, to give results as good in each case as can be obtained by any other process. If we multiply the number of processes worthy of trial by the number of samples of opium notably different we should form an estimate of the number of assays from which we might draw a conclusion. I have endeavoured to simplify this elaborate subject by dividing the process into sections, the first being the extraction, the obtaining of the morphia in solution together with more or less of the other constituents of the opium; the less the better, provided the thorough extraction of the morphia be assured. I have not met with any instance in which a thorough extraction was not easily and speedily obtained by the method which I published in 1873* (*i.e.*, reducing the opium to a pulp with a little warm water, adding spirit and percolating with spirit). I never found a sample of opium which did not give an acid reaction, but it is stated that some samples, being destitute of free acid, require the addition of an acid to insure their exhaustion. I will quote one experiment illustrating the exhausting of the opium.

200 grains of lump opium with half an ounce of water rubbed to a pulp in a warm mortar, 1½ ounce of methylated spirit gradually added, the whole put into a percolator. The percolation was slow. More spirit was added as required, and the percolate was fractionated; the first portion of 2 ounces yielded 18·8 of pure morphia, the second portion of 2 ounces yielded 4·6 of morphia nearly pure, and the third portion consisting of 3 ounces yielded 1·0 of morphia. In this instance we find 200 grams of opium exhausted with 7 ounces of methylated spirit. In practice for the sake of safety I habitually use at least double this proportion.

The next stage is to separate the alkaloid from the other matters held in solution.

I have seen less reason to fear the partial precipitation of the alkaloids—morphia especially—by reagents not supposed to precipitate them than I have seen to fear their imperfect precipitation when intentionally thrown down from solutions containing the extractive matters of opium; besides which these colloid bodies detract from the crystalline conditions of the alkaloids, which is of some importance in the third stage of the process. Guided by these considerations I aimed at separating the bulk of amorphous matter before acting on the crystalloids. With this view I evaporate the solution to a syrupy condition, adding a little water towards the end of the evaporation to insure the spirit being got rid of without making the residue thicker than syrup. This syrupy liquid, though devoid of spirit, holds in solution sundry matters reputedly insoluble in water, but which increase the solubility of one another, while their proportion to that of the water is considerable, but which do not retain that mutually solvent action when diluted; I therefore add two ounces of water (in the treatment of 100 gr. opium), by which means there is thrown down a considerable quantity of caoutchouc, fat, resin, colouring matter, narcotine, etc. These sometimes adhere into a soft, plastic mass, which may remain attached to the bottom of the dish, or be collected in a lump on the end of a stirring rod. I have repeatedly tested this clot and found it devoid of morphia. In physical qualities it varies with different samples of opium. The liquor when decanted, or if necessary filtered, contains all the opium constituents which are freely soluble in both water and spirit, and the treatment has rejected the great bulk but not the whole of those constituents which are reputedly insoluble in these two menstrua. It is to be evaporated to two fluid-drachms, an equal bulk of methylated spirit added, and then ammonia added in slight excess.

If the spirit added exceeds the water present, mucilaginous matter is frequently deposited; if, on the other hand, there be a deficiency of spirit, the ammonia throws down much colour with the alkaloids. The alkaloids are sometimes thrown down immediately, and in powder, but in many cases slowly, in crystals and contaminated with but little colour. Twelve to eighteen hours are allowed for the deposition of the alkaloids, which concludes the second stage of the process. The third stage consists in the treatment of this precipitate. It is collected on a filter, washed with a mixture of equal parts of methylated spirit and water till the washings are almost colourless, about an ounce of the dilute spirit being usually sufficient, then washed with water till a drop on evaporation leaves an insignificant residue.

The precipitate is then dried and contains morphia in yellow or brown crystals, and narcotine, usually silky white. Without removing the precipitate from the filter, benzine is washed through so long as a drop evaporated on a slip of glass leaves any conspicuous residue. Half an ounce to an ounce of benzine usually suffices.

As soon as the benzine evaporates the morphia is in condition for weighing. I believe the process as now described will be found an improvement upon that of the Pharmacopœia, or many others which have been recommended, but it is not yet perfect. The morphia is not quite pure and I have not yet been able to vary the process so as to insure a satisfactory approximation to purity in all cases, without having recourse to redissolving and reprecipitating the morphia. The precipitate however is so nearly pure morphia that its behaviour with solvents and precipitants can be depended upon. It may be dissolved with lime and water,—filtered,—acidulated with hydrochloric acid,—evaporated to small bulk—and precipitated by ammonia. Or it may be dissolved with acid and water, then spirit added, and finally ammonia. I have with me a sample of well crystallized morphia

* 'Lectures on Practical Pharmacy,' p. 352.

obtained by this latter method. The use of spirit and water as the solvents from which to precipitate the morphia involves a small loss amounting to about ¼ grain in the original precipitation and as much more if a second solution and precipitation is necessary; but this is a trifle compared to the large and uncertain proportion of impurity contained in the precipitates yielded by many of the published modes of assay.

I think there has been too much stress laid upon avoiding a free excess of ammonia in the precipitation of morphia—a 5 per cent. solution of ammonia only retains about 0·4 per cent. of morphia. And I have repeatedly found liquors, which had had ammonia added till a faint odour was perceptible, lost that odour on standing a day, and deposited a further crop on the addition of more ammonia.

Since writing this note, having an assay in hand, I took the opportunity of recording a little more precisely the results in this respect. To the liquor prepared from 100 grains of opium, in the manner before described, ammonia was added till the odour was perceptible though not powerful; on standing eighteen hours the precipitate was collected on a filter, and though the liquid was still feebly evolving ammonia, as indicated by red litmus paper slowly becoming blue when suspended over it, no further precipitation took place on standing six hours; but on the addition of three drops more of strong solution of ammonia a second crop of morphia was obtained; after standing eighteen hours this was collected separately. This treatment repeated again gave no further precipitation of morphia, only dark brown sticky matter being thrown down. The first precipitate after washing weighed 6·6, the second 2·5. The first, as it was thrown down, contained narcotine, morphia, and colour; the second contained morphia and colour, and the third colour only. The first when purified yielded 5·1 and the second 2·0 of pure morphia.

It has been recommended to add ammonia freely and drive off the excess by evaporation, a proceeding which I likewise think objectionable. It is stated that morphia is not soluble in ammonium chloride, but if morphia be added to a solution of ammonium chloride, ammonia is liberated and by the repeated evaporations the whole of the morphia may be dissolved and will be re-precipitated on the addition of free ammonia. I might add many observations having more or less bearing upon the subject, but at the present time they could only be fragmentary and ill digested. And though I do not deny the importance of recording unsuccessful researches the value of negative results depends much upon their being so arranged as to afford positive information.

I have said I consider the process of extraction satisfactory. I may now add in conclusion that I think the treatment of the liquor satisfactory as far as it goes; that is, that evaporation and precipitation by water, followed by the addition of spirit before precipitation is advantageous, but that some further intermediate treatment, such, for example, as boiling with lime, might be beneficial.

The treatment of the precipitate when formed is satisfactory as regards washing with weak spirit, then with water, and finally, after drying, with benzine. I consider it desirable to avoid the necessity for redissolving and again precipitating the morphia on account of the time and loss of material. I therefore advise that the precipitate should be weighed after treatment with benzine, and only subjected to purification if on treatment with lime water it is found to be contaminated with much colour or a palpable amount of insoluble matter, and finally, I advise no one to trust very much to my recommendations.

So far as the subject has yet been investigated it appears to me, no method or selection of methods would give infallible results, even in the hands of an intelligent operator unless supplemented by some considerable experience.

I usually make two assays of a sample by different methods, and whether they agree or differ they are a check upon one another and a lesson on the applicability of the processes.

New Derivatives from the Opium Alkaloids.

BY C. R. ALDER WRIGHT, D.SC. LOND.,

Lecturer on Chemistry in St. Mary's Hospital Medical School.

Since the last meeting of the Conference the following results have been obtained in continuation of the author's researches on the subject, and in conjunction with Mr. G. H. Beckett.

A community of "structure" between the alkaloids narceine and narcotine has been established, and both have been found to be closely related to a new alkaloid, *oxynarcotine*, recently separated from the crude narceine obtained from the mother-liquors of the Robertson-Gregory morphine extraction process by Messrs. Macfarlan, of Edinburgh, and sent to the author for further purification and examination. To these three bodies the following formulæ are found respectively to apply:—

Narceine,	Narcotine,	Oxynarcotine,
$(C_{13}H_{20}NO_4)$	$\left\{ C_{11}H_{11}(CH_3)NO_3 \right\}$	$\left\{ C_{11}H_{11}(CH_3)NO_3 \right\}$
$\vert$	$\vert$	$\vert$
CO	CO	CO
$\vert$	$\vert$	$\vert$
$C_6H_2 \begin{cases} CO.OH \\ O.CH_3 \\ O.CH_3 \end{cases}$	$C_6H_2 \begin{cases} COH \\ O.CH_3 \\ O.CH_3 \end{cases}$	$C_6H_2 \begin{cases} CO.OH \\ O.CH_3 \\ O.CH_3 \end{cases}$

From each of the three bases, by appropriate means, the bibasic acid *hemipinic acid*—

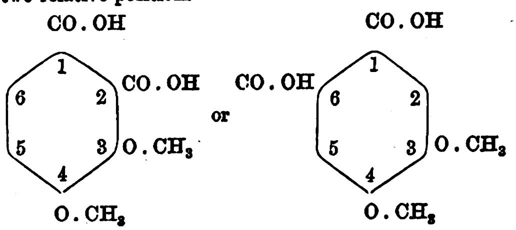
$$C_6H_2 \begin{cases} CO.OH \\ CO.OH \\ O.CH_3 \\ O.CH_3 \end{cases}$$

can be prepared, narcotine giving rise to the nearly correlated *opianic acid*—

$$C_6H_2 \begin{cases} COH \\ CO.OH \\ O.CH_3 \\ O.CH_3 \end{cases}$$

by an intermediate reaction; this latter, however, as indicated by the above formulæ, is not producible from either of the other two alkaloids.

In pursuance of this subject a lengthy research has been made on the nature of the reactions undergone and the products furnished by hemipinic acid, with the result of completely establishing that this acid is a benzene derivative, as expressed by the above "structural formula;" and that, moreover, it is a carboxylated protocatechuic acid, the four lateral chains being in one of the two relative positions—



The CO.OH which represents the linking—CO—radical in the formulæ of narcotine, narceine, and oxynarcotine being in one of the two positions (2) or (6), with reference to the other three lateral chains, the two oxymethyl groups being in the positions 3 and 4, and the other remaining group in the positions 1.

In the course of this research it has been demonstrated that *vanillin* the odorous principle of vanilla, can be manufactured from narcotine; the small yield, however, has prevented this practical application of the hitherto almost waste product in morphine-extraction, narcotine. The steps in this operation are as follow:—

(1) By cautious oxidation with manganese dioxide and sulphuric acid narcotine furnishes, as is well known, opianic acid.

(2) Opianic acid, when converted into sodium salt and cautiously heated with an intimate admixture of dry sodalime, furnishes a distillate from which, by fractional distillation, a crystalline body melting at 41° and boiling at 283° can be separated; this body is *methyl-vanillin* (dimethyl protocatechuic aldehyde), formed thus from the opianic acid—

$$C_6H_2\left\{\begin{matrix}CO.OH\\CO\ \ H\\O.CH_3\\O.CH_3\end{matrix}\right. = CO_2 + C_6H_3\left\{\begin{matrix}COH\\O.CH_3\\O.CH_3\end{matrix}\right.$$

(3) By heating methyl vanillin with hydrochloric acid, methyl chloride is evolved and *vanillin* (monomethyl protocatechuic aldehyde) is formed thus—

$$C_6H_3\left\{\begin{matrix}COH\\O.CH_3\\O.CH_3\end{matrix}\right. + HCl = CH_3Cl + C_6H_3\left\{\begin{matrix}COH\\OCH_3\\OH\end{matrix}\right.$$

A large number of other derivatives from opianic acid have also been obtained; some of these were previously known, and have been re-investigated for the purpose of establishing their "structural" relations to one another and to bodies well known as derived from other sources, but not hitherto recognized as being in any way connected with any of the natural alkaloids. (For the details of these experiments the reader is referred to the *Chem. Soc. Journ.*, 1876, February, March and April numbers.) It is hoped that the knowledge thus gained may ultimately lead to the synthesis of one or other of these alkaloids, and thus pave the way to the artificial manufacture of the more valuable alkaloids, such as morphine and quinine; as yet, however, this prospect is still far off.

Narcotine, oxynarcotine, and narceine, besides having a considerable amount of community of "structure," resemble one another, and differ from most other alkaloids in the ease with which these compounds with acids break up in presence of water into free acid and a basic salt; the amount of acid retained in these basic salts seems solely to be influenced by the amount of water present relatively to the acid, no definite basic compounds being obtainable. Curiously, however, narceine exhibits an extraordinary attraction for small quantities of hydrochloric acid, it being extremely difficult (even by precipitation with excess of an alkali) to obtain narceine perfectly free from hydrochloric acid associated as a highly basic salt.

No derivatives of opianic acid have hitherto been obtained from morphine or codeine, although carefully sought for, whence it would seem that these two bases, although of closely similar "structure," are nevertheless very different in constitution from narcotine and its congeners narceine and oxynarcotine. These latter bases, moreover, are physiologically possessed of but little activity; that this is due to the influence of the copulated benzene radical is rendered highly probable from the circumstance that hydrocotarnine is (as mentioned in the paper read before the Conference last year) a tolerably active alkaloid, this base being readily formed from narcotine by the reaction—

$$\underset{\text{Narcotine.}}{C_{22}H_{23}NO_7} + H_2O = \underset{\text{Hydrocotarnine.}}{C_{12}H_{15}NO_3} + \underset{\text{Opianic Acid,}}{C_{10}H_{10}O_5}$$

With a view to completing the history of the "constitution" of narcotine and its congeners experiments are being carried on with hydrocotarnine and its derivatives. The results of these experiments (if not entirely negative) will in due course be brought before the Conference.

Note on the Presence of Free Acetic Acid in Opium.

BY DAVID BROWN.

It does not appear to be generally known that free acetic acid exists in opium and that it can be obtained from it by submitting an aqueous extract to distillation, neutralizing the distillate, evaporating to dryness, and decomposing the residue with sulphuric acid. Traces of butyric acid were observed in the crude acid. The silver salt of the pure acid gave 64·13 per cent. Ag; theory requires 64·67.

The quantity found in opium is small; I have, however, been able to extract it from a sample of genuine Turkey opium as well as from all grades of that drug, until I came to an article which bore the name opium, but which certainly had nothing in its composition to entitle it to such a designation.

From the frequency with which I have observed the presence of this acid in opium I think it may, with all safety, be set down as a constituent of that drug.

I have much pleasure in confirming the statement made in 1869 by Dr. Flückiger regarding the presence of a member of the pectin series in opium. In 1864 I roughly examined a quantity of crude pectate of lime obtained from opium, but a pressure of other work prevented me at that time going more fully into the subject. In 1871, without any knowledge of Dr. Flückiger's work, the subject was again taken up, and the result of a careful examination of various opium samples enables me to confirm his results.

The President said the first duty of the Conference was to express its thanks for these very valuable communications, and he had also to invite discussion upon them. Those papers which were first brought under notice were in particular of considerable interest for all practical men. He certainly considered that if this Conference had produced nothing more than these papers it would have added greatly to the indebtedness of pharmacists to it for having brought under their notice matters of such importance. The questions affecting the strength of the preparations of opium are very important. He conceived, however, that in the consideration of the subject, it would have been desirable to give attention in the first place to the means of ascertaining the strength of opium, that is, to testing or titrating the different samples of opium that were used. If druggists were more in the habit of applying the test of the Pharmacopœia, or any improvement upon that test which could be devised, it would no doubt obviate to a very great extent, in fact, practically, it might entirely remove the objection that had been taken, founded upon the great variation observed by practical men in the preparations of opium. These variations were referable chiefly to the differences in the samples of opium used, and it was known, in fact the statements made by Mr. Cleaver and Mr. Proctor indicated, that there were very considerable variations in that respect. Then with reference to the processes which have been suggested for testing the strength of opium, he confessed he had been considerably gratified in finding that so decided a testimony was borne to the value of the process now given in the Pharmacopœia. He did not consider that process to be by any means perfect. In fact he had long considered it to be a process which called for some modification. Whether the modifications that have been suggested by Mr. Cleaver would be sufficient to meet the requirements of the case, he was not prepared to say. He had been himself rather disposed for sometime past to look more to a process analogous, or very similar, to that recommended by Mr. Proctor. At all events the question was an important one, and it was just one of those questions which he should like to see referred to such a committee of the Conference as he had alluded to in his opening address, with power to have a sufficient number of experiments carried out by an operator employed by such Committee, with the view of determining which process should be considered the most reliable and best.

Mr. CHIPPERFIELD said it had struck him in making tincture of opium as well as other tinctures by the formulæ of the British Pharmacopœia that the results were more uncertain than if they were prepared by the old method of the London Pharmacopœia, for this reason, that the London Pharmacopœia directed that maceration should take place, and that the marc should be pressed. No matter what loss there might be by the imperfection of the pressing, the strength of the tincture would remain the same whether a great or a small loss took place. By the present method, however,—that of the British Pharmacopœia—a very great loss in strength might result. If tincture of opium were made in large quantities and pressed by hydraulic power, then there would be little waste. If it were made in smaller quantities and very imperfectly pressed there would be a very considerable percentage of loss, which loss being made up with additional menstruum, to that extent the tincture would be reduced in strength, and could not contain "1 in 13½." In that respect the old method of making the tinctures by the London Pharmacopœia was superior to that of the B. P.—insuring a uniform result.

Mr. GERRARD said he was able to confirm Mr. Cleaver's statement with reference to the use of benzole in the assay of opium, more especially in the Persian variety, which sometimes contained a large quantity of oil.

Mr. CLEAVER said his investigation was made more especially with the object of devising the process in which the whole of the morphia in opium could be obtained. In the ordinary processes the precipitate weighed as morphia was not all morphia—in fact, it contained 10 to 20 per cent. of colouring matter. He tried, therefore, to purify the morphia and prevent loss in the purification. He thought the method he had given would do so. As to the difference between his and Mr. Proctor's modes of operation for the extraction of morphia, he thought that Mr. Proctor would not get any more by his process, for the simple reason that he washed with dilute spirit, by which means there was a certain loss of morphia. Then, again, he did not take account of the loss owing to the solubility of morphia in water.

Mr. PROCTOR said he had used the method he had proposed for extracting Persian opium. He thought the main thing was the comparative purity of the different samples of morphia as obtained by the two processes, and he produced samples as giving indications of the actual superiority to be obtained by the process advocated by him. He thought the main thing to be aimed at was getting the alkaloid in a pure state, not in a state of proximate purity, which the Pharmacopœia and other formulæ give.

Professor ATTFIELD remarked that it would be obvious the specimens in the upper part of the box submitted by Mr. Proctor were much lighter in colour than those in the lower, which he understood were samples given to Mr. Proctor by a friend who had adopted some other process. He should like to ask Mr. Proctor or Mr. Cleaver whether they could hold out any hope that pharmacists would ever have any one particular process for the extraction of morphia in opium which would answer for all opiums, and whether also much must not depend upon the experience of the operator, in judging by preliminary experiment and the appearance of the opium as to which of the one, two or three modifications of processes he would adopt.

Mr. CLEAVER said he would not say the process he had described was applicable to every sample of opium that was to be met with, but it was applicable to the greater part, and he thought the judgment of the operator must be the best guide. He should also make a preliminary test of the opium in order to see whether its acqueous infusion was freely acid. If so every trace of morphia would be extracted by the method described.

Mr. PROCTOR pointed out that one of the last remarks in his paper was that no system whatever would be perfect without very considerable experience on the part of the operator.

(To be continued.)

Parliamentary and Law Proceedings.

THE SALE OF LAUDANUM.

An inquest was held at Spalding on Thursday, August 24, before Mr. J. G. Calthorpe, coroner, touching the death of Thomas Kirby. The deceased had been found by his wife in a heavy sleep, with a bottle labelled "Laudanum" close by. Medical assistance was obtained, and by the stomach pump the contents of his stomach, smelling strongly of opium, were removed. Under medical treatment the deceased appeared to recover from the effects of the poison, but died four days afterwards from inflammation of the lungs, which the medical witnesses could not say had not been aggravated by the treatment necessary to recovery from the effects of the laudanum. Deceased, who was a volunteer, had received a slight hurt whilst exercising, and had attracted the attention of his comrades by his strange behaviour.

The following is the evidence respecting the sale of laudanum to the deceased, and the coroner's remarks thereon:—

Frederick Arch, apprentice to Mr. Gibson, chemist, saw the deceased on the Friday previous about 4 o'clock. He came into the shop for some laudanum, and witness supplied him with one ounce. He said he had fallen and hurt his ribs at Bolton, and witness supposed he required the laudanum for external application. He knew deceased quite well, and he noticed nothing peculiar in his manner. He did not enter the sale in his book; Mr. Gibson kept a register for the sale of poisons. He did not consider it necessary to enter the sale of laudanum in any case. He had been at Mr. Gibson's four years, and during that time he had sold a great deal of laudanum without entry.

Alfred Lunn, apprentice to Mr. Asling, chemist, said Kirby went to his master's shop just before 5 o'clock on the previous Friday for three pennyworth of laudanum. Witness supplied him; deceased did not say for what he required it. Witness knew him well, but he did not recollect supplying him with laudanum before. Mr. Asling kept a register of the sale of poisons, but this was not entered, as it was not required by law. It was not Mr. Asling's practice to register the sale of laudanum. Unless they knew the person purchasing, they did not usually supply it without a good reason from the purchaser. He did not recollect that Mr. Asling had given him any instruction as to the sale of laudanum, or any preparation of opium. His practice was to sell any quantity up to half-a pint to a known customer. A stranger did not require an introduction if his explanation was satisfactory when purchasing laudanum. Witness had been at Mr. Asling's a little over four years.

Henry Atkin Gibson, chemist, said he had sold laudanum to Kirby on the previous Friday night; it would be between 5 and 6 o'clock. Kirby asked for two ounces of laudanum in a bottle, and he supplied him with it. He told him he had an ounce from his young man before on that afternoon, and he had used it all for his arm, on which he had had a fall on some ice. He appeared in the same state and manner as usual. Three ounces was not a large quantity to sell in one day to one person. They did not register laudanum; any one could get it at his shop, and without any explanation, except in a special case. Practically, he made no restriction on the sale of laudanum. He was acquainted with the Sale of Poisons Act, and it was not necessary to register laudanum; that was the general opinion of chemists.

The Coroner here remarked that, for the information of witness and all other chemists, he might say he was clearly of opinion that it was necessary to register the sale of all poisons specified both in Schedule A and B. And furthermore, if there was a sale of any poison to any stranger, it must be only after the introduction by some person known to the chemist, and after obtaining the signature of both the parties.

The jury returned a verdict in accordance with the medical evidence.

Poisoning by Laudanum.

On Friday September 8, an inquest was held at Lower Broughton Road, Broughton, near Manchester, by Mr. F. Price, district coroner, on the body of Maud Aramina, aged seven days. The child was in the care of a monthly nurse, named Margaret Johnson, who on the previous Monday morning compounded a mixture, consisting of three or four drops of brandy, one drop of laudanum, and about a dessert-spoonful of water, and gave the infant a teaspoonful to alleviate pain in its stomach. The next night the child was again troubled with the pain, and the nurse about midnight gave it a similar dose. This caused the child to sleep until about eight o'clock on Wednesday morning, and when it awoke its father observed that it presented a peculiar appearance. He drew the attention of Johnson to it, who said she thought it had "caught cold," but made no reference to the mixture which she had administered. Mr. Winterbottom, surgeon, was summoned, and, on seeing the child, he said it was suffering from the effects of some narcotic poison. The nurse said she had not given it anything, but afterwards admitted that she had "given it a drop of laudanum to quieten it." The child became convulsed, and died during the day.—The woman Johnson, in her evidence, said that so far as she knew she did not put more than one drop of laudanum into the mixture which she compounded on Tuesday night, but she might have put a little more than one drop into it, and have administered more than a teaspoonful of the compound to the infant. A medical man had once recommended her to give children the mixture, and she had been in the habit of administering it regularly to infants which she nursed.—Mr. Winterbottom said there was no doubt the child had died from the effects of narcotic poison. The jury were of opinion that the mixture had been administered solely with the object of relieving pain, and, there being no suspicion against the nurse, returned a verdict of "Death by misadventure." At the request of the jury the coroner censured Johnson for her carelessness.

Obituary.

Notice has been received of the death of the following:—

On the 20th of June, 1876, Mr. William Woods, Pharmaceutical Chemist, Worcester. Aged 60 years. Mr. Woods had been a Member of the Pharmaceutical Society since 1842, and at the time of his death was the Local Secretary of the Society for Worcester.

On the 30th of July, 1876, Mr. Robert Carr, Chemist and Druggist, Berwick-on-Tweed. Aged 47 years.

On the 19th of August, 1876, Mr. John Legge Newcombe, Chemist and Druggist, Okehampton, Devon. Aged 60 years.

On the 20th of August, 1876, Mr. Joseph William Gowing, Chemist and Druggist, Snettisham, Norfolk. Aged 55 years.

On the 21st of August, 1876, Mr. James Agnew, Chemist and Druggist, Great Homer Street, Liverpool. Aged 41 years. Mr. Agnew had been a Member of the Pharmaceutical Society since 1869.

On the 4th of September, 1876, Mr. Joseph Moore, Chemist and Druggist, Pembroke Dock. Aged 45 years.

On the 5th of September, 1876, Mr. Joseph Bower Williams, Chemist and Druggist, late of Kingswinford, Staffordshire. Age 26 years. Mr. Williams had been an Associate of the Pharmaceutical Society since 1869.

On the 7th of September, 1876, Mr. Henry Clement Heard, Chemist and Druggist, Bridgewater. Aged 58 years.

On the 9th of September, 1876, Mr. Joseph Fairs, Rye Hill, Newcastle. Aged 76 years. Mr. Fairs was formerly in business as a Chemist and Druggist in Newcastle, but retired from business a few years ago.

Notes and Queries.

[524]. GLYCERINE AND COLLODION OINTMENT.—Can any reader oblige us with formula for making Glycerine and Collodion Ointment.—G. and T.

Correspondence.

A. W.—See Mr. Pocklington's paper on 'Glycerine Jelly' in vol. iv., p. 401, of the present series of the *Pharmaceutical Journal*.

"*Caution.*"—*J. B.*, of Shoreham, writes to caution the trade against the operations of a family who appear to be making a tour of the South Coast, and are in the habit of presenting various quaint prescriptions, and obtaining quantities of chlorodyne, and then decamping without making payment.

"*Inquirer.*"—A series of papers and reports on the preparation and action of resin of scammony was read at the Evening Meetings of the Pharmaceutical Society in February and March, 1869, and were reported in the *Pharmaceutical Journal* for that year.

J. E. Lord.—The pamphlet was published by J. Moore, Ann Arbor, Michigan, U. S. There is a copy of it in the library of the Pharmaceutical Society.

J. H. S.—The Nessler reagent consists of a solution of iodide of potassium saturated with periodide of mercury, and rendered powerfully alkaline with potash or soda. A method for its preparation is given in Wanklyn's 'Water Analysis.'

T. D. (Northampton).—The circumstance mentioned is not unknown. Germination of the so-called "stones" appears to take place readily.

"*Syrupus.*"—(1) *Polygonum aviculare*; (2) *P. Convolvulus*; (3) *Mercurialis annua.*

F. S. Temple.—Your letter has been handed to the Secretary.

C. J. P.—*Inula Conyza.*

S. Nockolds.—Myrobalans, the fruit of *Terminalia Chebula*, Retz. A native of India. Is our correspondent sure they were grown near St. Petersburg?

"*Captene.*"—(1) Trade marks must be registered under the Act providing for their registration, passed in 1875, an abstract of which and the regulations will be found in the *Pharm. Journ.* for Jan. 8, 1876. (2) See under "Answers to Correspondents," before p. 168. (3) There is nothing to prevent such a proceeding.

"*Theta.*"—(1) We can give no further information than is contained in the published regulations of the Board of Examiners. (2) A thorough knowledge of the metrical system of weights and measures is required in the Preliminary Examination. (3) Any good work on Chemistry.

Communications, Letters, etc., have been received from Mr. Prebble, Mr. Pickburn, Mr. Fairlie, Mr. Brown, Mr. Hail, Mr. Wylie, Mr. Wilkinson, Mr. J. J. Smith, Mr. Borland, Mr. Temple, "Saline," "Registered Apprentice," 'Acid.'

NOTE ON THE PRINCIPLES OF ERGOT.

BY M. TANRET.

In a note read before the French Academy in the latter part of last year, and reproduced in this Journal,* M. Tanret published his discovery in ergot of what he considered to be a new alkaloid, to which he gave the name of "ergotinine." Subsequently, Professor Dragendorff published in this Journal† the results of his investigation of ergot in conjunction with Herr Padwissotzky. In this paper Professor Dragendorff stated that Tanret's ergotinine had been prepared by himself and his colleague and that they were of opinion that it did not represent a chemically distinct substance, but that it contained, among other substances, an admixture of sclererythrin, to which its activity was to be attributed. This statement has evoked from M. Tanret the following rejoinder, which appears in the *Journal de Pharmacie* for September:—

"In the course of my researches upon ergot of rye I have isolated a colouring matter which is found to be the sclererythrin of MM. Dragendorff and Padwissotzki. It was prepared by treating with an acid the alcoholic extract of ergot from which the fatty matter and resin had been separated. The precipitated sclererythrin was collected and purified by solution in ether. The study which thus enabled me to prepare this substance has also permitted me to demonstrate by numerous proofs that my ergotinine cannot contain the least trace of sclererythrin. I will limit myself to some in which the evidence is clear, and depends upon properties that M. Dragendorff has attributed to sclererythrin.

"Sclererythrin is a red substance. Its alcoholic or ethereal solutions are of an intense reddish yellow colour. A trace of it is sufficient to give with dilute alkalies 'a beautiful murexid colour.' Now ergotinine is nearly colourless, and does not give any colour reaction with alkalies.

"If an alkaline solution of sclererythrin is treated with an acid and shaken with ether the colouring matter passes into the ether. The contrary takes place with ergotinine; acids remove it from its solution in ether.

"As to the violet colour which sulphuric acid produces with scleroiodin, it cannot be confounded with that characteristic of ergotinine. Sulphuric acid alone gives with the latter only a greenish blue colour; in order that the red yellow colour followed by a magnificent violet blue may be manifested it is necessary that the acid should not be too concentrated, but diluted with about one eighth water, and, what is indispensable, with sulphuric ether, though of this there might not be more than a trace. Further ergotinine is soluble in alcohol, chloroform and ether, whilst scleroiodin is not.

"As M. Dragendorff has not named the other substances that he says are mixed with sclererythrin to constitute ergotinine I am not at present able to deal with them. But might it not be with them as with sclererythrin?

"In conclusion, I would express a regret, and one that is shared by all who are interested in the study of ergot of rye, that M. Dragendorff has not given more explicit details as to the preparation and properties of the bodies that he has represented as being the active principles of ergot, scleromucin and sclerotic acid."

* Pharm. Journ. [3], vol. vi. p. 522.
† Pharm. Journ. [3], vol. vi. p. 1001.

PRELIMINARY NOTE ON XANTHIUM SPINOSUM.*

BY M. GUICHARD.

The author presents the following contribution to the chemical and pharmaceutical history of this new medicament, which has recently been recommended as a remedy for hydrophobia.†

The drug is met with in the form of stalks bearing leaves and numerous spines. There is room therefore for the study of the picked and unpicked drug, and to ascertain which of the two should be employed, as probably the activity of all the parts is not the same. Their yield in extract is very different, 20 grams of cleaned leaves gave with alcohol 5 grams, or 25 per cent., of green extract containing much chlorophyll. 150 grams of the uncleaned drug treated in the same way yielded also a green extract, but in less quantity, the yield being only 12 grams, or 7½ per cent. The difference was due to chlorophyll.

The two extracts were prepared by coarsely powdering the plant, and treating it after twelve hours' maceration by displacement, first with 90 per cent. and then with 60 per cent. alcohol.

128 grams of the unpicked plant were treated by infusion, then pressed, and treated a second time. The product was evaporated in a water-bath, and gave 50 grams, or 39 per cent. of extract.

The alcoholic extracts were very bitter; the aqueous extract scarcely so. The author therefore thinks that probably the alcoholic extract is the most active, and this appears to be borne out by the following preliminary experiments:—

The alcoholic extract redissolved in water was precipitated by iodized iodide of potassium, but not by cadmi-potassic iodide. The alkalies precipitated iron and alumina. When dried with calcined magnesia and treated with ether, an extract was obtained which, if redissolved in water acidulated with few drops of hydrochloric acid, gave with the iodized iodide an abundant kermes-coloured precipitate, and with cadmi-potassic iodide a dirty grey precipitate that separated rapidly like curdled milk. Ammonia precipitated the solution slightly.

If the above aqueous solution be allowed to evaporate upon the object glass of a microscope crystals are obtained of various forms, such as needles grouped in crosses, or three branched stars and granular crystals; also some green colouring matter. The hydrochloric solution gives large square or rectangular tables as well as acicular crystals. The liquid precipitated by ammonia contains a large number of amorphous points and numerous bundles of fine needles.

The aqueous extract treated in the same manner gives no results. But the author considers that the preceding experiments demonstrate the presence of an alkaloid which he hopes soon to be in a position to isolate.

The mode of employment of the drug previously indicated was to administer 60 centigrams of the plant, finely pulverized, several times a day.

* Répertoire de Pharmacie, vol. iv., p. 513.
† See before p. 80.

PEPTONE.*

The term "Peptone †" is used to denote those albumin-, or proteïn-bodies, which have been altered by the gastric juice, or in other words, the result of the action of pepsin upon fibrin or albumin. Peptones, introduced into the digestive organs, are directly absorbed into the blood, without having to undergo previous digestion, and are converted into albumin-bodies. As there are various diseases in which the secretion of normal gastric juice is more or less diminished or entirely suppressed—preventing, therefore, the assimilation of the protein compounds —the nutrition of the system may still be accomplished by introducing peptones into the digestive canal. The importance of this mode of administering nourishment in typhous and gastric diseases is fully recognized by physicians.

The German peptone is sold in round tin cans weighing 340 gm. (12 ozs. avoird.), and containing 250 gm. (9 ozs. avoird.) of material. Dr. Hermann Hager suggests the following method of examining it: 10 vol. of the peptone are slightly warmed, mixed in a large test-tube with 60 vol. of a concentrated solution of sodium chloride, and the mixture set aside. After the lapse of thirty minutes the peptone has collected at the bottom of the liquid, and occupies 8 to 9 volumes, after thirty minutes more 7 to 8 volumes and after twelve hours not less than 3·3 volumes. Peptone, in a thin layer, is a clear liquid of the consistence of thin syrup, has a faintly bitter aste, somewhat resembling that of extract of beef or extract of mushrooms. A peptone-chocolate is also manufactured; this is of dark brown colour, has the consistence of a soft extract, and is sold in the same kind of tin boxes as the peptone itself.

Hager quotes the following extract from a report of Dr. H. Sanders in Amsterdam (who is also a manufacturer of peptone): It is well known that the albuminoid substances are the most important nourishing agents of the animal body. From them the muscles and nerves draw the necessary material for their constant recontruction during the process of life. But before these albuminoids can become of any use to the body, they must be digested; and this is done by being converted into peptone in the stomach and intestinal canal; as peptone, it is taken up by the blood, and there reconverted to albumin. As soon as any peptone as been formed, it is very rapidly absorbed. Whenever digestion is defective, or the gastric juice is of abnormal character, it is readily understood that the conversion of albumin or fibrin into peptone, and hence nutrition in general, must become impaired.

This defect may be removed by introducing ready-made peptone, which is rapidly and completely absorbed by the body, and which requires no further digestion. For this reason, it is just as effective if administered by the rectum, as if introduced into the stomach, and in many cases the former way is alone practicable.

The only disagreeable point about peptone is its taste; and if given by the mouth, this may require correction. In the case of nursing infants, it is sufficient to add it to the milk, about one to two tablespoonfuls to the quart. By beginning with small quantities, say one teaspoonful, they become easily accustomed to it. Adults may take it in milk, or diluted with water, or beef-tea. Or it may be mixed with equal parts of sherry, madeira, or some other generous wine. The most agreeable mode of administration, however, is the following:

Peptone-chocolate: 250 gm. (9 ozs. avoird.) of peptone are gently heated, and 200 gm. (7 oz.) of white sugar dissolved in it; to the warm solution are added, under constant stirring, 100 to 125 gm. ($3\frac{1}{2}$ to $4\frac{1}{4}$ ozs.) of pure pulverized chocolate (free from oil), until there is produced a homogeneous syrupy mass, which may be flavoured with vanilla, essence of orange, or of lemons. On cooling this mixture may be kept for a long time without spoiling, and a portion may be dissolved in hot water or milk. When administering it per rectum, it should be diluted with four to six parts of warm water.

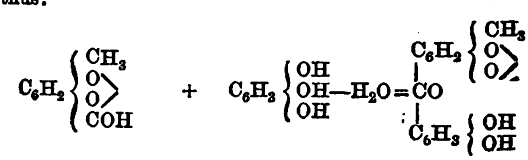
* From *New Remedies* August, 1876.
† Πεπτός, όν, digested, digestible.

GENTISIN.*

BY H. HLASIWETZ AND J. HABERMANN.

A previous paper on this subject appeared in abstract in this Journal.† Further research has shown that pyrogentisic acid is identical with hydroquinone. Of the various melting-points of the latter body hitherto given none are correct; the true melting-point is 169° (uncorr.). Gentisic acid has been found to be identical with oxysalicylic acid, which melts when pure at 196°—197°.

Gentisin, when treated with sodium-amalgam, yields a compound having the formula $C_{13}H_{10}O_4$, which differs from that of gentisin ($C_{14}H_{10}O_5$) by CO; and when fused gentisin is treated with dry hydrochloric acid, it yields methyl chloride. Hence gentisin contains the radicle methyl. In the former paper a diacetyl-gentisin was described, showing that gentisin contains two hydroxyl-groups. These facts admit of explanation on the assumption that gentisin is formed by the combination of phloroglucin with a body isomeric with piperonal, thus:



Piperonal isomer, Phloroglucin, Gentisin.

CAMPHIC ACID.‡

BY J. DE MONGOLIFIER.

This acid, which Berthelot obtained by treating camphor with alcoholic potash, is also formed by the action of oxygen on sodium camphor.

$$C_{10}H_{15}NaO + O = C_{10}H_{15}NaO_2.$$

Thus on heating a solution of the sodium-compound in benzene to 100° in a tube filled with oxygen, the gas was completely absorbed in a few hours, while at the common temperature it took two days. To prepare camphic acid, the product of the action of sodium on camphor is dissolved in coal-tar naphtha boiling at 125° C., and a current of air is passed to the gently boiling liquid. After the reaction is finished, the naphtha is distilled off, the residue exhausted with water, and the solution fractionally precipitated with an acid. First a resin is precipitated carrying down camphoric acid, which is also formed, and then camphic acid is thrown out, while some camphoric acid remains in solution.

Camphic acid yields, by double decomposition, the salt $(C_{10}H_{15}O_2)_2Cu$ as a green powder, which is partly soluble in ether, benzene, chloroform, and strong alcohol. The green alcoholic solution deposits a viscid almost black mass, drying up to a dark-green brittle substance consisting of $C_{10}H_{16}O_2 + (C_{10}H_{15}O_2)_2Cu$.

By oxidizing camphic acid with potassium permanganate, it is converted into oxycamphic acid, $C_{10}H_{16}O_3$, which does not crystallize, and resembles camphic acid, but is more liquid. At the same time some acetic acid and camphoric acid are formed, as well as an acid which appears to be toluic acid.

* From the *Journal of the Chemical Society* for July (Liebig's *Annalen*, clxxx., 343—349).
† *Pharm. Journ.* [3], vol. vi., p. 90.
‡ From the *Journal of the Chemical Society* for July (*Bull. Soc. Chim.* [2], xxv., 13—17).

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 23, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE IGNOBLE ARMY OF GRUMBLERS.

THE letter which appears in our correspondence columns this week, under the title of "Pharmaceutical Politics," expresses some wholesome views in regard to several of the subjects which have recently agitated the pharmaceutical community, with the result that another effort is being made to bring about united action of the trade for purposes of internal self-government. Without entering into the merits of the objections referred to by our correspondent as being urged against the Council of the Pharmaceutical Society on the ground that it has not secured for every individual in the trade that particular condition of affairs which would be deemed satisfactory by himself, we will merely direct attention to the concluding paragraphs of the letter as being especially worth considering.

The opinions there put forward are by no means novel; in fact they have been in various ways repeatedly urged, but hitherto they have been to a great extent disregarded. We are not aware of any attempt having ever been made to prove that they are unfounded, neither do we believe that such an attempt would be at all successful. On the contrary, we regard the recent endeavour to form a Trade Association as evidence that the greatest need of the trade and the chief obstacle to its improvement is want of unity. It has been inferred by some that the comments we have made on the slow increase in the numbers of the Trade Association were instigated by a spirit of antagonism, or a desire to discountenance the enterprise. We entirely repudiate such motives, and far from being disposed to sneer at the disproportion between the members of the Association and those upon the 'Register,' we are rather moved with regret at being the unwilling witness of another indication that there is amongst the great mass of the trade a radical unfitness for participating in or even recognizing the value of any effort to improve.

Even the very form of the complaints that reach us from time to time give evidence of the grave deficiency we refer to. "What do we get for our guinea a year?" writes a Norwood chemist *à propos* of the correspondence which lately appeared in the *Echo* on the subject of dispensing charges, and if the question has any meaning we must infer that he supposes the Council of the Pharmaceutical Society ought to impose a tariff of dispensing charges for the whole of the country. It is true that in the particular case referred to the difference in the charge made for the medicine dispensed was between a Registered Chemist and a Co-operative Store, and our correspondent must be credited with the belief that the Stores carry on a piratical trade which the Council of the Pharmaceutical Society ought to oppose. We are aware that many hold this view; but it is not represented in the Council to such an extent as to command its being acted upon, and, therefore, the charge of neglect of duty falls to the ground.

But the cry, "What do we get for our money?" betrays a further and a more serious evil in the state of feeling among certain sections of the trade. There is nothing but the selfish regard of individual interest, without any consideration of the benefit conferred on the trade at large by giving support to an organization which has, at least, for its object the advancement of those engaged in this pursuit, which has already done much in this direction, and has unquestionably been restricted in its beneficial action by the fact that it does not even now represent more than one half the trade.

We, therefore, commend to the thoughtful consideration of the dissatisfied portion of the trade the letter in which MR. MEE deals with this subject.

SALE OF POISONS.

IT is scarcely possible to believe that the provisions of an Act of Parliament which was passed mainly out of consideration for the safety of the public should be so generally misunderstood as it appears is the case in regard to the sale of poisonous drugs. Last week we had occasion to comment on the unaccountable misinterpretation of the Pharmacy Act, by which it was held to be necessary to register the sale of laudanum, and on previous occasions we have had to record equally unjustified proceedings on the part of magistrates and coroners.

But it is still more remarkable to find that in regard to an Act dealing specially with the sale and supply of drugs, a vast amount of ignorance prevails among medical men. Only last week the *Lancet* in reporting the facts of the Spalding case, commented upon the sale of the laudanum in the following terms:—

"The gravest aspect of the case is the facility with which a large quantity of opium was and can be obtained. Laudanum was sold in large quantities to the man by two chemists: by one, first one ounce was given, and afterwards two ounces more. No entry was made of the sale in the register for the sale of poisons, and it was stated by the chemists in question that the sale of laudanum is never so registered by them. Any quantity is sold on a pretext being given for its use, without any of the restrictive regulations prescribed by the Sale of Poisons Act. This is reducing the statute to a dead letter, for it is disregarding it where it is most needed."

Here the assumption that the Act requires registration of the sale of laudanum is manifestly the basis upon which these opinions are expressed. The fact that such an assumption is totally inconsistent with the provisions of the Act, would be sufficiently clear to most of our readers, but to the public generally, and even to medical men, this would not be the case. The result is, that an unmerited opprobium is cast not only upon the actual vendors of the laudanum in the Spalding case, but also upon chemists and druggists in general, who are represented as being in the constant habit of disregarding the regulations of the Act. With the same injustice they are indirectly charged with aiding the deleterious practice of opium eating. In point of fact, however, there is nothing in the Pharmacy Act which would enable the druggist to influence that practice one way or the other, and we venture to add that it is no part of his business to attempt doing so.

If our contemporary be desirous of attacking one of the illegal modes in which narcotics are supplied for consumption by the rural population in some parts of the country we recommend to his attention the sale of laudanum and opium under the guise of patent medicines, that is to say with a 1½*d.* Government stamp on the packet containing them, so as to evade the provisions of the Pharmacy Act. This is an abuse which not only facilitates the pernicious habit of opium eating, but also does harm in other ways. We shall be glad to see the influence of the *Lancet* brought to bear for its suppression.

TESTIMONIAL TO A PHARMACIST.

We learn from the *Cape Mercury* that a very handsome testimonial was recently presented to Mr. Thomas Daines, Pharmaceutical Chemist, and a member of the Pharmaceutical Society of Great Britain, of King William's Town, Kaffraria. The testimonial consisted of an address, illuminated and engrossed on vellum, together with a highly finished binocular microscope and accessories, and was in recognition of Mr. Daines' services as Secretary to the King William's Town Temperance Society.

FRENCH PHARMACEUTICAL STATISTICS.

According to recent statistics, quoted in the last issue of the *Bulletin Commercial*, there are at the present time in France 2,121 pharmaciens of the first class and 4,089 of the second class, being a total of 6,210 pharmaciens. Ten years since, in 1866, there were 2,457 of the first class, and 3,346 of the second, or altogether, 5,803 pharmaciens. Next to the department of the Seine, in which alone there are 820 pharmaciens (495 first class and 325 second), the departments having the highest number of pharmacists are the Bouches-du-Rhone, Gironde, Nord, Seine-Inferieure, Seine-et-Oise, Var, and Haute-Garonne. Between the 1st of January, 1803, and the 1st of January, 1876, the superior schools, the medical juries, and the preparatory schools of pharmacy have conferred no less than 16,650 degrees of pharmacien, of which 6,462 have been of the first class and 10,188 of the second. On the average, there is now in France one pharmacy to 10,000 inhabitants and a territorial area of 2,000 hectares.

ONTARIO NOTES

At the last half-yearly meeting of the Ontario College of Pharmacy, an application from a Government detective to be appointed Public Prosecutor under the Provincial Pharmacy Act of 1871 was agreed to. The new official, who holds a similar appointment from the Dental Association and the College of Physicians and Surgeons for Ontario, is to act as the authorized agent of the College, but it is provided that the College shall not incur any expense by his operations.

At the same meeting a person applied for registration under the local Pharmacy Act, without submitting to examination, producing as proof that he had been in business on his own account before 1871 a receipt given by the Pharmaceutical Society of Great Britain. The application was, however, rejected, on the ground that the provision in the Act applies to the province of Ontario only.

There appears to be a very general desire amongst the members of the Ontario College of Pharmacy that the American Pharmaceutical Association should meet in Toronto next year. A delegate has been authorized to attend the meeting of the Association at Philadelphia with an invitation to that effect, and a numerous and influential committee has been appointed to carry out the necessary arrangements should the invitation be accepted.

ARTIFICIAL COLOURING OF WINES.

Since the vintage of 1875, the artificial colouring of wines in France has attained such a development as to raise fears not only for the good name of French wines, but also for the public health. The Syndicate of wine merchants of Paris has taken the matter up and urged it upon the attention of the French Government in a vigorously written memorial, in which it is roundly asserted that the sole object of the colouring is so to treat a wine, at an insignificant cost, that it may be sold considerably above its real value. Formerly colouring was only done to a small extent and with vegetable and comparatively inoffensive matters, but now, it is stated, hundreds of kilograms of arsenical fuchsine and other equally poisonous substances are used for the purpose and the sale of such preparations is openly advertised. The Syndicate urges that it is useless to discuss in chemical laboratories whether fuchsine itself, or arsenical fuchsine when diluted to a certain extent, is poisonous or not, there being no guarantee against the greediness of the wine colourer. One result of the agitation has been that the officers of *octroi* have been ordered to take samples, for analysis, of all red wines coming into Paris.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

At the Annual General Meeting of this Association, held at the Bristol Museum and Library, on Thursday, August 31st, the following gentlemen were elected to serve on the Council for the ensuing year:—Mr. C. Boorne, President; Mr. J. Stroud, Vice-President and Treasurer; Mr. R. L. Tucker, Honorary Secretary; Mr. W. Berry; Mr. J. Boucher; Mr. J. Pitman; Mr. J. G. Plumley; Mr. G. F. Schacht; Mr. W. W. Stoddart; Mr. A. Towerzey; Mr. C. Townsend; and Mr. J. W. White.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

Tuesday, September 5, 1876.

(*Continued from page* 247.)

The next paper read was on—

A New Excipient for some of the Official and other Pill Masses.

BY G. WELBORN.

One of the subjects for investigation in the list compiled by the British Pharmaceutical Conference relates to the unsatisfactory condition which some of the pill masses of the Pharmacopœia acquire by long keeping.

It has doubtless been observed by every pharmacist who has had an extended experience in the preparation and dispensing of the official pill masses, that, as far as regards the keeping qualities of several of the masses in question, there is still much to be desired.

Deterioration is marked by widely different phases, and is dependent upon a variety of causes. In some instances, the masses are hygroscopic and become soft or sticky, *e.g.*, "pil. saponis comp.," "pil. scillæ comp.," and "pil. ipecac. c. scillâ." Others become dry through evaporation,—as "pil. colocynth. comp.," or, extremely hard and vitreous, as "pil. assafœtidæ comp.," or granular, as in "pil. aloes et ferri."

Having noticed the various altered conditions developed by age in the above mentioned preparations, it becomes of some importance to consider whether those changes can be prevented by the use of some more suitable excipient.

With the view of obtaining such a substance, glycerine was selected as a basis, since it has been found to prevent the damaging effects caused by evaporation. It cannot, however, be used by itself for this purpose, as it is open to the objection of causing pills thus prepared to "fall," and, in some cases, to run into a mass.

This tendency may be obviated by the addition of tragacanth mucilage in the following proportions:—

Gum tragacanth, in powder .	½ oz.
Glycerine	
Water, of each	2¼ oz.
Oil of Pimento	gtt. v.

Mix.

The above product will keep good for several years in an ordinary covered pot.

The weight of "tragacanth excipient" required for the following official pill masses and the Pharmacopœia quantities, is approximately as follows:—

	Tragacanth excipient		Conf. of Roses.
Pil. aloes et ferri	2½ oz	may be substituted for	4 oz.
Pil. aloes et myrrhæ	1 oz	"	2½ oz. Treacle.
Pil. rhei comp.	2 oz	"	4 oz.

ʒj of Howard's sulphate of quinine, and ℈j of the tragacanth excipient make a nice mass; while only gr. vij of it are required to form a tough, plastic mass with ʒj of compound ipecacuanha powder.

When this excipient is used there is but rarely the slightest tendency to adhesion between the mass and the pill mortar,—consequently there is no loss of materials.

Another point of some importance is, that the use of pill-powder in the operation of pill making is usually unnecessary.

The advantages as an excipient possessed by the substance just described, may be summarized as follows:—the small quantity necessary to effect the desired purpose; the facility with which it mixes with dry powders; its cleanliness; and its efficacy as a preservative.

The thanks of the Conference having been awarded to the author,

Mr. Greenish observed that tragacanth and glycerine as an excipient for pills was by no means new, and he considered the addition of oil of pimento unnecessary and a bar to its general employment.

The next paper read was a—

Note on Phosphorus Pills and Pill Coatings.

BY THOMAS HAFFENDEN.

My mode of dispensing phosphorus in pills is by means of a water-bath. The one I use is a small porcelain kind of cup and saucer, the cup holding four or five ounces and the saucer a proportionate amount of water. This, with a tripod stand and ordinary spirit lamp, is all the apparatus that is needful in addition to the usual pill making requisites. The bath is filled up with nearly cold water, and then inside the cup a small quantity of B.P. mucilage and the phosphorus; in a few minutes, as soon as the proper degree of heat is attained, the phosphorus melts, and on being stirred forms quite an emulsion with the mucilage. Now is the time. The cup containing the emulsion is removed from the saucer and the powder to form the pills rapidly but carefully stirred in with a small spatula. Care is required in doing this to keep the mass together, otherwise if spread on the warm sides of the cup the phosphorus is apt to catch. When well mixed together they may be put in a mortar and worked up in the usual way. By this method, without using any greasy or oily preparation, we get a pill containing phosphorus in a free state and exactly in the condition required by the profession. Dr. Corfe and Mr. Eugene Hart, for whom I have frequently prepared them, speak most highly of them. This simple and expeditious method seems to obviate the necessity of keeping them in stock, or being obliged to limit prescribers to one or two formulæ. They take but a few minutes longer in the making than any ordinary pill. I have also dispensed the emulsion of phosphorus in a mixture and it combined quite readily. I found the emulsion did not keep by itself for more than a few days, a deposit of some kind making its appearance. I have, however, kept pills for months, made of phosphorus, quinine, iron, tragacanth, and mucilage, by simply varnishing them with tolu and ether. To make them more presentable it is my custom to coat also with French chalk. The secret of successfully coating pills is to varnish, first rendering them partially waterproof; then it is simply a question of manipulation to get a pearl-like covering with mucilage and French chalk. I have succeeded very well with albumen, freshly prepared in the way recommended for albumenized paper for photography, substituted for mucilage.

The President said there was in the Pharmacopœia a process for the preparation of phosphorus pills which had been a good deal criticized by some members of the trade. It was one which originated with himself, although he did not originally suggest it. The first suggestion came from Mr. Abraham, who found that phosphorus was very readily dissolved or diffused through tolu balsam when the latter was heated. The resinous substance having a greater specific gravity than water could be melted at the bottom of hot water and the phosphorus could then be mixed with it without any possibility of oxidation taking place from contact with the atmospheric air. Certainly it did appear to him that this process was a perfectly good and valuable one, and as far as he had been able to judge by comparison with other processes to the present time, he believed that it was the best process for administering phosphorus in the form of a pill, or rather he should say the best form for keeping phosphorus in a pilular condition available for dispensing. It had, however, been stated by a gentleman who was present, and confirmed by others, that this phosphorus pill, when taken in this form would pass through the intestinal canal without the phosphorus getting into action. But that was very easily obviated by the admixture of a little soap. The great advantage which he considered this pill to possess, was, that it afforded a perfect facility for dissolving or entirely diffusing in a very minute state of comminution the phosphorus through the tolu balsam without oxidation of the phosphorus taking place. This product, when the wax had been added to it, could be kept beneath the surface of cold water for a great length of time without any change occurring. He had kept the mass for more than twelve months and found the free phosphorus present at the end of that time just as it was at the commencement. This he held to be a great advantage. When this pill was prescribed the physician ought to order that in dispensing it a small portion of soap should be added, which was easily done with a drop or two of spirit, and one grain of Castile soap to three grains of the pill mass rendered the pill perfectly miscible in water, and therefore its action would take place without difficulty. There was one other form for the administration of phosphorus in a pillular form that he consider was also a good one, although in some respects he did not consider it equal to the one he had just described. It was first to dissolve the phosphorus in some kind of grease, tallow for instance, and then to add to it powdered phosphate of lime, which possessed in a very remarkable manner the property of giving a greasy substance, such as lard or mercurial ointment, a good pilular consistency when added in a comparatively small quantity. If phosphate of lime were added to the fat or tallow in which the phosphorus had been melted by the aid of heat, the mass could be kept beneath the surface of water, because the addition of the phosphate of lime gave the mass a greater specific gravity than the water. A pill mass of that description could be kept beneath cold water, just as phosphorus was kept, for any length of time without sign of a change, and a pill of that kind diffused in the contents of the stomach more readily than the resinous mass which was at present ordered by the Pharmacopœia. These were the two forms which, as far as he knew, appeared to be most advantageous for administering phosphorus in a pill.

Mr. Martindale said he felt inclined to take objection to the mode of making phosphorus pills directed by Mr. Haffenden on this score, that the pill would be merely in a state of emulsion, minutely divided, not perfectly dissolved. He thought phosphorus was much better administered in a state of solution. For making phosphorus into a pill mass he had with great advantage for several years adopted the plan of dissolving it the extent of one per cent. in cacao butter. He objected to Mr. Haffenden's method because the pill would only reach a state of minute division, and much of it would be scarcely acted upon in its passage through the human body, as it required a higher temperature than that of the body to liquefy it. On that account a much larger dose would be required to produce the same action than if it was in the state of perfect solution. With regard to the use of resin as a basis one member of the medical profession who used phosphorus largely said decidedly that he could not get any definite effect from phosphorus given in a state of pill as described by Mr. Gerrard. It was well known that among other things common turpentine neutralizes the effect of phosphorus and renders it non-poisonous if a sufficient quantity be given to act as an antidote. Common resin being so nearly allied to it one might assume that it may have a similar action. Other resins, such as balsam of tolu, may also have the same effect and thus be objectionable. The formula first published by Messrs. Bell and Co., Oxford Street, was that of using suet as a solvent for phosphorus, and rolling it in pills. Cacao butter would make a harder pill with a little dexterity, but there was at first a little difficulty in rolling it out. He had tried the President's process of adding a little phosphate of lime. He did not think that with it the cacao butter was more plastic or easily rolled, so he left off using it. But such a mass might be kept, under water, as the President said, without much difficulty. It could, however, be better kept in a bottle with a well greased stopper, by which means there was an entire prevention of the access of air; and there was an objection to keeping the pill mass under water in that it became saturated with moisture, and pills made from such a basis would not take a varnish well. Mr. Proctor recommended a solution of sandarach in ether—he preferred in absolute alcohol— as a varnish. This gave the pills a nice coating, and they were as a rule much liked if they were made by a careful manipulator.

Mr. Proctor said he thought there was one point in which the Pharmacopœia formula for these pills was defective. It did not contain sufficient phosphorus. Sometimes he could scarcely get the dose prescribed into an ordinary pill if he used the pill mass of the Pharmacopœia. If the formula were increased in strength it would be a fairly satisfactory one when used in connection with the soap. He knew of one case in which a quarter-grain of phosphorus was prescribed in a dose, but according to Mr. Martindale's form 25 grains would be required—rather a large dose to swallow. In such cases he worked by a formula which he published in the *Pharmaceutical Journal* for November 1, 1873, p. 359, in which the phosphorus was dissolved in sulphide of carbon, and a drop of oil of cloves was used to reduce the tendency of the phosphorus to inflame. He varnished the pills with sandarach dissolved in ether, not in alcohol, and they kept in good condition, so much so, that when manipulated between the finger and thumb they could be almost made to ignite after being kept for six months in an ordinary pill box.

Mr. Greenish stated that he considered bisulphide of carbon as a solvent for phosphorus quite unexceptionable; he had long used it in preference to any other. With regard to the vehicle for a pilular form, cacao butter was perhaps one of the best; but he had found that the addition of a little balsam of Canada rendered the mass more plastic, and this addition would also have a tendency to retard the too rapid solution of the pills in the stomach. There was, however, one great objection to cacao butter alone as a vehicle for phosphorus which he should like to mention, and that was, the too ready solubility of the pills in the stomach, giving rise to the unpleasant eructations peculiar to phosphorus, on account of which some persons had been obliged to discontinue taking it. He had taken the pills himself and considered that the objection was well grounded. To remedy this inconvenience, he would suggest that the cacao butter be combined with some other and less soluble substance, so that the pills should pass lower down the stomach before being dissolved, and he considered that the addition of balsam of Canada to the pill mass was a step in this direction.

Mr. Borland said he had for some time past had experience in the preparation of phosphorus pills, both with theobroma butter and with the process given in the Pharmacopœia, and he most distinctly gave his preference to the one as stated in the Pharmacopœia, for the reason that he had found it to keep much better. In the locality from which he came some medical gentlemen were in the habit of prescribing it as a compound pill. The difficulty that had presented itself in compounding such a pill was how to get a butter made pill to take as good a shape in pill mass. When they had to take half-a-grain of extract of nux vomica and one grain of ferrum redactum, with three grains of phosphorus pill, if they used the cacao made pill they could not get a mass at all. It was with great difficulty they could get a five-grain pill made unless they employed the mass according to the Pharmacopœia formula, and by introducing a very small portion of Castile soap they found no difficulty whatever.

Mr. Ekin said that in his opinion, resin answered best. The objection to Mr. Martindale's formula was that it was very difficult to varnish, and it made far too bulky a pill with a large dose of phosphorus. To him resin seemed to answer every possible purpose. The solution took place very readily under hot water, and the product, as he had proved, kept perfectly well under cold water for ten or twelve months without any apparent loss of phosphorus. With resin such a strength of solution could be made as would be convenient for dispensing, it being possible to give a full dose of phosphorus, combined with 3 or 4 grains of other matter, such as quinine and reduced iron, without making too large a pill. The mass also powdered very readily, and could be worked up easily and rapidly. Phosphorus combined in this way had been prescribed very largely and with excellent effect, especially in cases of acute neuralgia, so that the activity of the phosphorus was evidently not impaired by the solvent used.

Mr. Taylor said there were some practical difficulties in the way of preparation that were rather against the use of tolu balsam. The B. P. phosphorus pill, in his opinion required to be modified in some way so that a soluble instead of an insoluble substance like wax could be introduced.

The President said: The object of adding the wax was to give better pilular consistency to the mass. Long ago he urged upon medical men in prescribing this pill that it should always be prescribed in combination with soap.

In answer to a question from the President, Mr. Ekin said that he used the common yellow resin, which yielded a mass having a greater specific gravity than water.

The next paper read was on—

Some Salts of Pilocarpine.

BY A. W. GERRARD,

Teacher of Pharmacy at University College Hospital.

The only described compounds of the alkaloid pilocarpine known to the present time are the nitrate, chloride, and platino-chloride. The two former, I, a year since, prepared and briefly described; the latter has since been made by Kingzett as a crystalline salt, and was used by him in making an elementary analysis of the alkaloid, to which, after several experiments, he assigned the formula—

$$C_{23}H_{34}N_4O_4+4H_2O$$

In the early part of this year I succeeded in obtaining some almost pure and colourless alkaloid (its purification having been hitherto a matter of difficulty) by means of the property I found the nitrate of pilocarpine to possess of being soluble in boiling alcohol, from which it separates on cooling in tufts of white shining crystals. By three crystallizations it can be obtained in an almost perfect state of purity. The alcohol from which it is crystallized should be retained for further treatment, as it still holds in solution a small portion of the salt. The crystals thus obtained dissolve in water and the solution made alkaline with potassic hydrate, shaken with chloroform, the chloroform separated and removed by distillation yields as a residue the purified pilocarpine. Portions of alkaloid prepared by this method were dissolved in water and neutralized respectively with nitric, hydrochloric, sulphuric, acetic, phosphoric, and hydrobromic acids; the quantities of each being small, they were allowed to evaporate spontaneously. In three days they had all become crystalline, the nitrate, phosphate, and hydrobromide were best defined, the remaining salts were very deliquescent, especially the sulphate and acetate; when in the crystalline state the acetate formed a block of pretty looking crystals with plumose markings.

I made some experiments on the effect of various solvents on the above salts, excluding the sulphate, as its crystals were imbedded in a viscous mass and difficult to separate. Nitrate of pilocarpine is soluble in water, sparingly in cold, but freely in boiling alcohol; it is insoluble in ether, chloroform, benzole, and carbon bisulphide. Hydrochlorate of pilocarpine is soluble in water, alcohol, and chloroform; insoluble in ether, benzole, and carbon bisulphide. Phosphate of pilocarpine is soluble in water, sparingly in cold, but more freely in boiling alcohol, from which it crystallizes on cooling, in lustrous tables; it is insoluble in ether, chloroform, benzole, and carbon bisulphide. Acetate of pilocarpine is soluble in water, alcohol, chloroform, benzole, and ether; insoluble in carbon bisulphide. Hydrobromide of pilocarpine is soluble in water, alcohol, and chloroform; insoluble in ether and carbon bisulphide. The form of the crystals of all these salts are, I believe, tabular and of the oblique system; the nitrate and phosphate, by reason of their stability and definite character, recommend themselves most for general purposes.

Mr. Kingzett said he wished to correct some errors committed by Mr. Gerrard in referring to his researches. He was the first to attach, on analytical evidence, a formula to pilocarpine, and he did this not only on the analysis of the free alkaloid, but also on that of the dihydrochloride platinic chloride compound, which he was the first to prepare and in a crystalline form. Mr. Gerrard had alluded to it as the platinic chloride salt; this it was not, and it was important to recognize the fact. Mr. Kingzett contended that his researches left no doubt of the true composition of the alkaloid. Its formula was $C_{23}H_{34}N_4O_4 (4H_2O)$ and that of the salt he had discovered $C_{23}H_{34}N_4O_4, 2HCl\ PtCl_4$. Although he had failed to get a crystalline hydrochlorate of the base, there yet could be no doubt that there was in jaborandi only one alkaloid. This fact would become evident when his research was seen by them in printed form. The suggestion made by Mr. Gerrard to the effect that his (Mr. Kingzett's) preparation may have been a mixture admitted of no support; it could not be. He had isolated the alkaloid by various methods, but most readily by means of the phosphomolybdic acid method, and it was from the analysed free base that the platinic compound had been prepared. He had, moreover, reconstructed the base from the platinum salt. He had seen Mr. Gerrard's preparations, and of course did not doubt their existence, but before all things it was necessary that they should be submitted to analysis; this, however, had not been done. He should feel extremely grateful for any preparations that Mr. Gerrard or others might be pleased to make over to him, and in that case he would examine and analyse them. He moreover, trusted to be able at the next meeting of the Conference to supply some knowledge regarding the physiological action of pilocarpine, a matter which a medical friend of his intended to study. Mr. Kingzett added further, that it was his opinion that the difference exhibited in the compounds of his preparation and that of Mr. Gerrard was probably to be explained on the ground of isomerism.

The President said he thought it should be understood that Mr. Gerrard only undertook to extract from the jaborandi some crystalline salts, and to get at the pharmacy rather than the chemistry of the matter.

In response to the President's request, Mr. Kingzett promised to carry on his researches in this direction.

Second Report on the Chemistry of the Aconite Alkaloids.

BY C. R. ALDER WRIGHT, D.SC. LOND.,

Lecturer on Chemistry in St. Mary's Hospital Medical School.

The results described in the first report (made to the Conference last year) on the chemical composition of the alkaloids extracted by Mr. Groves from *Aconitum Ferox* and *A. Napellus*, whilst rendering it probable that the principal active constituents of the two roots are not identical, were yet not completely satisfactory on the point, inasmuch as the methods of extraction adopted by Mr. Groves were in each case extremely liable to induce changes and decomposition of the alkaloids originally present; and that such changes were actually produced in the product from *A. Napellus* is rendered almost certain by the circumstances that the majority of the mixture of bases yielding crystallizable salts obtained by him consisted of an almost inert bitter base closely akin to the "crystallizable aconite" of Duquesnel, but differing therefrom not only in physiological potency but also in facility of crystallization from ether; whilst by a different method of proceeding, Duquesnel obtained a considerable yield of a highly active, well crystallized body.*

The circumstance observed by all who have worked with the aconite alkaloids that these bodies are very readily alterable; the fact that the commercial drug called "aconitine" is for the most part amorphous and not of constant physiological power; and the very different characters ascribed to the alkaloid isolated from *A. Napellus* by different observers; all appear to point to the conclusion that the use of alcohol acidulated with a *mineral* acid to percolate the ground root, and the subsequent boiling down of the extract thus rendered acid, as usually practised, cause alteration in the alkaloid originally present; whilst the use of tartaric acid and a low evaporating temperature, as recommended by Duquesnel, appears, from the crystallizable nature of the base thus obtained, to produce less change, or perhaps none at all. Inasmuch as nearly all the observers who have worked on the aconite alkaloids have employed mineral acids as extracting agents in the first instance, it seems to be not impossible that the bodies described by Hübschmann, Groves, and others as Napelline, Lycoctonine, Acolyctine, Pseudaconitine, etc., may really be different alteration products, or mixtures of such products, of some one parent alkaloid common to all the species of aconites.

A thorough revision of all that has been done on the subject seems therefore essential in order to reconcile conflicting statements and to clear up the true character of the active principles contained in these roots: with this object in view experiments were first commenced with *A. Napellus*, the extraction method of Duquesnel being employed; the results of these experiments being as yet far from complete, the following must only be taken as an interim report on the subject.

Messrs. Hopkin and Williams kindly carried out the first part of the operation, viz., grinding 2 cwt. of *A. Napellus* root, percolating with alcohol acidulated with tartaric acid (about one pound of tartaric acid and about 60 gallons of alcohol being used), and concentration of the extract at as low a temperature as possible. Two percolates were thus obtained (No. 1 and No. 2), but as these did not appear to exhibit any essential differences in character, they were finally worked up together. The concentrated extracts jointly amounting to some 5 gallons were sent to the reporter, and consisted of a clear brown red aqueous solution and a resinous viscid mass insoluble in water. The whole was exposed to the air in shallow pans for about ten days to dissipate as far as practicable remaining alcohol, and was then diluted with its own bulk of water and filtered from the resinous mass. The filtrate and washings were agitated with benzoline (light petroleum distillate) whereby some further amount of resin was removed, and the aqueous liquid was then precipitated by means of potassium carbonate; flakes were thus thrown down which became indistinctly crystalline on standing, whilst the alkaline liquor retained some alkaloid in solution. The whole was filtered through calico and the precipitate washed two or three times; the filtrate was precipitated by mercuric iodide dissolved in potassium iodide solution; a copious precipitate was thus thrown down which was collected, washed, and suspended in alcohol and decomposed by sulphuretted hydrogen. The base ultimately obtained from this liquid has not yet been completely examined; it appears to be non-crystalline and completely different from the crystalline alkaloid described below, which is almost absolutely insoluble in sodium and potassium carbonate solutions.

On agitation with a large bulk of ether of the precipitate thrown down by the potassium carbonate, it dissolved with the exception of some humus-like flakes; the ethereal solution was agitated with aqueous tartaric acid, and the ether thus deprived of alkaloid used over again, and so on seven or eight times; finally the ethereal liquid left after agitation with tartaric acid retained in solution a small amount of a clear yellow resin. The acid tartrate solution thus obtained was precipitated by a slight excess of sodium carbonate, and the precipitate agitated successively with small bulks of ether. Much was thus dissolved, but finally, a considerable quantity of snow-white crystalline flakes, comparatively sparingly soluble in ether, were left. A portion of these was well washed and dissolved in hydrochloric acid; with auric chloride it threw down a pale yellow amorphous gold-salt of which

0·8045 gram dried over H_2SO_4 and finally at 100° gave 0·1640 Au = 20·38 per cent.
0·9210 " " 0·1875 " = 20·36 "

These crystalline flakes were then agitated with ether so as to dissolve about one-third; on spontaneous evaporation, the ethereal solutions deposited crystals (No 1) which were converted into gold salt, of which 0·4825 gram gave 0·0980 Au = 20·31 per cent. The insoluble residue was again similarly treated with ether, and two gold salts made, one from the crystals from this second ethereal solution (No 2), the other from the crystals finally left undissolved by the ether (No. 3).

From ethereal solution (No. 2) 0·5730 gram gave 0·1165 Au = 20·33 per cent.
Left undissolved (No. 3) 0·6760 gram gave 0·1375 Au = 20·34 per cent.

The percentage of gold in these different gold salts being practically identical, it would seem that the portion of the original potassium carbonate precipitate which was left undissolved by successive treatments with ether, consisted of one single base; a conclusion corroborated by the results obtained on combustion of the different samples thus prepared, and by the similarity in their general properties.

No. 1	0·2615 gave	0·5840 CO_2 and	0·1600 H_2O.	
No. 2	0·3545 "	0·7880 "	0·2200 "	
	0·2720 "	0·6060 "	0·1670 "	
No. 3	0·2830 "	0·6380 "	0·1730 "	
	0·2880 "	0·6475 "	0·1800 "	

Crystals left undissolved by ether at first.	No. 1	No. 2		No. 3		Mean.
Carbon in free base	60·91	60·62	60·76	61·48	61·32	61·02
Hydrogen in free base ...	6·79	6·89	6·82	6·79	6·94	6·84
Gold in gold salt 20·38 20·36	20·31	20·33		20·34		20·34

* *Comptes rendus*, lxxiii., p. 207.

Notwithstanding the tolerably close agreement between these different specimens, however, it seems that no one of them was absolutely pure, though each one was very nearly so; for on mixing about equal quantities of Nos. 1, 2 and 3, dissolving in slightly warm dilute hydrobromic acid, and precipitation by sodium carbonate of the drained and washed snow-white crystals of hydrobromide that separated on cooling and standing, a quantity of base was obtained which after solution in ether gave by spontaneous evaporation crystals much better defined and larger than any of the above described specimens; from these the following numbers were obtained (purified base, specimen "A"):—

0·2660 gram of base dried at 100 gave 0·5955 CO_2 and 0·160 H_2O
0·3445 gram of gold salt dried at 100 gave 0·1690 Au.

These numbers agree best with the formula $C_{33}H_{43}NO_{12}$ which requires the following values:—

Calculated.			Found. Purified Base. Specimen "A."	Mean of Nos. 1, 2 and 3.
C_{33}	396	61·39	61·06	61·02
H_{43}	43	6·67	6·68	6·84
N	14	2·17		
O_{12}	192	29·77		
$C_{33}H_{43}NO_{12}$	645	100·00		
Gold in Au Salt— $C_{33}H_{43}NO_{12}$ H Cl, Au Cl_3		= 19·92	20·01	20·34

Similar numbers have also been obtained with other specimens of purified base (*vide infra*); from which it may be concluded that two or three recrystallizations from ether are not sufficient to free aconitine completely from another base of lower molecular weight which accompanies it, whilst, however, a greater degree of purity is attained by crystallization of a salt of the base, *e.g.*, the hydrobromide.

The ethereal solutions obtained as above described, by agitating with successive small bulks of ether the precipitate thrown down by sodium carbonate from the crude acid tartrate, were mixed and allowed to evaporate spontaneously to a small bulk; a large crop of slightly coloured crystals was thus obtained, which were drained with the filter-pump and slightly washed with ether; the remaining crystals were then dissolved in benzene, in which they were very soluble, most of the colouring matter being retained by a small aqueous layer, which formed under the benzene solution. On adding light petroleum distillates (benzoline of commerce) to the benzene solution a large crop of nearly white crystals was thrown down (No. 4). These crystals appeared identical with the substance constituting specimens Nos. 1, 2 and 3, but were less pure. They gave the following numbers:—

No. 4.—0·2330 gram gave 0·5360 CO_2 and 0·1470 H_2O.
0·3965 gram of gold salt gave 0·1850 Au.
0·9215 " " " 0·1905 "

After recrystallization from ether somewhat different numbers were obtained, almost identical with those given by specimens Nos. 1 and 2.

No. 5.—0·2700 gram gave 0·5980 CO_2 and 0·1620 H_2O.
0·5630 gram of gold salt gave 0·1140 Au.

Finally, these recrystallized crystals were converted into hydrobromide, and the base regenerated from the drained and washed crystals of the salt, and crystallized from ether. This sample ("Purified Base Specimen B") gave numbers almost identical with those obtained with "Purified Base Specimen A."

0·2440 gram gave 0·5500 CO_2 and 0·1520 H_2O.
0·5725 gram of gold salt gave 0·1145 Au.

Calculated for $C_{33}H_{43}NO_{12}$.		Found.			
		Purified Base Specimen B.	No. 5.	No. 4.	
Carbon in Base . . .	61·39	61·47	60·40		62·74
Hydrogen " . .	6·67	6·92	6·67		7·01
Gold in Gold-Salt . . .	19·92	20·00	20·25	20·63	20·67

Hence the base contained in the crystals obtained from the portion of crude bases first taken up by a quantity of ether insufficient to dissolve the whole was identical with that left in the portion not taken up by the ether so employed, both giving numbers agreeing with the formula $C_{33}H_{43}NO_{12}$. To this base it is proposed to restrict the name *aconitine* in future.

In last year's report numbers were given, obtained by the analysis of a base derived from the products obtained by Mr. Groves from *A. Napellus*, closely resembling this aconitine, but somewhat different from those required for the above formula. These numbers, however, are very close to those obtained with specimen No. 4. Thus—

Impure Aconitine. No. 4.			Base from Mr. Groves' Products.*		
			From Specimen marked "B" in First Report.	From Specimen marked "C" in First Report.	
Carbon in Base		62·74	62·90	62·90	62·75
Hydrogen "		7·01	7·45	7·24	7·30
Gold in Gold-Salt . . .	20·63	20·69	20·32		20·71

From this it would seem very probable that the physiologically active crystalline base extracted from Mr. Groves' products really was aconitine in an impure state. In order to make sure that this is so, the crystalline base from the specimen marked "B" in first report was converted into hydrobromide, and the base regenerated from the well drained and washed crystals of the salt. The following numbers were then obtained, agreeing perfectly with the above formula for aconitine:—

0·2245 gram gave 0·5080 CO_2 and 0·1370 H_2O.
0·4630 gram of gold salt gave 0·0925 Au.

Calculated for $C_{33}H_{43}NO_{12}$.		Found.
Carbon in Base.	61·39	61·71
Hydrogen "	6·67	6·78
Gold in Gold-Salt.	19·92	19·98

The hydrochloride examined last year gave numbers agreeing better with this formula than with those considered probable last year from the analyses of the impure base.

Per Cent.
Chlorine in anhydrous salt—$C_{33}H_{43}NO_{12}$, HCl = 5·21
Found . . . . 5·18

Water of crystallization, calculated for—
$C_{33}H_{43}NO_{12}$, HCl, 3 H_2O = 7·34
Found . . . . 7·59

Hence it is clear that the crystalline physiologically active base obtained from Mr. Groves' products really was aconitine $C_{33}H_{43}NO_{12}$ in a state of imperfect purity.

The various mother liquors obtained in the preceding crystallizations of the two batches of aconitine were worked up in the hope of isolating some second crystallizable alkaloid from them, but without success, nothing but the above described aconitine in a state of greater or

* 'Year-Book,' 1875, p. 514.

less purity being obtainable from them. Thus from the mother liquors of crop No. 5, a crop of crystals was obtained which gave a gold salt containing 20·68 per cent. of Au. Other similar crops were obtained by evaporating down the ether-petroleum liquors from which No. 4 had separated, together with the syrupy ethereal liquors drained from the first crop of crystals from which No. 4 was obtained by solution in benzene and precipitation by petroleum distillate; the residues thus obtained were dissolved in dilute acetic acid, whereby a little resin was left insoluble, and were then slightly precipitated by a small addition of sodium carbonate; the filtrate from this precipitate (which contained much tar and colouring matter) was then wholly precipitated by sodium carbonate, and dissolved in ether. By spontaneous evaporation crystals were obtained of which the gold salt contained Au = 20·88 per cent. The mother liquors of these dried up to a resinous mass containing a few crystals; these were extracted by thinning the resinous mass with a little ether, and filter-pumping. After recrystallization from ether they exactly resembled the other crops, and gave a gold salt containing Au = 20·71. The viscid liquid which drained from these crystals dried up to a varnish; on solution in acids it gave no crystalline salts whatever; the gold salt darkened slightly at 100°, and appeared to be slightly decomposed. The following numbers were obtained.

0·2210 gram gave 0·5380 CO_2 and 0·1580 H_2O
0·2990 of gold salt dried at 100 gave 0·0715 Au.

These numbers are not very far removed from those required for the formula, $C_{30}H_{47}NO_7$, assigned by Von Planta to the amorphous alkaloid which he isolated from *A. Napellus*, and considered to be the active principle thereof.

	Calculated	Found
Carbon in base	67·54	66·39
Hydrogen „	8·79	7·94
Gold in gold salt . . .	22·48	23·91

Whence it would seem not at all improbable that the body examined by Von Planta consisted of a mixture of this noncrystalline substance (napelline?) with more or less aconitine, and the products of its alteration, with probably more or less adherent resinous matter.

This amorphous alkaloid has a strong tendency to become mechanically adherent to or enclosed in the crystals of aconitine that form from ether; and in all probability the slightly higher percentages of gold found in the gold salts from the crystals thus prepared were due to the adherence of this other body. The hydrobromide of this amorphous base is readily soluble in water, however, and does not appear to stick mechanically to aconitine hydrobromide.

The different batches of impure aconitine thus extracted from the mother liquors were united and crystallized from ether. The crystals (No. 6) gave the following values.

0·2525 gram gave 0·5705 CO_2 and 0·1520 H_2O
0·5615 „ gold salt gave 0·1135 Au.
0·5190 „ „ „ 0·1050 „

To make sure that they really were aconitine identical with the former samples, they were converted into hydrobromide; the regenerated alkaloid then gave the following numbers (purified base specimen "C").

0·3005 gram gave 0·6800 CO_2 and 0·1850 H_2O.
0·6210 „ gold salt gave 0·1240 Au.

Calculated for $C_{33}H_{43}NO_{12}$		Found.	
		Purified base, specimen "C."	No. 6.
Carbon in Base ...	61·39	61·71	61·62
Hydrogen „ ...	6·67	6·84	6 69
Gold in Gold Salt	19·92	19·97	20·23 20·21

The total quantity of crystallized aconitine in a state of either approximate or absolute purity obtained from the 2 cwts of roots employed amounted to somewhat upwards of an ounce, representing about 0·03 per cent. of the roots used, whilst the total yield of alkaloids crystalline and non-crystalline, and including the mother liquors of the crystalline base which still retained aconitine, was fully 2½ oz., or 0·07 per cent. Probably in the extraction of crystallized aconitine on a large scale, where mother liquors could be methodically worked up, a yield of 0·04 per cent. of pure crystals of aconitine would have been obtained with the quality of roots experimented with; say ¾oz. per cwt. It would be of considerable pharmaceutical interest to determine on the large scale the relative quantities of *pure* aconitine obtainable from *A. Napellus* roots grown in different soils, and under different conditions of climate, etc. The values obtained by Zinoffski, Dragendorff and others, by the use of a standard mercuric iodide solution represent the *total quantities* of alkaloids present, and give no clue to the amounts of crystalline active base, *aconitine*, actually present in the different samples and different portions of the plants examined by them at various times; and similar remarks apply to the results obtained by Proctor (*Chemical News*, ix., 87), who found a total percentage of alkaloids amounting to 0·42 in American roots, and 0·2 in roots of European origin. The foregoing results clearly show that *Aconitum Napellus* contains only one crystallizable physiologically active base, and that this body when pure, possesses the formula $C_{33}H_{43}NO_{12}$. Duquesnel, who first obtained this crystallizable body, does not appear to have succeeded in getting it quite pure, to judge from his analytical figures; whilst apparently no other experimenter has succeeded hitherto in obtaining it even in a state of approximate purity. The following table gives the results of the preceding analyses of the pure and nearly pure specimens examined.

Specimens purified simply by crystallization of free base from ether, etc:—

	Carbon in base.	Hydrogen in base.	Gold in Gold Salt.
First Crystals undissolved by Ether .	—	—	20·38
Do. duplicate . .	—	—	20·36
No. 1	60·91	6·74	20·31
No. 2	60·62	6·89	20·33
Do. duplicate . .	60·76	6·82	—
No. 3	61·48	6·79	20·34
Do. duplicate . .	61·32	6·94	—
No. 5	60·40	6·67	20·25
No. 6	61·62	6·69	20 23
Do. duplicate . .	—	—	20·21
Average	61·02	6·79	20·30

Specimens purified by conversion into hydrobromide and regeneration of base therefrom and crystallization from ether:—

	Carbon in base.	Hydrogen in base.	Gold in Gold Salt.
Purified Base; specimen A	61·06	6·68	20·01
Purified Base; specimen B	61·47	6·92	20·00
Purified Base; specimen C	61·71	6·84	19·97
Purified Base from Mr. Groves products	61·71	6·78	19·98
Average	61·49	6·80	19·99
Calculated for $C_{33}H_{43}NO_{12}$ . .	61·39	6·67	19·92

All these samples of pure base were perfectly anhydrous after crystallization from ether; they exhibited exactly the same physical and chemical properties and produced the same tongue-prickling and irritation characteristic of the aconites. Experiments on the physiological action of the pure base are contemplated but have not yet been proceeded with; involuntary experiments in the laboratory, however, show that the base is extremely active. The gold salts when dried for several days over sulphuric acid lost no weight and suffered no change whatever on heating to 100° for a few hours; several hours' heating at 100° causes no alteration in the pure alkaloid; at a higher temperature it becomes yellowish and fuses with decomposition and blackening. It is proposed to examine some of the salts of the alkaloid, and more particularly to investigate the action of acids and other reagents upon it, with a view to obtaining information as to whether the inert bitter alkaloid obtained by Mr. Groves, and examined in the first report (base A.), which gave numbers leading to one of the formulæ $C_{30}H_{43}NO_{10}$ or $C_{31}H_{45}NO_{10}$, can be prepared by its decomposition; and generally to endeavour to obtain a clue to its relationships to other series of chemical substances.

The practical conclusions that may be drawn from the above experiments, incomplete though they are as regards the "constitution" and chemical relationships of aconitine, appear to be as follows:

(1) When *A. Napellus* is treated by Duquesnel's process there are extracted (*a*) a crystallizable alkaloid, insoluble in potassium carbonate solution, which is difficult to purify by simple crystallization from ether, but which after conversion into a crystalline salt and regeneration therefrom gives numbers agreeing with the formula $C_{33}H_{43}NO_{12}$*; and (*b*) a second alkaloid or mixture of bases which does not crystallize itself, and does not yield crystalline salts, and which has a lower molecular weight than aconitine, and contains more carbon and hydrogen: (*c*) a non-crystalline base or mixture of bases soluble in dilute potassium carbonate solution, and possibly identical with (*b*).

(2) The formula assigned to "crystallizable aconitine," viz., $C_{27}H_{40}NO_{10}$, by Duquesnel, who first isolated the substance in a state of moderate purity does not exactly represent the compesition of the pure base, the difference in Duquesnel's results being apparently due to imperfect purity of the substance isolated and examined by him.

(3) The amorphous substance examined by Von Planta, to which he assigned the formula $C_{30}H_{47}NO_7$, was probably a mixture of aconitine, more or less altered during the extractive process, and the amorphous bases above mentioned. Whether this amorphous body pre-exists in the fresh roots, or whether it is formed in drying or during the extraction process it is at present impossible to say. Probably "Napelline" is identical with or closely allied to this body.

(4) Although when alcoholic hydrochloric acid is used to extract the alkaloids from *A. Napellus* a considerable quantity of a comparatively inert base (base A. of First Report) appears to be formed, and largely dilutes the crystalline nitrate of the active base, $C_{33}H_{43}NO_{12}$, yet no appreciable amount of this substance appears to be produced by Duquesnel's tartaric acid method.

(5) The method that ought to be adopted for the preparation of a pharmaceutical product of constant composition and properties is: 1st, percolation by alcoholic tartaric acid and evaporation to a small bulk of the percolate at as low a temperature as possible (probably in a vacuum pan would be best): 2nd, crystallization from ether of the base separated by sodium or potassium carbonate from the aqueous solutions of the extract (after separation of resin, etc.); in this way "base A." if present would be separated: and 3rd, further purification by conversion into a crystalline salt, for which purpose the hydrobromide is well fitted; in this way small quantities of another base which obstinately adheres to aconitine when crystallized from ether are separated. The base obtained in this way is a simple body, expressed by the formula $C_{33}H_{43}NO_{12}$, in a state of great purity and possessing high physiological activity.

* It has been pointed out by Hesse and corroborated by the author and Mr. G. H. Beckett (*Chemical Society's Journal*, 1876, May), that *papaverine* is characterized by a precisely similar behaviour; a large number of crystallizations from various solvents of the free base itself do not suffice to give the body more than an approximate degree of purity; whilst a pure alkaloid is readily obtained by converting the partly purified substance into a crystallizable *salt* (the acid oxalate) and regenerating the base therefrom.

The PRESIDENT said, the importance of this inquiry could hardly be overrated. Up to the present time the results obtained had principally borne a pharmaceutical aspect. It had been shown that what had been hitherto met with in commerce, or prepared by the Pharmacopœia process, as amorphous aconitine, could not be depended upon as the active principle of aconite in its unmixed and most active condition. There was now no doubt that it could be obtained in a pure state as a crystalline alkaloid, and that was the only condition in which it ought to be used medicinally. He was glad to find also that there was a prospect of having the subject still further worked out in its chemical as well as its pharmaceutical aspects.

Mr. WILLIAMS said that it might be worth mentioning that upon one occasion, in operating upon aconite for the extraction of aconitine, the roots were divided into two equal quantities, and one was treated with alcohol and tartaric acid and the other with alcohol and hydrochloric acid, and it was a curious fact that the alcohol containing the tartaric acid only yielded half the weight of crude alkaloid that the tartaric alcohol did.

The next paper read was on—

CAPSAICIN: THE ACTIVE PRINCIPLE OF CAPSICUM FRUIT.

BY J. C. THRESH, F.C.S.

Soon after the last Conference I had occasion to examine a very suspicious sample of cayenne pepper; it was of an unusually red colour, and almost immediately stained the paper in which it was wrapped. Referring to Hassall's work on the 'Adulteration of Food,' I found that he considered this a certain indication of the presence of common salt. Upon incinerating a portion and examining the ash, I could detect only a trace of chlorine, therefore it could not be adulterated with sodium chloride. A microscopical examination of it revealed nothing abnormal, consequently in order to continue my investigation it was necessary to look up the published analyses of this pepper, but the results obtained by the few chemists who had examined it differed so widely that they were totally useless for my purpose, and I was thus left to my own resources.

The result of this investigation, so far as I have yet pursued it, I do not intend troubling you with at present, excepting so far as it may relate to the subject of my paper.

The active principle which I have been so fortunate as to isolate, and which I have named capsaicin occurs only in the pericarp of the fruit, and is intimately associated with a red fat or mixture of fats, the whole together forming 20 per cent. of the weight of the pericarp. The process by which I first isolated this crystalline substance, and which is published in the *Pharmaceutical Journal* of the 8th of July last, answered very well when employed on a small scale, but when I began to work with 7lbs. of the pepper, I found that it would be requisite to use very large quantities of almond oil and spirit (and as the former cannot be recovered, the process is very costly) in proportion to the small quantity of capsaicin obtained.

Experiments made with the small quantity of this substance at disposal led me to substitute petroleum for almond oil, which besides being much cheaper, answers very much better.

The residue obtained by this first part of the process is a pale red waxy substance, and from this the crystalline capsaicin can be obtained by three methods. Before relating in detail these processes, let me say that unfortunately pressure of business has prevented me preparing a sufficient quantity of the crystals in a state of absolute purity for the purpose of effecting their ultimate analysis, I hope, however, during the coming winter to be able to do this, and to communicate the results in due course.

The first method of crystallizing the capsaicin is the one by which I originally obtained it, namely by dissolving the fatty or waxy residue in dilute solution of caustic potash, and adding thereto excess of ammonium chloride solution; a milky fluid results which is not affected by filtration, but if this is put aside for a number of hours, the capsaicin settles in well defined crystals, and the supernatant liquid becomes quite clear. In the second process the residue is dissolved in warm liquor potassæ, then diluted and set aside. The milky liquid deposits crystals much more rapidly than in the former process, but since capsaicin is freely soluble in dilute solutions of the fixed alkalies, a considerable quantity remains in the mother liquor.

The third plan consists in dissolving the residue in dilute liquor potassæ, and passing carbonic acid through the solution, when the capsaicin is immediately precipitated in minute crystals, which can be entirely removed by filtration. This method not only yields the principle with greater facility but also in a state more approaching that of purity. The first plan yields the finest crystals, but there is great difficulty in freeing them from traces of ammonia and colouring matter, and besides it does not yield the whole of the capsaicin. From the mother liquors I attempted to obtain it by adding excess of acid, and treating the oily matter thus separated with petroleum and spirit, as the original fat was treated, but I was not successful, since the fatty acid is as soluble as the active principle in the spirit, and consequently the spirit removes both from the petroleum, leaving the latter colourless.

The few characteristics, etc., of this substance which in the limited time at my disposal I have been able to ascertain are as follows:

The action of heat. Carefully heated capsaicin melts at 138°F. to a transparent oily fluid, and if then allowed to cool it rapidly solidifies, and assumes a crystalline condition. A portion melted on a watch glass and left to cool rapidly crystallizes, but if a portion is heated in a melted narrow tube a few degrees above its melting point, it does not upon cooling return to its crystalline condition but remains semi-fluid and transparent for 24 or 30 hours, solidification then commencing at the surface and slowly extending through the whole mass.

Capsaicin can be volatilized without suffering decomposition. A small portion was placed on a watch glass, covered accurately with another, and the pair laid on a hot plate, and a thermometer placed near. At 240°F. the capsaicin began to volatilize, and at 248° it began to change colour, becoming brownish black. On removing the upper watch glass it was found to be covered with minute oily globules which have since become crystalline.

The specific gravity is 1060, as ascertained by taking the specific gravity of a solution of sodium chloride, in which a cylindrical piece of the fused substance floated indefinitely in any portion.

Strong nitric acid acts energetically upon it, decomposing and dissolving it. The resulting solution is of a bright red colour, which when heated evolves ruddy fumes and changes in colour to a straw yellow. The addition of water causes no precipitate, but the addition of an alkali in excess strikes a rich golden yellow colour, which is perceptible even when the fluid is largely diluted.

Dilute nitric acid, though acting more slowly upon it than the strong acid, appears to decompose it with formation of the same products. The solution thus formed when neutralized is quite tasteless.

Strong cold sulphuric acid readily dissolves it without decomposition, but if heat is applied or a little water added the fluid becomes first red and ultimately purple black.

In dilute sulphuric acid capsaicin is not soluble, therefore it is precipitated when the strong acid solution is poured into a considerable volume of water.

The sulphuric acid and bichromate test applied to this substance gives rise only to the green colour resulting from the reduction of the bichromate.

Strong solution of hydrochloric acid dissolves only a trace, which is deposited when the solution is diluted.

Glacial acetic acid readily dissolves it, but from this solution water precipitates it.

As previously stated strong solutions of the fixed alkali readily dissolve it and deposit a portion when diluted, if the alkali is not in excess.

Strong liquor ammoniæ takes up but a mere trace, and retains it when diluted, but a current of carbonic acid passed through the liquid renders it opalescent.

In solutions of carbonates of the fixed alkalies and of ammonia it appears to be totally insoluble; hence carbonic acid precipitates it from its solution in alkali.

Alcohol, rectified and proof spirit, dissolve the crystals instantaneously; ether, amyl alcohol, acetic ether, benzine, and fixed oils dissolve it very readily; turpentine and carbon bisulphide much more slowly; and in petroleum oil it is soluble with great difficulty. Even when heated, petroleum does not readily dissolve it, and upon cooling the greater part is deposited in a crystalline form upon the sides and bottom of the containing vessel. The addition of a little fixed oil or of the red capsicum fat greatly increases the solvent power of the petroleum. I have not yet attempted to form any substitution products from capsaicin, but I have noted that after it has been acted upon by chlorine, either by passing the gas over the crystals or by sending a current of the gas through water in which the crystals are suspended, whilst the appearance of the substance remains unchanged, it is no longer freely soluble in alkaline solutions.

Boiling dilute sulphuric acid, even after a length of time, does not affect it, and the acid liquor remains free from glucose.

My physiological experiments with this powerful substance have been confined to the application of a solution to the arm, and the administration of one-eighth of a grain in a coated pill.

The application consisted of one part of capsaicin to forty of spirit and glycerine. In this I dipped a piece of lint and laid it on my arm. I very shortly began to experience a sensation of warmth, which gradually increased until it became unbearable and I had to remove the lint. A great part of the arm appeared much inflamed, but there was no blistering, and in two hours from the time when the lint was removed the skin had assumed its normal appearance and the pain had ceased.

The one-eighth of a grain dose I took after breakfast (at about 9 a.m.), and felt nothing of it until 11 o'clock, when I was seized with violent burning pain in the stomach, which I was glad to assuage with copious draughts of demulcents. A similar dose taken next day produced exactly the same effects. In conclusion, I may state that I have also tasted it. The result is an agonizing sensation of burning throughout the whole mouth, accompanied by a copious flow of saliva, of tears, and of mucus from the nose. This continues for about a quarter of an hour and then rapidly abates.

A vote of thanks to the author having been passed the Conference adjourned until the next morning.

The Conference was resumed on Wednesday, the 6th inst. Professor Redwood, President, in the chair. The first paper read was a—

Report of the Limited Oxidation of Essential Oils. Part IV.

Containing a Preliminary Report on the Ethers.

BY CHARLES T. KINGZETT, F.C.S.

A. Oxidation of Turpentine.—Since my last publication on terpenes and the products of their limited oxidation, I have had the opportunity of repeating the whole of my observations upon the aqueous solution that results when turpentine is oxidized by a current of air in the presence of water. This opportunity has been afforded me while experimenting upon no less than fifty gallons of turpentine; and while in no one particular have I to withdraw or alter any of my original statements, certain matters have come more strongly before my observation which are worthy of some notice. Before proceeding to summarize these, it will be well to recapitulate the main products of the oxidation. My past researches then have established that turpentine yields when oxidized by air in the way I have described, peroxide of hydrogen, and camphoric acid (both of which may result from the action of water upon camphoric peroxide $C_{10}H_{14}O_4$), acetic acid, camphor, and certain other less defined substances. The oil itself increases in specific gravity and contains, after this treatment, certain oxidized bodies among which is a further quantity of this camphoric peroxide.

I have been able to indicate the rate at which this oxidation takes place, and to investigate more fully the nature and uses of the solution I have described. And in doing so I have experimented with large earthenware vessels arranged in a series like so many Wolffe's bottles, each of about twenty gallons capacity.

The oxidation proceeds very slowly at first, the rate being indicated by the estimation from hour to hour of the peroxide of hydrogen which is formed; but when once the oxidation has fairly set in, it proceeds more rapidly with increasing production of peroxide of hydrogen and the other products, the amounts of which are simply limited by that of the turpentine itself. Now, assuming the operation to be started with a given quantity of turpentine in the presence of a given quantity of water at, we will say, 60° C., the turpentine begins slowly to oxidize and produce the bodies named, which then pass into solution, while the oil itself increases gradually in specific gravity, a phenomenon which is accompanied by a gradual rise in its boiling point. Now if no fresh turpentine be added to that already in operation there will come a time when the percentage of peroxide of hydrogen is at a maximum and then if the blowing be continued after that time it slowly diminishes, in fact at about the same rate that it forms. If, on the other hand, the turpentine which is blown away as vapour be condensed and returned to the oxidizer, or what amounts to the same thing, if fresh turpentine be added, the oxidation proceeds as rapidly as ever, while there is no limit to the amount of peroxide of hydrogen which is formed.

It is remarkable that turpentine in the act of being oxidized is capable of imparting to fresh turpentine the same and equal facility to absorb oxygen.

The slow rate at which the oxidation of fresh turpentine proceeds, and the greater rate attained after the molecules have undergone the change which induces a rapid oxidation is seen by the following figures which relate to an experiment conducted on some gallons of turpentine and water,

Hours.	Grms. of H_2O_2 in 100 c.c. solution.
After 37 hours	·0651 grammes H_2O_2
„ 41 „	·2000 „ „
„ 54 „	·3000 „ „
„ 58 „	·4500 „ „

The increase that takes place in the specific gravity of the oil of turpentine as the oxidation proceeds is exemplified by the following figures which relate to another experiment:—

	·864 originally
After 24 hours the sp. gr. of the oil	= ·8[illegible]0
„ 28 „ „	= ·881
„ 32 „ „	= ·888
„ 44 „ „	= ·949
Again—	
After 16 „ „	= ·8886
„ 20 „ „	= ·8996
„ 26 „ „	= ·9060
„ 39 „ „	= ·9136
„ 46 „ „	= ·9366
„ 48 „ „	= ·9476

The increase in the boiling point of the oil as the oxidation proceeds is illustrated by the following determinations which relate also to a different experiment.

The turpentine used in this experiment boiled as indicated in column (1).

(1) Original Oil.	(2) Oil after 24 hours Oxidation.	(3) After 27 hours Oxidation.
10 p. c. over at 157°C	162°C	165°C
20 „ „ 159	165·5°C	166
30 „ „ 160	168	170
40 „ „ 160	171	171
50 „ „ 160·5	174	174
60 „ „ 161	181	185
70 „ „ 162	193	206
80 „ „ 164	210	
90 „ „ 166		

In regard to these boiling point determinations I should remark that in each case 100 c.c. were subjected to distillation in the way that is usual in these matters, and the temperature recorded after each 10 c.c. was collected. It is necessary also to point out that the oil, although it has been oxidized in the presence of water, is yet so full of the organic peroxide I have discovered and described in my previous researches, that when it has once reached a temperature of 160° C. or less, a violent effervescence sets in from the escape of oxygen, and much heat is eliminated, as indicated by the rise in the thermometer after the lamp has been removed. I shall conclude this part of my paper by stating that having been led by the value of the solution as an antiseptic and disinfectant to attempt the manufacture of it and the residual oil I have described, on a commercial scale, I have devoted a great deal of time to the study of those conditions which are calculated to lead to the most desirable results. In this attempt I have received much help from Mr. J. Brown, F.C.S., which I have the pleasure to acknowledge. I have been so far successful as to obtain, readily, under certain conditions, from an inconsiderable amount of turpentine, water, and air, a solution containing such large quantities of peroxide of hydrogen and the other substances above named, as to qualify it for purposes and uses upon which I propose to dwell in section B. of my report. I find that a solution containing so much peroxide of hydrogen as to be capable of evolving from 1 litre either 1531 c.c. oxygen or 3062 c.c. oxygen, according as one or both molecules of oxygen (in H_2O_2) are affected, has all the properties which I propose to describe; but before doing this I must add that these properties are far from being entirely dependent upon the peroxide of hydrogen contained. They are related also to the camphoric acid and other constituents, for they are not seriously impaired by the total destruction of the peroxide of hydrogen. This I have substantiated in an experimental way, and shall now proceed to describe the experiments themselves. These I shall only preface by stating that a solution which contains 323 grains of peroxide of hydrogen to the gallon also contains 367 grains of camphoric and acetic acids. But the percentage of each constituent and the strength of the whole mixture are matters to a great extent under control in the method of preparation.

B. Antiseptic and disinfecting powers of the solution.—In studying the properties of the solution I have described

I discovered that it possessed great power as an antiseptic and disinfectant, and I was led to investigate this matter somewhat fully, also to inquire into similar properties possessed by the known constituents of my solution, and in comparison with those of salicylic acid.

In the following experiments the solution employed was of that general strength I have indicated above and contained 2·5 grms. H_2O_2 per litre.

Article experimented upon.	Antiseptics Used.	Result.	With equal vols. of water and no Antiseptic.
Egg Albumen. 50 c.c. containing 10 c.c. white of egg in each case.	5 c.c. neutralized by soda = 10 per cnt.	Observed 24 days. Still fresh as at first.	Began to stink on 2nd day after.
Must from Muscatel Grapes, 50 c.c. taken in each experiment.	10 c.c. neutral antiseptic = 20 per cent.	No fermentation even after days.	Soon fermented at 40° c., giving alcohol.
Milk. 200c.c. in each case.	10 c.c. Neutral antiseptic = 5 per cent.	Faintly acid on 5th day after. Solid on 7th day.	Solid and sour on 3rd day after.
Urine. 60c.c. in each case.	10 c.c. Antiseptic = 16 per cent.	Unchanged after 7 days. No longer observed.	Bad smell 2nd day. Stunk on 3rd day.
Brain matter. 10 grms. in each case.	10 c.c. Antiseptic.	Kept fresh 15 days. No longer observed.	Stunk on 3rd day after.
Milk. 100 c.c. in each case.	10 c.c. Antiseptic = 10 per cent.	Liquid, and sweet for 9 days.	Sour and solid on the 2nd day after.
Flour paste. 100 c.c. in each case.	10 c.c. Antiseptic = 10 per cent.	Fresh after 19 days. No longer observed.	Stunk on the 3rd day.
Milk. 160c.c. in each case.	10 c.c. Antiseptic = 6 per cent.	Solid and sour after 7 days.	Bad on the 2nd day. Very bad on 3rd day.
Bitter Beer. 160 c.c. in each case.	10 c.c. Antiseptic = 6 per cent.	Still good and unchanged on 7th day. No longer tested.	Thin films on 2nd day. Fungus over surface on the 3rd day.

All the foregoing experiments were made during October and November, 1875.

Those now to be given were made during June, July, and August, 1876. The antiseptic solution employed was not so strong as that used above.

	With 3·5 c.c. Antiseptic = 10 per cent.	With 1·75 c.c. Antiseptic = 5 per cent.	With 4 c.c. neutral. Antiseptics = 11 per cent.
White of egg. 35 c.c. in each case.	Kept fresh for 35 days; then mould appeared. No stink.	Fresh for 21 days; then mould appeared. No smell.	Fresh for 35 days, then mould appeared. No smell.

The only other alteration in each case was a slight darkening to brown in the colour of the albumen. But after each experiment the albumen had still its coaguable character and was not otherwise changed.

After dipping in the same solution, brain matter also kept fresh for several days, whereas without such treatment it stunk on the next day.

Milk was also preserved for a much longer period than without, but not for so long a period as in the winter months.

Beer was also thoroughly preserved for a number of days, as long as observed; so also was blood serum. Stinking water recovered and remained good with it for months.

In conclusion I would only add that I have never examined seriously the influence of less percentages than those detailed, but there can be no doubt that much less quantities could be used in many cases with the same effects as those described. In fact this would be necessary with articles of food on account of the aromatic odour and peculiar taste of the solution.

The experiments that follow next were conducted in order to ascertain to which constituents of my solution the antiseptic and disinfecting character is to be ascribed. They are as follows:—

Camphoric Acid experiments.

0·3 grm. of the acid in water was sufficient to preserve 400 c.c. milk unaltered for seven days. After that a skin appeared and a cheesy taste. But it did not go solid and sour till the eleventh day.

0·1 grm. camphoric acid kept 50 c.c. of flour paste fresh for eleven days. On the twelfth day it became sour.

0·1 grm. camphoric acid preserved 50 c.c. grape juice in a warm oven from fermentation permanently so far as could be observed.

0·1 grm. camphoric acid kept 15 c.c. egg albumen and 10 c.c. water fresh for twenty-one days. Became mouldy afterwards.

0·1 grm. camphoric acid preserved 200 c.c. bitter beer unaltered for eleven days in an open vessel. It afterwards became covered with fungus.

Peroxide of Hydrogen experiments.

The strength of the solution used was that of Robbin's 10 volume solution.

10 c.c. preserved 400 c.c. milk for six days, meanwhile oxygen was slowly evolved; thick and sour on the eleventh day.

5 c.c. preserved 47 c.c. grape must from fermentation for some twenty-four hours, then bubbles of oxygen were liberated; finally it had an odour like apples.

5 c.c. preserved 15 c.c. albumen (egg)+10 c.c. water fresh for very many days.

5 c.c. preserved 400 c.c. bitter beer unaltered for twenty-six days; then sour; fungus did not appear.

5 c.c. preserved 30 c.c. flour paste for six days; afterwards went bad.

Experiments with Salicylic Acid.

0·1 grm. preserved 100 c.c. bitter beer for twenty-five days, but gave to it a most peculiar taste—spirituous, bitter sweet. No longer observed.

0·1 grm. preserved 100 c.c. milk for four days. On the fifth it was sour and cheesy, and on the seventh it stunk.

0·1 grm. preserved 50 c.c. flour paste for a number of days, but acquired even on the fourth day a very stale odour.

0·1 grm. preserved 23 c.c. egg albumen, and 12 c.c. water fresh for four days. On the fifth it stunk.

These experiments, as also those with camphoric acid and peroxide of hydrogen, were all conducted during October, November, December, 1875.

I will conclude these remarks by pointing out that the solution whose properties have been described has a somewhat bitter but not unpleasant taste; it is non-poisonous, and harmless to clothing and furniture. While its antiseptic power is distributed between the peroxide of hydrogen and camphoric acid, the former of these is able to evolve large quantities of oxygen, which in this state is nascent and of a powerful oxidizing character. Finally, I desire to express my thanks to my friend Dr. H. W. Hake, for having rendered me much help during the prosecution of this part of my investigation.

C. I now propose to resume the thread of my original researches, and by way of introduction, I may be allowed to state that by them it has been established that all the members of the terpene family represented by the formula $C_{10}H_{16}$ give peroxide of hydrogen by atmospheric oxidation, and I have further pointed out that this property is undoubtedly related to cymene ($C_{10}H_{14}$) which, as obtained from various sources, also yields peroxide of hydrogen, so that any hydrocarbon containing cymene as a proximate nucleus would presumably give peroxide of hydrogen under suitable treatment.

Since my last publication, I have been able through the kindness of Dr. Wright, who placed a small quantity of menthene ($C_{10}H_{18}$) at my disposal, to investigate that body according to the method instituted by me.

18·5 grms. menthene, from solid Japanese camphor, on oxidation in a current of air at a temperature of 60°C., in the presence of 100 c.c. water, gave a solution in which the amount of peroxide of hydrogen was estimated by the iodide of potassium method after forty-four hours, and found to = 0·09114 grm. H_2O_2. A further amount was produced on continuing the oxidation. Meanwhile the oil grew yellow and thick, but was not examined on account of the small quantity. The aqueous solution contained also acetic and formic acids, which were identified by the usual test, and further an oily body which was deposited on concentration. This last body on oxidation with strong nitric acid (1 : 1) gave a yellow solution which was neutralized by soda, and this solution was found to give a barium salt insoluble in water, and also a precipitate with nitrate of silver. This silver salt on heating deflagrated, and was found to contain more than 64·45 per cent. silver (a little was perhaps lost). A small quantity of menthene derived from *liquid* Japan camphor by the action of zinc chloride gave similar results to those above ascribed to menthene from *solid* Japan camphor.

This limited inquiry exhausted my supply of menthene, nevertheless it supports the conclusion I stated in the third part of these researches (*Chemical News*, vol. 32, p. 138), to the effect that all bodies having cymene as a proximate nucleus give peroxide of hydrogen on oxidation by air. For Dr. C. R. A. Wright has (*Journ. Chem. Soc.*, series 2, vol. xiv p. 2) by the action of bromine upon menthene, succeeded in obtaining a terpene from it in the *first* place, and on further bromination, cymene. I have also demonstrated that clove terpene $C_{15}H_{24}$, by the fact that it fails to give peroxide of hydrogen on oxidation, *does not* contain cymene as a proximate nucleus. And more recently Wright has supported this statement, by showing that clove terpene gives no cymene by the action of bromine. Regarding cymene (paramethylpropyl benzene) (C_6H_4 (CH_3) (C_3H_7) as a hydrocarbon constituted of proximate nuclei, I was led by a study of the subject to consider the possibility of obtaining peroxide of hydrogen by the atmospheric oxidation of suitable compounds containing methyl, propyl, etc. And for the obvious reason that the ethers may in a sense be considered as oxides of the hydrocarbon radicles of the marsh gas series, I fixed upon them for my first experiments.

Ordinary ethylic ether has for long been credited with the power of producing ozone, but beyond this, the subject was at the time I commenced my investigation in a similar state of mystery as that which surrounded the so-called formation of ozone by the oxidation of essential oils. That is to say nothing was known about it, beyond that there had been recognized under these conditions a principle which was mistaken for ozone, and of whose production there was no reasonable theory.

I do not propose to relate in detail, my experiments, which are necessarily incomplete, but shall only state that ethylic ether gives apparently, by atmospheric oxidation, acetic ether and certainly peroxide of hydrogen. This latter I have obtained in estimable amount, but this subject presents great difficulty in working, on account of the volatile nature of the ether, and most of its compounds and derivatives.

The following equations may possibly represent what occurs when ethylic ether is oxidized in the presence of water in the way I have described.

$$(1.)\ \left.\begin{matrix} C_2H_5 \\ C_2H_5 \end{matrix}\right\} O + O_2 = \left.\begin{matrix} C_2H_3O \\ C_2H_5 \end{matrix}\right\} O + H_2O$$

$$(2.)\ \left.\begin{matrix} C_2H_3O \\ C_2H_5 \end{matrix}\right\} O + O_3 = \left.\begin{matrix} C_2H_3O \\ C_2H_3O \end{matrix}\right\} O_2 + H_2O$$

$$(3.)\ \left.\begin{matrix} C_2H_3O \\ C_2H_3O \end{matrix}\right\} O_2 + 2H_2O = \left.\begin{matrix} C_2H_3O \\ H \end{matrix}\right\} O + \left.\begin{matrix} C_2H_3O \\ H \end{matrix}\right\} O + H_2O_2$$

or (3.)

$$\left.\begin{matrix} CH_3CO\ O \\ CH_3CO\ O \end{matrix}\right\}\begin{matrix} H\ HO \\ H\ HO \end{matrix} = \left.\begin{matrix} CH_3CO\,OH \\ CH_3CO\,OH \end{matrix}\right\} + \left.\begin{matrix} HO \\ HO \end{matrix}\right\}$$

These equations may be explained as representing—

(1) The oxidation of ether into acetic ether and water.

(2) The oxidation of ether into the anhydride, and that into the peroxide.

(3) The decomposition of the latter with water, simultaneously with its formation.

I believe that we must assume the formation of acetic peroxide, a body which as yet has only been prepared by Brodie by acting on acetic anhydride with barium peroxide.

In my experiments it would appear that ordinary atmospheric oxygen plays the same part as the oxygen of the barium peroxide in Brodie's method.

If this be so, the mode by which the peroxide of hydrogen is assumed to be formed would give strength to my theory regarding its production from turpentine, which may be represented first as its oxidation into camphor (corresponding to ether); secondly, the oxidation of this body into camphoric anhydride, and the anhydride finally into the peroxide which is slowly decomposed by water.

I have observed these properties and isolated the products of its change by water, but have not succeeded further.

My method of experiment I hope at no distant period to apply to all the ethers available. Meanwhile the preliminary results I have obtained in this new direction already foreshadow a system of classification of the terpene derivatives.

Finally, I submit that the production of peroxide of hydrogen from camphoric peroxide (in the case of turpentine), and acetic peroxide (in the case of ether), amounts to a demonstration of the existence of the radicle hydroxyl in compounds.

The PRESIDENT said the paper just read appeared to be one extremely well suited for a meeting of the Conference. In the first place the subject treated of had an important bearing on the interests of pharmacists. Mr. Kingzett had shown that the products of oxidation of these bodies possess, in a high degree, antiseptic properties. He considered, also, that this paper was valuable and very suitable as a communication, from the fact that it indicated the great importance of carrying out systematically and scientifically the complete investigation of what takes place in processes such as are referred to. For instance, as long as twenty years ago he had seen Faraday demonstrating in his way to the extent of the knowledge then possessed the presence and production of ozone, which was thought to occur during the oxidation of these bodies, and until comparatively recently it had been assumed that ozone was the body produced. But by further and more perfect investigation it was now demonstrated to us that not ozone, but peroxide of hydrogen was the body which exists in these products.

Dr. TILDEN asked if the author had ascertained whether any change had taken place in the atmospheric air used during the performance of these experiments.

Mr. GROVES asked whether the products of oxidation had a decolorizing action.

Mr. KINGZETT: Yes. He thanked the President for the remarks he had made upon the paper, for it was often said concerning such investigations, *cui bono?* The study of the question had led him to a satisfactory reply to that question. He and a scientific friend had patented this solution and intended to manufacture it so that those who were interested in the matter might have an opportunity of studying its value. With regard to the question of Dr. Tilden, he had proved in the first part of these researches that there was no ozone formed in these oxidations. As regards the many other applications to which this solution might be applied, Mr. Groves has pointed out one—decolorizing. A provisional protection had been obtained and he hoped to continue the study as regards the application in this way.

The Therapeutic Value of the Aloins.

BY WILLIAM A. TILDEN, D.SC., F.C.S.

At the last meeting of the Conference I brought forward the results of the analysis of barbaloin and socaloin and some of their derivatives. My experiments led me to the conclusion that these two bodies, although differing in chemical and some physical properties, have nevertheless the same composition, which is represented by the chemical formula $C_{16}H_{18}O_7$. They unite, however, with different proportions of water of crystallization. These results have since been confirmed by the observations of Dr. Ernst Schmidt of Halle. Nataloin differs altogether in properties and constitution from both barbaloin and socaloin, notwithstanding that it contains nearly the same proportions of carbon and hydrogen.

The fact that the crystalline constituents of the several varieties of aloes are different substances is now generally recognized. It therefore occurred to me that it would be desirable to ascertain if these substances were possessed of equal power as purgatives; especially as socotrine and Barbadoes aloes are constantly prescribed indiscriminately, and some difference of opinion had prevailed regarding the action of barbaloin.

I, therefore, begged Mr. Nelson C. Dobson, F.R.C.S., to undertake the administration of these crystalline principles in a sufficient number of cases to make conclusions based upon them tolerably secure. He has recorded his observations made in fifty cases in the Bristol General Hospital and his results have been published in the *Medical Times and Gazette* (Aug. 12, 1876), and in the *Pharmaceutical Journal* (Aug. 19, 1876).

It remains for me only to point out the conclusions at which Mr. Dobson has arrived. They are as follows:—

Barbaloin in doses under two grains frequently produces some slight laxative action. Two grains cause a decided effect, never, however, amounting to complete purgation.

Socaloin and nataloin seem to be less active than barbaloin, four grains having been frequently given without producing more than slight effect.

All three are decidedly uncertain and variable in their action, and seem to present no advantage over an equal dose of aloes, except perhaps that griping was rather less common than when aloes alone was given.

The superior activity of barbaloin seems to justify the apparently general preference for Barbadoes over the other varieties of aloes.

The President said no doubt it would be the pleasure of the Conference to return thanks to Dr. Tilden for the investigation he had been making into this practical subject. The observations which had been made with reference to the therapeutic value of the chemical compounds obtained from aloes had a considerable amount of interest to pharmacists as tending to show that at any rate there are some medical substances obtained from the vegetable kingdom that are perhaps as advantageously administered in the form in which they are got directly from their natural sources as after they have been submitted to chemical processes by which more definite chemical compounds were extracted from them. The investigation which had been made with reference to aloin separated from aloes was an important as well as an interesting investigation. Probably the investigation of some other substances, such as senna and rhubarb, would lead to very similar results. Whatever bodies of a chemical nature might be extracted, might not to any sensible extent be possessed of properties more advantageous than those found in the substance in its natural condition. Of course they were not to be discouraged on this account from making investigations in those directions, but rather might make a practical application of the result of the investigation pharmaceutically. There were many substances which might be included in the category with aloes, and while they investigated them as pharmacists, their practical object would be to ascertain what forms could be obtained which were most suitable for medicinal use. He knew some pharmacists had been using aloin with the view of obtaining more activity—getting a more decided action—than aloes themselves would afford. It did not appear however that the experiments which had been made were such as to fully justify that expectation.

Mr. Stoddart said he could confirm what Dr. Tilden had said. He had taken, with little effect, a dose of this aloin at the suggestion of a native of that part of the world who considered that aloin was better than aloes.

Mr. Proctor said he had prepared aloin from Barbadoes aloes, and had taken doses of the aloes and its separate constituents, that is the insoluble portion, the uncrystallizable extract and the aloin. He found they all acted almost equally as regards their purgative properties. He fancied the resinous matter was a little more griping, but he confessed he found the experiment rather unpleasant.

Mr. Groves said that the experiments of Dr. Dobson seemed to show that aloin and crude aloes did not differ much in their effects except that the latter was rather the more griping. In his own experience the extract of aloes had a very innocuous action in regard to hæmorrhoids, as compared with crude aloes. He had a client who was in the habit of taking pil. rhei co., and was perfectly able to distinguish by the effects when crude aloes was used and when the extract.

The next paper read was on—

The Solubility of Cinchona Principles in Glycerine.

BY F. ANDREWS.

A notice of the solvent powers of glycerine upon Peruvian bark having lately appeared in the *Pharmaceutical Journal* and the *Chemist and Druggist*, an account of a few observations made by myself, although very fragmentary and incomplete, may perhaps prove interesting.

Some months ago I had occasion frequently to mix tincture of bark with glycerine. As the mixture remained perfectly bright, it occurred to me that perhaps glycerine might prove as good a solvent of the cinchona principles as the spirit, and I therefore made the following experiment:—4 ozs. of yellow bark in coarse powder were mixed with 4 fl. ozs. of rectified spirit, and digested for several days; the mixture was transferred to a percolator, and spirit added until 4 fl. ozs. of a very strong tincture of bark had passed through. This was mixed with an equal quantity by measure of glycerine and the spirit evaporated. There remained 4 fl. ozs. of a thick syrupy liquid, dark brown in colour, and having the peculiar bitter and astringent taste of Peruvian bark in the highest degree; it was perfectly bright and entirely without deposit, showing that the glycerine had retained all that had been dissolved by the spirit. I then thought it would prove important to find whether there was anything further left in the bark that could be extracted by glycerine, and therefore poured water into the percolator until upwards of eight pints had passed through and the percolated liquid was colourless and tasteless. The apparently exhausted bark was then placed in an evaporating dish and 4 fl. ozs. of glycerine stirred in; the mixture was heated slightly and allowed to stand a day or two, again transferred to the percolator and water poured through until about a pint of turbid brownish liquid was obtained; this was evaporated to 4 fl. ozs., the result being a brown syrupy fluid, having the peculiar taste of glycerine, but with very slight bitterness or astringency.

Several experiments were then made by the direct action of glycerine upon powdered bark; percolation was tried but was so slow as to be practically useless, and finding upon trial that quinia and its sulphate were soluble in warm glycerine and were not precipitated from solution upon the addition of water, the following process was adopted as the best:—

Four ounces of coarsely powdered yellow bark were mixed with eight fluid ounces of glycerine, heated for a short time over a water-bath, and allowed to stand till cold; water was added in successive portions, and strained or pressed out until there appeared no extractive left; the whole was then evaporated to eight fluid ounces—the original bulk of the glycerine. This liquid, carefully made, appears to contain in each fluid ounce the whole extractive matter of half an ounce of Peruvian bark, and might, I think, be appropriately termed Glycerinum Cinchonæ.

The PRESIDENT said this was a useful and practical communication for which he was sure, as practical men able to appreciate it, they would be anxious to return thanks to the author.

Mr. CLEAVER asked whether the liquid obtained by the treatment precipitated on the addition of water.

Mr. MARTINDALE said that there was a similar preparation included in the United States' Pharmacopœia. He had kept it for three years and had had an opportunity of observing its keeping properties. It had this disadvantage, that on being kept for some time it became converted into a kind of jelly; it did not deposit, but got into a peculiar gelatinous condition. It mixed tolerably well with water. It took out more of the constituents of the bark, but whether in doing so it took more of the active alkaloid he did not know. It contained, however, more of the astringent matter than the B.P. fluid extract did.

Mr. EKIN said the gelatinous condition to which Mr. Martindale referred in the United States preparation was probably due to quinovic acid.

Mr. ANDREWS in reply said the preparation precipitated slightly but not so much as the ordinary tincture. With respect to the assay of the bark, that which he had used was fully up to the Pharmacopœia standard. He had intended to have made an assay of the bark after the extraction by glycerine, but had not yet been able to do so. There certainly was a trace of bitterness left, but it was very slight.

The next paper read was on—

ESSENTIAL OIL OF SAGE.

PART I.

BY M. M. PATTISON MUIR, F.R.S.E.,

Assistant Lecturer on Chemistry, The Owens College, Manchester.

Through the kindness of the Executive Committee of the Bell and Hills Research Fund, who placed a small grant at my disposal, I have been able to commence a research into the chemical nature of essential oil of sage. I have now the honour of submitting the first part of this investigation to the Conference, and can only express my regret that the time at my command has been too limited to allow me to do more than make a hasty survey of the field of investigation. From the results already obtained I am confident that future researches, which I hope to make and to communicate to the Conference, will be not altogether wanting in interest.

1. The only notices which I can find bearing upon the subject of the present paper are those enumerated in Gmelin's handbook. So long ago as 1811, Ilisch* appears to have made a few desultory experiments upon oil of sage, but without any very definite results. Herberger,† Rochleder,‡ and Zeller§ added but little to what was known; they seem to have contented themselves with qualitative experiments relating to the action of various reagents upon the oil, and to very partial fractionation and determination of the carbon and hydrogen in the various fractions.

2. The oil upon which I have worked was obtained from Messrs. Wright, Layman, and Umney, of Southwark Street, London: it was by them believed to be a genuine sample. The oil is obtained by distilling sag (I believe *Salvia officinalis*) with water. I was unfortunately unable to ascertain the age of the sample.

The oil was of a yellow-brown colour without any shade of green. According to some of the authors quoted above, sage oil, especially when prepared from young plants, has a green colour changing to brown. The smell can only be described by saying that it was intensely sage-like; the taste was hot and burning; the reaction was neutral.

3. A quantity of the oil was allowed to remain in a loosely covered vessel for several months; it did not deposit any solid matter, neither did it become resinous; the reaction remained neutral.

4. The oil readily absorbs oxygen from the air; a quantity of oil, about 80 c.c. was allowed to stand in an inverted tube containing air, and placed in sunshine. After two days the level of the oil in the tube showed that the oxygen (about 4 c.c.) contained in the confined air had been entirely removed. On testing the oil with paper soaked in starch paste and potassium iodide solution a blue coloration was produced, but only after some time.

5. Concentrated nitric acid acts most energetically upon sage oil with the production of a red semi-resinous body; this action is explosive in its violence if the oil and acid be shaken together.

6. Strong sulphuric acid causes the production of a brownish-red, semi-viscid mass; by this action much heat is developed and sulphur dioxide is evolved. If the semi-solid mass be allowed to remain at rest for twenty-four hours and water be then added, and the liquid submitted to distillation in a current of steam, a distillate is obtained, the oily portion of which when separated from the aqueous part, and dried, boils for the most part between 215° and 225°; this distillate appears as a heavy yellow-coloured oil; it is most probably a polymeride produced by the action of the sulphuric acid upon the hydrocarbons present in the original oil.

The greater portion of the product of strong sulphuric acid upon the oil remains behind after distillation in steam, in the form of a very thick black resin, which becomes almost solid after standing in the air for some time.

7. On passing dry hydrochloric acid gas into a portion of the oil, it darkened in colour, becoming finally reddish-brown; heat was evolved, and considerable quantities of the gas were absorbed. On submitting the product to distillation, after washing with dilute caustic soda, and repeatedly with water, the greater portion boiled between 195° and 200° and presented the appearance of a light-yellow liquid with a peculiar, somewhat ethereal odour; this liquid darkened slightly after standing in diffuse sunlight. Portions of the oil saturated with hydrochloric acid were allowed to remain at rest for some days, both alone and also mixed with water, but in no case was any solid matter deposited.

Another portion of the oil was surrounded with a freezing mixture, whereby the temperature was maintained at—10° to—15°, and was then saturated with hydrochloric acid gas. As in the former experiment the oil darkened in colour, until it had become reddish-brown. No solid substance was formed, nor did any separate out on standing. After washing as before and distillation, two liquids were obtained, one boiling from 195° to 200°, and the other from 205° to 210°. Whether these actually represent two separate chlorhydrates, I am not as yet prepared to say. These liquids were light-yellow in colour, their reaction was neutral, they were lighter than water and were not decomposed by shaking with water whether hot or cold. Only after prolonged agitation and washing with water the reaction of the liquids became very slightly acid. Ribaw* proposes to adopt the behaviour of the various isomerides of the formula $C_{10}H_{16}HCl$ with water as a means of distinguishing them from one another. Some of these chlorhydrates are decomposed

* *A. Tr.*, 20, 2, 7.
† *Repert.*, 34, 311.
‡ *Ann. Pharm.*, 44, 4.
§ Stud. über äther, oele. Landau, 1850.

* *Bull. Soc. Chim.* [2], xiv., 241

by mere contact with moist air, others by contact with water, etc. The chlorhydrates derived from sage oil appear to possess a great degree of stability in this respect.

8. The specific gravity of the oil determined at 14° C. was found to be 0·9339.

9. A portion of the oil, when mixed with about half its volume of water, the same quantity of strong nitric acid, and one volume of alcohol, became dark-red in colour, and after some days separated into an under light-yellow and an upper dark-red layer. No solid matter was, however, deposited after two months' standing, and at the expiry of that time the two layers had re-united.

Proximate Constituents of the Oil.

10. On submitting the oil to distillation, a small quantity of water came over; after the removal of this, distillation began at about 170°; four-fifths of the whole quantity of oil distilled between this point and 215°, the greater portion boiling between 175° and 195°. That portion which boiled below 190° was treated with sodium, which caused the formation of considerable quantities of red resinous matter, and again distilled: about four-fifths of the whole again passed over below 190°, leaving a semi-solid red gelatinous mass which dissolved in ether to form a brown coloured liquid with a slight green fluorescence.

11. The fraction boiling at about 190° deposited a small quantity of solid matter after standing for some time; it was therefore exposed to the cold of several successive days and night during a rather severe frost, whereby a larger quantity of solid matter was separated. This solid substance was separated from the liquid, pressed between paper, and set aside for further examination.

12. That fraction obtained in the first distillation of the oil which boiled above 190° was now submitted to fractionation without being treated with sodium; the greater portion came over below 210°. After repeated fractionation and removal of the solid matter which separated out on standing, the main portion of this liquid boiled between 198° and 203°.

After each fractionation, however, a considerable quantity of resinous matter remained in the flask, and it was only when this had been repeatedly removed that it was found possible to distil the liquid entirely below 208°. It would thus appear that the liquid contains compounds which become polymerized by the action of heat alone: in this respect it agrees with the behaviour noticed in the case of many other essential oils.

13. After repeated distillation over sodium, the fraction which on the second distillation boiled below 190° was entirely split up for the most part into two portions, a smaller, boiling from 156° to 158° and a larger, boiling from 166° to 168°. During the fractionation a very considerable quantity of yellow-red resin was formed, chiefly it seemed by the action of the sodium upon the oil. This resin was decomposed with water, the oil was separated, dried, and again fractionated; from the portion of higher boiling point a large quantity of the solid matter already noticed separated on standing at the ordinary temperature.

14. In the first distillation of the oil, boiling was discontinued when the temperature reached 215°; that which remained was a thick very dark coloured liquid. This liquid was now submitted to distillation: about one-half distilled below 250° leaving a semi-solid nearly black mass in the retort. On fractionating the distillate solid matter was deposited from those fractions which boiled below 220°, but not from the higher fractions: after the removal of all matter volatile below 240° a dark brown liquid with distinct green fluorescence remained in the flask.

15. The oil was thus separated into four, or perhaps into five main portions.

(1) A liquid boiling at 156°–158°.
(2) A liquid boiling at 166°—168°.
(3) A liquid boiling at 198°—203°.
(4) A solid deposited chiefly from those fractions of the oil boiling from 190°—220° and perhaps,
(5) A heavy fluorescent liquid boiling about 240°.

The resinous matter which remained behind was very probably produced, or at any rate partly produced, by the polymerizing action of heat upon the original constituents of the oil.

16. I shall now describe the results of the examinations of these different constituents of the oil so far as they have yet extended.

That portion of the distillate which boiled from 156° to 158° was fractionated until the greater portion boiled constantly at 157° to 157·5° (thermometer surrounded with vapour, and barometer at 760 mm.). The liquid so obtained was perfectly colourless; it had an exceedingly slight odour of sage, its specific gravity was 0·8635 at 15 C

Action of Bromine upon the Terpene of lower boiling point.

17. Twelve grams of this liquid, placed in a flask, surrounded with snow and ice, were subjected to the action of bromine, added drop by drop, through a capillary tube. The bromine was very rapidly absorbed, a hissing noise being produced on the addition of each drop. When no further absorption appeared to take place, it was found that the liquid weighed 25 grams. In order to convert 12 grams of $C_{10}H_{16}$ into $C_{10}H_{16}Br_2$, 14 grams of bromine (in round numbers) are required: 13 grams were used in the foregoing experiment. The liquid thus obtained was a heavy colourless oil. On submitting it to distillation torrents of hydrobromic acid were evolved, and a nearly colourless liquid came over, which, however, quickly darkened, until of a reddish-brown colour. On attempting to distil this liquid, it was again decomposed, yielding hydrobromic acid, a distillate boiling from 175° to 180°, another and heavier portion boiling from 220° to 240°, and a considerable quantity of black resin. This process was repeated several times with the same result, nevertheless the greater portion of the liquid eventually distilled between 220° and 240°. That fraction which boiled between 175° and 180° gave all the qualitative reactions for cymene.

I have not yet performed a combustion of that portion of the distillate from sage oil boiling at 157°, but from its reactions I have no doubt that the liquid is a terpene of the formula $C_{10}H_{16}$. Like the other terpenes of this formula, the lower boiling terpene from sage oil appears to be readily converted into a dibromide, which is decomposed by the action of heat with the formation of cymene. This decomposition does not, however, take place with so great facility as has been noticed in the case of other terpenes of higher boiling points.*

Does the Terpene of lower boiling point contain Cymene?

18. About 20 grams of the liquid boiling at 157° was surrounded with a freezing mixture, and concentrated sulphuric acid was added drop by drop, the liquid not being allowed to become warm. A very small quantity of sulphur dioxide was evolved, and a deep-red semi-solid mass was formed. After twenty-four hours this was distilled in a current of steam, the distillate was dried and fractionated, the greater portion boiled between 175° and 178° and gave the reactions of cymene. In this way about 7 per cent. of cymene was obtained.

Oxidation of the 157° Terpene.

19. About 25 c.c. of the liquid was subjected to the action of 2 litres of boiling chromic liquor, containing 10 per cent. of potassium dichromate, and sulphuric acid sufficient to saturate the bases present. After thirty-seven hours, the boiling was stopped and the small quantity of solid matter which floated on the surface of the liquid was collected, washed with hot water, dissolved in boiling ammonia and reprecipitated by means of hydrochloric acid. It gave the reactions of terephthalic acid. The liquid when distilled showed the reactions for acetic acid.

* See Wright 'On Isomeric Terpenes.' *Chem. Soc. J.* [2], xi., 694.

Reactions of the Terpene of higher boiling point.

20. That portion of the original distillate which boiled from 166° to 168° was fractionated until the greater part boiled constantly from 167° to 168° (thermometer surrounded with vapour; barometer 760 mm.). The liquid so obtained had a somewhat more pronounced odour of sage than the fraction which boiled at 157°. The specific gravity was 0·8866 at 15° C. A portion treated with bromine reacted in a manner very similar to that already described in the case of the terpene of lower boiling point. Only, on distilling the brominated liquid it was very readily and almost entirely split up into hydrobromic acid and what appeared, from its reactions, to be cymene. Treatment with sulphuric acid, the liquid being carefully kept cold, resulted in the formation of a semi-solid mass from which about 8 per cent. of cymene was obtained by distillation in steam and fractionation of the distillate.

This terpene, for such it doubtless is, yielded on oxidation (which was carried out exactly as in the case of the terpene of lower boiling point) a considerably larger quantity of terephthalic acid than was obtained from the 157° terpene.

Oxidized Constituents (?) of the Oil.

21. I have as yet separated so small a quantity of that fraction of the oil which boils from 198° to 203° that I am not in a position to describe its properties. It is a nearly colourless heavy liquid, with a very strong odour of sage; it does not become sensibly darker on exposure to air. I have little doubt that this substance represents the liquid oxidized constituents of the oil. I propose for it the name of *salviol*.

22. The solid which separated from the higher fraction of the oil was dried by pressure between blotting paper. As thus purified it closely resembles ordinary camphor, both in appearance, smell and taste; it has, however, a peculiar sage-like odour, which ordinary camphor has not. This sage-camphor is soluble to a very slight extent in water; it swims upon the surface of water and exhibits the peculiar rotatory movements of camphor. It is soluble in alcohol—from which solution water precipitates it in the form of white flakes—in chloroform and in ether. Nitric acid dissolves sage-camphor with the evolution of small quantities of lower oxides of nitrogen; from this solution water throws down a white precipitate. Sulphuric acid dissolves it with difficulty, and hydrochloric acid only after continued boiling.

If sage-camphor be dissolved in chloroform, and bromine be then added, and the liquid be placed over strong sulphuric acid, light cream-coloured crystals are deposited having a bromine-like odour, and melting at 132°—133°C.

By sublimation sage-camphor is obtained in exceedingly beautiful crystals. The mean of several determinations of the melting-point of these crystals was 187° C., and of the point of resolidification 177° C.

23. I hope to continue this investigation, and to present a report of work done to the next annual meeting of the Conference. I shall endeavour more particularly to study the physical properties of the constituents of sage oil with a view to throwing some light on the questions of isomerism.

The PRESIDENT said this must be taken as the commencement of the investigation. As Mr. Muir had stated, the investigation had to be carried much further. They would of course be glad to have a determination of the composition of some of these products, and something more than a mere inference or opinion that they possess the properties and characters which Mr. Muir assigned to them. All this would probably come in subsequent communications.

Mr. KINGZETT suggested that in the portion boiling at 167°, there was cymene existing in a free state.

Dr. TILDEN asked what proportion of terpenes was obtained from the oil, and whether they existed in considerable quantity. He did not hear whether they formed the main constituents of the oil or whether the oxides constituted the main part.

Mr. MUIR, in answer to Mr. Kingzett, said the portion of higher boiling point almost certainly contained cymene, as was shown by the action of strong sulphuric acid upon the carefully cooled liquid, and subsequent distillation in steam. In answer to Dr. Tilden, he said the greater portion of the oil consisted of the oxidized constituents, liquid and solid, of the terpenes; that boiling at 167° was present in larger quantity than that of lower boiling point.

(To be continued.)

Parliamentary and Law Proceedings.

POISONING BY LAUDANUM.

On Monday last an inquest was held at the Davenport Hotel, Middlesborough, before Mr. J. T. Belk (Borough Coroner), on the body of Mr. John Baker Walker, who poisoned himself by taking laudanum on the previous Saturday. Deceased had been much depressed in mind owing to the failure and bankruptcy of the firm with which he was connected. After the medical evidence, from which it appeared probable that the deceased had swallowed two separate half-ounces of laudanum, Mr. James Crosby Robson, chemist, 37, Linthorpe Road, Middlesborough, said he knew deceased, and last saw him at about half-past five on Saturday night. He went into his shop and asked for half-an-ounce of laudanum for his daughter, who, he said, had a swollen face. He was then in his usual state, and nothing was particularly noticeable in his manner. He said his daughter had a decayed tooth, and he wanted the laudanum. The bottle was labelled "Laudanum—poison," and witness cautioned him as to its use. He would not have sold it to him had he not known him to be a man of education and likely to know of the power of the drug. It was only necessary, in accordance with the Act, to label the bottle "laudanum—poison," with the name of the seller added.

The jury returned a verdict that the deceased "Died from the effects of an overdose of laudanum, administered by himself during a period of temporary insanity."—*Middlesborough Daily Exchange.*

Notes and Queries.

[525]. BLEACHING OF TALLOW.—Can any reader of the Journal tell me the best and quickest way to bleach tallow?—H. B.

---

[518]. COCKROACHES.—At page 108 of the current volume of the Journal (July 29), Chas. M. Foottit asks how to keep cockroaches away. Is this a pharmaceutical subject? However, the insect is a disagreeable one, alhough not so destructive as its fellows in tropical climates—say the Barata of Brazil. The insect can be poisoned; but a more salutary plan is to buy a beetle-trap, and use it; also to go with a candle every night, and destroy them; a ready way to kill them, on the walls, is the sole of a slipper, held by the heel. The winter helps to destroy them; except where a constant fire is kept.—JOSEPH LEAY.

[**** It cannot be pretended that the subject of cockroaches is very closely allied to pharmacy and the above answer suggests but a very mechanical remedy. Nevertheless our correspondent should bear in mind that many questions equally foreign to their calling are daily brought before chemists and druggists. We consider this fact a sufficient justification for the appearance of this and similar questions in the Notes and Queries column.—ED. PH. J.]

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

PHARMACEUTICAL POLITICS.

Sir,—I am sorry my conviction compels me to oppose the formation of a Trade Protection Society, for pedlars are doubtless a boon in out-lying districts. We have a Pharmaceutical Society which undoubtedly represents the trade more effectively, and should render a protective association quite unnecessary. Surely the Conference of chemists in 1841 were quite as much in earnest in defence of their rights and privileges as the Conference of chemists in Birmingham in 1876. It is impossible to educate a great body of independent workers into a phalanx for self protection and promotion of general weal in a few years, especially among a class who cannot claim a superior stock of commercial knowledge or very sound common sense, judging by the way many of us open expensive shops where much more lucrative trades could not exist, and living by the combination of extraordinary and incompatible trade,—dispensers of medicine, purveyors of ice-cream, soda, Gilbey's agency, grocery, etc., etc., take umbrage at Epsom salts and patent medicines being sold at an oil-shop.

There are too many chemists, and a man when he finds a young family growing around him, is bound to make the best income he can by honourable trade; but this is a misfortune for pharmacy. The chemist exercises his legitimate calling only occasionally for the families by whom he is surrounded, while his neighbours exercise theirs daily; hence he is the first to encroach, first on the one side then on the other.

It is a slow process, but as men become better educated they will recognize their position better, and many of the hopeless essays will never change hands. Close confinement at £100 or £150 a year will not tempt Mr. Parnassus who has done the Square. He will for years at least prefer more freedom in a larger establishment. No change can be effected, alas, without much individual suffering, and the hopeful ground for concerted action lies in our Benevolent Fund. The thousands of chemists who do not belong to us now will gradually join us, more especially if we could out of their guinea a year set aside 20 or 25 per cent. to the account of the Benevolent Fund, to raise the scanty pittance or increase the number of annuitants. £1 1s a year in the heyday of life is not missed, and in the dark evening £40 or £50 a year is not to be despised, and none of us can say we are sure not to want it.

These smaller organizations embracing each minute subsections of a trade, and each in their turn having to bear the rebuke of non-supporters "What are you doing for us?" "What has the Pharmaceutical Society done for us?" is a well-known cry. Apathetic or half educated men expect to reap where they have not sown, and curse the earth because they are starving.

The Pharmaceutical Society, if moulded aright,—and members and associates have the power to mould it, as much if not more than the people of this country mould their imperial and municipal government,—can accomplish more than any other; we have a Charter and two Acts of Parliament and a prestige to which no new organization can possibly aspire; we have an assured income, and funded property enough to render hostile attacks difficult,—and if we had the moral and substantial support of all the chemists in this country such attacks would be impossible. The thousands of chemists who do not belong to us must be the last to blame us for short-comings, and our Council or for want of energy or for whatever arises in the future to their hurt, by hostile attacks, or vexatious legislation, or too rapid a diminution of their numbers. Many of our members complain, perhaps justly, of the Society's action or inaction; they doubtless belong to a section of the trade so little represented in the Society that there are not enough representative men on the Council. The same thing would occur if the House of Commons represented one fifth of the ratepayers of this country, and that part only which took an interest in land and the mercantile marine.

It is possible for a thoroughly representative Council to meet in Bloomsbury Square, but nowhere else. The influence of the Society is the collective influence of its individual members. It is not a God nor a Spirit, it is not a mystic body, it is the sum of its units.

GEORGE MEE.

79, Grosvenor Road, Highbury New Park.

DISPENSING CHARGES.

Sir,—The fact that you can buy a bottle of physic at a lower price in one part of the town than in another, has frequently of late been held up to the chemist and druggist as a proof that the dealer in drugs is no better than a rogue, because of this well known circumstance. It is not perhaps surprising that persons who have no technical knowledge of the subject should fall into absurd errors in discussing such a question as the charges of chemists and druggists generally for dispensing medicines, but it is unfortunate that those who have better judgment should follow them in their errors. A gentleman, an old customer, recently complained to me that he could get a prescription dispensed at the east end of the town for one half of what he had to pay if he took his prescription to a west end druggist, forgetting that the expenses of a west end druggist to meet the requirements of a more wealthy and fastidious *clientèle* are on a very different scale from those of the small druggist in the back street. Even on the ground of ordinary trade-differences of price, depending on the differences between east and west, the poor and rich, a considerable difference in price is to be expected for articles much more delicately chosen, more carefully prepared and issued. A chemist who lives in a neighbourhood where the poor get all or nearly all their medicines from public hospitals and dispensaries, who is not called upon to keep the most costly drugs, nor those of the best quality, and where the resident doctors do their own dispensing, carries on a business very different in character, and requiring far less skill, than one whose whole time, as is the case with most of the leading chemists at the west end, is in great part occupied in acting as the physician's assistant, in the nicest possible operations with drugs, when life or death is but the matter of half-a-grain. To regard men who have such duties continually in hand as mere retailers of salts and rhubarb is as absurd as to complain because Sir W. Jenner charges 50 guineas for a visit when the parish doctor may be had for perhaps as many pence.

The skill of the chemist, and his professional self-respect and knowledge are appreciable elements in his value, and the value of his drugs, and should bring the award of higher social standing and higher remuneration, for better education, professional trustworthiness, the cultivation of nice skill, and a professional standard of decorum.

Llanberis Terrace, Lewisham. ALEX. COURTENAY.

"*Pharmacist, G.*"—We think the label would be held to recommend the preparation for the relief of disease, and, therefore, to require the stamp. The best way would be to ask the opinion of the Inland Revenue Authorities.

C. B.—We are not aware that the oil has been used for the purpose stated.

W. Wilson.—The dose was by no means an excessive one. In a paper published in *The Practitioner* for March last, Dr. Ewald, of Berlin, states that he has seen cases in which 15 or 20 grams of salicylic acid have been given during twenty-four hours without ill effect.

"*Walter.*"—See the article on Water in Watt's 'Dictionary.'

C. M.—(1) Salicylate of ammonia. (2) Marshall's 'Outlines of Physiology' (Longmans), 2 vols., 32*s*.

"*Litmus.*"—Blue litmus is reddened by acids.

"*Acid.*"—(1) We believe that sulphuret of antimony, and not vermilion, is what is intended under the circumstances mentioned. (2) The red colour is due to oxidation.

J. Litchfield.—Simple precipitation by alkalies from solution of the trichloride.

J. Smith.—Several formulæ for Diuretic Wine are given in Dorvault's 'L'Officine.'

J. Botham.—De Candolle's 'Prodromus,' vol. v., p. 523, Wood's 'Tourist's Flora;' a supply could probably be obtained through Messrs. Butler and McCulloch, Covent Garden. See before, pp. 80 and 249.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Howie, Mr. Corder, Mr. Hale, Mr. Campbell, Mr. Hunter, Mr. Gilmour, Mr. Barclay, Juvenis, East End, J. C. P.

SOME CONSTITUENTS OF GELSEMIUM SEMPERVIRENS.

BY F. L. SONNENSCHEIN.

For several years past various preparations of the so-called Carolina jasmine (*Gelsemium sempervirens*, Pers.) have been used in medicine in North America, the two principal being the fluid extract and "gelsemin." The first of these is a concentrated alcoholic extract, the latter is a dried alcoholic ethereal extract, containing much resin. Notwithstanding that different chemists, and more recently Wormley, have been engaged in the investigation of this drug, hitherto no exact information has been given as to the composition and nature of the two principal constituents, namely, a non-nitrogenous body approaching to an acid, and a non-nitrogenous basic compound. In a paper lately read before the Berlin Chemical Society,* Professor Sonnenschein gives the following information, which is based upon a series of experiments carried out in his laboratory with a suitable supply of material, by Mr. C. Robbins, of New York.

The powdered root was extracted to exhaustion with a mixture of equal parts of alcohol and water; the extract was concentrated, and after separation of the resin thus thrown out of solution basic lead acetate was added as long as any precipitate was formed. This precipitate served especially for the preparation of the indifferent compound. A mixture of 1 part of ether and 3 parts of alcohol used instead of the aqueous alcohol for extraction gave a larger yield. The filtered liquid was used for the separation of the nitrogenous body.

The lead precipitate was suspended in water, decomposed by sulphuretted hydrogen, filtered, the filtrate concentrated by evaporation, and the liquid so obtained was shaken several times with ether. The ethereal solution, upon spontaneous evaporation, left behind some light acicular crystals, which had to be separated from adhering resinous matter by treatment with absolute alcohol. The same compound may be obtained direct by shaking the commercial fluid extract with ether, a method that was adopted by Wormley.

Thus purified, this substance is white, crystallizes readily in tufts, is without smell, and almost tasteless, and possesses feebly acid properties. The acicular crystals are best obtained after slow crystallization from an alcoholic-ethereal solution. If heated to about 160° C., this substance melts, and solidifies upon cooling to an amorphous mass. Upon heating it above the melting-point it is decomposed and turns brown, and upon raising the temperature still higher it is at last completely volatilized. If heated very carefully a portion can be sublimed. The compound is soluble with difficulty in cold, but much more readily in hot water; it is soluble in about 100 parts of cold alcohol, almost insoluble in pure ether, but easily soluble in ether containing alcohol.

The aqueous solution is distinguished by its fluorescence, which can be observed even after very considerable dilution. In an alkaline solution this appearance becomes yet more manifest; the solution then appears yellow by transmitted light, and by reflected light blue.

* *Berichte d. deutschen chem. Gesselschaft*, jahr. ix. (Sept. 18), p. 1182.

Concentrated sulphuric acid dissolves this substance with a reddish-yellow colour; carefully heated, the solution becomes chocolate brown. Hydrochloric acid causes no particular change of colour. If the substance be shaken with a small quantity of nitric acid a yellow solution results, which upon the addition of ammonia takes a deep blood-red colour. This reaction is so delicate that 0·00002 gram can be detected by it.

The same results were obtained by Wormley, who named the compound "gelseminic acid;" principally because of its acid reaction, but also because, the compound with an alkali produces precipitates in the solutions of most of the heavy metals. These precipitates Wormley considered to be insoluble gelseminates. Careful experiments and examination under the microscope have, however, proved that with the exception of the lead compound they consisted of the hydrated oxides of the metals mixed with the supposed acid.

It was, therefore, thought probable that this substance instead of being a new acid would prove to be identical with æsculin (formerly called polychrom), obtained from the bark *Æsculus Hippocastanum*. An agreement was observed in its external characters as well as its chemical behaviour, especially in the blue fluorescence of the aqueous solution, the dichroism of an alkaline solution, the reaction with nitric acid and ammonia, and its behaviour at high temperatures. This agreement was established by parallel experiments with commercial æsculin. Also, by digestion of æsculin prepared from gelsemium with dilute sulphuric acid sugar was separated and detected by Fehling's test.

In order further to establish the identity of the two substances a combustion was made with some of the prepared substance that had been dried at 115° until it ceased to lose weight. There was found—

	I.	II.
C	52·04	51·82
H	5·18	4·98

According to Rochleder, æsculin has the formula $C_{30}H_{34}O_{19}$, which would give a percentage composiof C, 51·57; H, 4·87.

A further confirmation was found in the hydration. The air-dried substance obtained from gelsemium lost at 110° C. 4·73] per cent. of water. Æsculin = $C_{30}H_{34}O_{19}+2$ aq. lost by drying 4·90 per cent.

Professor Sonnenschein, therefore, thinks there can be no doubt that the acid reacting body prepared from gelsemium is perfectly identical with æsculin.

The solution from which the lead precipitate had been separated was freed from dissolved lead by sulphuretted hydrogen; then from the still acid liquid any yet remaining æsculin was removed by shaking with ether, the ether was chased off by heat, and potash added up to an alkaline reaction. A light flocculent precipitate was thus thrown down, which was collected on a filter, and after washing, which could not be continued long on account of it being slightly soluble, it was dissolved for purification in hydrochloric acid. The filtered solution was, after the addition of potash, several times shaken, with ether which was left to evaporate spontaneously, when a colourless, transparent, varnish-like coating was left on the sides of the vessel. It was found that the largest yield of this substance was obtained from the aqueous alcoholic extract.

When the dish was gently warmed the residue puffed up strongly whilst parting with entangled ether, and then appeared as an amorphous transparent brittle mass, which could be rubbed to an almost colourless, perfectly amorphous powder. Upon gently heating this it melted, under 100° C., to a colourless liquid; at a higher temperature it was partially decomposed. In water it was with difficulty soluble, more readily in alcohol, and very freely in ether and chloroform. Its reaction was strongly alkaline and its taste very bitter.

The behaviour of this body, which has all the characters of an alkaloid, and has been named gelsemine, was briefly as follows:—

It completely neutralized acids, but hitherto no crystallizable salts have been prepared. The combination with hydrochloric acid, upon evaporation over sulphuric acid, leaves an amorphous mass, which is white in the centre, red towards the periphery, and blue grey at the outer edge.

The residue readily formed a solution with water, which only when concentrated gave a white precipitate with tannin, but when diluted gave it first with ammonia. Gold chloride gave a yellow precipitate that was not altered by heating. Iodine in iodide of potassium gave a flocculent red brown turbidity, which became somewhat conglomerated by heating. Potassio-mercuric iodide gave a white flocculent precipitate, which dissolved upon heating and again separated on cooling. Phosphomolybdic acid gave a flocculent yellow precipitate. Platinic chloride gave an amorphous citron yellow precipitate, soluble in water, especially upon heating. It was also readily soluble in alcohol. An aqueous solution of the platinum salt left upon spontaneous evaporation transparent square octahedra, which upon the addition of water immediately took the amorphous form, with separation of platinum chloride.

The pure alkaloid dissolves in concentrated nitric acid with a yellow green colour. In concentrated sulphuric acid it gives at first the same colour, but this passes immediately to a reddish brown and upon heating to a dark dirty red colour.

If gelsemine be dissolved in concentrated sulphuric acid and potassium bichromate be added, it takes, especially at the line of contact, a cherry red colour, changing a little to violet, which soon forms a bluish green spot. This reaction cannot be confounded with that of strychnine, although it shows some similarity. If instead of potassium bichromate ceroso-ceric oxide be added to the sulphuric acid solution there is produced a bright light cherry red colour, especially at the point of contact, which by stirring is diffused through the mass. This reaction takes place so sharply with the smallest trace that it may be looked upon as the best test for the presence of gelsemine.

The amorphous platinum precipitate left upon incineration 16·25 and 16·85 per cent of metallic platinum. The hydrochloric acid compound contained 8·73 per cent. of chlorine. Upon incineration with soda lime the nitrogen in two experiments was found to equal 7·26 and 7·23 per cent. The carbon found in two experiments was 66·10 and 66·41 per cent. and the hydrogen 9·44 and 10·05. This allows of the construction of the following formula for gelsemine—$C_{11}H_{19}NO_2$.

		Calculated.	Found. I.	Found. II.
C 11	= 132	67·00	66·41	66·10
H 19	= 19	9·64	10·05	9·44
N	= 14	7·10	7·26	7·23
O 2	= 32	16·24	16·28	17·23

This formula, however, has to be doubled if it depends on the hydrochloric acid compound, since this contains 8·73 per cent. of chlorine. $(C_{11}H_{19}NO_2)_2 + HCl$ requires 8·24 per cent. of chlorine.

According to the platinum left after incineration the platinum compound must have a composition represented by $[(C_{11}H_{19}NO_2)_2HCl]\,PtCl_4$, which would explain its behaviour in water by the formation of a basic salt.

0·012 gram of the hydrochloric acid compound injected into the leg of a strong pigeon caused manifestations of cramp, followed by death in thirty-six minutes. Similar results were obtained with frogs.

SALICYLIC COTTON WADDING.

For this purpose a white wadding completely freed from fat by sodium carbonate is necessary. E. Rennard saturates in a porcelain mortar 10 parts of this wadding with a solution of 2 parts salicylic acid in 15 of alcohol, and 35 of water of 25 to 30° C. (77 to 86° F.). After the solution has been completely absorbed, and uniformly distributed through the cotton, the latter is subjected to pressure until 25 parts of the solution are recovered, which may be used for wetting a fresh portion of cotton. If it is desired to avoid expression, only one part of salicylic acid is employed, but the full quantity of liquid mentioned above, which is about the smallest quantity with which a uniform moistening of the cotton can be effected. The wadding is then dried at ordinary temperature, since a higher heat causes a reddish colour. Thiersch has recommended the addition of some glycerin, in order to fix the acid more permanently upon the cotton; but Rennard states that the addition of 10 and even 20 per cent. of glycerin will not completely prevent the dusting of the acid on beating the cotton. The above proportions furnish a wadding impregnated with 10 per cent. of salicylic acid; this strength and a wadding containing 4 per cent. are most generally employed.—*Zeitsch. Oester. Ap. Ver.*

MEETING OF CHEMISTS AND DRUGGISTS IN ABERDEEN.

A meeting of the chemists of Aberdeen, called by circular, was held in the room of the local society, on Wednesday, September 20, at which Mr. A. Strachan was elected Local Secretary of the Chemists' Trade Association.

A deputation was appointed to canvass the town with as much expedition as possible, so that its report might be presented to the Executive of the Chemists' Trade Association before the discussion on the Glasgow memorial. This deputation reports very favourably, only having received two decided refusals out of a possible thirty-one. Most persons, however, withhold their donations until they see the work proceeding. The subscriptions are given conditionally:—

1. That the Association leave no stone unturned to procure an amendment of the Pharmacy Act.
2. That an Executive, with head quarters, be appointed in Scotland, as per Glasgow memorial, having Scotch solicitors to conduct Scotch prosecutions and defences.
3. That they give their attention to cases handed them through the local secretaries and prosecute when necessary, collecting further information at the expense of the Association.

In the meantime, and until satisfactory answers to the above be received, the amount collected will be placed in the George Street branch of the North of Scotland bank on deposit receipt.

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 30, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

COUNTER PRESCRIBING.

IF it were to turn out that the vigorous words used by Professor REDWOOD at Glasgow, with respect to the composite business done in the establishments of many medical men in that city, had given rise to a certain amount of irritation, we confess that to us the result would not be unpleasing. But, on the other hand, we are more satisfied to find that the thoughtful utterances with respect to so-called counter prescribing, spoken by the Professor in his presidential address to the British Pharmaceutical Conference on the same day, have received the general approbation of the medical press. This approbation has not been won by a simple abnegation of the right of the druggist, under all circumstances and to any degree, to give advice respecting the use of the drugs in which he deals; but by his evident recognition that this advice should be limited within safe and reasonable bounds. But the difficulty of defining these bounds is acknowledged to be very great, and the "border line which separates the respective domains of the prescriber and dispenser of medicines" might be shifted over a wide area, according to the interests or prejudices which are dominant. It was forcibly urged by Professor REDWOOD that of the fourteen thousand chemists and druggists in Great Britain the greater part have at present little to do with the dispensing of physicians' prescriptions, but are principally engaged in supplying medicines to be used by the public on unprofessional responsibility; and that it would be unreasonable, whilst heads of families and others were considered justified in treating slight ailments according to knowledge empirically obtained, that men who through being continually engaged in the preparation and sale of medicines might be supposed to have a knowledge of their properties should be debarred from imparting that knowledge when appealed to. It cannot be supposed that if this were prohibited to-morrow the public would be thus driven to consult the skilled physician respecting every simple ailment. At the same time we quite agree that it is essential there should be "some control exercised over the assumption of a duty which so obviously affects the health of the public."

We need not recapitulate here all that Professor REDWOOD said, since his address was published in our columns so recently. Respecting it the *Lancet* says, "We almost entirely concur in Professor "REDWOOD'S views. . . . . Professor REDWOOD well "observes that a pharmacist who prescribes for the "sick acts with far greater responsibility than that of "an individual unconnected with any department of "medicine. . . . . It may be, as Professor REDWOOD "says, that a certain amount of counter practice is "unavoidable, and that as domestic medicine does so "little harm, counter practice will do less. This, "by the way is rather doubtful reasoning. Be "this as it may, we cannot but wish that the "distinction so admirably stated by Professor "REDWOOD were duly observed." The *British Medical Journal* considers that Professor REDWOOD'S remarks are "worthy of consideration by the "too numerous transgressors on the domain of the "physician. It is evident that he regards a certain "amount of counter practice as unavoidable rather "than justifiable; and there is much force in this "view. At the same time he is desirous of limiting "the evil as far as possible."

We do not care to cavil as to whether the words "unavoidable rather than justifiable," and "evil," represent Professor REDWOOD'S view of the "certain amount" of counter prescribing; but we freely admit, and we believe this to be the opinion of the majority of pharmacists, that this should not extend beyond the amount required for the public convenience. We cannot do better perhaps, just now, than recall the opinion of Mr. Baron BRAMWELL as to the extent to which the public convenience might be considered to modify the stringency of the law as laid down by him—quite strictly enough—in the case of the *Apothecaries' Company* v. *Nottingham*. In summing up, his lordship said, "If a man "entered a chemist's shop and asked for something to "cure a bad headache, and the chemist gave him a "draught, without doubt the chemist would techni"cally infringe the terms of the [Apothecaries'] Act, "but it would be very unreasonable if the Apothe"caries' Company were to interfere in such a case."

It cannot be denied that there are instances, and some of them very gross ones, where the chemist and druggist enters into direct competition with the medical man. For these we offer no defence; but we object strongly to their being spoken of as representative of pharmacists generally. We are of those who believe that as pharmacists and druggists become more engaged in their legitimate duties they will be less disposed to engage in those for which they have no special qualification. The *Lancet* thinks that there is far more work to be done by pharmacists whenever they will give their undivided energy and attention to the duty of preparing remedies for public use on the prescription of medical men. But for this result an important factor is at present much wanting,—the prescriptions. As soon as these are forthcoming there is little doubt that they will command the attention of pharmacists.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

Tuesday, September 6, 1876.

(*Concluded from page 267.*)

The next paper was a—

NOTE ON THE BENZOATES IN SUINT.

BY ANDREW TAYLOR, F.C.S.

Chevreul demonstrated how the wool proper by no means constitutes the major portion of a sheep's fleece. Here is his analysis of merino wool:—

Earthy matter washed out by water, when the wool is washed	26·06
Suint soluble in cold water	32·74
A peculiar grease found in interior of the wool fibre soluble in alcohol	8·57
Earthy matter fixed by the fats	1·40
Wool properly so called	31·23
	100·00

The fact of the first item consisting mainly of potassic carbonate has awakened attention to the large quantity of one of our prime fertilizers annually extracted from the soil by browsing sheep, which afterwards helps to pollute our streams. A new source of potash salts has thus been recognized. Of the 48,000,000 kilo. potash salts annually made, 1,000,000 kilo. is derived from wool washing. Though the fatty matters form a larger percentage of the wool than the earthy matters soluble in water, they are not reckoned profitable raw material for the special industrialist. The pioneers of this new industry, MM. Mauméne and Rogelet, first concentrated the wash waters from the wool to a treacly consistence. They next distilled it in cast-iron retorts, recovering the ammonia water thus formed; and lastly, lixiviated the dry ash for the potash salts. But, since, the exigencies of manufacturing convenience have developed a simpler plan, collecting only the latter bodies. The suint is concentrated to a sp. gr. of 30·13, in a series of brick evaporators, the flame being drawn along the top of the liquors by an exhauster. The thick suint is then burnt off for the potash. Havrez, indeed, has indicated that suint mixed with other fatty matters forms an excellent source of prussiate of potash. This application may adapt itself better to the specialities of an intricate manufacture rather than to public utility. Theoretical research, on the other hand, has demonstrated the existence in the wool of bodies, if isolated, demonstrably of general use in the arts. Thus cholesterin and isocholesterin have much higher melting points than paraffin, and seem likely to compete with it if introduced into commerce; but still remain chemical curiosities. I suspect they cannot be obtained profitably from suint as at present manufactured. The boiling down to a syrup of the wool-wash waters may be suitable to the recovery of potash alone; but it chars the fats, and gives pitch as the highest product in a distillation, as of palm oil with superheated steam. An experiment of this kind on the large scale yielded unsatisfactory results. The material operated on yielded 50 per cent. of water, 32 per cent. of mineral matter, and only 18 per cent. of fatty matter, so burned as to render only a very small proportion available for the purposes of the soapmaker. I suspect that the wool must be treated in different fashions to obtain special materials, as cholesterin, demonstrated by laboratory experiments as present in it. In such methods washing in alcohol, ether, or acetic acid, has always been employed. It might destroy the value of the wool for its primary uses so to treat it.

Messrs. Schulze and Allrich announce that they found that the portion of the suint remaining undisturbed by the action of alcohol consisted of benzoates: one the benzoate of an ether which crystallizes from acetone or ether in needles, and separates from it in flocks or jelly-like masses. Desiring to test this practically, I employed an 80 gallon steam-jacketted still, working at a pressure of 20 lbs. to the square inch, and distilled in it equal mixtures of petroleum spirit and suint, until I had operated on a ton of the latter substance. As it stood 15 lbs to the gallon, 150 gallons were thus gone through. I recovered nearly all my petroleum spirit, or might have done so with suitable precautions, and besides a yellow fatty liquid of a sp. gr. 1·2. Every five gallons of suint used gave one of this fat; this is in the proportion of 30 gallons to the ton. This liquid gave characteristic tests for benzoic and hydrocyanic acids. On heating eight gallons of this fat in a steam jacket, after mixing with it about a gallon of hydrochloric acid, for about an hour and half, during which the boiling shed was filled with ammoniacal and other vapours, I found remaining a brown liquid filled with benzoic acid crystals; the sides of the vessel were covered with these shining needles. Fully, three-quarters of a pound of dried substance were collected from the drainings besides; or nearly three pounds to the ton of suint. I believe the whole available benzoic acid was not collected, and from laboratory experiments I find the water washed from the wool yields nearly 3 per cent. more benzoic acid than the concentrated suint.

I desire to record this somewhat imperfect experiment, because whatever economic difficulties may surround the commercial recovering of potash salts from suint, such a ready source of benzoic acid ought to bring it into much more general use, specially as a preservative agent for organic substances. It might be easily collected at every sheep-washing station.

The PRESIDENT said he was sure the Conference would thank the author of this paper. It afforded an indication of an additional source from which benzoic acid was derivable. Already in commerce there was benzoic acid derived from two or three, if not more, sources, presenting peculiarities which were very obvious to the senses. In fact at certain periods it was found that the benzoic acid of commerce was by no means so suitable as it used to be for use in medicine. That, for instance, which was prepared in Germany from cows' urine retained most persistently the odour which was quite characteristic of it. Whether such a disadvantage appertained to any extent to benzoic acid derived from this source, he was not aware. The subject, however, was of interest to the pharmacist, who might sometimes be in doubt as to the cause of slight differences in the odour presented by this therapeutic agent. Of course it was known that benzoic acid derived from benzoin, which was most suitable for medicinal purposes, and was alone recognized in the Pharmacopœia, would vary in its physical characters,—in the odour especially—according to the manner in which it was prepared. The old method of obtaining benzoic acid by sublimation had been to a great extent modified by getting it by precipitation. But then unless it were sublimed finally it lacked to a great extent the peculiar odour which was so characteristic of benzoic acid.

The next paper was on—

A NEW BASIS FOR CANTHARIDES PLASTER.

BY A. W. GERRARD,

Teacher of Pharmacy to University College Hospital.

In a report upon the official plasters presented by me before the meeting of our Conference held in London in 1874, the cantharides plaster was omitted from the list, as my experiments upon it were not then concluded. Mr. T. Groves, who was the president of the Conference for that year, remarked, in his discussion of my report, that the blister plaster was the only one in which he believed, therefore I thought it too important a matter to overlook, and am now in a position to lay the subject before you.

The basis of our present cantharides plaster, as is well known, consists of a mixture of wax, prepared suet, resin, and lard. In my experience with this basis, the most important faults it possesses are insufficiency of adhesiveness and flexibility, and by reason of this, after it has been spread a few days, and more especially during the winter months, it becomes brittle, cracks, and peels from the surface of the material upon which it is spread. To overcome these objections it was necessary to alter the proportions of its present ingredients, or seek a new formula. I chose the latter, for I consider the presence of a granular body like mutton fat a quite unnecessary and useless ingredient, and to be the main cause of the objections urged. After numerous trials with mixtures of various proportions of wax, resin, fats, and oils, most of which answered my object but indifferently, I tried Canada balsam, and found that when mixed with wax and lard in the following proportions it gave a very good result.

Take of—

Cantharides in fine powder	6	ounces.
Canada Balsam	8	"
Yellow Wax	5	"
Lard	1½	"

Dissolve the wax, lard, and balsam over a water-bath, add the cantharides, and allow them to macerate at a gentle heat for one hour, then stir till cold; during the winter months the lard may be doubled with advantage.

In deciding upon the above proportions, I have borne in mind that the plaster should be only just sufficiently adherent, that on its removal from the patient the blister is not torn.

Plaster prepared according to this form has been on its trial for some time, it produces a good blister in from four to eight hours, and I have had no complaints concerning it. For experiment I placed a small plaster of this formula, and one of the B.P., upon my own arm, the former was seven hours and the latter nearly eight hours producing the desired result.

Canada balsam is, I consider, well adapted for the purpose I have chosen it, as from its terebinthinate character it has a solvent action upon the wax, which imparts to the mixture the desired qualities of adhesion and flexibility; it is also probable that it aids the extraction of the cantharidin from the flies.

A German pharmacist, whose name I am unable to call to mind, has stated that an advantage is gained by treating the cantharidies by the following process before making them into plaster. Digest the powdered flies with caustic soda, cantharidate of soda is formed, neutralize this with hydrochloric acid, cantharidin is liberated and chloride of sodium produced: the mass is then dried and mixed with the bases, the chloride of sodium being in no way detrimental. I tried the experiment, but obtained no apparent advantage.

A blistering plaster may sometimes fail from the bad quality of the flies, and in this matter if there is any suspicion, I think the judgment would be much aided by the use of a microscope. There are other causes of failure, such as the plaster being insecurely applied, or the patient's skin may be of that nature that vesicants will not effect it; these matters are outside our control. I have only attempted that which is within it, and believe the form I have given for cantharides plaster will be found an improvement on that to which we have been accustomed.

The President said he presumed that Mr. Gerrard's special object in proposing this modification in the form of the cantharides plaster had been to adapt it for hospital use. He was not aware, through his own experience and observation, that it had been customary to keep cantharides plaster ready spread. It was usually understood when a plaster was ordered that it should be spread at the time, therefore the objection urged by Mr. Gerrard would hardly apply, namely, that of its becoming brittle with keeping. The cantharides plaster now ordered in the Pharmacopœia had been in use so long and had acquired so completely the confidence of the medical profession that it would require a good deal of consideration before an attempt should be made to alter it in the direction indicated. At the same time, of course, the Conference was obliged to Mr. Gerrard for having paid attention to the subject, and it was at any rate now within its knowledge, founded upon the result of Mr. Gerrard's observation that the plaster can be rendered more suitable for use, where it is to be kept spread for a length of time by a little modification of the materials which are introduced into it.

Mr. Martindale said it was of great advantage to keep a cantharides plaster spread in hospitals where there were many patients. The B.P. plaster had this disadvantage, that it often cracked and separated from the material upon which it was spread. He had seen samples of American cantharides plaster in which the basis was spread upon a fabric which could be crumbled up without the plaster separating from what it was spread upon. He had also seen mustard plasters spread upon the same material, which really seemed to be everything that could be desired in the way of a good mustard cloth.

Mr. Proctor said there were two distinct sides to the question, the hospital side of the question being one. He thought they might leave the hospitals to take care of themselves. The hospitals were not bound to follow the Pharmacopœia. They could make any modification to suit themselves, but the British Pharmacopœia—as the guide to pharmacists—ought to be kept quite distinct from hospital practice. The formula of the British Pharmacopœia gave a plaster which was somewhat crumbly. If that difficulty could be got over it would be a great gain. He thought in that respect Mr. Gerrard's modification would give an improved plaster. But it would be a serious consideration if they were compelled to have one form of plaster for summer and another for winter, which seemed to be Mr. Gerrard's suggestion; that would be a serious inconvenience.

Mr. Groves said he thought it was an annoyance in carrying on the routine of a chemist's business to be called upon to spread this plaster extemporaneously. It was very messy and dirted the fingers. He had hoped that Mr. Gerrard would propose something that could be kept in stock and be of the same consistence in summer and winter. D'Albespyre's blister appeared to him to fulfil those conditions. He would like that some one should make experiments in that direction.

Mr. Greenish said that by this method an adhesive margin, which was always required to a blister, could not be obtained. He had never experienced any difficulty with the present formula, and, with reference to brittleness, the plaster only required to be worked in the hand before being spread. Mr. Martindale had alluded to mustard paper; perhaps he was not aware that in the original patent benzole was used to extract the fixed oil from the mustard, and benzole in which some caoutchouc had been dissolved was used to give the mustard paper its elasticity.

Mr. McKenzie said he had always looked upon the operation of plaster making as the most crude operation in a dispensing shop, wetting your fingers and straining your thumbs. It would be a good thing to get a plaster that could be easily spread. Many know in spreading a plaster the difficulty there is to get it spread with comfort, and a uniform thickness was seldom obtained. Plasters were spread all thicknesses. In some parts they were spread upon leather, and in other places upon the ordinary substance.

Mr. Cutting said he found as a rule that the Pharmacopœia form had acted well, and as regarded the manipulation he had found it workable. He did not know that they could adopt a better plan. He found the spatula to be very serviceable in spreading plasters.

Mr. Rimmington said that by using a slightly warmed spatula the plaster could be spread without dirting the fingers.

Mr. LONG said that in preparing such plasters he always took a slab and worked the material till it was of a sufficient consistence to use. In that way he never soiled his fingers. Using a brown paper shape, he spread the plaster with a spatula, and thus obtained a nice clean shape; then he rubbed a little olive oil over it. He doubted the advisability of the plaster being made adhesive. The plaster was put on with the intention of causing a blister to rise, and if it were stuck down with an adhesive edge this action would be interfered with. The better plan was to fasten the plaster on with a bandage.

Mr. GERRARD said his object had not been to provide a plaster for hospital uses, but one for general purposes, and if by a modification of the present form it could be improved so as to suit all parties an advantage would be gained. The material upon which the plaster should be spread should not be too unyielding—such as brown paper or leather; he thought calico best adapted from its flexibility. There was no occasion to use the fingers if the plaster had been warmed and a spatula used. The blister did not run upon a heated skin in the slightest.

The next paper read was on—

A PROPOSED SOLUTION OF CITRATE OF IRON AND QUININE.

BY J. F. BROWN.

Just two years ago I was led to consider the possibility of preparing at home the citrate of iron and quinine. To this course there were two strong inducements: its importance, and the difficulty of testing its quality. Quite recently the latter has been materially lessened by the published researches of Messrs. Allen, Palmer and Cownley; but at that time manufacturers were more eager to proclaim that their preparation fulfilled the official tests than practised in the art of applying them.

One eminent firm wrote me that "The B.P. instructions, even when very carefully followed, generally give different results, although the samples be taken from the same bottle and worked under precisely the same circumstances."

At the outset I abandoned any idea of scaling the salt as beyond the scope of my time or appliances, and taking, on Mr. Umney's authority (see *Pharmaceutical Journal*, August 30, 1873), four and a-half ounces as the yield of the quantities ordered to be used, I so far modified the formula as to obtain a solution containing five grains in each fluid drachm.

As preservatives I tried first sugar and glycerine, and found both answer very well, the only perceptible difference being that the solution with glycerine changed from the reddish-brown colour, common to both when fresh made, to a much more pronounced green colour than did the syrup.

I use now chloroform in the proportion necessary to convert the solution into Aqua Chloroformi, and find it unexceptionable, preserving it quite clear and bright for months, and serving, also, to render it more palatable.

The precipitated quinine should not be suffered to dry upon the filter after washing; nor should it be added to the solution of citrate of iron until the latter has cooled, or it will fuse into soft, tenacious lumps, which dissolve very slowly.

The addition of the ammonia, according to the Pharmacopœia process, is a tedious operation, involving a good deal of labour; but by diluting it to rather more than the volume of the citrate solution, and mixing in a large bottle, with brisk shaking, the combination is very speedily effected, the separation of the quinine being scarcely visible, so rapidly is it redissolved.

The only modifications of the official directions which I propose in order to adapt them to the solution are these:—Dilute twelve fluid drachms of solution of ammonia with twenty-five fluid ounces of distilled water, and add to the cooled solution contained in a stoppered half-gallon bottle, agitating briskly; filter, make up the measure to forty-nine fluid ounces with distilled water, and add two fluid drachms of pure chloroform; shake briskly at intervals for twenty-four hours. Each fluid drachm contains five grains of the citrate.

I have tested the solution so made both by the Pharmacopœia process, and by agitating twice with ammonia and ether, pipetting off the latter and evaporating in a tared watch glass; the results were not satisfactory, 14·9 per cent. of quinine by the former and 15 per cent. by the latter process. But I believe that this deficiency arose either from my inexperienced manipulation or from faults in the methods employed, as the results compare favourably with those obtained by testing, under similar conditions, the usual scaled product.

A speculation on the chemical constitution of this salt is perhaps scarcely worth attention, but I may note in conclusion that—

3·00 oz. citric acid,
·70 oz. anhydrous quinine,
·14 oz. ammonia gas, and
·66 oz. metallic iron,

contribute to the 4·5 oz. obtained; and these quantities correspond nearly to the formula—

$$(C_{20}H_{24}N_2O_2)_3, 2\,C_6H_5O_7, Fe'''C_6H_5O_7, NH_4H_2C_6H_5O_7,$$

also that it contains 22·7 per cent. (nearly) of citrate of quinine.

The PRESIDENT said he did not exactly see what object was contemplated by Mr. Brown. Was the solution intended for use in dispensing? because if so he apprehended the presence of the chloroform would be a decided objection and render it inadmissible for the purpose.

Mr. CLEAVER said it appeared that the paper had been written to induce pharmacists to use a solution of citrate of iron and quinine instead of the ordinary scales. As a matter of fact many pharmacists had done so by dissolving the scales in water and keeping such solution ready for use; but with many scales now in the market a precipitate was gradually thrown down on standing, therefore a solution which would be quite clear and would do away with the trouble and expense of scaling would appear to be a desideratum. This thought had occurred to him some time ago, and he made a large quantity of such solution, but found it did not keep well. A small percentage of sulphuric acid, however, would make it keep for two or three months, but he did not think that that plan would be allowed if the solution was to be used for dispensing.

Mr. GREENISH said he always kept citrate of iron and quinine in solution for the convenience of dispensing; but he found it did not keep good for any length of time. He should prefer making this solution himself to being dependent on a wholesale house, and he considered that the introduction of any foreign substance, as chloroform or sulphuric acid, in order to prevent decomposition or mould would be very objectionable.

Mr. KEMP said that he added a few grains of citric acid and a little alcohol and found it kept remarkably well. In that way the mixture could be dispensed in a moment. He did not think there was any serious objection to a small portion of spirit. He added four grains of citric acid to the ounce of solution and one-eighth its volume of spirit.

Mr. ALLEN had had something to do with the estimation of quinine in the liquid and thought it would keep better if a strong solution was used. There was a similar case in tartaric acid. He understood the reader of the paper determined the amount of quinine by adding ammonia. But he himself had had great difficulty in ascertaining the amount of ammonia to be added and he did not know whether to wash, for he might wash away the quinine. But at any rate the results were constant and agreed with those when chloroform was used.

Mr. RIMMINGTON said if the solution were made of one part of citrate to two of water it would keep very well.

Mr. SMITH confirmed the remark. Perhaps the solution made by Mr. Cleaver was more dilute.

Mr. CLEAVER: It was a solution of one drachm to the ounce.

Mr. NESBIT said he had tried solutions of various strengths, but he had never found them to keep unless with the addition of a little spirit. He made a solution similar to that made by Mr. Kemp, but a little weaker—namely, one part to three. He added 15 per cent. of spirit to it, and it kept perfectly well. He had tried it of greater strengths, but not successfully. He found when spirit alone was added it kept perfectly.

The PRESIDENT said he knew that in a highly concentrated state such a solution would keep well for a considerable time. Therefore he agreed with what had been stated by Messrs. Allen, Rimmington and Smith. No doubt if it could be kept in that way, it would be the least exceptional mode of accomplishing the object. He presumed it would be subject to one little objection and inconvenience—namely the difficulty of accurately adjusting the quantity in dispensing. Such a solution would often have to be measured out in small quantities, and the determination would not be so accurate. However that would be a matter of manipulation. He wished to make a remark with reference to the method which is indicated in the Pharmacopœia for testing the strength of citrate of iron and quinine. Mr. Allen took exception to it that it was not a strictly accurate mode of obtaining an indication. It was not intended to be so. It was intended to be a method of indicating approximately the strength of a very important therapeutic preparation, the strength of which it was desirable that there should be the means afforded for ascertaining by every pharmacist. In giving that method in the Pharmacopœia, what was contemplated was, that there should be a process given there that every pharmacist throughout the country could readily apply. It was intended, and the terms in which the process was indicated were to that effect, that the precipitate should be dried, and weighed without being washed. It was—"50 grains dissolved in a fluid ounce of water, and treated with a slight excess of ammonia, gives a white precipitate (if ammonia is not added in undue excess) which when collected on a filter and dried weighs 8 grains." This test was the result of many experiments made at the time, after a good deal of deliberation as to what kind of process should be given. His object in proposing that mode of testing was, that it should be adapted to the general position and qualification of pharmacists throughout the country—that it should, in fact, be a process that all could readily apply. If strictly carried out as indicated in the Pharmacopœia, it did afford the means of approximately ascertaining the condition of the salt. He very frequently employed it himself. It was the first test he should use. At any rate it served to distinguish between a preparation that had been made practically according to the Pharmacopœia, and other preparations that did not pretend to be made according to the Pharmacopœia. He hoped the time was coming—if it had not arrived—when so important a preparation as citrate of iron and quinine would always be used by all parties, made according to the Pharmacopœia. The great difficulty for a length of time after this process was introduced into the Pharmacopœia did not originate nor exist amongst pharmacists so much as medical men. They were accustomed to use citrate of iron combined with a smaller proportion of quinine than was ordered in the Pharmacopœia and this had to be prepared for their use. Hence two preparations had been commonly made and sold, and often the weaker had found its way as well as the stronger into the hands of the pharmacist. It was important to every pharmacist who wished to act conscientiously that he should have a ready means by which he could determine whether the preparation was such as was intended to be made according to the Pharmacopœia. He was quite ready to admit that now it becomes important to go a step further and examine this preparation more critically and more strictly by processes that would give a more accurate indication.

The next paper read was—

PRELIMINARY REPORT ON THE CHEMICAL CONSTITUENTS OF THE IVY.

BY ROBERT H. DAVIES, F.C.S.,

Demonstrator in the Laboratories of the Pharmaceutical Society, and,

CHARLES H. HUTCHINSON, *Student in the Laboratory.*

Although the Conference question as to the existence or non-existence of an alkaloid in the seeds of *Hedera helix* was the starting point of this inquiry, we are not at present able to give very certain information on the point. The few chemists who have followed MM. Chevallier and Vandamme have not corroborated the discovery which those investigators considered themselves to have made, and this fact inclines us to the opinion, which is shared by one of the very few writers on the subject,* that the statement was made in error. This opinion gathers strength from the very loose manner in which the report was compiled, and the entire absence of evidence in support of the statement in question. Upon another occasion we trust to have the opportunity to state definitely as the result of our own observation whether or not, "hederine" exists.

Professor Posselt, in 1849, made some investigations into the subject dealt with in this report, and his general method of procedure has been that followed by us. Ivy berries were exhausted by continuous percolation with ether, the ethereal solution was distilled, and the residue thus obtained was found to consist of fatty matter, and has not yet been subjected to a detailed examination; the "marc" from which the remaining ether had been pressed out was twice boiled with methylated spirit (for this and some kindred operations we are indebted to Messrs. Corbyn's kindness), and the spirit distilled from the tincture thus produced. In this liquid two substances were found by Posselt, both of which he considered acids, and which he named hederic and hederitannic acid, the latter being a variety of tannin. The former so-called hederic acid is the only one which we have so far isolated and it has been but very partially examined.

It separated upon allowing the concentrated tincture to cool, as a light green powder, which by repeated solution in hot alcohol, and by boiling with animal charcoal was obtained in a colourless condition. This white powder, washed with ether and dried, was the subject of our experiments.

Some of its characteristics are as follows:—

It forms a white powder, which has proved so far uncrystallizable; is very soluble in hot alcohol, from which it is deposited to a great extent on cooling. Enough, however, remains dissolved to give the liquid a syrupy consistence. It is slightly soluble in ether, and to a less extent in carbon disulphide, chloroform, benzene and water. The solution of the pure substance does not colour blue litmus red, so that we consider the name hederic acid is probably a misnomer. Posselt seems to have found it very difficult to purify the substance from the uncrystallizable hederitannic acid, and speaks of its solution as slightly affecting litmus. We find the mother liquors decidedly acid, but the pure substance in solution incapable of action upon litmus.

When treated with sulphuric acid, this substance develops in a few minutes a splendid violet colour, which is more permanent than such colours are usually, continuing unchanged for several days. If the violet liquid be

* Dr. F. A. Hartsen, *Archiv der Pharmacie*, April, 1875.

thrown into water, a light flocculent matter separates, which is either of a brown green colour at the time of precipitation or becomes so upon drying. This is soluble in alcohol or benzene, and if the solution be evaporated the residue *instantly* assumes the fine violet tint if touched with sulphuric acid.

When treated with nitric acid the substance dissolves upon the application of a gentle heat, and if the liquid be boiled, or upon dropping the original powder into fairly hot, strong acid, copious red fumes are given off.

Dilution of the resulting liquid with water causes the separation of a yellowish white, flocculent precipitate, which, from its containing nitrogen (as proved by the detection of cyanides after heating it with sodium) and from its explosive mode of decomposition when heat is applied, is believed to be a "nitro" compound.

The so-called hederic acid dissolves in strong ammonia, and the solution if slightly diluted becomes gelatinized. Whether the transparent substance thus thrown out contains ammonia is a point not yet decided.

In the *Archiv der Pharmacie* for April, 1875, a communication appeared from Dr. F. A. Hartsen announcing the discovery of a new body in ivy leaves. From a comparison of the properties of this substance and his mode of obtaining it with those of Posselt's "hederic acid," it was concluded that they might be the same substance. Accordingly some ivy leaves were obtained and we extracted some of the "new body" after Hartsen's method, getting as result a white powder which gave the violet with sulphuric acid, so characteristic of Posselt's "hederic acid."

If the spirituous solution of this substance be largely diluted with water, the liquid froths strongly upon agitation, resembling in this respect a solution of saponin. The slight solubility of hederic acid in water is sufficient to distinguish the two, however. This property of frothing, noticed by Hartsen, led us to look for the identity of his substance with the hederic acid of Posselt. Like saponin, our substance after being boiled with dilute sulphuric acid gives a solution which reduces Fehling's copper solution, but since its solution before treatment with acid does this to some extent we do not here attach importance to the reaction.

So called hederic acid consists wholly of carbon hydrogen, and oxygen. Its formula remains to be determined after combustion.

Thanks were presented to the author of the paper.

Mr. Kingzett said the hederic acid described by Messrs. Davies and Hutchinson appeared to be a body constructed on the type of Berthelot's saccharides; that is to say, sugar, in which hydroxyl is replaced by a fatty acid. Such bodies all give the purple reaction with sulphuric acid, and on boiling with dilute acids, sugar and the original fatty acid are reproduced; such a solution should, therefore, reduce Fehling's solution.

The Conference then adjourned till the afternoon.

On the business being resumed after luncheon,

Mr. J. C. Hunter read the following paper on—

Further Experiments on the Antiseptic Action of Salicylic Acid.

BY JOHN C. HUNTER A.P.S.

Since the discovery of the antiseptic qualities of salicylic acid by Professor Kolbe, and his publications concerning it, the attention of many other scientific men, both at home and abroad, has been turned towards it for the purpose of verifying the results of Kolbe and Von Meyer, and also of assigning to it its proper place among other known and well tried antiseptics, such as carbolic acid, creosote, chromic acid, etc., etc.

Salicylic acid being only soluble to the extent of one part to the 1000 parts of water, many formulæ have been published from time to time as good solvents for it, but I think that a solution of ammonium citrate is about the best.

The formula used by me was as follows, which is a modification of one that appeared in the *Pharmaceutical Journal* about two months ago.

Citric Acid	60 grs.
Ammonia Carb	70 grs.
Water	6 ozs.

Dissolve the acid in the six ounces of water and neutralize with the ammonia, and when neutral add salicylic acid 60 grains, stirring, until it has all dissolved, and then filter. On testing the solution after the acid has dissolved, it is found to be quite acid.

From a gentleman in the wine trade, I obtained about one gallon of ginger cordial which was newly made but did not contain any alcohol to preserve it, as I wished to try the effects of salicylic acid upon it as a preventive of fermentation.

The cordial was divided into four parts—

To part 1 was added no salicylic acid.
To part 2 „ 10 grs. of salicylic acid to the pint.
To part 3 „ 15 grs. „ „ „ „
To part 4 „ 20 grs. „ „ „ „

All the bottles were loosely corked and put into a place where they would get plenty of air and light. They were examined day by day. That part containing no acid began to give way on the fifth day, a mucus forming on the surface, and shortly after carbonic acid was evolved showing that fermentation had set in. In about eight days the part containing 20 grains to the pint gave way, whilst the other two containing 10 grains and 15 grains respectively of acid to the pint gave way three days later.

I was astonished to find that the part containing the most acid was the first to give way, and the only reason that I could assign for this was, that it contained more of the ginger than the others, and that the acid was not powerful enough to overcome the decomposition of the vegetable matter.

The results from these experiments did not prove that salicylic acid was a preventive of fermentation in sugar solutions containing ginger or other vegetable matter.

In the experiments of Kolbe and Von Meyer, they employed simply sugar solutions to which they added yeast as a ferment, and from their results they inferred that so many grains of yeast could be rendered powerless to cause fermentation by a certain quantity of salicylic acid. But according to my experiments salicylic acid does not prevent fermentation in sugar solutions if they contain much vegetable matter.

Mr. Baden Benger, in his paper read before the Conference last year, mentioned the preservative action of salicylic acid on lime juice; consequently I determined to try its effect in the making up of the syrup of lemon, B.P., which is very ready to give way, a nasty white-green mucus forming on its surface.

Five grains of salicylic acid were added to the pint of lime juice used in making the syrup, and although it is now two months since the syrup was made up there is not the slightest appearance of any mucus on its surface.

The experiments of Professor Neubauer on the power of the acid to prevent grape juice from fermenting, and also for the prevention of further fermentation in wines that have fermented, prove that we possess a valuable agent in salicylic acid.

At the suggestion of Mr. Fairlie, and through his kindness in furnishing me with a supply of grape juice for the purpose of experimenting upon it with salicylic acid, I attempted to verify Neubauer's experiments. One portion with 10 grs. of salicylic acid was exposed last January as a preliminary test, and up to the present time no mucus has formed on its surface; nor has any fermentation set up, for on distilling a portion of it, chemical tests failed to detect any alcohol present in the distillate.

The second supply was obtained about two months ago; it was divided into four parts—

To No. 1 was added 10 grains salicylic acid alone to the pint.

To No. 2 was added 15 grains.

To No. 3 was added 20 grains.

These three parts contained the salicylic acid dissolved by means of the ammonium citrate solution.

To No. 4 was added 20 grs. salicylic acid to the pint.

These four quantities were all exposed under the same conditions in uncorked bottles, and have been examined from time to time. It is now two months since they were first exposed, and the grape juice contained in them is as sweet and fresh as if it was newly expressed from the grape.

These experiments confirm the statements of Professor Neubauer, that the acid is well adapted for the preservation of grape juice, as it is odourless, tasteless, and non-poisonous.

Mr. Baden Benger gave the results of his experiments last year, of its action on the infusions of the Pharmacopœia, and having tried its effects in that direction also, I find that it has a decided effect in preventing them from giving way.

Two quantities of infusion of orange and two of infusion of quassia were made by me, these infusions being selected, as they give way readily.

The two infusions of quassia and orange that contained no acid gave way first, the infusion of orange in three days, and the quassia in five days; but of the two infusions that contained the acid in the proportion 10 grs. of acid to the pint of the infusion of orange, and 5 grs. of acid to the pint of the infusion of quassia, the infusion of orange is still fresh after sixteen days exposure, whilst the infusion of quassia gave in six days a yellow flocculent deposit.

The last series of experiments undertaken by me, had for its object to determine the antiseptic action of the acid on infusions of hay and turnips used in the generation of infusorial animalcules.

I prepared four infusions of turnip.

Infusion No. 1 contained no acid
„ „ 2 1 part salicylic acid in 1000 water.
„ „ 3 1 part creosote in 1000 water.
„ „ 4 1 part of salicylic acid dissolved in 2 ammonium citrate in 1000 water.

The infusions were examined day by day with the microscope. On the third day the turnip infusion, which contained no salicylic acid, gave signs of animalcules, but the other three were still free from any. On the eighth day, infusion No. 3, containing the creosote, and also infusion No. 4, containing the salicylic acid in the ammonium citrate solution, commenced to decay, a green mucus forming on the surface of both, and on examination under the microscope, quarter-inch objective being used, animalcules were seen to be present in both; but infusion No. 2, which contained one part of the salicylic acid alone in 1000 parts of water, on being examined after a lapse of fourteen days, gave no signs of animalcules being present, and it still was quite fresh to the eyes and nose, while the other three had the mucus formed on their surface, and they all had a putrescent smell.

Three infusions of hay were prepared.

Infusion No. 1 contained no acid.
„ „ 2 „ 1 part salicylic acid to 1000 parts water.
„ „ 3 „ 1 part carbolic acid to the 1000 parts of water.

These three were also examined microscopically every day, and after a lapse of thirty-six hours there appeared in the infusion of hay, which contained neither salicylic nor carbolic acid, plenty of infusorial animalcules; paramecii, and other smaller animalcules were in abundance; and four days later, in the same solution, rotifers, or the wheel animalcules, began to appear. After four days had elapsed, infusion No. 2, containing the salicylic acid, was examined, but there was no appearance of any life. So also in infusion No. 3 containing the carbolic acid there was no appearance of life.

On the 9th day animalcules began to appear in the infusion containing the carbolic acid; these on being examined a few days later showed signs of increase in the fluid, showing that the carbolic acid had lost its power of further preventing them from multiplying; but infusion No. 2, containing the salicylic acid, had up to the thirteenth day no appearance of any animalcule, but on the fourteenth day, I was able to detect a stray small animalcule now and again. In the fluid, however, there were very few when compared with the solution containing the carbolic acid, which was also examined on the fourteenth day, and was found to contain a far greater quantity, but not so many as were to be found in the infusion that had neither salicylic nor carbolic acid.

All the infusions that had generated animalcules were alkaline to test paper, proving the well-known fact that we find animalcules present only in alkaline solutions or in vegetable infusions which are alkaline, for in the infusion of turnip which contained the pure salicylic acid, and was still quite acid to test paper, no animalcules had been generated.

Summing up the foregoing results, salicylic acid does not appear to prevent fermentation in sugar solutions containing vegetable matter.

It prevents the decomposition of lime juice, and it is also of great use in preventing the decay of syrup of lemon.

It prevents in a very marked manner the fermentation of grape juice for an indefinite period.

And, lastly, it prevents the disentegration of vegetable tissue, hence it will be found useful in preventing vegetable tissue, used for microscopic mounting, from decaying.

In conclusion, I would venture to give my opinion, "that the adaptability of salicylic acid for preserving the infusions of the Pharmacopœia is not so great as that of alcohol, when we take into consideration the many substances used conjointly that would destroy or neutralize its antiseptic action."

Mr. Siebold mentioned last year his objection to it when prescribed with salts of iron, as it would give a purple solution. Again, many medical men prescribe infusions combined with alkalies, such as bicarbonate of potass, bicarbonate of soda, liquor potassæ, etc. Consequently salicylic acid would combine with these and form salts which have a very feeble antiseptic action. Hence the infusions so preserved would in all probability begin to ferment as soon as that change took place, and the patient would find the mixture which he had obtained from his chemist becoming sour and a mucus forming on its surface before it was all taken.

The President said the results described in this paper were confirmatory of such as had been obtained by previous inquiries in the same direction. Mr. Benger had last year got a number of results and he (the President) believed that that gentleman was prepared to put the same specimens before them now that were produced on that occasion, and no doubt he would have a few words to say in reference to this communication. Their thanks were due to the author of the paper for the information he had conveyed to them.

Mr. Benger said that most of the infusions preserved by salicylic acid which he exhibited last year had kept for about six months, after which they for the most part became unfit for use. The infusions preserved with benzoic acid, ½ grain and ½ grain to the fluid ounce, had without exception kept well. They had now been prepared thirteen months, and had been kept in a hot room where the temperature was never below 70° F. In some recent experiments he had found that salicylic acid does not appear to prevent fermentation of grape sugar to the extent that had been described by some experimenters.

The PRESIDENT said he should like to ask the author of this paper why he gave a preference to citrate of ammonia for effecting a solution. There were other salts that could be used for a similar purpose, and especially borax. In making experiments in the same direction he had himself used borax and found an advantage in doing so. It was in itself an exceedingly good antiseptic, in some cases better than salicylic acid; in fact, he found it to be one of the best antiseptics for some purposes, and as it fully accomplished the object of greatly increasing the solubility of the salicylic acid it appeared to him to be suitable for that purpose.

Mr. MCKENZIE asked whether the author of the paper had made any experiments with the solution of salicylic acid with borax, and if so what results had been obtained; also, if a decomposition of the salicylic acid took place, especially when glycerine was used.

Mr. EKIN said he had found from some recent experiments on milk that he had made, the results of which were published in the last number of the proceedings of the *West of England Agricultural Society*, that boracic acid was far superior to salicylic acid in its keeping properties, and that benzoic acid ranked second.

Mr. SAVAGE wished to know how the boracic acid was dissolved when it was used with milk. He had known it used extensively by milk dealers for some time and it had been attended with decided benefit. Something like an ounce was used to ten or twelve gallons, and the milk would then keep for ten days in a large quantity. It would be a great pity to disseminate anything like an adulteration of milk, but if they got an agent so simple and which produced so admirable results it would be a great advantage.

The PRESIDENT said his experience was that borax was rather more effective than boracic acid. There was a solution very largely used in London which was a strongly alkaline solution of soda to which boracic acid has been added and that was found to be very efficient for that purpose, especially for the preservation of cream, which would keep for a week or a fortnight perfectly well.

Mr. HUNTER, in reply to Professor Redwood, said, the ammonium citrate was more soluble in water than borax, and it also had less taste. Again, the borax was not desirable in many fluids, and in using borax along with the acid they did not get to know the exact antiseptic action of the acid, as the borax itself was an antiseptic agent. He thought that the ammonium citrate was preferable as a solvent for the acid, when used to preserve either lime juice or grape juice, as the citric acid combined with ammonia forming the ammonium citrate was also one of their constituents.

NOTE RESPECTING THE STRENGTH OF COMPOUND SYRUP OF PHOSPHATES (PARRISH).

BY W. L. HOWIE, F.C.S.

The object of this paper is not to put forward any new fact or process for the preparation of any of the phosphate syrups, but simply to bring prominently before the trade through this Conference the question of what should be considered the standard strength of compound syrup of phosphates (Parrish). I need scarcely say one word of the importance of a thorough understanding being come to on this point; the extent and universality of the demand, as well as the class of ailments for which this syrup is prescribed, place it on a par in importance with any item of the Pharmacopœia, and it is to be regretted that the state of our knowledge of the subject, perhaps as much as anything else, has excluded from past editions of that work an article in such common use.

At first sight the question seems a very simple one, since Parrish, in his 'Practical Pharmacy,' attaches to the original recipe the statement that "each teaspoonful of the syrup contains about two and a half grains phosphate of calcium and one grain phosphate of iron," and this has apparently been adopted without question by various writers on the subject, who have furnished us with what was meant to be improved formulæ. On closer examination, however, we perceive that a decision is not so easily arrived at. If we consider the quantities of iron and lime salts ordered by Parrish in his formula in relation to the bulk of the finished product, we find that such a strength is absolutely impossible, and that the statement must have been the result of a miscalculation, while inaccuracy in figures is, unfortunately, not singular in the work in question. In the paper on 'Phosphate Syrups,' published in the Journals last April, I was at some pains to state this matter as clearly as I could, and trusted the question of strength might be taken up and discussed. Since then three papers have appeared on the subject, one by Mr. Ernest C. Saunders in the *Pharmaceutical Journal* for July 15, and another by an anonymous contributor in the last issue of the *Chemist and Druggist*, both of whom, on the question of strength, fall back on the statement the accuracy of which is questioned. The third paper is by Mr. E. B. Shuttleworth, in the *Canadian Pharmaceutical Journal* for August, and appeared in our own Journal for the 26th of the same month. In it Mr. Shuttleworth seems to accept the result of the formula as the standard, and to my knowledge many others hold the same opinion. In appealing to this Conference I trust we may be enabled to come to a decision which shall serve as a guide so long as we must follow an empirical formula for the preparation of this valuable remedy.

For the sake of those who may not have read the former paper I shall endeavour to state as concisely as possible the more important points. In Parrish's formula there are ordered 10 drachms sulphate of iron, which would produce 257·5 grains triferrous phosphate, were none wasted in following the process, and the finished syrup measures as nearly as possible 45 fluid ounces, or 360 fluid drachms. Were all this iron utilized we would only have ·715 grain per fluid drachm, and if allowance be made for loss through imperfect precipitation, we have almost exactly half a grain (·501) per fluid drachm. The lime, also, is over-stated. Twelve drachms of phosphate of calcium, the quantity ordered in the formula, gives exactly 2 grains per fluid drachm, and this makes no allowance for any moisture, which is present to a large extent in commercial samples, nor for loss in the reprecipitation and washing which Parrish directs. You will therefore follow me, that the syrup prepared according to Parrish's own directions cannot contain as tribasic phosphates the quantities of lime and iron which he asserts, but that something less than 2 grains of phosphate of calcium, and ½ grain phosphate of iron per fluid drachm is the extreme result of the formula. This same error is reproduced in the 'Companion to the Pharmacopœia' by Peter Squire, whose firm have long prepared what in this country is known as the genuine syrup, an examination of which I have found to bear out what has just been stated. The quantities of iron and lime obtained from the samples I have examined being somewhat under the theoretical yield of the formula. With the view of still further sifting the matter, I have lately procured through the kindness of Mr. P. S. Smith, several sealed bottles of the syrup direct from Parrish's pharmacy in Philadelphia; but unfortunately it turns out to be such poor stuff, as you will perceive by consulting the table,

PARRISH'S SYRUP. STRENGTH PER FLUID DRACHM.

	Sp. Gr.	Total Iron Calculated as $Fe_3P_2O_8$.	Phosphate of Calcium (Indefinite).	Hydrochloric Acid.
English . . .	1·320	·447 grain.	1·37 grain.	none.
American No. 1.	1·212	·160 ,,	0·87 ,,	present.
,, ,, 2.	1·235	·200 ,,	1·06 ,,	present.

that we must consider it almost out of the argument. The negative evidence, however, which may be deduced is that evidently no attempt is made to arrive at Parrish's stated strength.

It might be asked, why not discard Parrish's recipe altogether and adhere to the statement, and on it found a new formula the product of which would have a closer relation to the object aimed at? In the first place by so doing we would produce a new syrup—not Parrish's; and though it is not denied that it is quite possible to produce a syrup having this extreme strength, yet it must be borne in mind that it is not a chemical preparation we are fabricating, but a syrup the popularity of which is in great measure due to its palatable character; and further that being given to young persons and children, the extreme strength, if really existing, besides making the syrup somewhat disagreeable on account of its acidity and smaller proportion of sugar, would require to be prescribed in most cases in fractions of a teaspoonful. You will notice that this latter argument does not apply to the B. P. phosphate of iron syrup, nor to Easton's, though both of these preparations when the original formulæ are followed are not up to the stated strength, yet with them it would I think be quite consistent, as far as the dose is concerned, to improve the formula so as to make it agree with the statement; Easton's syrup being very seldom indeed prescribed for any but adults and the quantities per fluid drachm given in the statement being no more than a moderate dose.

I therefore consider that the strength of one grain of iron and two and a half of lime per fluid drachm rests only on a loose and inaccurate statement which has been freely reproduced on labels, etc., and which unless care be taken might be made a point in a prosecution under the "Sale of Food and Drugs Act" in which the sufferer might be one who on the best evidence, and believing he was doing best for both physician and patient, had closely followed the originator of the formula.

It is but right to state that on the label of the American syrup no reference to the strength is made; the name being "Parrish's Compound Syrup of Phosphates (Chemical Food) a wholesome Tonic without Alcohol," etc., which latter allusion, those familiar with the patent medicine trade of the United States will doubtless appreciate.

The PRESIDENT said this was a subject which he was sure would raise a good deal of discussion. He would then simply invite remarks upon it.

Mr. SCHACHT said that in the paper published a few months ago by Mr. Howie, when the subject was rather elaborately entered into, the conclusion arrived at was that the best strength to adopt was half a grain of the phosphate of iron and two grains of the phosphate of lime in each drachm. He had himself experienced a good deal of trouble—in fact he found it utterly impossible—to accomplish the strength declared to be that of the original preparation. He had been very glad to find that the conclusion of a gentleman who had paid so much attention to the subject was exactly like his own, and had another month gone over he would have obtruded his observations, which would have been very much of the same character as those by Mr. Howie, upon the pharmaceutical public. He thought Mr. Howie's suggestion an extremely sensible one; the strength was one that could be easily accomplished without the addition of an undue and excessive quantity of phosphoric acid. It was possible that a still greater strength of the active ingredients might be arrived at, but then it would be necessary to add so much free acid that it would render the preparation to that extent objectionable. The difficulty he found in attempting to get anything like an approach to the alleged strength of Parrish's professed preparation consisted in the tendency of some of the constituents to arrange themselves as subsalts, and to separate from the preparation. He believed Mr. Howie was perfectly right in saying that the accredited preparation never contained what was stated on the label. If the Conference could agree to recognize a preparation of the strength recommended by Mr. Howie in his first paper it would be a great convenience to pharmacists and to medical practice.

Mr. EKIN thought it was rather important to know the exact formula that was used by Mr. Howie because there were some slight modifications in the different published formulas as regards the acid. Of course they did not know how Parrish's syrup was made. In some formulas he found the ordinary phosphoric acid was used with an addition of hydrochloric acid, but when there was an addition of glacial phosphoric acid a syrup was produced which was very unpalatable and very different from Parrish's. This objection to the use of glacial phosphoric acid as an addition, however, did not apply to the use of hydrochloric acid. The strength of the syrup had to do with the way in which it was made, and in the absence of that knowledge the discussion must be somewhat hazy. He wished to know if Mr. Howie could tell the strength of the syrup referred to in his former paper.

Mr. HOWIE, with permission of the President, reminded the members that it was the question of strength only that was before them. He had gone into the chemistry of the subject in the paper already referred to, but to guide the discussion and prevent unnecessary questions he would say that he had made none of the syrups referred to in the former paper himself; they were obtained from different wholesale makers, and he thought represented what was commonly met with in the trade. At one time he had made this syrup in considerable quantity, but his later work had been wholly experimental, undertaken somewhat as an amusement, his business now taking him entirely out of the laboratory.

Mr. EKIN replied that what he had said still held good,—that the stability of the syrup depended very much on the strength and description of the acids used.

Mr. HOWIE agreed with Mr. Ekin as to the superiority of the syrupy or tribasic phosphoric acid over the glacial, and also that hydrochloric acid, as pointed out in his former paper, had a wonderful power of retaining the phosphates in solution. He at the same time called attention to a sealed bottle of the Philadelphia syrup on the table, which, despite the presence of a large proportion of hydrochloric acid, showed an abundant ferric precipitate, proving faulty preparation.

Mr. KERR said he thought it would be a pity to confine the discussion to the mere question of strength when they perhaps had opportunity of eliciting useful information concerning the preparation of the article. He had made Parrish's syrup for the last twelve years and had always kept to the one formula; but he must say that the variations in the appearance of the preparation had sometimes been very great, and he had come to the con clusion that this was caused by the sugar. Sometimes they got a very good result, and batch after batch would prove clear and bright, and keep well. He always tried to get the same sugar, but when the grocer ran out of it he had sometimes got a different sugar, and obtained very different results. He would like if some gentleman would give him an idea of how to meet this inconvenience, as he thought it had a great deal to do with the success of the preparation.

Mr. MACKENZIE said his experience had been much the same as that of Mr. Kerr. He had obtained very different results on different occasions with the same formula. He attributed a good deal of this to the sugar, and he had therefore spent some considerable time experimenting with various kinds of sugar.

Mr. GREENISH said he had made a great quantity of syrups at different times. He had tried every published formula and modifications of these formulas, but he must say the results had not been perfectly satisfactory.

Mr. SCHACHT: You have always endeavoured to make it according to the declared strength?

Mr. GREENISH: Certainly.

Mr. BORLAND said he had had some experience in the matter and had consulted with Mr. Howie on the subject. In the paper Mr. Howie had read before the Edinburgh branch last session he specially adverted to the fact that the main cause of the early precipitation that took place was due to the formation of ferric salts. To obviate that he had within the last two months been directing his attention towards making a solution of the ferrous phosphate in a direct manner without exposing it to the action of atmospheric air at all. So far as his experiments had gone, he thought there was some evidence of some little success. He dissolved calcium phosphate in phosphoric acid and to that he added a strong solution of ferrous sulphate. Double decomposition took place in a very short space of time and he had the ferrous phosphate in solution,—contaminated, he admitted, with a very small quantity of sulphate of lime. That sulphate was in such a very small quantity that he did not think it could be said to vitiate the process he was aiming at. This added to the simple syrup of the Pharmacopœia made the strength equal to what was stated to be that of the Pharmacopœia syrup. He had made syrup and had it exposed to sunlight in bottles, of course corked, and no decomposition had taken place up till the present time. He was simply aiming at forming the ferrous phosphate without exposing it to the action of the air at all. He had prepared it in a bottle, using a bottle which would exactly hold the quantity he was going to bring into combination, and in that way he thought he had been very successful. He had not yet had an opportunity of applying it to the formula of Parrish's syrup, but he thought it was a hint which might lead to further improvements in the preparation of that compound also. He thought that, so far as the simple phosphate of iron syrup was concerned, it was a decided improvement.

Mr. GREENISH said he should like to mention a circumstance which he had forgotten. His son had been making experiments for some time in the direction indicated by the last gentleman with regard to Parrish's syrup, and he knew that his opinion was that it would be quite successful.

Mr. GILMOUR said there was one point on which he would like Mr. Howie to give some explanation, viz., whether he had estimated those syrups for ferric phosphate or for ferrous phosphate alone, as he would like to know if even an attempt had been made to get in the proper percentage of iron. If they made any attempt to change the strength of Parrish's syrup they would, unfortunately, come into collision with the many other preparations of ferrous phosphate syrups. They had, for example, a B.P. syrup which was a sort of standard for all those preparations, more or less, and it would be a most unfortunate thing if they were to change the strength of Parrish's syrup in relation to the strength of the B.P. syrup, more especially as its strength, whether satisfactory or not, was generally accepted by the medical profession. He had not tried Mr. Howie's process, but be found that with a modification of the Pharmacopœia formula, taking care that no oxidation took place, a very satisfactory syrup indeed was produced, a syrup that would stand the test of strength, which would stand the test of keeping, and in every other respect be a satisfactory syrup. At the present time he had laid aside for some months a B.P. syrup prepared according to this formula. It had not deposited to any extent, that was to say the bottom of the bottle had scarcely been covered with deposit, it was quite clear, and this he took to be a very satisfactory proof that if care were taken in the matter of oxidation, and other respects, a very satisfactory syrup would be produced.

Mr. BURRELL had listened to the remarks of the various gentlemen present with very great interest, because he did not know a more unsatisfactory compound to attempt to make than Parrish's syrup. His experience had been somewhat the experience of the various gentlemen who had spoken. For one time he had succeeded he thought he had failed half a dozen times to make it what he wished; the fact was he had classed this phosphate syrup question with the Eastern question. There was one mode that he followed in making it regarding the phosphate of lime which he would mention, and which he thought was a useful way of doing it. He always made it direct. He happened to have a large quantity of a stuff called ivory dust, which at one time was used largely for stiffening bonnets—that was when ladies wore bonnets. He found he could make it very easily and simply by mixing the ivory dust with hydrochloric acid, and filtering it through paper, then precipitating with ammonia, and washing; and when he added that to the syrup and put the other ingredients into it, it was soon dissolved. It appeared to him that that syrup was better than that which he read of; at the same time he confessed that he had very little faith in any process he had ever seen or tried. He was very glad that Mr. Howie had taken the subject up, because he was sure that the profession or trade would be very much indebted to him for the time and pains he had taken in solving this very difficult question.

Mr. HOWIE, in reply, said the sugars he thought the best were Martineau's London loaves, and Finzel's crystals. There might be others, but these were first-rate sugars. Mr. Borland's original suggestion he thought a very promising one, such as could be framed into a convenient and rapid process; but he feared Mr. Burrell's success with the ivory dust was due to its not representing the full proportion of calcium phosphate. With regard to Mr. Gilmour's query, if he had estimated the relative proportions of ferrous and ferric phosphates in the syrups, he said he had not done so; he believed it could not be accomplished on account of the presence of the sugar, which interfered with the estimation of the ferrous salt, and if this sugar were eliminated, the process changed the condition of the iron. The estimations were made by his process, explained in the former paper, and represented the total iron in the syrup, and he had calculated it as ferrous phosphate. As Mr. Gilmour had said, there was little difficulty in obtaining or keeping B.P. phosphate of iron syrup, of the full strength of one grain to the fluid drachm, and he (Mr. Howie) did not deny that even a Parrish's syrup could be made of the full stated strength; but it required great skill and care in preparation, and very careful storing to ensure its stability, and even if this strength were accomplished it would be producing a new syrup. Parrish's syrup would still be made, and the new syrup would be some other person's. He thought the Conference should state a little more distinctly, if it could be done, whether the statement of strength should be adhered to, and a new syrup made, or whether the product of Parrish's formula should be taken as the standard, which he thought most natural, because were the statement adopted the old Parrish's syrup would still continue to exist.

NOTE ON SALICYLATE AND SULPHOSALICYLATE OF SODIUM.

BY JOHN WILLIAMS, F.C.S.

Salicylate of sodium has been much employed lately as an internal remedy.

It is made by neutralizing a solution of salicylic acid with caustic soda, and evaporating to dryness. It can be purified by crystallization from alcohol; the crystals formed are, however, very small and indistinct, and this method of purification is not generally adopted.

Complaints have appeared in the medical journals that the salt sometimes produces irritative effects when administered medicinally, and it has been suggested that probably a trace of carbolic acid may occasionally be retained by the salicylic acid made by artificial means, and thus the salt prepared from such acid is impure.

An examination of the salicylic acid made from carbolic acid by Kolbe's process soon proves that the product is not always to be depended upon as a pure homogeneous article; indeed it can hardly be otherwise, when we consider that the carbolic acid from which it is made is itself not an absolutely pure or definite article. Still I must observe that the salicylic acid now being supplied is much purer and more definite than that which was at first sent into the market by the German makers.

Thus salicylate of sodium—made from the artificial acid—and from the great difficulty of purifying it by recrystallization—is liable to be more or less impure, and indefinite in composition. It thus appears desirable if possible to obtain a salt which can be purified, and obtained of definite constitution.

Sulphosalicylic acid appeared to offer such a compound. It was discovered many years back by Cahours, and has been further investigated by Mendius. The process described for its production is, however, one of considerable practical difficulty.

The vapour of anhydrous sulphuric acid is passed over salicylic acid kept cool; gradually a sticky, gummy mass is produced, which contains the new acid, and can be separated by appropriate means.

I have made several attempts to produce this conjugated acid by means of ordinary sulphuric acid, and have at length succeeded in doing so, but not without several failures. I find the following process to answer.

The salicylic acid must be very pure; the unpurified commercial acid, when treated with sulphuric acid, simply yields a black mass, giving off sulphurous acid; and yielding no sulpho-salt capable of giving definite crystals.

If pure acid is employed, then about twice its weight of sulphuric acid is quite sufficient. The mixture must be gently heated in a sand-bath up to about 100° C., when action will commence in the liquid, and considerable heat be developed. The beaker must be removed from the sand-bath, and the contents stirred, so as to regulate and keep down the temperature; but the cooling must not be sufficient to altogether check the reaction. If the temperature exceeds the proper point, little or no sulphosalicylic acid is produced, but apparently bisulphocarbolic acid, which does not yield definite crystallizable salt.

When the reaction has been properly maintained, at the end of ten minutes or a quarter of an hour the temperature begins to fall and in a short time the whole becomes a solid mass, generally of a light brown colour; this will speedily deliquesce if left exposed to the air; but it can be dissolved in water at once, and treated with carbonate of barium in the usual way. I may mention that as the sulphosalicylate of barium is not a very soluble salt, it is necessary to employ a considerable quantity of water, and filter the liquid while still hot. This solution of the barium salt, decomposed by an equivalent quantity of sulphate of sodium, yields a solution of the sulphosalicylate of sodium, which upon evaporation to a small bulk yields crystals; these crystals must be pressed from the mother-liquor and purified by recrystallization two or three times from hot water.

When pure, sulphosalicylate of sodium forms hard white prisms; it is not deliquescent, although very soluble in water. It is almost insoluble in alcohol, has no caustic, but a slightly bitter taste, and is altogether a salt well adapted, I think, for medicinal use.

Salicylic acid and its salts give, as is well known, a striking reaction with perchloride of iron, producing a dark purple coloration. The sulphosalicylates produce exactly the same reaction, proving that the salicylic acid radical is still intact in these compounds, and it is fair to infer that the medicinal properties of these sulpho-salts will be found in practice to be identical with, or perhaps superior to, the simple salicylates.

We have in the analogous case of the carbolate and sulphocarbolate of soda, an instance in which the sulpho-salt possesses great advantages over the simple salt, and such may prove to be the case with the sulphosalicylates.

The acid itself is crystallizable, but deliquescent; the zinc salt is also very deliquescent. I have not paid any attention to the other salts as yet.

The PRESIDENT said the subject referred to by Mr. Williams was interesting and important. He knew, in one instance especially, in his own family, where salicylic acid had been taken internally, inconvenience was experienced from the fact of its containing an appreciable quantity of carbolic acid,—so much so in fact that the taste became an objection to further use of the remedy. He observed that Mr. Williams stated that the sulphocarbolates had a decided advantage over carbolates. Was that a confirmed fact? because he had had reason to doubt as to how far sulphocarbolic acid possessed the properties of carbolic acid.

Mr. WILLIAMS was under the impression that the sulphocarbolates were considered superior for internal administration to the carbolates. This impression was principally based upon the fact that the demand for them was increasing very considerably.

The next paper read was on—

FILTERING PAPERS.

BY THOMAS GREENISH, F.C.S.

Whilst engaged in examining some of those fungoid substances which every now and then make their appearance in solutions kept by pharmacists either for convenience in dispensing or other purposes, I have found on several occasions that the fungus had formed around a fibre, the presence of which in the filtrate was due to the paper through which the solution had passed. I observed also that those solutions which had passed through a filter were more liable to the presence of fungi than others where no filtration had been employed after solution. The paper used was the circular grey foreign filter paper. This circumstance induced me to subject the filtering papers in general use to a microscopical examination, with the view of determining the composition of each. The details I have thought may possess a certain amount of interest.

The white unsized filtering papers may be classed under Swedish, Rhenish, English, and Scotch. Sweden has obtained a reputation for filtering papers. Its manufacture has long been in the hands of the Munktell family. The supply, however, is not equal to the demand for it, consequently there is an inquiry for other papers to supply its place. The Swedish filtering paper is composed of flax fibre, and the fibres are very much crushed and broken. The linen had evidently done duty elsewhere in the rag before it found its way into the paper. The fibrillæ of the broken fibres serve to fill up the pores, and prevent solids passing through the paper. I am told that the water used in its manufacture is very pure, and contributes to its value as a chemical filtering paper. It yields a very trifling amount of ash, but recent investigations prove that the average quantity of ash has increased, pointing to the conclusion, either that the material used in the manufacture of this paper is not so pure, or that the same care is not exercised in its preparation.

The next paper is the Rhenish. This competes with the Swedish; it is a flax paper, but more fibrous in its structure and consequently less dense than the Swedish; this is due to the fibres being less broken and crushed. The fact of there being so much less fibrillæ would render such a paper quick in filtration, but not so satisfactory in results as the Swedish.

The English white filtering papers have a little cotton mixed with the flax and the fibres are very much crushed and torn. I have not had the opportunity of examining the Scotch filtering paper, which I understand to be very good, and some of the value of which is said also to be due to a very pure water used in its manufacture. These papers differ more in their physical characters than in their composition.

I now come to filtering papers of a very different character—those of foreign manufacture, grey in colour, cut circular, and of different sizes, also grey sheet filtering paper of Dutch and home manufacture. These papers are of a more composite character and have in their composition a considerable quantity of wool, said to be used to render the paper absorbent. Much of this wool is coloured and has evidently done previous duty in some textile fabric. I have also found in some samples, in addition to this dyed wool, fibres of jute and esparto, unbleached, and mixed with other fibres—in fact, to the microscopist interested in fibres it is a kind of curiosity shop. It is evident that these papers must be very unsuited for alkaline solutions and others which will suggest themselves to the pharmacist, and it is not difficult to understand that from the heterogeneous character of the material from which filtering papers of this kind are made that it may be the source from which certain impurities find their way into delicate solutions.

Here is a sample of filtering paper which has been introduced to supply a want. The Swedish is difficult to get in sufficient quantity, and some of the others are not satisfactory. This is made on the Rhine, and composed mainly of flax; it allows the fluid to pass rapidly through it. The paper being uniform the amount of ash is tolerably definite. The fibres are more torn than in the other Rhenish papers which I have examined.

It is extremely difficult to determine the fibres crushed and torn as they exist in these papers. A flax fibre where crushed resembles that of cotton, and it requires to be traced further to establish its identity. Again, the same fibre bruised only, resembles the hemp fibre. The wool is not usually much injured, with this exception, that the characteristic imbrications are sometimes nearly all obliterated.

I have here, more as a curiosity than with any practical object, a specimen of Japanese filtering paper. I do not know what the Japanese can use it for. It appears adapted only for filtering flies out of a syrup. It is prepared from the liber tissue of the mulberry *(Broussonetia papyrifera)*, a substance yielding the longest fibre of any material used in the manufacture of paper.

The PRESIDENT said the meeting had sufficiently indicated its thanks to Mr. Greenish by the way in which it had accepted his paper on filtering paper, a subject which had a good deal of practical interest to pharmacists as well as to chemists; he meant to scientific chemists. Mr. Greenish had stated that the presence of certain fungoid vegetation which was found frequently in solutions might be traced to the paper through which the solutions had been filtered. Mr. Greenish seemed to think that the commoner kinds of paper were most likely to produce such results. He must say, however, that he did not think Mr. Greenish had adduced sufficient evidence to satisfy him as to this, and his own experience was rather to the effect that papers of all kinds, of the best description as well as of the commonest description, were liable to have such substances developed in them. That was a matter which had been frequently brought under his notice both in connection with printing establishments and paper works. Not unfrequently it was found that when paper, and even paper of the very best description, such as for instance was used for the illustrations of some of our expensive books, where such paper had been kept in a moist state for any length of time these growths become largely developed in it. In old books there might be constantly observed brown spots upon the paper, which some persons had ascribed to ink spots, but they really would be found to have an entirely different origin; and those substances became developed and extended with very great rapidity, often so that a single spot at the commencement of the book would gradually creep through from page to page until it entirely permeated the book. He would be disposed to ascribe those results which Mr. Greenish had observed not so much to the character of the paper as to the condition the paper may have acquired before it was used. As far as his experience went, good filtering paper was as liable to this as the commoner kinds. The subject, however, was really a very interesting one and one which young pharmacists who were using the microscope would find to offer an opportunity for cultivating their microscopic powers of investigation. It would be found that papers were rich in substances of that description.

Mr. GREENISH said this was only a portion of a larger subject which was engaging his attention, and he hoped to be able to bring some perhaps curious results before the Conference. He thought the President in his remarks had not borne in mind the distinction between the unsized paper and the sized paper; the decomposition was generally attributed to the "size," but the unsized filtering papers were free from that unstable element.

The PRESIDENT: I have not certainly.

In reply to a question respecting the specimen of Japanese filtering paper exhibited,

Mr. GREENISH said that it was prepared from the liber of the mulberry tree. He had isolated the fibres from that liber tissue, and, having examined them under the microscope, found that they were identical with those of which this paper was composed. It was generally supposed that these Japanese and Chinese papers were made from straw. Some might be made from straw, but he had several specimens, particularly of Japanese, and all these were made from the mulberry.

Mr. EKIN said he supposed Mr. Greenish did not refer to the common mulberry tree grown in England.

Mr. GREENISH replied that he alluded to the paper mulberry tree (*Broussonetia papyrifera*) specimens of the liber tissue of which he had in his possession.

The next paper read was on—

NOTE ON THE CONDITION IN WHICH SALICYLIC ACID IS EXCRETED BY PATIENTS.

BY F. BADEN BENGER, F.C.S.

The question whether or not salicylic acid ever exists in a free, and therefore active condition, in the urine of patients being of some importance, the following experiments were made, and the results are offered as a small contribution towards a settlement of the point.

The urine of a patient who had taken 60 grains of salicylic acid during the day was collected in the evening and the following morning. It was slightly acid to test paper, and gave the purple reaction with ferric chloride characteristic of salicylic acid and its salts. A portion shaken with bitter almond meal in the proportion of two grains to the fluid ounce immediately developed the odour of bitter almond oil. In a similar portion treated with two grains of mustard flour to the fluid ounce, the odour of mustard oil was at once perceptible; mixed with forty grains of sugar and half a grain of German yeast to the fluid ounce, fermentation rapidly took place. Five fluid ounces were evaporated to half an ounce, thoroughly shaken with its bulk of ether, the ethereal solution evaporated to dryness, and the residue dissolved in one fluid ounce of sweetened water; to this half a grain of yeast was added, and fermentation immediately commenced. A portion set aside in a warm place decomposed with the same rapidity as another specimen of urine containing no salicylic acid or its salts.

Parallel experiments were then made with urine in which salicylic acid had been dissolved in the proportions of ¼ grain, ½ grain, 1 grain, and 2 grains, to the fluid ounce. Sweetened with sugar, and half a grain of yeast to the fluid ounce added, the ¼ grain and ½ grain solution fermented more or less rapidly, the 1 grain solution slightly in twenty-four hours, whilst that containing two grains to the ounce remained unaffected. Mixed with bitter almond meal, two grains to the fluid ounce, the ½ grain solution prevented the production of bitter almond oil, but with mustard flour in the same proportion a slight odour of mustard oil was apparent, nor did the 1 grain solution entirely prevent its production. Similar experiments were then made with aqueous solutions of salicylic acid, and ¼ of grain of acid to the fluid ounce was found to be sufficient to prevent the action of ½ grain of yeast on 1 fluid ounce of sweetened solution. Smaller quantities only slightly retarded the action. A larger proportion of salicylic acid was required to prevent the action of yeast on sugar than has been recorded by some experimenters, and, as might be expected, more acid was required to produce the same effect in sweetened urine than in sweetened water, some of it probably combining with the alkaline phosphates present; nevertheless these experiments, as far as they go, seem to indicate that, at all events in the case under observation, the acid was not excreted in an active condition.

In connection with this subject, some experiments were made with urine in which salicylate of sodium had been dissolved in the proportions of 1, 2, 3, 4, and 5 grains to the fluid ounce, 40 grains of sugar and half a grain of yeast were added to an ounce of each. The one grain and two grain solutions fermented rapidly, the three and four grain solutions less rapidly, and the five grain solution remained unaffected by the ferment.

Solutions of salicylate of sodium in urine appeared to exert no retarding action on the production of oil of mustard, or oil of bitter almonds. Aqueous solutions of salicylate of sodium acted in a similar manner.

It has been stated that the salts of salicylic acid do not possess antiseptic properties, but it is evident that salicylate of sodium is capable of preventing fermentation if present in the proportion named.

The next paper read was on—

The Strength of Tincture of Nux Vomica.

BY L. SIEBOLD.

Having frequently noticed a striking difference in the opalescence produced by the addition of water to tincture of nux vomica obtained from different establishments, and also a difference in the degree of bitterness quite in harmony with the difference in the opalescence, I desired to ascertain the extent to which this preparation might vary in strength as well as the cause of such variation. For this purpose I examined ten specimens of this tincture from pharmacists of very good reputation. All were perfectly clear and proved to have been made with pure rectified spirit. The solid extract was estimated in each by evaporating 10 c.c. in a platinum dish and heating the residue in a water-bath until it ceased to lose weight. The following table is arranged according to the strength of the tinctures, beginning with the weakest, and gives the weights of the dry residues calculated for 1000 c.c. of tincture:—

No. 1	2·7 grms.
No. 2	2·9 „
No. 3	4·0 „
No. 4	4·3 „
No. 5	5·5 „
No. 6	8·9 „
No. 7	9·0 „
No. 8	9·6 „
No. 9	9·6 „
No. 10	10·1 „

From this it will be seen that the strongest tincture yielded nearly four times as much extract as the weakest. As far as I could ascertain the tinctures were all made in strict accordance with the B.P. process. They varied somewhat in colour but much more in the opalescence produced on the addition of seven fluid drachms of water to one fluid drachm of tincture. On the whole the relative strength of the ten specimens was pretty well indicated by the degree of opalescence thus produced.

In the next place, I endeavoured to ascertain how far the bitter taste of tincture of nux vomica might be relied upon as an indicator of its strength, and here I obtained results which very fairly correspond with those obtained by evaporation. By adding measured quantities of tincture to 10,000 parts of water until the mixture had a distinctly bitter taste, it was found that the following quantities were required:—

14 parts of Nos. 1 and 2
10 „ „ 3 „ 4
7 „ „ 5
4 „ „ 6, 7, 8, 9 and 10.

These experiments were repeated independently by two friends of mine with the same results.

In order to see what is the proper strength of tincture of nux vomica I prepared four specimens from four different samples of the finely-powdered seeds according to the B.P. directions, and estimated the amount of solid extract in each as before. Of this they yielded 9·5, 9·9, 10·0, and 12·0 grams per 1000 c.c., respectively. As the maceration and percolation were conducted alike in each case, the difference in the result could only be due to a difference in the quality and condition of the seeds used. It will be observed, however, that three out of the four tinctures agreed very well, and that none yielded less than 9 per mille of extract. The fourth, which yielded 12 per mille was made from an exceedingly fine powder. Two tinctures made from the same powder by repeated and long continued boiling with the alcohol yielded 14·6 and 13·0 parts of extract. By this process the powder was so completely exhausted that a fresh quantity of alcohol boiled with it came off free from bitter taste. I do not advocate the uses of boiling alcohol for preparing this tincture, but merely record the two last experiments in order to show how much matter soluble in alcohol nux vomica contains.

Another series of experiments was made to ascertain whether the coarser or finer condition of the powder used is to be considered the main cause of the variation in strength of the tinctures, and also whether or not the time allowed for maceration has any appreciable effect upon the result. The B. P. directs the finely-powdered seeds to be macerated in the spirit for forty-eight hours, previous to percolation, and it appeared to me not improbable that this time is often exceeded by pharmacists under the not unnatural impression that prolonged maceration is an advantage rather than otherwise. For the experiments now to be quoted the nux vomica was used in four different states, viz., as a coarse, as a moderately fine, as a fine, and as a very fine powder. Two tinctures were made of each sample, one in strict accordance with the B. P. directions, the other by macerating for six instead of two days. The determination of solid extract gave the following results:—

B. P. Tincture.	Tincture macerated for six days.
4·2	4·3
8·9	9·1
11·1	11·8
11·7	12·0

It is evident, therefore, that prolonged maceration does not materially improve the quality of the tincture, and that leaving out of consideration such slight differences in the yield of extract as may be due to variations in the quality of the seed, the real cause of the great discrepancies alluded to is to be found in the different degrees of fineness of the powder employed. Nux vomica is a tough substance to deal with, and it is no doubt used in many instances without being reduced to a sufficiently fine powder.

Absolute uniformity of strength in tincture of nux vomica would, of course, be obtained by preparing it from a definite quantity of the alcoholic extract. But until such a process is sanctioned in a revised edition of the Pharmacopœia pharmacists must take care to prepare the tincture from the very finely-powdered seeds only. By so doing they can make sure that the tinctures obtained will contain from nine to twelve parts of extract per 1000 c.c., a result which, I believe may be considered satisfactory. Those who do not prepare their own tinctures should not neglect to test the strength of the tincture of nux vomica they purchase; 10 c.c. of the tincture should yield no less than 0·09 gram of dry extract, one fluid drachm of the tincture should impart a distinctly recognizable bitter taste to two gallons of water; and the addition of ten to twenty volumes of water to one volume of the tincture ought to produce a marked opalescence.

Tincture of nux vomica is, I believe, a weaker preparation than it is generally supposed to be. The B.P. dose (10 to 20 minims) is very small as compared to that of the extract. I have repeatedly taken a 60 minim dose of a full strength tincture without perceiving any effect. Of one of the weak tinctures referred to in this report I took a dose of 90 minims without noticing the faintest symptom and might, no doubt, have taken 200 minims of it with perfect safety. If the ordinary medicinal doses of a carefully prepared tincture of nux vomica must be considered rather small, what effect is to be expected of those specimens which fall so lamentably short of the proper strength?

The CHAIRMAN said in reference to this subject he would suggest—what Mr. Siebold had not referred to—that the discrepancy in the strength of the tinctures might be due to the fact that the tincture was made from commercial powder of nux vomica which had not been properly prepared. He had found in the examination of many specimens of commercial powder of nux vomica what appeared to him to be very strong evidence of a considerable amount of adulteration in it. In fact he had been led to make such an inquiry in the first instance from an application having been made to him by a practical grinder as to what method he would suggest for facilitating the pulverization of nux vomica, as he had found up to that time that it was absolutely necessary to make some addition in order to promote and facilitate pulverization. It was well known now, however, to practical grinders generally that by pursuing a course somewhat analogous to the course that was indicated in the Pharmacopœia, softening the nux vomica by the action of steam, and then rapidly drying it, that it could afterwards be pulverized with tolerable facility. Practical grinders got into the way of adding other substances probably partly from example and partly also possibly from the idea that nux vomica was used as a poison for poisoning vermin, and that great uniformity in its strength and composition was not of very great account.

Mr. PROCTOR would have liked to know the sources of the powders because a chemist might err from excessive caution. The fact of powdering the nux vomica himself would prevent the production of so fine powder as would be produced by a practical grinder, and thus might make his tincture worse instead of better by his care.

Mr. BENGER believed the tinctures were prepared from powders ground as Mr. Proctor suggested by pharmacists, who had found the difficulty Professor Redwood had alluded to, in obtaining a sufficient degree of comminution.

The next paper read was on—

NOTE ON THE PREPARATION OF SULPHUR PRÆCIPITATUM.

BY L. SIEBOLD.

Most chemical handbooks represent the decomposition occurring in the preparation of precipitated sulphur by the following equation:—

$$2\,CaS_5 + CaS_2O_3 + 6\,HCl = 3\,CaCl_2 + 3\,H_2O + 6\,S_2.$$

According to this explanation the whole of the sulphur originally dissolved is regained, as the sulphuretted hydrogen liberated from the pentasulphide reacts upon sulphur dioxide disengaged from the hyposulphite forming sulphur and water. This view, however, is hardly in accordance with facts, for the two decompositions do not occur simultaneously, but take place one after the other, the pentasulphide being decomposed first. If the equation given were correct there would be no disengagement of sulphuretted hydrogen. In reality, however, a very large quantity of this gas is given off, which necessitates the operation to be conducted in an open place, or under a chimney, as directed in the British Pharmacopœia. After the pentasulphide has been decomposed the hydrochloric acid begins to act upon the hyposulphite, precipitating one half of its sulphur and giving off sulphur dioxide, which is to some extent decomposed by the sulphuretted hydrogen held in solution. I believe it is not generally known to pharmacists that the sulphur precipitated during this second stage of the decomposition differs in its physical characters from that obtained during the decomposition of the pentasulphide; it is coarser, heavier, and darker in colour, and does not exhibit the same perfect globular form under the microscope. Neither is it acted upon with equal energy by chemical agents. If the precipitation be conducted with a quantity of hydrochloric acid barely sufficient for the decomposition of the pentasulphide only, so that the mixture still retains a slight alkaline reaction, the resulting preparation will be found to be much superior to that obtained by the B. P. process, in which sufficient or almost sufficient hydrochloric acid is used for the complete decomposition of both the pentasulphide and hyposulphite. Prepared in this way the product amounts to about 55 per cent. of the sulphur used. It is a pale yellowish white, thoroughly uniform, fine powder, consisting entirely of perfectly round, smooth globules; it is sure to be free from arsenic, and can never contain any persulphide of hydrogen. Solution of chlorine dissolves it immediately, forming sulphuric acid and hydrochloric acid. From its general, physical, and chemical properties, I am inclined to infer that it will be more readily assimilated than the heavier, coarser, and less uniform preparation of the British Pharmacopœia. The advantages of this partial precipitation appear to me to outweigh the not inconsiderable loss of sulphur. Pure hydrochloric acid ought to be used if a pure precipitation, free from a greyish tint, is desired, as the iron contained in the impure acid always passes into the precipitate and cannot be afterwards removed. The surface attraction between the precipitated sulphur and the sulphide of iron is so great that it is impossible to remove the latter even by long continued washing with dilute hydrochloric acid.

The preparation of precipitated sulphur by partial precipitation is a process which, I believe, deserves to be strongly recommended.

The PRESIDENT said the suggestion thrown out by Mr. Siebold was one well worthy of consideration. It presented a method by which precipitated sulphur could be obtained free from the impurities which commonly occur in it, even when prepared according to the Pharmacopœia. He thought it would be difficult to induce manufacturers to incur so great a loss as would be entailed by the adoption of the suggested process, but it would be useful to draw attention to the fact that precipitated sulphur was somewhat different from what it was often assumed to be, namely, pure sulphur. He did not think it was desirable on the present occasion when discussing this subject to mix up any other question with it. The subject before them was precipitated sulphur, which as made by the Pharmacopœia possessed certain impurities and imperfections, which Mr. Siebold suggested a method of getting rid of.

Mr. KINGZETT was glad to be able to support what had been said regarding chemical equations. He had attempted to realize the equation often given in books, but which expressed only partially the truth—viz.,

$2(H_2S)+SO_2=2H_2O+S_3$. Not only was water and sulphur produced in this way, but also pentathionic acid $H_2S_5O_6$, so that, in fact, when some years ago attempts were made to utilize sulphurous acid and hydrosulphuric acid gases derived from certain industrial processes *in this* way, one fifth of the sulphur was lost as pentathionic acid. Further, the action of hydrochloric acid upon sodic hyposulphite as generally given in books was but partially true. A great excess of hydrochloric acid, on the one hand, was required to decompose it fully, or, on the other hand an excess of hyposulphite was required to make use of all the hydrochloric acid. That is to say, there obtain certain physical and other conditions in every chemical reaction which render equations true only within limits—in other words, a chemical equation is not a mathematical equation.

The next paper read was—

Note on Flower of Tea, or Pekoe Flower.

BY T. B. GROVES F.C.S.

Some time in March this year was received at the Weymouth Custom House for export to Jersey a package containing 100 lbs. of a substance bearing the above appellation, and purporting to be a variety of tea.

Its unusual appearance at once aroused the suspicions of the "authorities," who ordered it to be detained for inquiry. A portion having been sent to the London Custom House for report, an answer was returned that the substance was really tea, and must therefore be allowed to pass; that it was not the leaf of the tea plant, but the pollen of its flower; that it was of rare occurrence in the market, and was obtained indirectly by sweeping and screening the dusty matters that collect on the extensive floors where in China teas in large quantities are "bulked." A sample was kindly sent to me as a curiosity, and having learned its history as far as it could be ascertained, I determined on making a few inquiries respecting its origin, nature, and properties.

All I could learn of its commercial source was confined to the fact that it was purchased in London of a well-known firm of brokers in Crutched Friars; but of course any one on the spot could have followed it up with more success.

That it was not the pollen of the tea flower, or of any other flower, was evident to the naked eye. It might possibly be a collection of "filaments;" but it proved on submitting it to the microscope to be composed of simple unicellular vegetable hairs, mixed with small fragments of tea leaves, together with sand, and probably other extraneous substances.

Mr. Holmes, of the Pharmaceutical Society's museum, kindly made inquiries for me at Kew and elsewhere, and by actual comparisons established the fact that the pekoe flower was really the hair of the leaf buds of the tea plant, though these, in their natural state, are white, or nearly so. The few white hairs to be found on the outside of the sepals and at the base of the petiole might possibly have contributed to the collection.

The filaments of the tea flower are, besides being of altogether different structure, much broader than the hair from the buds; the two, therefore, are quite unmistakable.

Hassall, in describing the structure of the tea leaf, states that "the *hairs* are confined to the under surface of the leaf; in the very young leaf they are very numerous, but in those of middle age they are much less abundant—and, indeed, in some cases nearly altogether wanting; they are short, and when not broken pointed and undivided." He also gives a figure of the under surface of a leaf with a hair *in situ*.

It now remained to ascertain its chemical composition. This I proposed to do in conjunction with Mr. Wigner, whose well-known acquaintance with the subject would give additional value to his results, and enable the pekoe flower to be tabulated with the very numerous other varieties of tea examined by that gentleman. It was finally, however, arranged that the analysis should be carried through by one person, and I having then but little time at my command was glad to hand the subject over to Mr. Wigner.

The following is his report:—

	"Analysis of Tea Marked Pekoe Flower.		The Average Analysis of Pekoe.
"Ash Soluble in Water	1·15	per cent.	3·30
" " " Acid	4·54	"	2·60
Silicious Matter	13·04	"	·30
Total Ash	18·73		6·20
Moisture	7·00	"	7·30
Extract (soluble in Water)	14·65	"	34·00
Ash (of ditto)	2·40	"	5·00
Theine	1·50	"	3·50
Tannin (by Ph. process)	12·00	"	28·00

The composition of the ash was as follows:—

Oxide of Iron	6·01	"	5·00
Lime	4·83	"	11·00
Magnesia	2·05	"	
Potash and traces Soda	4·97	"	32·50
Oxide of Manganese	1·02	"	
Sulphuric Acid	1·29	"	4·80
Carbonic Acid	7·39	"	12·00
Chlorine	·61	"	
Phosphoric Acid	5·33	"	16·00
Silica	66·18	"	
Loss in Analysis	·32	"	
	100·00		

"I have made several unsuccessful attempts to sift the sample. A large portion of the hair has passed through with the dust. The gross ash yielded by the sifted part corresponding tolerably with that of the original sample. The microscope shows much leaf in fragments, and some of these fragments certainly appear to belong to some plant which is not *tea*."

It will be observed that whilst its extractive is less than half that of average pekoes, its ash is three times as great and mainly silicious. The difficulty of separating the sand, might, if it were worth while, be got over, I fancy, by winnowing. It is interesting to find theine present in the hair. Doubtless some of the 1·50 found is due to the fragments of the tea-leaf present in the sample, but as those fragments certainly did not constitute more than 2 or 3 per cent. of the bulk the yield must have been mainly due to the hairs themselves.

P.S.—The above was what Mr. Groves intended to read to the meeting, but in consequence of the miscarriage of the document, an imperfect *vivâ voce* statement had at the last moment to be substituted for it.

Mr. Greenish stated that a sample of this substance had been sent to him, without a name or a history, with a request that he would determine, with the aid of the microscope, whether it was of vegetable or animal origin. On examination he found it to be mainly composed of vegetable hair, with small particles of parenchyma and spiral tissue more or less attached to it, also of minute fragments of the epidermis of a leaf. From the character of the hair, and also that of the stomata, he came to the conclusion that the substance in question formed part of the *débris* of tea leaves. On being informed that it had been offered for sale as the "pollen of the pekoe flower," he continued his investigations, and would just state the successive steps by which he had arrived at his conclusions respecting it. In the first place he would explain what was pekoe flower. Pekoe tea consisted of the young leaves of the ordinary tea plant, the first pickings, gathered in early spring; and the pekoe flower, or "pekoe tips," as known in the trade, were the youngest, unexpanded leaf buds growing on the tips of the branches, with perhaps one or two leaves attached to each. These buds consisted of two or three leaves rolled together, each of which was covered on the under surface with hair, and the leaves being rolled outwards on the mid rib. Their under and hairy surface was exposed. The buds resembled hairy pods, with a couple of leaves attached to each, and when spread on the surface of a chest of pekoe tea, they gave it a flowery appearance. He had with him as examples, some of the tips or leaf-buds, covered with grey hairs; these had been obtained direct from China. Also one, which, having been placed in water, had expanded, showing the smaller leaves enclosed forming the bud. He had detached some hair from one of these buds and found that it agreed with the hair in question; the epidermal and cellular tissue corresponded also. There still existed a difference with regard to the colour of the hair; in the sample under examination it was brown, while that on the pekoe was grey. On searching, however, a sample of Assam pekoe, he had found the buds covered with brown hair. A specimen of this also he submitted for inspection. Not yet satisfied with regard to the source of this colouring matter on the hair, he examined it more minutely and found that the colour was mainly due to particles of cellular tissue adherent to the hair, the chlorophyll of which had become more or less brown, probably from oxidation, and partly decomposed. A small quantity of the hair warmed in a dilute solution of liquor potassæ gave off a strong odour of tea, and those particles to which the hair chiefly owed its colour were removed. These facts he thought suggested the probable origin of the substance. In buildings where tea was manipulated the light hairs would be carried with the dust and lodged in different parts of the building, where it would be exposed to changes of weather. In course of time an accumulation took place, which, being swept together and collected, would eventually find its way into commerce. The fact that small particles of calcareous matter and silica were found mixed with it would favour this supposition; and he might add that the sample did not contain a particle of pollen. He had been to Kew Gardens and had seen the downy hair on the young leaves of the tea plant growing there; he had also examined in the herbarium the dried tea plants from different countries, and had come to the conclusion that the colour of the hair was a feature not special to any particular tea. He would add in conclusion that the hairs of the tea leaf offered a means of identification when, from the broken character of the leaf itself, the peculiarly serrated margin and emarginate apex could not be discovered. The hairs were conical, pointed, one-celled, slightly bent near the base, the cell walls very thick, and the central duct generally containing granular matter. The stomata also, with the cells immediately surrounding them, had certain characters, which, taken together with the hair, served to distingush the leaf of the tea from that of any known plant.

This concluded the reading of the papers.

The Bell and Hills Gift of Books.

Professor Attfield, on behalf of the Conference, presented Mr. Fairlie, as representing the local association with a number of books as a donation to the library of the association, and together with these, although having no connection with the gift, he presented two engravings, one of Dr. Pereira and the other of Jacob Bell.

Mr. Fairlie, on behalf of the local association, accepted the handsome present which had been made to them. The only thing he was sorry for was that the books were just a little too handsome to be put beside those they already had. The books were a valuable addition to their library, and he had not the slightest doubt they would be used to the best advantage by the members of the association.

Place of Meeting in 1877.

Professor Attfield said it had been the custom of the Conference, with one exception, to meet in the town in which the British Association met and on the two days preceding the meeting of that Association. The British Association, as was well known, was to meet at Plymouth next year, and he had received a letter from the Secretary of the Plymouth, Devonport, and Stonehouse Association which he would read to the meeting.

"Plymouth, Devonport, and Stonehouse Chemists and Druggists' Association.

"77, Old Town Street, Plymouth.
"August 18, 1876.

"Professor Attfield, Hon. Sec., British Pharmaceutical Conference.

"Dear Sir,—As Honorary Secretary of the above Association I am instructed to send a warm and hearty invitation to the British Pharmaceutical Conference to hold its 1877 meeting at Plymouth; and on behalf of the chemists of the three towns and neighbourhood to assure you that nothing shall be wanting on their part to cause the memory of such a visit to be one of the most pleasant recollections of the members of your Conference.

"Remaining
"Sincerely yours,
"Robert J. Huntly."

He (Professor Attfield) had very much pleasure in moving that the invitation be accepted and that the meeting of the Conference for 1877 be held at Plymouth on the two days immediately preceeding the meeting of the British Association. He was convinced from what he knew of the pharmacists of that district that the Conference would receive a warm and hearty welcome in Plymouth. One of the most prominent of these pharmacists was proposed as vice-president of the Conference. He was a visitor at their first annual meeting at Bath, where he was one of the thirty-one visiting members at the meeting. He alluded to Mr. Balkwill, and he was convinced from that gentleman's interest in and knowledge of pharmacy that they would have a successful meeting at Plymouth.

Mr. Jones had very great pleasure in seconding the motion.

The President put the proposal to the meeting and it was unanimously agreed to.

Election of Officers.

A ballot was then taken for the ensuing year, when the list proposed by the Executive Committee was unanimously elected as follows:—

President.
Professor Redwood, London.

Vice-Presidents.
A. P. Balkwill, Plymouth.
T. H. Hills, F.C.S., London.
R. Reynolds, F.C.S., Leeds.
J. Williams, F.C.S., London.

Treasurer.
G. F. Schacht. F.C.S., Clifton.

General Secretaries.
Professor Attfield, F.C.S., London.
F. Baden Benger. F.C.S., Manchester.

Local Secretary.
Robert J. Clark, Plymouth.

Other Members of Executive Committee.
M. Carteighe, F.C.S., London.
F. Codd, Devonport.

C. Ekin, F.C.S., Bath.
D. Frazer, Glasgow.
A. Kinninmont, Glasgow.
B. S. Proctor, Newcastle-on-Tyne.
E. Smith, F.C.S., Torquay.
W. A. Tilden, D.Sc., F.C.S., Clifton.
C. Umney, F.C.S., London.

Auditors.

T. Davison, Glasgow.
J. B. Turney, Plymouth.

Mr. Schacht moved a vote of thanks to the local Executive Committee for the manner in which they had arranged for the Conference. It was his conviction that the Conference had never had occasion to feel more gratitude to any such body of men than it did on the present occasion. Their thanks were specially due to Mr. Frazer, Mr. Greig, Mr. Kinninmont, Mr. Fairlie, and others, for their untiring and most successful efforts in organizing the present meeting. He would therefore move—

"That the most cordial thanks of the non-resident members be given to the Glasgow and West of Scotland members of the Conference generally, and to Mr. Frazer, Mr. Greig, Mr. Kinninmont, Mr. Fairlie, and other members of the local committee especially, for their untiring and most successful efforts in organizing the present meeting, and for the kind and thoughtful way in which every arrangement has been made."

Mr. Williams seconded the resolution, which was agreed to with acclamation.

Mr. Frazer, as Chairman of the Local Committee, acknowledged the compliment.

Mr. Gilmour moved the following resolution:—

"That the thanks of this meeting be given to the President for the ability and courtesy with which he has discharged the duties of that office, and conducted the business of the meeting."

He was sure he did not require to add one word to that resolution in support of it. From the very first,—in the able address they received from their worthy President, an address he was sure they would all remember with pleasure—down through the various papers which had been read, to the close of the meeting, the discharge of the President's duties had been characterized with an ability, address, and courtesy, which he had scarcely ever seen equalled. He had been particularly struck with the knowledge which their excellent President had brought to bear upon every subject that had been before them, and above all the practical bearings he had always sought to keep uppermost in respect to all the papers.

Mr. Proctor seconded the resolution. It was, he said, indeed a red letter day for the Pharmaceutical Conference when Professor Redwood was made its President.

Professor Redwood, who on rising was greeted with general cheering, said he felt deeply indebted to them for the very kind expression of their feeling towards him. He accepted most gratefully their vote of thanks for the slender offices which he had been enabled to fulfil during the meeting. He felt it to be a very great honour to occupy the office which he had held during the last twelve months and which they had now conferred upon him for another year. He had been greatly pleased and gratified with the manner in which the proceedings of this meeting had been carried through. The papers had been of a valuable character and the discussions had been conducted in a manner very creditable to the members of the British Pharmaceutical Conference. If anything could have been required to convince him of the great value of their institution he would have needed nothing more than the experience he had had at that meeting. He thanked them most sincerely for their expressions of good feeling towards him.

This terminated the proceedings.

Obituary.

JOHN SIMPSON.

A few months ago we had occasion to notice the death of Mr. William Tait, the then senior partner of the old established and well known firm of Duncan, Flockhart and Co., and it is now our sad duty to record the sudden and unexpected death of another partner of the same firm.

On the morning of the 22nd inst. Mr. John Simpson died after a few minutes' illness, in his house, Lauder Road. Observed to breathe somewhat unusually about 7 o'clock, medical aid was at once summoned, but he had passed away before it could be obtained. For some years he had been afflicted with valvular disease of the heart, and although he well knew how singularly uncertain his life was with such a serious and insidious complaint, yet he was able cheerfully and actively to carry on his daily occupation. He has been removed at the early age of thirty-nine and leaves a widow and five children to mourn his sad and sudden removal.

Mr. Simpson was a member of the Pharmaceutical Society, and though from his state of health he was seldom present at any of the evening meetings, he fully recognized the importance of the association and wished it well in its endeavours to promote increased education among pharmacists generally.

A nephew of the late celebrated Sir James Y. Simpson, the deceased had been connected with the business of Duncan, Flockhart and Co. for many many years, and became a partner in 1863, devoting his time and energies to that branch carried on at 52, North Bridge. From the prominent part he took in the management there his loss must be very deeply felt by his remaining partners. He was also much esteemed and respected by all who knew him, while in the more immediate circle of his relatives and friends, who were acquainted with his rare qualities of head and heart, he was greatly beloved.

The late Mr. Simpson took a deep interest in the prosperity of several of the religious and charitable institutions of the city. His heart was quick to feel for and his hand was ever ready to help the friendless and the destitute, and it is not too much to say that many, old and young, will miss in his removal a kind friend and generous benefactor.

Notice has also been received of the death of the following:—

On the 2nd of September, 1876, Mr. John Armitage, Chemist and Druggist, of Dukinfield. Aged 36 years.

On the 16th of September, 1876, Mr. Thomas Hockenhull, Chemist and Druggist, of Congleton, Cheshire. Aged 34 years.

On the 17th of September, 1876, Mr. David Atkinson, Chemist and Druggist, of North Shields. Aged 26 years. Mr. Atkinson had been an Associate of the Pharmaceutical Society since 1870.

On the 23rd of September, 1876, Mr. Joseph Wigginton, Chemist and Druggist, Long Causeway, Peterborough. Aged 36 years. Mr. Wigginton formerly represented Messrs. Richardson and Co. Leicester.

The following journals have been received:—The 'British Medical Journal,' September 23; the 'Medical Times and Gazette,' September 23; the 'Lancet,' September 23; the 'London Medical Record,' September 23; 'Medical Press and Circular,' September 23; 'Nature,' September 23; 'Chemical News,' September 23; 'Gardeners' Chronicle,' September 23; the 'Grocer,' September 23; 'Journal of the Society of Arts,' September 23; 'Grocery News,' September 23; 'Produce Markets Review,' September 23; 'Practical Magazine,' for September; 'Educational Times,' for September; 'British Journal of Dental Science,' for September; 'Journal of Applied Science, for September.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

Sir,—From your remarks and those of Mr. Mee in last week's Journal, I think there is considerable misconception of the objects and aims of the Chemists' Defence Association. The objects, as far as I see and know, are to protect the chemists and advance their interests.

You and Mr. Mee both admit that the Council of the Pharmaceutical Society is not sufficiently representative of the trade, and in my opinion it will require a far different organization than any that exists at present to accomplish so very desirable an object. The present method of election for the Council, though very broad, does not give the members an opportunity of knowing the views of those seeking election; there has been no organization of the great body of chemists, hence the majority vote haphazard or in the dark. It is also my opinion—and in this I am not alone—that the Council aim too much at the scientific, and too little at the practical instruction in the examinations of pupils for the trade. I say by all means give the highest scientific education you can to those who have the time and the means for chemical research, which is always highly estimated, and is invaluable to the community, and I think that each grade should be recognized by a higher title or reward; but the Council must not forget that ours is a trade that every one hopes to get a living by, with due attention to business.

There is very little doubt that the Act of 1868 did much good to the general body of chemists, but in many cases it is nearly inoperative. Legislation has not provided for the supply of drugs in numerous districts too small to support a chemist. These in many cases are miles apart and a great distance from any town; no doubt it was an oversight in passing the Act, but so serious that the defect makes the Act, as I said before, inoperative. I believe the movement now on foot will do much to strengthen the Pharmaceutical Society, as it will be able to take up many questions the Council cannot or is not willing to take up. It will also produce, when fairly carried out, a public opinion that will make its influence felt amongst the chemists of the country, and will, I have no doubt, complete an organization that will tend considerably to modify the present position of the Council to the trade, and will, I hope, make it have a more representative character.

It has been asked what the new association can do that could not be done by the old one. There are many things. I will briefly illustrate one of them by what we have done and propose to do in Chesterfied and East Derbyshire. Late in July, after the Birmingham meeting, we formed a branch association to embrace the eastern division of the county; it has been with us a complete success (as I have no doubt it will have been in other places where it has been tried). The trade has long been the victim of unscrupulous customers who have played upon the jealousy which has unfortunately existed so long in the trade, thereby reducing profits to the grocer's level without the grocer's rapid turn over of stock, his articles being an everyday necessity, ours only in very limited demand; and the present system of unremunerative prices will continue till there is a better understanding in the trade. Our branch association has already accomplished more than we expected in so short a time—viz., the good understanding and the determination to act together for the general good. Jealousy of each other now only excites surprise that it should have existed so long, as all that each individual wants is an honest and honourable living.

We are now engaged in arranging a schedule of prices, both for dispensing and retail, to suit our locality; we fix a minimum charge—more may be charged according to locality, the class of customers one may serve, and the expensive nature of the drugs used in dispensing. We have a private mark which is put on all prescriptions dispensed, so that if a prescription is sent to a second establishment it is charged accordingly.

Again, a chemist may have a prescription to dispense for a person in indigent circumstances; he dispenses this for less, but at the same time uses a private mark in addition to the cost mark, which shows his reason for dispensing it for less than the usual charge.

Then I may add that all our members are members of the Birmingham Association, and whilst loyal to their rules, we adopt our own, suitable to the locality; our subscription for local purposes is five shillings per annum, and has already greatly benefited its members in many ways—besides, what is worth more than all, producing a good understanding amongst them. Our secretary collects the subscriptions from the members for the general association, and remits them to their secretary, saving much trouble, time, and expense to our members and the general secretary.

If societies like ours were formed all over the country it would form one vast federation of chemists, thoroughly representative in its character, and would have force and influence upon future legislation that must be heard and attended to.

Thus it will be seen we are doing nothing that can be construed into hostility to the Pharmaceutical Society; and further, we are doing for ourselves what that Society could not do as a general body. There is room for both in their respective spheres. A. GREAVES.

Chesterfield, September 26, 1876.

A. Z.—We do not consider that the dose would be necessarily a dangerous one, but it should be given only on the responsibility of a medical man.

S. P. S.—First rub the extract up with a little warm water, sufficient when mixed to diffuse it through the liniment.

J. C. Fell.—See a paper by Mr. E. C. Saunders, in the present volume, before, p. 89.

"Pharmaceutical Chemist."—The fact of a person joining the Pharmaceutical Society as an Associate would not affect his position in respect to passing the Major examination.

"Spiritus."—By the Act 9 and 10 Vict. cap. xc. sect. 4, the Commissioners of Excise may permit a person to keep and use a still for the manufacture of any articles other than spirit or spirit mixtures, upon the person giving notice to the nearest officer of excise, and conforming to regulations laid down by the Commissioners, before commencing to use the still.

H. G.—The following formula is given by Squire in his 'Companion to the Pharmacopœia':—"Chloroform, 4 oz.; ether, 1 oz.; rectified spirit, 4 oz.; treacle, 4 oz.; extract of liquorice, 2½ oz; muriate of morphia, 8 grs.; oil of peppermint, 16 minims; syrup, 17½ oz.; prussic acid (2 per cent.), 2 oz.; dissolve the muriate of morphia and the oil of peppermint in the rectified spirit; mix the chloroform and ether with this solution; dissolve the extract of liquorice in the syrup, and add the treacle; shake these two solutions together and add the prussic acid.

J. Williams.—Solution of potassium sulphocarbonate has been recommended by Dumas as an insecticide especially effective against phylloxera. The sulphocarbonates are compounds of carbon bisulphide with metallic sulphides, which are slowly decomposed with evolution of sulphuretted hydrogen. See vol. v. p. 404.

J. D. F.—We should think not, if sold under their proper name. The only persons who can give an authoritative answer are the Inland Revenue authorities, to whom you are recommended to apply.

J. W. S.—Composition Powder.—The following recipe has been published:—

Pulv. Bacc. Lauri	℥iv.
Pulv. Zingib. Opt.	℥ij
Pulv. Pini Canadensis	℥i
Pulv. Caryophyllarum,	
Pulv. Pip. Cayenne ana	ʒij.

Mix. Dose: A teaspoonful in a cup of hot water, sweetened.

Moss.—The moss sent by a correspondent is *Marchantia polymorpha.*

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Hadley, Mr. Baxter, Mr. Reynolds, Professor Dymock, Mr. Stewart, Mr. Robinson, Mr. Cox, Mr. Corder, Mr. Welborn, Mr. Aldridge, Mr. Mason, Registered Apprentice, Aliquis, Hampton, Old Fashioned Druggist, Y. Z., J. C. P., S. N. O., A. G., J. T. R., H. M. H., B. W. W.

NOTES ON PHOSPHORUS PILLS.

BY E. J. APPLEBY.

With reference to the discussion that took place at the Conference meeting at Glasgow on phosphorus pills, which is reported in the *Pharmaceutical Journal*,* I venture, at the suggestion of Mr. Ekin, to submit the results of some experiments I have made during the last twelve months, in order to find a good vehicle for the administration of phosphorus, either alone or in combination with other ingredients.

The different substances I have experimented upon have been suggested from time to time by communications to the *Pharmaceutical Journal*, and by the reports of the discussions on the subject at the meetings of the American pharmacists published about the middle of last year. It is, I think, generally admitted that the formula for phosphorus pills given in the Additions to the Pharmacopœia is anything but satisfactory. Although the pills can be easily made according to the B.P. process, they are perfectly insoluble, as I have proved, in water at ordinary temperatures even after more than a year's immersion.

Another very serious objection to the pills is, that in order to give a full dose, say of $\frac{1}{8}$ of a grain of phosphorus—a quantity I have sometimes dispensed—16 grains of the mass must be prescribed. Messrs. Allen and Hanbury recommend a solution of phosphorus in bisulphide of carbon to be added to guaiacum resin, soap, etc., to form a mass, and possibly the process answers very well. The odour, however, of the bisulphide of carbon given off whilst making the pills must manifestly be most objectionable, especially when the process has to be repeated, as must sometimes be the case, several times a day. Later, a formula by Dr. Corfe has been brought under notice by Mr. Haffenden of Brighton, as one that he has been very successful with. But Mr. Haffenden does not show that the emulsion of phosphorus can be preserved to meet the requirements of pharmacists dispensing fractional parts of a grain of phosphorus frequently.

Of the different substances I have myself used, I give the preference to cacao butter, balsam of tolu, and common yellow resin. Cacao butter I melted in a wide-mouth bottle, and having introduced the phosphorus, well agitated them until the latter was dissolved; soap and tragacanth being added, the cooled mass was rolled into pills of small size containing $\frac{1}{30}$ and $\frac{1}{16}$ of a grain of phosphorus in each.

Balsam of tolu and phosphorus, in the proportions of 24 to 1, I rubbed together in a mortar under hot water until thoroughly incorporated. A portion of this was beaten into a mass with compound tragacanth powder and treacle, and divided into pills of the same strength as above.

This experiment was repeated, yellow resin being substituted for the balsam, and a portion made into pills by the aid of compound tragacanth powder and treacle as before. In each case the pills were varnished with an ethereal solution of resin, and subsequently coated with mucilage and French chalk.

Pills thus made in October last year give even now abundant evidence of the presence of phosphorus, as they are quite luminous when crushed between the fingers in the dark.

The objections to cacao butter are, the mass requires some time and patience to prepare, and it is necessary that it should be divided into pills and coated at once. The pills also soon become rancid on keeping, and further, the butter is difficult to incorporate with other ingredients.

The phosphorized balsam of tolu is easily made, and keeps well under water; but it is difficult to incorporate with other ingredients. Pills, too, made from it, soon lose their shape, and are with difficulty soluble in water.

Phosphorized resin possesses none of these disadvantages. To sum up its advantages: it is easily prepared and may be preserved under water for any length of time; it can be quickly reduced to a fine powder, and made into a mass with compound tragacanth or other ingredients; it can be conveniently made so that twenty-five parts of the resin shall contain one part of phosphorus in solution.

As a very small portion only of the resin, therefore, is required for an ordinary dose of phosphorus, other ingredients may be combined with it without making too large a pill. I give, as an example, a formula which I frequently dispense.

℞	Phosphori	gr. $\frac{1}{30}$
	Ferri redacti . . .	gr. ij.
	Quiniæ Sulph. . . .	gr. iss.
Ft. pil. i.		

Pills properly prepared with the resin are thoroughly disintegrated by cold water in a very short time.

8, *Argyle Street, Bath.*
Sept. 28*th*, 1876.

* See before, p. 253.

FUCUS VESICULOSUS AND SOME ALLIED SPECIES.*

BY JOHN M. MAISCH.

Though Theophrastus already, in his history of plants, mentions several species of marine algæ, the sea wrack does not appear to have been employed medicinally before the first half of the eighteenth century; I find, at least, no mention made of it in the new 'London Dispensatory' of 1676. Russell seems to have been instrumental in introducing it into medicine through his essay, 'De tabe glandulari,' which was published in 1750, and in which he specially recommended *Fucus vesiculosus* in the form of charcoal and jelly, the former, known afterwards under the name of *Æthiops vegetabilis*, being prepared by heating the plant in a crucible closed with a perforated cover until smoke ceased to be given off, while the latter was made by expressing the mucilaginous liquid, and also by macerating the fucus in an equal weight of sea-water for two weeks, or until it was converted into a kind of jelly, which was employed both externally and internally. Upon the strength of these observations *Fucus vesiculosus* was admitted into several pharmacopœias, but was afterwards dismissed, the last one dropping it being the 'Dublin Pharmacopœia,' in the edition of 1850. The beneficial effects in scrofulous swellings and goitre of the vegetable ethiops and of the sponge charcoal, which had been introduced by Arnaud de Villeneuve near the close of the thirteenth century, and the discovery of iodine in the ashes of sea-plants, induced Dr. Coindet, of Geneva, in 1819, to study the effects of iodine, and led to the introduction of this element into medicine. Subsequently, Duchesne Duparc, and after him Godsfrey, stated (1862)

* Read at the Meeting of the Philadelphia College of Pharmacy, August 15, 1876. From the *American Journal of Pharmacy.*

that they had found this fucus to possess valuable properties as a remedy for morbid obesity, an observation which, by later investigators, does not appear to be confirmed to the full extent mentioned by the first recommenders in this complaint.

Of late, the bladder wrack, it seems, has been employed medicinally to some extent in the United States, so that a brief description of this and some allied species may be desirable.

The genus *Fucus* belongs to the sub-order *Fucoideæ* or melanosporeæ of the natural order *Algæ*. As originally constituted by Linnæus, it embraced several genera which have been separated by later authors, and among which are the genera *Laminaria*, *Sargassum* and *Cystoseira*, the last named having the thallus usually inflated into vesicles which often show a moniliform arrangement, while the vesicles of *Sargassum* are stipitate. *Fucus* has either a cylindrical (filiform) or flat, usually forking thallus, and the sporocarps inflated and usually terminating the branches. In their fresh state they have an olive or brownish-green colour, becoming blackish on drying. Several species have portions of the thallus inflated so as to form hollow vesicles.

Fucus vesiculosus, Lin., attains the length of one to three feet, and has a flat thallus one-half to one inch wide, with the margin entire and a distinct midrib running the entire length of the thallus; the vesicles are always in pairs, one being placed on each side of the midrib, spherical or oblong globular in shape, and occasionally attaining the size of a hazel nut. It grows on rocky sea-shores of the Atlantic Ocean, near high-water mark, and in marshes which are occasionally overflowed by the tide. Formerly it was known by the name of *Quercus marina*, or sea oak, its common English names being bladder wrack, sea wrack, sea ware, kelp ware, and black tang. In Scotland and other northern countries it is used in winter for feeding horses, cattle and sheep, and is eaten by deer when other food is scarce.

F. nodosus, Lin., knobbed sea wrack, grows in similar localities, but at or near low-water mark. It attains a length of four to six feet, and has a narrower veinless frond, with the branches almost filiform at the base, the vesicles single in the centre of the thallus, or frond, ovate in shape and usually quite large.

F. serratus, Lin., has a veined and serrate frond, and is destitute of vesicles.

F. siliquosus, Lin., s. *Cystoseira siliquosa*, Agardh, has a very narrow frond, two to four feet long, with short branches, articulated vesicles and lanceolate flattened sporocarps.

F. natans, Lin., s. *Sargassum bacciferum*, Agardh, the gulf-weed of the Atlantic Ocean, is often found in immense masses floating in the sea. Its frond is terete, with the branches linear and serrate and the vesicles globular and aculeate.

All these and many allied species appear to be very similar in their constituents, of which they contain mucilage, mannite, odorous oil, bitter principle and a considerable proportion of saline matter, varying from 14 to 20 per cent., calculated for the dry plants. According to Godeschen, James and others, the variation is just as great for the bladder wrack as collected in different localities, and it is not impossible that this may be, at least in part, accounted for by having been collected in different seasons, the plant being assumed to be most active when collected after the sporocarps have formed, about the month of July. E. Marchand found (1865) in the ashes of *F. vesiculosus* 0·719 per cent. iodine and 0·603 per cent. bromine; in *F. siliquosus* nearly the same amount, and in *F. serratus* 0·834 iodine and 1·007 bromine, while the ashes of the fucoideæ *Laminaria digitata*, Lamx., contained 5·352 iodine and 0·774 bromine, and *Lam. saccharina*, Lamx., about one-half these amounts (see also *American Journal of Pharmacy*, 1854, p. 438).

Bladder wrack has been employed in France in the form of extract, prepared, according to Dannecy, by exhausting the plant with 54 per cent. alcohol; it is stated to represent fifteen parts of the fucus ('Proc. Am. Phar. Assoc.,' 1863, p. 66); also in the form of syrup, suggested by Potier (*ibid.*), by exhausting 150 parts of the powdered plant with 14 per cent. alcohol, evaporating the tincture to 230 parts and dissolving in it 370 parts of sugar; 20 grams (one tablespoonful) of this syrup represents 0·6 grm. of the extract and 5 grm. of the fucus, which is the average dose. A fluid extract might doubtless be prepared by a process similar to the officinal one for fluid extract of chimaphila; the average dose of such a preparation would be about a teaspoonful. If, however, the virtues depend mainly upon the iodine and bromine present, the dose would have to be increased very considerably.

THE MILK-SAP OF CYNANCHUM ACUTUM.*

BY A. BUTLEROFF.

The author has examined a small specimen of this sap brought from the vicinity of the Oxus, where the plant (a creeper belonging to the *Apocyneæ*) is regarded as very poisonous, and especially dangerous to camels. The sap, as it reached the author, consisted of a white, soft, resinous mass, and an aqueous, nearly colourless liquid, these being probably formed by coagulation of the sap. It had a faint disagreeable odour, somewhat resembling that of infusion of tobacco.

The fluid portion of the sap deposited on evaporation a quantity of potassium chloride free from sodium chloride. The syrupy mother-liquor was treated with alcohol, the alcoholic liquid evaporated, and the residue dissolved in water. A portion of this solution injected into the veins of a dog exerted no poisonous action. On distilling the solution with potash, there passed over a strongly alkaline liquid of peculiar odour, likewise without poisonous action on a frog.

The white coagulum formed a soft resinous mass. When heated it melted and burned with the smell of burning caoutchouc. The coagulum was treated with alcohol, which dissolved the greater part: the residue dissolved almost entirely in hot carbon bisulphide. The latter solution left on evaporation a transparent yellow, sticky resin, which did not harden in the air, and smelt of burnt caoutchouc when heated. The solution in boiling alcohol deposited on cooling white granules, which, after being purified, crystallized in small needles and shining laminæ. This substance, called by the author *cynanchol*, is moderately soluble in hot, but nearly insoluble in cold alcohol. It is accompanied by an amorphous, resinous body, which appears to hinder its crystallization.

Cynanchol, when sufficiently pure to crystallize distinctly, is white, bulky, and friable in the fingers. It melts at 135°—145° to a colourless liquid, and on cooling solidifies in a transparent amorphous mass, which becomes white and opaque when moistened with alcohol. It dissolves in alcoholic potash, but is not attacked by it even on heating to 100°. It is not affected by hydrochloric acid or ferric chloride, nor by potassium bichromate and sulphuric acid. Strong sulphuric acid colours it reddish-brown in the cold, and blackens it when hot, evolving sulphur dioxide. Nitric acid acts violently upon it, giving off nitrous fumes, and ultimately forming a solution from which water throws down a yellow pulverulent resin, insoluble in ammonia. Analysis of cynanchol leads to the formula $C_{15}H_{14}O$.

* From the *Journal of the Chemical Society* for July. (Liebig's *Annalen*, clxxx., 342—355.)

The Pharmaceutical Journal.

SATURDAY, OCTOBER 7, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

MEANS OF STUDY.

THE question "How to prepare for the Examinations?" is one so frequently put by correspondents that we believe the remarks of Mr. BARNARD PROCTOR on this subject will be of great practical utility to many embryo pharmacists who are in the position of having still to undergo the ordeal of examination. These remarks, and the illustration of them by reference to the speaker's own experience, will also be serviceable in helping to do away with the erroneous impression that there is some amount of hardship attending the necessity of acquiring such knowledge as is demanded for the pharmaceutical qualification. It is not unfrequent to hear the examinations spoken of as if they related to subjects altogether foreign to the occupation and daily duties of those engaged in the business of a chemist and druggist, and we have reason to believe that many who look forward to passing them entertain the idea that they are rather obstructions to be overcome, than a means of proving that those who pass them are in a fair way to become creditably competent members of the trade. As Mr. PROCTOR tersely put it, in reference to the Minor Examination, "All that passing indicates, is, that you are not too ignorant, or too stupid, to be entrusted with the practice of your trade."

As to the means by which this minimum amount of knowledge is to be acquired, it is a mistake to suppose that attendance at a school of pharmacy is by any means an indispensable necessity. The shop and its ordinary duties afford a wide scope for the acquisition of knowledge by anyone who is disposed to seek it; and it is no disadvantage that the growth of knowledge thus acquired is slow. The articles with which an apprentice has constantly to do, together with the brief account of their character and natural history, should suggest to an inquiring mind the desirability of searching for further details respecting them, their sources, mode of preparation, and chemical composition. Three or four years thus spent in the study only of such articles as trade routine brought an apprentice in contact with, could not fail to raise him to the position of having a fair knowledge of the materia medica, and of being able to satisfy the requirements of the examiners in that respect.

In regard to chemistry, also, the systematic carrying out of the tests prescribed by the Pharmacopœia, together with the preparation and use of the various standard volumetric solutions, would not only afford considerable opportunity for acquiring the art of conducting such operations with dexterity, but would also suggest innumerable questions for study in leisure moments, with the result of familiarizing the mind with the details and general tenour of chemical science.

We believe that any young man of ordinary intelligence, who is engaged in performing the ordinary work of a chemist and druggist's establishment has in all cases within his reach ample material for study, and opportunity for obtaining sound knowledge of two of the most important subjects upon which he would have to undergo examination before gaining the legal title to carry on business himself. All that is necessary in order to render useful the means at his disposal, is to have a due appreciation of the possibility of helping himself by constant and diligent use of the faculty of observation.

The account Mr. PROCTOR gives of his own course of study at a time when there were not only no Schools of Pharmacy, but none of those aids to study in the shape of students' materia medica cabinets and scientific manuals which recent progress has produced, ought to dispel entirely the idea that without the opportunity of attending lectures on materia medica, and classes of practical chemistry, nothing is to be done towards qualifying for the examinations. It will, we trust, encourage many a one to follow his example, instead of remaining apathetically under the impression that the sciences of chemistry, physics, and botany can be studied after his apprenticeship is completed, and enough learned about them by a few months' grinding just to float him clear of rejection.

Another useful hint given by Mr. PROCTOR to the student was that in dealing with numerous scattered facts he should endeavour to arrange them in order and find out the law of their relation. Although the example given was an arithmetical one, it might have been supplemented by many others in sciences more nearly allied to pharmacy. That advantage would result to the student by exercising his thinking faculties in this direction is manifest.

THE SALE OF POISONS.

WE are glad to observe that the *Lancet* has promptly adopted the correction we had occasion to make in reference to certain statements made as to the sale of opium and its preparations without registration. At the same time the opinion is expressed that it is neither just nor wise to allow poisonous doses of opium to be sold freely while a dose of arsenic or aconite may not be sold. The same opinion is expressed in regard to the distinction between the sale of belladonna and atropine. It cannot be denied that there is an apparent incongruity in the imposition of restriction in one case and the permission of free sale in the other, but a very little reflection should be sufficient to suggest the existence of sound reasons for the distinction drawn between such articles as the preparations of belladonna and atropine, or between opium and arsenic. It is scarcely possible to avoid the adoption of an arbitrary distinction in accordance with the applications to which the articles are put. With all reasonable desire to restrict the illegal use of poison, would it be expedient to apply regulations that would cause inconvenience in the use of every-day remedies? The *Lancet* is of opinion that restriction should be put on the sale of opium and its preparations, and as a reason for this opinion it is alleged that their use as agents of self-destruction probably exceeds the illegal use of all other poisons put together, and that there is more accidental poisoning with opium than with any other agent. It is therefore suggested that opium should not be sold in larger quantities than two drachms, except on medical prescription.

The *British Medical Journal*, in referring to our remarks on the Spalding case, says it is hardly in the public interest that others should concur in the hope we expressed that "local officials will be restrained from commencing vexatious prosecutions against unoffending chemists and druggists." This remarkable comment is only to be understood on the assumption that the sale of laudanum without registration was supposed by the writer to be a breach of the law. That, no doubt, was the view of the Coroner at Spalding, but these officials possess a super-human capability of error, and we do not doubt that if our contemporary will take the trouble to refer to the Schedule of the Pharmacy Act, and the sections relating to it, he will concur with the hope we expressed, so far at least as the actual state of the law is concerned.

THE FRENCH INTERNATIONAL EXPOSITION IN 1878.

ACCORDING to the *Répertoire de Pharmacie* the chemical and pharmaceutical products, materials etc., exhibited at Paris in 1878, are to be classed in the following order:—

GROUP V., CLASS 47.—*Chemical and Pharmaceutical Products.*—Acids, alkalies, and salts of all kinds; marine salts and products of the working of mother-liquors. Various products of industrial chemistry; wax and fatty bodies; soaps and candles. Primary materials for perfumery; resins; tars and derivatives; essential oils and varnish. Various lubricants; blackings, etc. Products of the india-rubber and gutta-percha industry. Dyeing substances and colours. Natural and artificial mineral and aerated waters. Pharmaceutical substances. Simple and compound medicaments.

GROUP VI., CLASS 47.—*Material of the Chemical, Pharmaceutical and Tanning Arts.*—Laboratory utensils and apparatus. Apparatus for industrial and commercial tests. Materials and apparatus used in manufactories of chemicals, soaps and candles. Materials and processes of manufacture of essential oils, varnishes, and objects in india-rubber and gutta-percha. Materials and apparatus for gas manufactories. Materials and processes of bleaching. Material and preparation of pharmaceutical products. Materials used in tanning and leather dressing. Materials and processes used in glass works.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, October 4, 1876.

MR. JOHN WILLIAMS, PRESIDENT.

MR. WILLIAM DAWSON SAVAGE, VICE-PRESIDENT.

Present—Messrs. Atherton, Atkins, Betty, Bottle, Cracknell, Frazer, Greenish, Hampson, Hanbury, Hills, Mackay, Owen, Rimmington, Robbins, Sandford, Schacht, and Shaw.

The minutes of the previous meeting were read and confirmed.

METHYLATED SPIRIT.

The PRESIDENT stated that in accordance with the decision arrived at at the last Council meeting he, accompanied by Mr. Stacey, Dr. Paul, and the Secretary, had waited on the Secretary of the Board of Inland Revenue. That gentleman received them very politely, and as the result of a long interview desired them to place their views in writing for presentation to the Board. A memorial had therefore been drawn up and sent to the Board, but no answer had yet been received.

The memorial was as follows:—

"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, W.C.
"August 16, 1876.

"To the Honourable the Commissioners of the Board of Inland Revenue, Somerset House.

"Gentlemen,—The Council of the Pharmaceutical Society of Great Britain would respectfully draw the attention of your Honourable Board to a question of difficulty which has arisen amongst chemists and druggists, consequent on a recent order issued, virtually prohibiting the use of methylated spirit in the preparation of all medicinal compounds intended for external use, with two exceptions only—viz. 'compound liniment of soap,' and 'compound liniment of camphor.'

"Having carefully examined the various Acts passed to allow spirit of wine to be used duty free in the arts and manufactures of the United Kingdom, your Memorialists observe that the one prohibition running through them all is, that in no case shall methylated spirit form part of any article to be used as a beverage, or of any article to be used internally as a medicine.

"It is within the knowledge of your Memorialists that a general permission has been granted for the use of methylated spirit in the preparation of the two liniments above named, and it seemed but a natural inference that these two well-known compounds were to be taken only as types of the class of external remedies for which methylated spirit would be legally applicable, consequently that other liniments might be so prepared. As examples, those of belladonna and aconite; both of them so highly poisonous that it would be utterly impossible to convert them into beverages and thereby defraud the Revenue. Both of them are so expensive, when made with pure spirit, that their cost would be a bar to their use in hospitals and other charitable institutions, as well as in the medical practice of poor districts.

"Other external applications might be enumerated, but these two may suffice to illustrate the difficulty, the more especially as they have lately been called in question.

"Your Memorialists are aware that the permission of your Honourable Board to use methylated spirit in the preparation of the external remedies ordered by the British Pharmacopœia (even in the soap and camphor liniments) cannot override the 15th section of the Pharmacy Act, 1868, which renders it penal to compound any medicine of the British Pharmacopœia except according to the formularies of the said Pharmacopœia.

"Nevertheless, in the interest of charitable institutions and of the poorer classes, they would respectfully submit that to allow the continuance of the use of methylated spirit in such external remedies as by reason of their poisonous nature or offensive flavour could not possibly be converted into beverages, would be a great boon and no infringement or evasion of the methylated spirit Acts. Such articles, although equal in efficacy, could not be sold or dispensed as those of the Pharmacopœia, and therefore would not obtain generally.

"I have the honour to be,
"Gentlemen,
"Your obedient Servant,
"JOHN WILLIAMS,
"*President.*

"On behalf of the Council of the Pharmaceutical Society of Great Britain."

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

Baikie, Peter .... Armagh.
Duberly, George Smith .... Luton.
Jones, James Parry .... Cwm Coy.

Chemists and Druggists.

Cottingham, Joseph John ...... Dartford.
Duncalfe, Richard .... Urmston.
James, Hamilton .... Truro.
Olive, William Thomas .... Burry Port.

ASSOCIATES IN BUSINESS.

The following having passed the Minor examination, being in business on their own account and having tendered the subscription for the current year, were elected "Associates in Business" of the Society:—

Beverley, Robert Henry .... Nottingham.
Blades, Josiah Brunt .... Leek.
Harris, Francis George .... Liverpool.
Jones, William Henry .... Islington.
Rowcroft, Albert Edward ...... Maidstone.
Squire, Frank Robert .... San Remo, Italy.

ASSOCIATES.

The following having passed the Minor examination and tendered their subscriptions for the current year, or having already paid the same as Apprentices or Students, were elected "Associates" of the Society:—

Brooks, Charles T. .... London.
Collingwood, John Henry ...... Little Gonerby.
Collitt, William .... Gainsborough.
Craske, Thomas Augustus ...... Tunbridge Wells.
Evans, Thomas .... Cwmbach.
Hues, William Richard .... Everton.
Radford, Charles .... Nottingham.
Ridgley, Thomas .... Newport, I. of W.
Tompsett, Leighton Stovold ... Strood.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary Examination were elected "Apprentices or Students" of the Society:—

Boor, Jonathan .... Manchester.
Brown, Thomas .... Hull.
Butterfield, Joseph Wm. .... Blackburn.
Corfield, Edward .... Birmingham.
Cowpe, John .... Southwell.
Cutts, Joseph Nix .... Chesterfield.
Foggitt, John Blackett .... Thirsk.
Gibbons, Walter .... Manchester.
Gourd, William .... Stoke Devonport.
Hogg, Henry Scott .... Glasgow.
Marshall, Charles William ...... Devonport.
Matthews, John Henry .... London.
Pond, George Peter .... London.
Powell, Ernest Geo. B. .... Cheltenham.
Richards, Randolph H. .... London.
Roderick, Thomas A. H. .... Pontypool.
Sangster, John Graham .... Southsea.
Southee, Wm. Jennings .... London.
Toms, Alfred .... Swansea.
Tuck, Walter Barber .... Eastbourne.
Wale, George .... New Malden.
Williams, John Wynn .... Mold.

Two persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

Mr. Wm. Wright, an Associate of the Society before 1842, was elected a Member of the Society.

The names of John Henry Walker of 23, Mytongate, Hull and John Swain of 249, Mill Street, Liverpool, were restored to the Register of Chemists and Druggists.

THE NORTH BRITISH BRANCH.

Mr. STENHOUSE was re-appointed Assistant-Secretary to the North British Branch for the ensuing year.

Mr. HILLS moved,

"That two Members of the Board of Examiners in Scotland and the Assistant-Secretary to the North British Branch be invited to attend the meeting of the Board of Examiners in London during the present month, their travelling expenses to be paid, and the two Examiners be also paid a sum equivalent to Examiners' fees for two days, and Mr. Stenhouse the necessary sum to defray his expenses in London."

He said he thought such interchange of visits between the two Boards was of the greatest value in promoting uniformity of examination.

Mr. BOTTLE seconded the motion. He held it to be of the utmost importance that the examination in London and Edinburgh should be precisely the same, and with that view an interchange of visits was highly desirable.

Mr. MACKAY thought these interchanges of visits should take place at least once a year, and therefore strongly supported the proposition.

The motion was unanimously agreed to.

Mr. MACKAY said there were a great many candidates coming up at the next examination in Edinburgh, and after this resolution he should propose that the examination be deferred until after the deputation had visited London.

Mr. BOTTLE said a few weeks ago Dr. Fowler, a member of the Board of Examination of the Apothecaries' Company, expressed to him his desire of visiting the examination held by the Pharmaceutical Society, with a view to rendering the examination in dispensing held by the Apothecaries' Company equally searching. His impression was that the Apothecaries' Company was perhaps doing the Pharmaceutical Society injustice, by giving young men a qualification to dispense medicine after an examination below that required by the Society.

The PRESIDENT said he believed he had the privilege of inviting any one to attend the examinations, and he would, therefore, direct the Secretary to write to Dr. Fowler informing him when the examination would be held, anp inviting him, or a deputation from the Examining Board of the Apothecaries' Company, to attend.

REPORTS OF COMMITTEES.

LAW AND PARLIAMENTARY.

The report of this Committee was very long, referring to several matters of importance. It contained letters from the Solicitor, stating the progress of cases on which he was engaged in connection with breaches of the

Pharmacy Act; and also suggesting with reference to a question which had been raised as to the right of the Society to receive the penalties imposed by magistrates for breaches of the Pharmacy Act, that a written application should be made to the Commissioners of the Treasury on the subject. The Committee recommended that this course be adopted, and a draft letter was submitted for the approval of the Council.

A lengthy correspondence had taken place between Mr. Selby, deputy-coroner at Spalding, and the President and Secretary of the Society, with regard to the construction of section 17 of the Pharmacy Act, 1868. The coroner at Spalding having expressed his opinion that it was the duty of a chemist to register the names and addresses of all persons to whom poisons of any description were sold, Mr. Selby wished to know if the Society had ever taken counsel's opinion on the section, and if the coroner's was the correct interpretation of it. The Secretary having replied that such interpretation was not correct or there would have been no necessity to have two parts of the schedule, but that no opinion had been taken as the question had never been raised, Mr. Selby again replied to the effect that he had written on the subject to *The Justice of the Peace*, the response being that the interpretation by the coroner was the correct one. He therefore suggested that the Society should obtain the opinion of the law officers of the Crown upon the matter. The Committee recommended that Mr. Selby's last letter be simply acknowledged, and that he be informed that the Council sees no necessity for taking counsel's opinion on the question submitted.

A letter from a member of the Society at Nottingham had been received, stating that a private detective had lately been employed by the Nottingham Medical Defence Association, to visit various chemists' shops, and under the pretence of having a cold or sore throat had obtained a bottle of mixture; and that it was understood that proceedings were in some cases to be commenced for a breach of the Apothecaries Act. The Committee had considered the matter but deferred coming to any resolution.

The Committee had also considered the following resolution passed at the Chemists and Druggists' Trade Conference, held at Birmingham, July 11, last:—"That this Conference of chemists and druggists urge upon the Pharmaceutical Society the necessity of testing the legality of co-operative traders selling and dispensing poisons." The Committee decided to recommend the Council to invite a deputation from the executive of the Association to meet the Parliamentary Committee, when the latter would explain their views more fully than they could do in any other way.

Mr. Atherton said that Mr. Jones, the President of the Trade Association had come up to London for the purpose of seeking an interview with the Council as to the mode of procedure with regard to the threatened prosecution of chemists and druggists in Nottingham.

Mr. Hampson moved,

"That Mr. Jones be invited to attend the Council."

Mr. Atherton did not see what would be gained by the invitation.

Mr. Sandford said he should be very happy to see Mr. Jones, if he had anything to say, but it would be very irregular to discuss business in the presence of anyone not a member of the Council.

Mr. Atkins asked if Mr. Jones had made a *vivâ voce* or a written application to see the Council; if the latter, he should like to know the terms of it, in order to learn the special purport of his visit.

A considerable amount of discussion ensued as to the propriety of admitting Mr. Jones, but ultimately on that gentleman sending in a written request, it was resolved,

> "That Mr. Jones be admitted to make his statement respecting threatened prosecutions regarding alleged infringements of the Apothecaries Act, and that the Council resolve itself into committee for that purpose."

Mr. Jones was then introduced, and stated that he was desirous of obtaining the advice of the Council as to the steps to be taken by his Association in view of the threatened prosecution of chemists in Nottingham for prescribing. The Association had been informed that summonses had been applied for but had not yet been served.

The President informed Mr. Jones that the subject was at present under the consideration of the Council and that the decision arrived at would appear in the report of the day's proceedings.

Mr. Jones then withdrew.

A discussion next ensued on the portion of the report which dealt with the memorial from the Chemists and Druggists' Trade Association, asking the Council to take steps to test the legality of co-operative societies dispensing poisons. There was no difference of opinion as to the decision come to by the Committee and after some conversation as to the form in which it should be expressed, it was resolved on motion of Mr. Sandford,

> "That the report of the Law and Parliamentary Committee, so far as regards the communication from the Chemists and Druggists' Trade Association, be adopted."

The President said the next point for consideration was the letter from Nottingham, with regard to which the Committee had made no recommendation; but the matter was of some urgency, and it was for the Council to say whether it thought it necessary to pass any resolution upon the subject.

Mr. Atherton said he had made inquiries, and could get no definite information. He thought it very important that the matter should receive the careful attention of the Council, as a principle was involved.

Mr. Hampson suggested the following resolution in order to elicit the opinion of the Council:—

> "That it is desirable that in any case of prosecution, arising out of the action of the Medical Defence Association or otherwise, being brought against a registered chemist and druggist for simple prescribing, that the said chemist and druggist be defended by the Society."

Mr. Atherton would not say that every case should be defended.

Mr. Robbins thought the Council might come to a unanimous opinion that if the legitimate business of a chemist and druggist was interfered with by the Medical Defence or any other association, it would defend the case. It was known that there was a large number of chemists who tried to sail too near the wind, and trespassed on the province of medical men; such men, of course, the Council could not defend, but if the legitimate trade were interfered with it ought to do something. It was difficult to say what was legitimate trading, and therefore the Council could only deal with each case as it arose.

Mr. Mackay thought Mr. Robbins had chosen a very unfortunate word in saying "legitimate." If he had used the words "ordinary business" it would have been better. He had no doubt the Council would express in some tangible way its sympathy with any one who was vexatiously interfered with for giving simple remedies across the counter, and that such a person would receive the sympathy of the public also, but he saw considerable difficulty in framing a suitable resolution. It was known that some men not only prescribed but visited patients; but it was not necessary even to do that to trespass on the province of the medical practitioner, and until the Council had all the details of any particular case it could do nothing. If the members of the trade were made aware that the Society was both willing and able to protect them when unfairly interfered with he thought that was all that could be done at present, leaving further details to the Council.

Mr. RIMMINGTON said he understood there was a clause in the Apothecaries Act which secured to chemists and druggists all their previous rights and privileges, and if that were looked up and carefully examined it might be useful.

The PRESIDENT remarked that there had been an expression of a very eminent judge's opinion upon the question.

Mr. SCHACHT, being a comparatively young member, was not quite clear what principle the Council had adopted in previous cases. The details of particular cases must of course vary very much, but the question at the present moment seemed to be whether the Society should defend any case at all, whether its energies and resources should be devoted to such purpose at all. He could not remember that the Society had ever appeared in the capacity of defendant in any such case. It might be perfectly right, or it might be very unwise, and he should like the abstract question discussed first.

Mr. HAMPSON did not wish to be at all rash, and he was quite sure that the Council, representing pharmacy in its true sense, would object to anything like indiscriminate and reckless prescribing. But there was a certain privilege which custom seemed to have made almost into law, which must be maintained. This privilege was very difficult to define, but from the time chemists and druggists existed at all they had been accustomed to give advice in simple matters with respect to the use of drugs. While he would maintain this privilege intact, he would protest against a chemist and druggist exercising the functions of a medical man. He believed it was immoral in every sense for a man to undertake that which he was not capable of performing, and to obtain money for it. But still existing conditions must be recognized, and the condition was that the public expected to receive certain advice from chemists and druggists, and they were not prepared to give up that privilege at the dictation of any medical association. The motion might read as follows:—

> "That it is the opinion of this Council that it is desirable in the event of a chemist and druggist being prosecuted for simple prescribing that the Pharmaceutical Society should defend the case if it should be found to be unobjectionable."

Mr. ATKINS would prefer to discuss the general question before committing himself to a resolution, and therefore thought it desirable that Mr. Schacht's question should be answered.

Mr. SANDFORD said he believed there had never been a case in which the Council had appeared to defend an accused person; but there had been cases in which it had indirectly supported and given pecuniary assistance to a man in his own defence. In Berry's case the Council had supported the defendant in appealing against a conviction which was eventually quashed. The Hull "Pick-me-up" case would also be remembered, respecting which the Council sent a deputation to the authorities at Somerset House and the result was that the case was carried no further, and other threatened prosecutions were abandoned.

Mr. OWEN thought the Council would be treading on delicate ground if it gave the country to understand that it would defend any man who had violated the law. It ought not to defend unprincipled men who really broke the law; but on the other hand there was probably not a gentleman present who had not at some time or other given some sort of advice. He could only say that he often did so, and yet he never had any misunderstanding with his medical friends.

Mr. HILLS thought the Council should take no action of any kind until a definite case came before it.

The VICE-PRESIDENT agreed with this view. The clause in the Apothecaries Act referred to by Mr. Rimmington was very plain. It referred to the privileges exercised and carried on by chemists and druggists before the passing of the Act.

The PRESIDENT: It says nothing about prescribing.

The VICE-PRESIDENT: No; but it speaks of the privileges they enjoyed before; and there was no doubt, on the evidence of the *Lancet*, that chemists went much further in prescribing formerly than they did now.

The SECRETARY said when the Pharmacy Bills of 1865 were under the consideration of Parliament, Dr. Quain, in his evidence before a Select Committee of the House of Commons, said he considered a chemist who systematically treated diseases by giving advice day after day would be infringing the privileges of the medical profession; it was—he said—the systematic going out and visiting, and treating diseases at home, which were injurious to the public.

Mr. BETTY, in seconding Mr. Hampson's motion, said he felt it was desirable before asking the Council to decide on any proposition, however unobjectionable, in the first instance to decide whether it was wise to move at all in the matter. On behalf of taking some action he would urge that the Council had been asked to do so by a very important body, and that proceedings had virtually been commenced against certain gentlemen, who were in great perturbation of mind as to what the consequences might be. He saw no inconvenience that could arise from the opinion of the Council being stated, as to the course to be adopted if certain events should arise. It was possible also that an expression of opinion on the part of a powerful and organized body might at least be a practical protest against any vexatious actions. He did not believe the general body of the medical profession throughout the country desired that any chemist and druggist should be proceeded against, unless he systematically assumed the functions of the medical man. At the same time, advantage might be taken of the technical wording of the Act of Parliament to seriously annoy chemists and druggists. He contended that the powers of the Society could not be better employed than in combating any such attempts. They knew very well that these proceedings were taken in consequence of the remarks of Baron Bramwell in a recent case. Those remarks had been much canvassed, but he assumed the very wording of his judgment would guide the Council in the way of carrying out the resolution which he had much pleasure in seconding, and which it was now proposed by Mr. Hampson should read as follows:—

> "That in the opinion of this Council it is desirable in the event of a chemist and druggist being prosecuted for prescribing or advising on the action of remedies, so far as long usage and the public benefit and convenience should warrant him, that the Council should defend the case, should such a case prove unobjectionable."

The merits of each individual case would of course be judged of by the Council. There was a difference between the technical wording of the law and the practice which had long prevailed, which he believed made the common law. He only advocated that their practice should be shaped in accordance with the opinion of Baron Bramwell, the pith of which was that although a chemist could be proceeded against for prescribing in the most superficial way, it would be unreasonable to do so. If the Council could frame a resolution in accordance with that opinion, it would show that the Pharmaceutical Society, was determined that a custom so far as it was for the public convenience was not to be swept away. Possibly the attempt would not be made, but if it were he would urge that no effort should be spared to protect the interests of every chemist and druggist who carried on his business in such a way that it would be against all reason to prosecute him.

The PRESIDENT said he would ask the Council to very carefully consider this resolution before deciding on passing it.

Mr. ATKINS thought the Council must bark back to the question put by Mr. Schacht, which was one of vital importance. It was certain that large establishments such as those with which many gentlemen present were most familiar, were perfectly safe, but that was not the case with many other places, and if the question had not yet arisen, it must arise ere long, and probably on a considerable scale. The Council, representing pharmacy in its most cultured and thoughtful aspect, would desire to hold the scales equitably between pharmacists on the one hand and medical men on the other; but it would be as absurd as to try to stop the course of the sun in the heavens, to try to prevent such prescribing as was represented to have been practised in Nottingham in the case of the private detective. He thought in such cases the Secretary might fairly render assistance. A man with a limited purse, and a limited knowledge of the world, was frightened when a summons was served upon him, and would pay a fine rather than make a fight; but if he knew he had the assistance of a large body, who were determined to see that he had fair play and just treatment, he would feel in a much stronger position.

Mr. HAMPSON said he would ask permission to substitute the following form for his previous motion:—

"That this Council is prepared to consider the case of any chemist or druggist who is threatened with prosecution for prescribing according to long usage and, if the circumstances warrant, to defend the same."

The PRESIDENT having read from the *Pharmaceutical Journal* the words of Baron Bramwell already referred to,

Mr. SCHACHT said he thought it would be unwise for the Council to declare its intention, or to lead any individual to infer that the Society would defend any case, until the case was distinctly before the Council. It appeared from what the President had read that in the opinion of Baron Bramwell if anybody chose to prosecute for such an action as he described, the defendant must be convicted, but it would be most unreasonable for such a prosecution to take place; and he thought, therefore, the best course would be to endeavour to persuade the Medical Association not to prosecute in such cases. He would rather not undertake to defend any individual in any case whatever. He would not wish the Society to defend himself, if he were proceeded against for the most clearly innocent action, such as dispensing a physician's prescription, if such a thing were possible. He understood that Dr. Richardson was President of the Association, and he was quite sure that gentlemen would take a reasonable view of the matter.

Mr. FRAZER said he was once prosecuted but he did not ask the Society to assist him.

Mr. MACKAY said others were not so fortunately circumstanced as to be able to dispense with assistance.

Mr. ATKINS said that he found, on reference to the Charter, that the Pharmaceutical Society was established in 1841 for the purpose, amongst other things, of protecting those who carried on the business of chemists and druggists. He had told many persons who advocated the claims of the new association that the Society had the capacity to deal with all such cases as they arose, and if a case occurred where there appeared to have been no real infringement of the Apothecaries Act, and no trespassing on the manor of medical men, he thought the Society was bound to give the individual attacked pecuniary and moral support.

Mr. SANDFORD remarked that long usage in a wrong direction did not legalize it. It was known that druggists had for many years prescribed to a certain extent, and that in ordinary cases they had not been molested. Judges had to administer the law according to the spirit of it, not strictly to the letter, and therefore he had no fear of the result if chemists and druggists confined themselves fairly to their regular business. The Society was originally a voluntary one, but it had progressed step by step, and under the Act of 1868 was in a very different position. He therefore viewed the formation of the trade association somewhat favourably, as he believed it would be perfectly within its province to take up the case of members of the trade who were prosecuted vexatiously. It could not be denied that there was an immense deal of prescribing in druggists' shops which the law forbade, and the Council could not set itself up to oppose the law. The Society would lose its prestige and influence if it went forth that it was prepared to do anything of the kind. He would therefore move as an amendment—

"That it is undesirable for this Council to express any abstract opinion on the policy of employing the organization of the Pharmaceutical Society in defence of persons generally who may at any time be prosecuted for infringements of the Apothecaries Act, but that should vexatious prosecutions be instituted the Council hereby desire the Parliamentary Committee to watch and report on such cases."

Mr. HILLS seconded the amendment.

Mr. ATKINS said of course it would be understood that the Council would not in any way support the practice of illegal prescribing.

Mr. BETTY hoped the amendment would not be passed, since it started with assuming what was not a fact, that the motion was an abstract one, and ended by agreeing with it.

Mr. SCHACHT thought the motion was an abstract one.

Mr. BETTY contended that it was not.

Mr. SCHACHT said it was general if not abstract. He saw a clear distinction between it and the amendment, for which he should vote.

The amendment on being put was lost by nine votes to eight.

On the original motion being put several members objected to the word "prescribing," and, on the suggestion of the President, it was ultimately adopted in the following form by nine votes to eight:—

"That this Council is prepared to consider the case of any chemist and druggist who is threatened with vexatious proceedings for alleged infringement of the Apothecaries Act, and, if the circumstances warrant, to defend the same."

The report and other recommendations of the Law and Parliamentary Committee were then received and adopted.

FINANCE.

The report of this Committee was received and adopted, and sundry accounts ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation that the following grants be made:—

£10 to a registered chemist and druggist, aged 68, formerly in business, but latterly in temporary employment, and now unable to obtain even that.

£10, in two instalments at an interval of three months, to a registered chemist and druggist, aged 75. Applicant failed in business about two years ago, and has now no resources nor friends to whom he can apply.

£10 to a registered chemist and druggist formerly in business, but ruined by a partner. Now unable to obtain employment owing to deafness, brought on by nervous debility.

£10 to the widow of a former member in very poor circumstances, and suffering from chronic ill health.

£10 to the widow of a former member, having three children dependent upon her; the assistance being asked in order to enable her son to obtain a situation.

£10 to a registered chemist and druggist, formerly in business for forty-one years, but obliged to dispose of it owing to ill health.

£10 to an associate suffering from severe illness, whose case was considered in August last, when a temporary grant of £5 was made, pending further inquiry.

Several other applications were deferred for further information.

The report and recommendations were adopted unanimously.

NORTH BRITISH BRANCH.

It was decided that an estimate which had been obtained for two cases to contain the collection of minerals given by the late Mr. David R. Brown be accepted, and the specimens arranged therein as soon as possible.

THE CHEMISTS' TRADE ASSOCIATION.

The SECRETARY read a letter from the secretary of this association, asking for a complete file of the *Pharmaceutical Journal*, and for duplicate copies of the Register. The Secretary stated that the Register was out of print.

It was resolved that a set of the third series of the Journal, as far as possible, be sent, and that future numbers be forwarded as published.

THE MUSEUM.

The SECRETARY read a letter from Mr. W. L. Bird, of Castle Street East, for several years Vice-President of the Society, offering the Society a herbarium which he had collected some years since. He was directed to write to Mr. Bird accepting his offer, and thanking him for the donation.

Mr. SCHACHT suggested that a communication be sent to Dr. Richardson, President of the Medical Defence Association, with a view to a mutual understanding being arrived at as to the practical bearing of the Apothecaries Act on the usual conduct of the business of chemists and druggists.

Mr. HILLS thought it would be better for the President to see Dr. Richardson personally on the matter.

Many members having left, Mr Schacht, in deference to the views of those remaining, said he would bring the matter forward at the next meeting.

PHARMACEUTICAL MEETING.

Wednesday Evening, October 4, 1876.

The Opening Meeting of the Session, 1876-7, was held at 17, Bloomsbury Square, on Wednesday evening last. The chair was taken at half-past eight o'clock by the President of the Society, Mr. JOHN WILLIAMS.

The minutes of the previous meeting having been read and confirmed, the following Donations to the Library and Museum were announced, and the thanks of the Society voted to the Donors:—

To the Library.—'Science made easy: a Series of Familiar Lectures,' by T. Twining, from the Author; 'Ueber Carvol,' von Professor Flückiger, 'Documente zur Geschichte der Pharmacie,' von Professor Flückiger and 'Neue Beiträge zur Kenntuiss des Elemi, I. Ueber das Amyrin,' von Dr. E. Buri, from Professor Flückiger; 'Calendar of the University of Durham,' from the University; 'Calendar of the University of London,' from the University; 'Calendar of the University of Glasgow,' from the University; 'St. Thomas's Hospital Reports,' new series, vol. 6, from the Hospital; 'Guy's Hospital Reports,' 3rd series, vol. 21, from the Hospital; 'Statistical Tables of the Patients under Treatment during 1875,' from St. Bartholomew's Hospital; 'Pharmacopœa Helveticæ Supplementum, 1876,' from the Swiss Pharmaceutical Society; 'A Catalogue of Plants Cultivated in the Garden of John Gerard, 1596–1599, edited with Notes, References to Gerard's Herball, the addition of Modern Names, and a life of the author,' by B. D. Jackson, F.L.S., from the Editor; 'Science Papers, chiefly Pharmacological and Botanical,' by D. Hanbury, F.R.S., edited, with Memoir, by J. Ince, F.L.S., from Thomas Hanbury, Esq.; 'The Flora of British India,' by J. D. Hooker, etc., part iv., from the India Office, per Dr. J. Forbes Watson; 'Rapport sur le mémoire "Histoire des progrès de la médecine mentale depuis le commencement du xix^e siècle jusqu'a ce jour,"' Morel, rapporteur, and Analyse chimique de quelques Drogues actives et de leur Préparations pharmaceutiques,' par le Dr. G. Dragendorff, traduit par le Dr. J. Morel, from Dr. Morel; 'Du M'Boundou ou Poison d'Epreuve du Gabon,' par L. Kauffeisen, from Dr. Soubeiran (?); 'Medical and Surgical History of the War of the Rebellion,' part ii., vol. ii., from the Surgeon-General, U. S. War Department; 'Brief Considerations on the Diseases of the Ear,' by L. Thomas, M.D., second edition, from the Author (?); 'Introduction to the Study of Chemical Philosophy,' by W. A. Tilden, D.Sc., from the Author; 'Versuch einer vergleichenden Analyse der in den Monaten April, Juli und October, 1874, in der Umgegend Wolmars gesammelten Rd. filicis maris,' von Provisor Kruse, from Professor Dragendorff.

To the Museum.—Specimens of the flowers of *Spilanthes oleracea*, or Para Cress, from Messrs. Godfrey and Cooke; Specimens of the root of *Garuleum bipinnatum* (Cape of Good Hope), from Mr. F. M. Hyman; Specimen of Para Rhatany, from Professor Flückiger; Fine specimens of Magnesite of crystals of Iodide of Potassium and of Phosphate of Sodium, from Messrs. Huskisson and Son; Specimens of Nitrate and Phosphate of Pilocarpine, from Mr. A. W. Gerrard; Specimen of Chrysophanic Acid extracted from Goa Powder, from Messrs. Young and Postans; Fine specimen of a Musk Pod, from Nepaul, taken from a Deer shot during the Visit of H.R.H. the Prince of Wales to India, from Messrs. Battley and Watts; Cone of Mannite, from Mr. J. M. Broad; Specimens illustrating the Phenomenon of Fluorescence, from Mr. Lettsom; The Collection of Materia Medica Specimens and Pharmaceutical Portion of the Herbarium belonging to the late Daniel Hanbury, from the Executors; Specimen of Anthraquinone, from Mr. Richardson, Laboratory Student.

To the Herbarium.—Specimens of *Campanula latifolia* from Mr. Mordue; Herbarium, consisting of about 100 Specimens, from Mr. W. L. Bird.

The PRESIDENT called upon Professor BENTLEY (in the temporary absence of Professor REDWOOD) to make his—

REPORT ON THE BOTANY AND MATERIA MEDICA CLASS.

Professor BENTLEY said everything he had to report with regard to the class of Botany and Materia Medica was of a satisfactory nature. In regard to numbers he had not had so good a class for many years, over 100 students having attended during the last session. This was a great fact and, considering that the attendance on the classes was optional, spoke much in favour of the desire of pharmacists to get the best knowledge they could obtain by attending lectures. A large number attended throughout the entire course of ten months, and he hoped that it would become the practice for all to do so as far as possible. On the present occasion he could conscientiously say, as he had had to say for the last twenty-five years, that his class had been everything that could be desired; regular in attendance, and punctual; and the progress made had been well shown at the weekly examinations, to which he attached great importance. It was very desirable to bring the student not only into the lecture room, but into intimate relations with the Professor in the examinations. He had some little experience in teaching, having been Dean of a large Medical School for fourteen years, and he attributed any success he had had especially to the friendly intercourse which he was always desirous of establishing with his students. It was always his pleasure, as well as his duty, to explain after the lecture any points which seemed difficult to the students, and he hoped they would in future take full advantage of such opportunities. Speaking next of the competitive examinations for the bronze medals at the end of the two courses, and the silver medal at the end of the session, which he termed the blue ribbon of the Society, so far as his lectures were concerned, he had to state that at the end of February there were 22 competitors, Mr. F. W. Place being the successful candidate. At the end of the second course Mr. Charles Edward Palmer was the bronze medallist, and with regard to both gentlemen he could say that their honours were well earned and richly deserved. The competition for the silver medal was very severe, there being 16 candidates, and it was awarded to a gentleman bearing a name well known in pharmacy and wherever microscopic research was carried on, Mr. Henry George Greenish. The same gentleman had to receive other medals so that there was no doubt of the name being well supported. Certificates of honour were also given to three gentlemen, whose names will be found below, two of whom—Mr. A. W. Wheatly and Mr. T. D. Wright—had on a former occasion been successful competitors for the Herbarium prize. He would again urge upon his hearers the importance of practically studying botany during the term of their apprenticeship. Having mentioned the names of the gentlemen who had honourably obtained certificates of merit, Professor Bentley concluded by expressing a hope that for many years to come he might be able to attend there and present as satisfactory a report as on the present occasion.

The following are the names of the prize takers:—

TEN MONTHS' COURSE.

Silver Medal ....Henry George Greenish.

Certificates of Honour ... { Arthur William Wheatly. / Thomas David Wright. / Samuel Newbury. }

Certificates of Merit ...... { Augustus Frederick Dimmock. / Charles Edward Stuart. / James Hart. }

FIVE MONTHS' COURSE.

FIRST COURSE.

Bronze Medal.................Frederick William Place.

SECOND COURSE.

Bronze Medal.................Charles Edward Palmer.

The following were the questions for the examinations:—

MATERIA MEDICA AND BOTANY.

THE BRONZE MEDAL. FIRST COURSE.

Time allowed: Three Hours.

1. Describe the general properties and structure of the cell-membrane of plants; and distinguish between parenchymatous and prosenchymatous cells.
2. Define the following:—Starch, chlorophyll, vessel, cuticle, receptacle of secretion, cambium, spine, prickle, bulb, corm, stipule, and bract.
3. What is the fruit? Distinguish between small fruits and seeds.
4. What are the botanical and geographical sources of the official jalap and Tampico jalap? Describe their physical characters, and show how they may be distinguished from each other. Enumerate the official preparations of jalap.
5. Describe the physical characters of dandelion root, pointing out especially how it can be distinguished from other roots; also mention the period usually regarded as the best for its collection, and the data upon which such an opinion is founded. State the official preparations of dandelion.
6. What are the botanical and geographical sources of senega root and serpentary roots? Describe their physical characters, and enumerate their official preparations.
7. What are the botanical and geographical sources of buchu leaves? Describe the leaves of the official species, and state their official preparations.

THE BRONZE MEDAL. SECOND COURSE.

Time allowed: Three Hours.

1. What are parenchymatous and prosenchymatous cells, and in what parts of plants are they to be found.
2. Define the following:—Bulb, corm, rhizome, epiphyte, parasite, tuber, and the following terms as applied to leaves:—Serrate, pinnatifid, pinnate, mucronate, emarginate and retuse.
3. Define the following:—Bract, cupule, involucre, epicalyx, spathe, glume, spike, spadix, umbel and cyme.
4. What are the botanical and geographical sources of gamboge? How is it obtained, what are its physical and chemical characteristics, and how may its purity be ascertained?
5. What are the botanical and geographical sources of the official kinds of senna? What are the common adulterants of Alexandrian senna, and how may they be detected?
6. Describe the physical and chemical characteristics of kamala, and state its properties, uses and doses.
7. Distinguish the ranunculaceæ from the rosaceæ; the atropaceæ from the solanaceæ; and the liliaceæ from the melanthaceæ.

THE SILVER MEDAL AND CERTIFICATES.

Botany.

Time allowed: Three Hours.

1. What is chlorophyll? Where is it found, and what are its physical and chemical characteristics?
2. Give a general sketch of the structure of a palm stem.
3. Define the following terms as applied to leaves:—Connate, decurrent, amplexicaul, fascicled, equitant, obvolute, palmate, palmatifid, spine, tendril, ligule and phyllode.
4. Distinguish between determinate and indeterminate inflorescences; and define an umbel, panicle, locusta, capitulum, scorpioid cyme, and verticillaster.
5. Give the essential characters of the following natural orders, and enumerate the official plants which they respectively contain:—Iridaceæ, polygonaceæ, labiatæ, oleaceæ, rutaceæ and papaveraceæ.

Materia Medica.

Time allowed: Three Hours.

1. What are the botanical and geographical sources of quassia wood and simaruba bark? Describe their physical and chemical characteristics. What is Surinam quassia?
2. What are the botanical and geographical sources of Peruvian and Savanilla rhatany? How may they be distinguished from each other? And what are the official preparations of rhatany?
3. Describe the method by which opium is obtained. State the characters of good opium, and mention the official preparations into which it enters as an ingredient, and their doses.
4. Enumerate the official plants of the gentianaceæ

Describe the characters of the official chiretta, and show how it may be distinguished from spurious kinds.

5. How is aloes obtained in the greatest purity? What kinds of aloes are official? Distinguish between, and explain the characters of, socotrine, hepatic, and Barbadoes aloes.

6. Give the general and chemical characters of larch bark, and mention its properties, uses, and preparations.

The PRESIDENT then called upon Professor Redwood to make his—

REPORT ON THE CHEMISTRY AND PHARMACY CLASS.

Professor REDWOOD said he did not regret having been accidently detained a few minutes, so as to allow his colleague, Professor Bentley, to take precedence in explaining the facts relating to the progress of the school and the results of the examinations. Before announcing the results in his own class, he would only say that one of the most agreeable duties which the Professors had to perform was that of announcing at the commencement of each session the achievements of the past. These occasions were always very pleasant ones; in the first place because these were the only meetings which were graced with the presence of ladies, and also because every one seemed to come prepared to be pleased and to give pleasure to others. Young, middle-aged, and old, all seemed to agree in having for their special object the encouragement of those who were the recipients of the prizes. He should no doubt have to repeat some names which his colleague had already mentioned, though the gentleman who took the bronze medal at the end of the first five months' course was not the same as took a like honour in Botany. He might state that, as his examinations were conducted entirely in writing, the names of the successful candidates were not known to him until they were published in the *Journal*, the values only of the answers being communicated by him to the Council, who opened the sealed envelopes bearing the motto of the successful competitor to ascertain the name. In the case referred to the name was that of Mr. Samuel Newbury, and if more than one prize had been awarded, there were several others who would have been entitled to them. But no doubt the decision of the Council was a wise one not to hold out too much inducement to those who attended the shorter courses of lectures, but to offer more prizes at the end of the session. Consequently at that period there were a greater number of recipients, whose names he would next mention. The bronze medallist for the second short course—though it must be remembered that as there were sixty lectures given of an hour and a half each it was really as long as the courses delivered at most medical schools—was the son of a man well known to all practical pharmacists, and who had for many years been one of the advocates and foremost supporters of advanced pharmaceutical education, Mr. Abraham, of Liverpool. The silver medal was won by the same gentleman who received that distinction in Professor Bentley's class, Mr. Henry George Greenish, and he thought nothing would more clearly indicate the genuine and satisfactory manner in which the decisions were arrived at, than the fact that without knowing the names at all, they found the best man standing foremost in more than one department. Whether he also stood first in the third branch would be seen presently. Professor Redwood concluded by reading the names of those entitled to certificates of honour and of merit. The complete list of prizes taken in this class is as follows:—

TEN MONTHS' COURSE.

Silver Medal....Henry George Greenish.

Certificates of Honour... { Arthur William Wheatly. Samuel Newbury.

Certificates of Merit ... { Thomas Ridgley. William Champley Kidd. Frederick William Place.

FIVE MONTHS' COURSE.

FIRST COURSE.

Bronze Medal....Samuel Newbury.

SECOND COURSE.

Bronze Medal....Alfred Clay Abraham.

The following were the questions for the examinations:—

CHEMISTRY AND PHARMACY.

THE BRONZE MEDAL. FIRST COURSE.

Time allowed: Four Hours.

February 29th, 1876.

1. State the weight in grains of a pint, a fluid ounce, a fluid drachm, and a minim of water.
2. State the weight in grains of a fluid ounce of nitric acid of the Pharmacopœia.
3. Describe the method of determining the specific gravity of a piece of wax.
4. Name some of the best and some of the worst conductors of heat, also radiators of heat, and absorbers of heat.
5. State the latent heat of water and of steam, giving the latter at different temperatures.
6. Describe the processes of the Pharmacopœia for the extracts of colchicum, hemlock, liquorice, poppies, and liquid extract of opium, explaining the objects for which the special instructions are given.
7. Describe the preparation and properties of nitrous oxide.
8. Describe the process by which zinc is obtained from its ores, the properties possessed by the metal, and the different methods by which the oxide may be prepared.
9. Describe the process for the preparation of chloroform, and explain the reactions which may be supposed to occur in its production.

THE BRONZE MEDAL. SECOND COURSE.

Time allowed: Four Hours.

1. What are the values in English weight of a decagramme and centigramme?
2. What is the weight of a cubic inch of distilled water at a temperature of 62° Fahr.?
3. What are the weights respectively of a fluid drachm and of a minim of distilled water?
4. What is the specific gravity of a liquid a fluid ounce of which weighs 440 grains?
5. Explain the process of dialysis, and illustrate the results of the application of the process by a reference to examples.
6. Explain what occurs in the slaking of lime with water, referring all the phenomena to their causes.
7. Describe the production of an emulsion, specifying the ingredients used, the change, if any, which they undergo in the process, and the objects with which any of the ingredients are used which are introduced with a special object.
8. Describe the Pharmacopœia process for the prepara-

tion of diluted phosphoric acid, giving a full explanation of every part of the process.

9. Give the composition of cane sugar and grape sugar. Explain the characters by which these sugars may be distinguished, and especially point out what their respective solubilities and sweetening powers are.

SILVER MEDAL AND CERTIFICATES.

Time allowed: Six Hours.

1. Define the terms "density" and "specific gravity."
2. Explain the phenomena of capillarity.
3. What are the principal ascertained facts and phenomena relating to gaseous and liquid diffusion?
4. What are the principal characteristic features of a crystal belonging to the dimetric or square prismatic system? and how would you define this system according to the axial classification?
5. Explain the difference in properties between common light and polarized light, and state what these differences are supposed to be due to.
6. Describe the production, composition and properties of nitric oxide and peroxide of nitrogen.
7. Give the Pharmacopœia process and tests for iodide of potassium.
8. How is hypophosphite of lime prepared and what is its composition?
9. Give a sketch of the methods by which artificial alkaloids have been prepared.
10. What are the essential conditions for the production of ether, and how are these provided in the process given in the Pharmacopœia?

The PRESIDENT then called upon Professor Attfield for his—

REPORT ON THE PRACTICAL CHEMISTRY CLASS.

Professor ATTFIELD said that in reporting as to the state of his class in practical chemistry during the past session he was proud, for once, to be ahead of his colleagues as regards numbers, having had 123 pupils in the laboratory last session, or ten more than ever worked there since it was opened thirty-four years ago. These students entered for various periods, averaging about five months per head, and worked on an average four hours daily. He had in his report to the Council in August given a table showing the number attending for the different periods of study. The increase in the entries during the past session had been chiefly due to men who worked three hours daily for five months; all those also attended the lecture-classes. A considerable number worked for longer periods, some also for shorter periods; the latter had attended in the previous, or intended to enter again in the succeeding, session. He had explained in his report that three hours' attendance in the laboratory was about a fair proportion of the student's time if he were also attending the other classes, and if he wished to qualify as a "chemist and druggist" only, and not as a "pharmaceutical chemist." It was interesting to note that about 25 per cent. of the students might be fairly considered as resident in the metropolis, while 75 per cent. came up from the country on purpose to work in the school. As usual he had to testify to the diligence and gentlemanly conduct of the students. At the close of the session fourteen pupils competed for the Council prizes. The questions set included a synthetical one, two in qualitative analysis, one in quantitative analysis, and a chemico-physical question. At the termination of the two days' work the results were as follows. Out of 100 possible marks 84 were obtained by Mr. Greenish, whose name had been already twice mentioned. And he would say this, that it was not difficult for a man of fair average ability, if he devoted his whole time to one of the classes in the school, to take a first prize, but to take a first prize in each class a man must possess first-rate ability. Next came Mr. Kidd with 79 marks and Mr. Newbury with 78, taking bronze medals; Mr. Pollard and Mr. Campbell with 77, and Mr. Severs and Mr. Wheatly with 75, receiving certificates of honour, while Messrs. Wright, Gardner and Dimmock obtained respectively 70, 65, and 60 marks, entitling them to certificates of merit. The remaining four did not obtain the requisite number of marks for a certificate, but the gentlemen he had named well deserved the respective distinctions awarded to them.

The prize taken in this class were as follows:—

Silver Medal	Henry George Greenish.
Bronze Medals	William Champley Kidd. Samuel Newbury.
Certificates of Honour	Frederick E. Pollard. Henry Campbell. Samuel Thomas Severs. Arthur William Wheatly.
Certificates of Merit ...	Thomas David Wright William Gardner. Augustus Frederick Dimmock.

The following were the questions for this examination:—

PRACTICAL CHEMISTRY.

Two Days' Examination. Hours: Ten to Five each Day

(*Books and memoranda permitted. Standard number of marks,* 100.)

1. Prepare five fluid ounces of *Liquor Bismuthi et Ammoniæ Citratis*, B.P., from the materials in the laboratories.
2. Make a qualitative analysis of the fluid labelled "*Liquor Bismuthi.*"
3. Analyse the powder marked "Impure Carbonate of Bismuth."
4. Ascertain the proportion of bismuth in the "Solution of Bismuth" given to you.
5. Estimate the present weight of the air in the adjoining room "A"—assuming that furniture and fittings are removed. State, also, what the weight would be on a winter's day (temp. 5° C.; barom. 745 mm.)

NOTE.—Manipulation as well as results will be scrutinized.

The PRESIDENT then requested Professor Bentley to make his report respecting—

THE BOTANICAL PRIZE.

Professor BENTLEY said that he had not referred, when making his previous report, to the presence of the ladies because he knew that would be done more gracefully by his colleague, Professor Redwood, and also because he wished to take the present opportunity of stating that two ladies in his class had very highly distinguished themselves, and he hoped many others would follow their good example. One lady had obtained a high certificate in botany, and another was about to enter on an appointment in one of the largest schools for ladies. As he had frequently stated, he believed there was no training equal to that obtained by collecting herbaria, and any one who did this during his apprenticeship would find the value of it not only in the information he obtained but in the strengthening his powers of observation and discrimination. The Herbaria prizes on the present occasion had been conferred on two gentlemen who well deserved their distinctions, Mr. Buck, of Sandgate, winning the silver medal with a collection of 500 specimens, and Mr. A. H. Cooper, of Bradford-on-Avon, a bronze medal with 446 specimens. He would urge on any future competitors the importance of seeing that the specimens were not only carefully named, but well selected, so as to represent the plants in all their botanical aspects, that they should be well dried, each plant on a separate sheet, and the sheets all of the proper recognized size. A great deal of uncertainty had arisen from this not being understood, and if any intending competitors would communicate with him, he should be glad to afford them all requisite information.

Silver Medal ....Charles Burton Buck.
Bronze Medal..............Albert Henry Cooper.

The PRESIDENT then requested Mr. Carteighe to say a few words in reference to the—

COUNCIL EXAMINATION PRIZES.

Mr. M. CARTEIGHE said the competition was commenced for the first time this year under new conditions. Formerly certain prizes were given periodically on the reports of the Board of Examiners, somewhat informally; but the Council, conjointly with the Board of Examiners, had thought it wise to alter the arrangement, and under the present system a large number of Major candidates might, if they thought fit, compete for what he ventured to say was really the blue ribbon of the Pharmaceutical Society. The examination for these prizes covered the whole of the subjects taught in the school, and on that point he should like to state a fact presently which had only come to his knowledge that evening, which was peculiarly interesting. The Pereira Medal was founded in honour of the distinguished professor whose name it bore, who was known not only to pharmacists in Great Britain, but throughout the whole civilized world. It was therefore a very great honour to obtain this medal. The Council had also, by way of encouragement to those who failed to attain that high distinction, offered a silver medal; and to each of these medals, through the generosity of a former president of the Society, Mr. Hills, was attached a prize of books of substantial value. Lastly, there was a bronze medal as a sort of consolation stakes for those who failed to obtain the first and second prizes; also accompanied by a gift of books. The first process in the examination was one of sifting, for although a great number of gentlemen were eligible to compete, circumstances prevented many from attending. Some were at too great a distance; others, perhaps, thought they had had quite enough of examinations; and there was, besides, a general feeling on the part of the students that a certain number of them only would have much chance in the competition. In certain universities on the north of the Tweed, he understood that it was the practice for the students themselves to select the prize winners, thus saving the examiners all trouble, and so here, they generally arranged amongst themselves that a certain number of men were best qualified to sustain the honour of the class to which they belonged. The result was that only nine actually competed, and though this did not seem a large number he thought it very encouraging, for they had not before had so large a number of good men, or so many good papers to read through. Of those nine the first prize was awarded, on the recommendation of his colleague, Mr. Linford, and himself, to Mr. A. W. Wheatly; the second prize to Mr. Harry Alma Thomas, and the third prize to Mr. Newbury. Since he came into the room he had learned for the first time that all these gentlemen were students of the institution. The examination was open to all Majors, and as examiners they did not inquire where the candidates obtained their knowledge. They had simply to put certain sets of questions, and gauge the merits of the competitors by the answers. The fact that in this first competition the three successful gentlemen were honour bearers in the Society's School augured very well for its future prosperity.

Council Examination Prizes.

FIRST PRIZE.

The Pereira Medal (Silver) and Books value £5.

Arthur William Wheatly.

SECOND PRIZE.

Pharmaceutical Society's Medal (Silver) and Books value £3.

Harry Alma Thomas.

THIRD PRIZE.

Pharmaceutical Society's Medal (Bronze) and Books value £2.

Samuel Newbury.

The following were the questions for the examination:—

CHEMISTRY.

Time allowed: Three Hours.

1. ·1483 gram of an organic compound gave ·3799 gram of CO_2 and ·1575 gram of water. Its vapour density (air =1) was 2·951. Calculate a rational formula.

2. The analysis of the barium salt of an organic acid gave the following results:—

I. ·2065 gram of substance gave ·1297 gram of $BaSO_4$.

II. ·1377 gram of substance gave ·1307 of CO_2 and ·0300 of H_2O.

Calculate the formula of the salt and the corresponding acid.

3. A body having the composition $C_5H_{12}O$ is an alcohol. Express by equations the probable action upon it of acetic acid, oxalic acid, and oxidizing agents.

4. How are carbolic and picric acids respectively obtained? State the properties of each, and show the chemical relations assumed to exist between them.

5. A mineral contains sulphur, arsenicum, cobalt, nickel and iron. State minutely how you would analyse it.

6. What is the average composition of coal gas? How is it prepared and purified? How would you detect sulphur in it?

BOTANY AND MATERIA MEDICA.

Time allowed: Three Hours.

1. Give a short account of the principles of classification of plants under the Linnean and Natural Systems.

2. State the characters that determine the sub-orders of the compositæ, giving an example of each.

3. What is the difference in structure of the fibres of hemp, cotton, and New Zealand flax, and in what portions of the plant are they found?

4. What are the alkaloids yielded by the plants of the order melanthaceæ and how are they distinguished?

5. Describe the different drugs imported as pareira and state how they are distinguished?

6. What is gamboge, state its sources geographical and botanical as far as known and its characters?

7. How would you detect the adulteration of essential oil of almonds with nitro-benzol?

The PRESIDENT then proceeded to distribute, with a few appropriate words in each case, the various prizes and certificates. He afterwards introduced to the meeting the successful competitors for the—

Jacob Bell Memorial Scholarships.

George William Bullen.
George Frederick Gutheridge.

The following were the questions for this examination:—

CHEMISTRY AND PHARMACY.

Time allowed: Two Hours.

1. State all you know of the element chlorine, and describe processes for its production.

2. Describe the action of nitric acid (Brit. Pharm.) upon mercury and bismuth; also the action of *boiling* oil vitriol upon mercury and carbon.

3. How many grammes of oxygen could be produced from a kilogramme of chlorate of potassium? and about how many litres would it occupy at 0° Cent.?

4. Give the symbolic formulæ for emetic tartar, salts of tartar, tartarated soda, red and yellow chromates, and red and yellow prussiates of potassium.

5. Describe the official processes for the production of the liquid extracts of cinchona bark, and liquorice.

BOTANY.

6. Define a stem and a root, and explain the difference between the stem and root of an endogen and those of an exogen.

7. Explain the meaning of the terms determinate and indeterminate, as applied to the inflorescence of plants.

8. Give examples of the following fruits:—sorosis, etœrio, galbulus, legume, drupe, pome, pepo, achœnium and capsule.

LATIN, ETC.

Time allowed: Three Hours.

Virgil—Æneid, Lib. I., II., or III.

Translate into English:—

1. Portus ab accessu ventorum immotus, et ingens
Ipse: sed horrificis juxta tonat Aetna ruinis,
Interdumque atram prorumpit ad aethera nubem,
Turbine fumantem piceo, et candente favilla;
Attolitque globos flammarum, et sidera lambit:
Interdum scopulos, avolsaque viscera montis,
Erigit eructans, liquefactaque saxa sub auras
Cum gemitu glomerat, fundoque exaestuat imo.

2. Contra, jussa monent Heleni, Scyllam atque Charybdim
Inter utramque viam, leti discrimine parvo,
Ni teneant cursus, certum est dare lintea retro.

Grammatical Questions on the above:—

3. Give the present, the perfect, the infinitive, and the supine of *tonat, prorumpit, attolit, lambit, erigit, glomerat.*

4. Parse fully *accessu, immotus, fumantem,*

ARITHMETIC.

5. Find the value of $16\frac{3}{8} - 3\frac{1}{4}$ of $3\frac{1}{5}$.

6. Add together 1·234, 12·34, 123·4, 1234, and multiply the product by ·1234.

7. Subtract ·06789 from ·6789, and divide the product by 6·789.

8. A druggist borrowed of his neighbour a quantity of rose water, which was filled into a rectangular vessel, each side of which measured 12 inches; when he returned the rose water he sent *two* smaller vessels, the sides of which each measured 6 inches only. How many pounds did he borrow, and did he return the same amount? (1 cub. foot = 62·5 pounds).

ENGLISH.

9. Parse the following lines:—

Errors, like straws, upon the surface flow;
He who would search for pearls must dive below.

10. Write a short essay on *The Value of Time.*

FRENCH AND GERMAN.*

1. Translate into French:—

In one of the most beautiful regions of Spain, not far from Seville, and on an eminence as rich in vegetation as agreeable to the eyes of the traveller, was situate the castle of the Count of Bellamore.

And translate into English:—

Ma fille, tendre objet de mes dernières peines,
Songe au moins, songe au sang qui coule dans tes veines;
C'est le sang de vingt rois, tous Chrétiens comme moi;
C'est le sang des héros défenseurs de ma loi;
C'est le sang des martyrs.——O fille encore trop chère!
Connais-tu ton destin? sais-tu quelle est ta mère?
Sais-tu bien qu' à l'instant que son flanc mit au jour
Ce triste et dernier fruit d'un malheureux amour,
Je la vis massacrer par la main forcenée,
Par la main des brigands à qui tu t'es donnée?

Or translate into German:—

On a smooth table-rock surrounded by trees and shrubs, every leaf of which had been washed by the night's rain as clean as it could have appeared on the day of its birth, there were seated in front of their wigwam, and close to a fire, the white smoke from which was gracefully meandering upwards through the trees, an Indian's family, composed of a very old man, two or three young ones, about as many wives, and a most liberal allowance of joyous looking children of all ages.

Books, to the value of £5 each, were also presented to the Bell Scholars of the past session.

HENRY GEORGE GREENISH.
JOHN LEAVER WEST.

MR. BARNARD S. PROCTOR, of Newcastle-upon-Tyne, then proceeded to deliver—

THE INAUGURAL SESSIONAL ADDRESS.

STUDENTS OF PHARMACY,—

The "few words of encouragement and advice" which it is this evening my duty to address to you must of necessity be in many respects like the addresses which have been delivered in former years with the same object, so much so that I feel no small difficulty in imparting to them anything like freshness and vitality.

My simple duty is to tell you all to be good boys and learn your lessons well, and that then you will reap the reward which all good boys receive. That is a plain statement of the case with the great merit of brevity. Why should I say more? I do not much

* The Candidate is at liberty to choose either French or German, and is not required to show a knowledge of both.

like sermonizing, and I may add I do not like sermonizing much. My belief is that too frequent repetitions of good advice are debilitating rather than strengthening to the moral tone of any but those of very tender years. Now I expect you have all cut your double teeth, past your Preliminary, and do not require to be fed upon any of those insipid foods so highly recommended for infants and invalids. Do not mistake me; though I do not like sermonizing, yet I heartily admire excellence in moral and intellectual life. I enjoy to express my admiration of it, I also enjoy right heartily to give a vigorous thrust at any evil doing.

In performing the duty which lies before me I will endeavour to address you in a homely and friendly way, as I would old acquaintances, and thus avoid the distant or formal manner which too often separates the monitor from his audience.

You have chosen a particular road for your life's journey and are about to start upon the track which I have travelled for more than twenty years, and you are desirous, I doubt not, of profiting by the experience of myself and others, with the view of making your journey with as much comfort and success as is attainable.

Your Professors are your guides, and your text books teach you the language and topography of the district through which the path you have chosen to follow will take you; but there is still room to hear, and perchance to profit by, the tale of a traveller who has had some of the same experiences which you are about to undergo.

But, if I tell you about *my* journey, I must talk about myself—and that is egotistical. Well, suppose it is, I fear the fact must be admitted; I *am* and I intend to be egotistical, and if that requires excuse, my excuse is that I wish to convey to you the benefit of my experience, and to speak only that which I know. I will therefore keep pretty much to my personal experience, as by so doing I can express myself with the greater confidence.

Speaking now of the pursuit of pharmaceutical studies as the one thing which it is more particularly my province to dilate upon, I will say a few words first upon the mode of learning, and then upon the kind of learning, which is desirable.

You may have heard of a learned pig which could point to the number 18, when asked, How much is twice 9? That is the very lowest species of learning. It had learned, but it did not know. And from this upwards we have all grades, to the highest of which the human mind is capable. Learning, knowing, understanding, and that combination of intellectual faculties by which new truths are evolved from old ones.

It is quite necessary for any one who would excel that he should exercise all these powers.

Let me for a moment further illustrate the difference between learning and knowing. You have all learnt the multiplication table, and could say it from beginning to end, and if I were to ask you how much is five times seven, or eleven times twelve, you could give me the answer without consideration, in which case you may be said not only to have learned it, but to know it. Probably also you have all learned a verse which commences

"Thirty days hath September;"

But I rarely find any one who can tell the number of days belonging to each month, without a moment's consideration, and often, only by the aid of repeating the verse, and noting anew that the months containing thirty days are September, April, June, and November. In this case they have *learned*, but do not *know*, how many days there are in August.

All facts having a direct and practical bearing upon your daily routine work should be known as you know your multiplication table. With regard to facts which meet with application only once a month, it may suffice if you know them as you know how many days there are in August. Learn them, and if possible retain such a clue as will bring the knowledge to your mind by a moment's consideration. Information which is only wanted at long intervals is sufficiently in your possession if you retain the outline and know where to refer for the details. If you were all men of remarkable genius, it might be unnecessary thus to discriminate between the more and less important items of knowledge; but most men have a limit to their capacity, and must economize their power of learning and retaining knowledge. In all cases where you desire to retain a useful outline of a subject, take care that you understand it thoroughly at the time you read it, as in that case the impression left will be much clearer and more permanent.

Knowledge which is permanent is almost invariably of slow growth, more especially if it be in any branch of knowledge for which you have not a natural aptitude or liking. I believe I shall enforce this most effectually by giving you a page from my own history.

When I was a boy I had a taste for mechanics and physics, and my desire was to be an optician and philosophical instrument maker; but my father said I had to be a chemist and druggist and help him. I had no great dislike to the business, so without much reluctance I made up my mind to follow it and help him to the best of my abilities. I had some liking for chemistry, but none for botany, pharmacy, nor materia medica, and Latin was always drudgery to me. After I entered the business I continued for twelve years to wish and to hope that I should some day be released from it to follow a more congenial occupation; but I never ceased the endeavour to make the best of the position to which I was bound by circumstances which had more weight with me than my personal inclinations. In the days I speak of local schools of pharmacy were unknown, the guidance of any one who had passed the ordeal of a pharmaceutical examination was not within reach. I remember with what reverence I looked up to an associate who passed through our town after having accomplished his Minor, at the second attempt, and how great an advantage I thought it to hear from him what books I should read. If you note all these circumstances you will perhaps admit that it may be worth while to know by what method of study I was able to pass my examination without the usual preparation of a few weeks' or months' grinding.

The first and most important thing was that I began my apprenticeship with the intention of making myself as well acquainted with my business as any man in Newcastle, and commenced from the first to pick up information whenever I had an opportunity, for I anticipated that it would require all the study I could take during a seven years' apprenticeship to pass my Minor, and then I hoped to go to London to prepare for the Major, in which hope, however, I was disappointed. I had but few books, and those probably not in all cases the best; but I took care to keep their contents constantly before me and to understand them as I went along. I should like to impress you strongly with the importance of diligent husbandry in the cultivation of knowledge.

"True knowledge is of slow growth."

"He who would woo wisdom must work and weary not."

More students fail through making haste to get on than from slowness of perception. It is not the want of finish but the want of beginning and of going on where the weakness lies. If there are little hollow corners in your foundation the superstructure is sure to be shaky, but it is almost as difficult to build a ricketty reputation on a good foundation. Students' materia medica cabinets were not known during my apprenticeship, but I made the shop my cabinet, and put on the backs of the bottles and drawers labels indicating the botanical names and natural orders of vegetables, and the formulæ and equivalents of chemicals. So that my daily dealing with drugs, and my dusting of bottles and shelves, became a perpetual reminder of what I learned by reading. He who does not let his thoughts run idle while his hands are at routine work can afford to give his mind a holiday when his body is at liberty.

Now, here I am disposed to run counter to a common item of so-called good advice. I have repeatedly heard the classical scholar advise that we should pursue Latin for the pleasure it affords; and the botanist dilate upon the enhanced pleasure of a walk in the country if your vasculum be strapped to your shoulder and your flora under your arm. I do not consider that is at all the right light in which to view the matter. It is like telling a child that its medicine is not nasty, and the natural reply is, "Yes it is nasty and I won't take it." But I am speaking to men, not to infants, and I would say if you can enjoy your Latin and your botany by all means do so, and thank heaven that your path is made pleasant to you. But if these subjects be uncongenial, study them conscientiously, a little more than you think can be reasonably expected of you, and then thank Heaven yet more fervently that you can do your duty, be it a pleasure or a pain. If botany be not to you both a pleasure and a relaxation, do not spoil a holiday for the sake of a little half-hearted study. When you do study let it be with earnestness and industry, and when you take holiday let your pleasure be pure and hearty, let it be a bumper full to the brim. And if you must have a flora with you let it not be Babington's or Bentham's, but your sister Flora. If you take your study into your recreation, you will become impatient of such a spoil-sport, and jump to a wrong conclusion for want of patience to get at the right one. Now I have no objection to jumping; I have seen a great philosopher jump, though he was one of the most cautious men the world ever knew, as regards jumping to a conclusion. When I was a boy Faraday challenged me to a jumping match, and with a hop, step, and a jump, he cleared the length of a grass plot in my father's garden, while I could only accomplish two-thirds the distance. I do not think he was studying all the while. No, he was taking a holiday, and having a game with the children. It is only small men who must be always studying, and who are afraid of their reputation suffering by the enjoyment of light-hearted pleasures.

I was speaking of study, and I have taken a little holiday digression. Now let me return to the point where I advised that when you are occupied upon uncongenial subjects, you should go a little deeper into them than you think can be reasonably expected of you, and I will illustrate again by a little personal experience.

In the days when I became an apprentice, it was the custom to accept, in lieu of the Preliminary examination, a certificate from any competent person stating that the candidate had a sufficient knowledge of Latin, arithmetic, etc., to fit him for entering upon the technical studies of the trade. My father obtained this certificate from my schoolmaster, and on presenting it, was informed that it would have been more satisfactory if it had come from an unprejudiced witness. Nevertheless I had gained my status and then went to an evening school to grind up my Latin, lest the full status had been purchased with a short measure of qualification. I take no credit to myself for this; it was my father's doing, not mine; but the lesson was a good one, and afterwards I had an opportunity of doing the same on my own account as regards botany.

I went through my seven years' apprenticeship, slowly and steadily picking up such knowledge as I thought ought to qualify me for carrying on the business, and always looking forward to the finishing touch which was to be effected by the professors at Bloomsbury Square. But when the time came I met with the grievous disappointment of being told that my services were so much wanted at home that I could not be spared for a few months' study, and must wait a few years for a more convenient season. With this I commenced a more systematic study of chemistry, especially analysis, leaving botany and materia medica, not to be forgoten, but only attempting to keep up what I had acquired, for I wished to get into chemical works where these would not be required; but I did not let them slip, lest I should continue to be baffled by circumstances which, as I said before, had more weight with me than my personal inclinations. So things went on till, in the spring of 1853, I got leave for a ten days' holiday, and I availed myself of the opportunity for presenting myself before the examiners. I went to London almost without notice and quite without grinding, and, as a preparation for the ordeal, I spent the better part of two days in the museum at Bloomsbury Square. There I made acquaintance with the seeds of croton tiglium and ricinus communis, and filled up one or two other gaps which trade experience had left. But, more important to me than this, I met a number of students, some of whom had passed their Minor examination, and by conversation with them felt my way as to how far I might trust to my knowledge and experience to carry me through. At that time there was in force a pass examination something like the Modified of more recent date; with this I determined to have nothing to do. I would apply for the Minor, and if successful immediately put up for the Major, a policy which by a reference to the Journal of that date I find my friend Mr. Kinninmont successfully carried through, but which in my case miscarried, I believe, because my weak voice could not penetrate the poor deaf secretary's ears. I understood him to say I could pass both at once, and it was greatly to my mortification, when the day of examination arrived, to find that I was entered for the pass examination, for I thought myself thus doomed to be a second class chemist after all.

Among other things that I heard in the museum, there was a pretty free criticism of the board of examiners, of the examination specimens, and of the questions that were asked. I heard how well one got through who knew the formulæ for quinine, morphia, etc.; how another was plucked just because he could not answer one little question which escaped his memory at the moment. I heard how savage Mr. Squire was, how sulky was Bell, how particular was Deane, and how lucky I might think myself if I had nothing to do with any of them. I heard it all with a somewhat incredulous ear, and I said to myself, "I know that I cannot remember the formulæ for the alkaloids and organic acids, but I know that I have a good general knowledge of my business, and I will trust that is better than formulæ committed to memory." Probably many of you will at times hear such things said, as I heard, and I beg you will turn to them an incredulous ear, as I did. If you have a good knowledge of your business, and no memory of the formulæ of the alkaloids, I trust the examiners will find out your merits, and if you have great stores of chemical formulæ at your finger ends, and are superficial as regards other things, I trust the board will still find out your merits; and your demerits also. Remember, that a bad student never has a good examiner. It was my lot to fall into the hands of Mr. Squire first thing. He examined me in vegetable materia medica and botany; he found me with a moderate amount of information on the former subject and a deficiency in the latter; in fact, he told me so, and I agreed with him, which was very pleasant, and I thought him a very agreeable gentleman. He asked me many questions, and I asked him some, and got from him some information and advice as to how I should pursue my botany a little further when I returned home. So in botany as in Latin, after I had passed my examination I began to grind. The other parts of the examination were easily got through; pharmacy had occupied my days and chemistry the majority of my evenings, so these departments I passed through comfortably, though not without a feeling that in some cases the questions were unreasonably severe, considering that I was entered for the pass examination, and that rejection would disqualify me from membership of the Society. For example, I remember the chemical examiner, after a great many other questions, said, "Suppose I were to give you a white powder insoluble in water and not dissolved by boiling with nitric and hydrochloric acid, what could it be?" And when I enumerated chloride of silver, silica, and sulphate of baryta or strontia, he pushed me further as to the method of discriminating which of these four a given specimen might be. I made a mental note, "this is not the kind of knowledge that can reasonably be demanded of an ordinary chemist and druggist," and proceeded to describe to the best of my ability the usual process for such an analysis. He pointed out to me one particular in which I had gone astray, and then with the remark, "Very good!" passed me on. I looked at Mr. Bell with a feeling of pity and half regret that I had not to pass under his hands also. He sat there with an expression of patient suffering on his face. I wished for the honour of his approbation and the pleasure of saying he was not sulky, but I did not get that privilege, nor was I examined by Mr. Deane, for he was chairman of the board that day. However, that gave me the advantage of hearing, in his kindly words, what the examiners thought of me. Now, if I were a modest man, I could not tell you what he said, but as my argument would not be complete without it I will give my modesty leave to withdraw for five minutes.

He told me that the gentlemen through whose hands I had passed had been comparing notes about me, and that each had found me better informed than the majority of the candidates for the pass examination, that they had consequently pushed their questions a little further to ascertain how far my knowledge extended. He reminded me that as I had entered for the pass examination I had not gone through the part of their programme which was conducted in writing, but that the examiners were satisfied from the way I had answered the oral questions that I should have passed the whole of the more stringent examination to their satisfaction, and they felt that under the circumstances it would be unfair not to give me the honorary certificate which they felt sure I deserved. He also told me I must not conclude that my examination being passed, my education was finished. It was the duty of every one with ability to work, and to give some portion of his work to the public good. I might, for example, work out some subject connected with my daily occupations and publish the result in the Journal; they would be glad to see me a contributor to its pages.

I did not see Mr. Deane again for ten years, when I met him as a fellow councillor; by that time he had forgotten all about it, no doubt having given similar advice and encouragement to many other students, but I had neither forgotten it nor failed to act upon it. I now echo his sentiments and advise you all to profit by them as I have done. But that is not just the point of my story; I tell it you as an illustration of the falsity of the reports circulated by unsuccessful students about the sulkiness, the hardness and the savageness of the examiners. I tell it you to show how they even went out of their way to confer an honorary distinction which was not asked for, lest the omission would be unfair to a willing student. I found all with whom I spoke pleasant, gentlemanly, and kind, and though we have not the same men, we have the same spirit in the board still.

Now I will tell you a secret which will help you to pass your examination with pleasure and comfort. Be prepared to give your examiners about 50 per cent. more of good solid information than you think they have a right to expect, and depend upon it you will find, as I did, that they are all remarkably pleasant gentlemen.

While I earnestly commend diligence and persistence in the prosecution of your studies I must also add this further injunction, that you be not students in pharmacy only. Do not give your whole soul to this one study, for your duties as pharmacists will not be worse performed, but better, for the cultivation of refined tastes and the following of intellectual pursuits. Keep a little corner of your soul free from the bricks and mortar of pharmacy—there the daisies will blossom and your hobby may be turned out to grass.

Three months' training cannot make a sedentary man into an athlete, neither can three months' grinding make a tyro into a philosopher.

The growth of physical power comes by daily work, battle against resistance, alternated with food and rest. By no other means can you develop bone and sinew, muscle and nerve, in a healthy and vigorous condition.

The growth of moral and intellectual power takes place upon precisely similar principles. It is the daily battle with difficulties, little difficulties, the daily learning of little facts, the daily exercise of observation and judgment; it is the daily struggle and the nightly rest that makes the moral and intellectual powers grow strong and healthy.

I have no fear of error in your judgment of what it is desirable you should become in the course of the next ten or twenty years. If I had a power to give you I would give you strength of will. The picture drawn by hope is bright and fair. What is wanted for its realization is the determination that every day shall record some definite progress, however small.

Learning commences in the cradle, it goes on always and for ever. Going to school and leaving school, passing an examination and entering business, are not to be regarded as aims or ends, but only stages in an endless journey.

The necessity for a compulsory curriculum is a question which has often been debated by leading men in our Society; the necessity for it only exists inasmuch as you fail to be a law unto yourselves. Voluntary work is both better and less irksome than that performed under compulsion, but it must be work of that quality with which a taskmaster could find no fault. Be your own task masters, and practice upon yourselves that rigorous discipline to which you would like to subject me.

If you do so we should hear no more of cram, or of students who crowd their efforts into a three months' course of study, and convert their brains into deposits for dry rubbish.

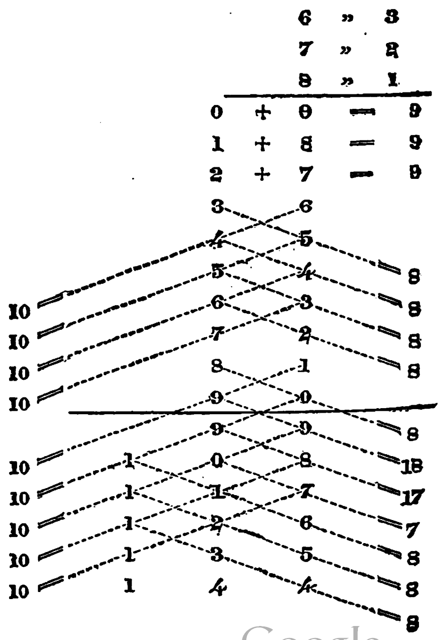
And when you have passed your examination remember you have not done any great thing; do not grow conceited on the strength of so small an achievement. All that passing indicates is that you are not too ignorant, or too stupid, to be entrusted with the practice of your trade. Do not think that, having learned enough to merit this first mark of confidence, you may then rest from active exertion. Rest is only given us to restore our power. Prolonged rest is neither useful nor agreeable. Activity is life, stagnation is death—death such as no Christian should acknowledge. The glory of the Christian faith is going on in all good works, and knowing no end. It is the mark of unworthy aims and narrow views to look forward to an achievement which is an end to work and progress.

> "Glory of warrior, glory of orator, glory of song,
> Paid with a voice flying by, to be lost on an endless sea.
> Glory of virtue, to fight, to struggle to right the wrong.
> Nay, but she aimed not at glory; no lover of glory she!
> Give her the glory of going on and still to be!
>
> The wages of sin is death: if the wages of virtue be dust,
> Would she have heart to endure for the life of the worm and the fly?
> She desires no isles of the blest, no quiet seats of the just,
> To rest in a golden grove, or bask in a summer sky;
> Give her the wages of going on, and not to die!"

I have endeavoured to show the importance of the gradual and persistent accumulation of facts and of their consequent assimilation and permanence in effect when thus slowly acquired. But this acquirement of facts is a very poor kind of education unless it be accompanied by a general development of faculties which raises it to a higher level, far above that parrot-like power of giving certain answers to certain questions. I am perfectly aware that it is not possible to cultivate this or any other branch of education without developing in some degree all the others, but for a satisfactory cultivation of your powers all the faculties of the mind and heart should have full and healthy play. You learn to remember what you read, you must learn to understand it also. You learn to remember the objects you see, you learn to observe accurately, to compare and to classify. You endeavour to remember the phenomena that take place in the operations you perform, and you learn to observe, to compare, to judge. You try to overcome a difficulty or to understand a failure, and you learn to imagine, and to theorize. Not only must your minds have received an ample store of useful facts, but all those faculties must also have received a large development before you can be regarded as in any complete sense well educated and intelligent men.

To make a carpenter you want wood and tools, and skill to use them So to make a learned man you should have knowledge of facts and laws, and power to use them.

Probably many of you are not aware how imperfectly you exercise these faculties upon facts or circumstances which are presented to you. I will take an illustration. Suppose I write down in vertical column the series of units 0, 1, 2, 3, etc., up to 9. You observe that I have written down the whole series. You observe and would readily remember the order in which I have placed them, because the order is regular, and with one exception it is probably the order in which you were were required to write them when you learned to write. Suppose I write a second column beside these in the reverse order;



you would have equal facility in observing and remembering the units and their order. But there are now several other things which may be noticed with regard to them. Some would be noticed by all of you if you regarded the figures long enough, but you would not all observe them equally soon; it would depend upon the innate faculty and the degree of educational development of the individual. The first thing you would notice is that the double column represents the nine column in the multiplication table; next you might notice that if we place a plus mark (+) between these two columns, and an equal mark after them, we would be led to putting down a third column all nines, 0+9=9, and the same with all the others down to 9+0=9. And if you take their sums diagonally they are all eights one way and all tens the other. In making these observations we should not say you had discovered a law, though we might say you had detected a rule applying to the arrangement, and you would naturally say, "Where there's a rule there's a reason." And in the search for the reason you exercise the higher faculties of the mind. You do not continue your observations upon these figures alone; you commence considering, speculating, and testing speculation with experiment. You may extend the column upwards and downwards and find nine times nine tenths is 8·1, and nine times eight tenths is 7·2. So of the remainder, the sum of the two figures continues to be nine. You may then carry your extension downwards, and find nine times eleven are ninety-nine, the sum of which two figures is not nine but eighteen. Then nine times twelve equal 108, in which case the sum of the three numbers gives us nine, as also is the case with the following numbers, 117 and 126, etc. You will observe the hitch at eleven times nine in the sum taken horizontally, and that there is no hitch in the sums taken by the right-hand diagonal, and three hitches in the left hand diagonal. This will lead you to observe that in stepping from decimals into units the rate of progression is altered, and that it is not altered in passing from units to tens, because we take in the teens between ten and twenty. It is not my object to teach you arithmetic, or to explain the law which governs these phenomena, but I would just suggest for any one curious in figures to note that nine is the highest number in units, and that comparable phenomena may be observed if he takes eleven as the highest number of pence, not a shilling. The products in the eleven column expressed in shillings and pence give eleven as the number of coins. Seven being the largest number of pints, not a gallon; the seven column expressed in gallons and pints gives seven as the sum of the measures, etc. How much more interesting arithmetic becomes when the reason for a rule is found. How much more interesting and useful every branch of science becomes when it is followed with intelligence instead of being learned merely by memory.

The 11 Column in Pence.	In Pence and Shillings.	In No. of Coins.
11	0 „ 11	11
22	1 „ 10	11
33	2 „ 9	11
44	3 „ 8	11
55	4 „ 7	11
66	5 „ 6	11
77	6 „ 5	11
88	7 „ 4	11
99	8 „ 3	11
110	9 „ 2	11
121	10 „ 1	11
132	11 „ 0	11
143	11 „ 11	22
154	12 „ 10	22
165	13 „ 9	22

The 7 Column in Pints.	In Pints and Gallons.	No. of Measures.
7	0 „ 7	7
14	1 „ 6	7
21	2 „ 5	7
28	3 „ 4	7
35	4 „ 3	7
42	5 „ 2	7
49	6 „ 1	7
56	7 „ 0	7
63	7 „ 7	14
70	8 „ 6	14
77	9 „ 5	14

In all cases when you have numerous scattered facts, endeavour to arrange them in order, and to find the law of their relation.

I regard it as one of the weak points of the pharmaceutical examinations, as at present constituted, that though they inquire into the student's knowledge of facts and power of memory, they do not sufficiently test his power of thought, judgment, and originality: I trust the day is not far distant when a change will be made in this respect.

All of you to whom I am now speaking are destined to be Square men; let me urge upon you the importance of being both able and willing to fill a round hole, or any kind of a hole in which fortune may place you.

The use of the laboratory and the guidance of professors are your great privileges. Such aids often make a little man stand fairly well, and enable a man of good abilities to distinguish himself, but they alone never make a great man, and they even risk the dwarfing of great characteristics by bending habits of thought into the established forms. This is a word of encouragement to many who may read my words, but who like myself have to do the best they can without the advantages you enjoy. The dwellers in little country towns often have the advantage of shorter hours and of more leisure behind the counter, and if they have the wisdom to make good use of these, and their opportunity of gathering a few indigenous herbs, they stand a good chance of developing individual characteristics, which is a great boon in a world of common-place men, and at a time when individuality is scarce, and every day becoming a scarcer commodity. Comparative ignorance and inexperience in the case of the home student, and slavish conformity to custom, and to a regulation pattern on the part of the collegians, are the dangers of the two positions to be avoided if possible. It may not be in the power of many in the country to choose between their circumstances and yours; but to both I would offer a piece of good advice, in the words of somebody who says, "Of two evils choose, neither." Do not neglect cultivation, but do not let cultivation convert you into a locomotive engine, which can run only on the line upon which it is placed.

Your studies will cost you something, so will your pleasures. If the cost of study be burdensome, take care that the cost of pleasure be the less. Do without expensive pleasures; whether the expenditure is much money, much time, or much energy.

Cultivate those pleasures which leave you better able for duty, shun those which leave a bad after taste. There is one cheap pleasure I would commend to you all, I mean the habit of cheerfulness and of making the best of the unpleasant duties which are sure to fall to your lot. We often hear complaints—sometimes a chorus of complaints—about the hard fate of the pharmacists; how hard it is that they should be learned and poor. Now let me caution you; the learning did not make them poor unless they learned to be idle, to be above drudgery, to be negligent of common duties; but these are things you ought not to learn in any school or you will have to unlearn them in the school of adversity. Instead of thinking how hard it is to be poor and learned, think how much harder it would to be poor and ignorant, as the bulk of pharmacists were fifty years ago.

Much has been said about our professional status. We have repeatedly seen it suggested by writers in the journals that we should rise above our trading character; and we have seen communications from young men apparently not yet come to years of discretion, asking if the wearing of an apron were not degrading to gentlemen of their professional status.

I had almost resolved to say nothing on a subject so little worthy of our attention; but I must just give it a word in passing to express my contempt for men who, having entered the business, are ashamed to take upon themselves some of the duties of their position. I care not to address such superfine gentlemen, any more than Hotspur cared to discourse with the perfumed popinjay who said that he, too, would have been a soldier were it not for the villanous saltpetre and the vile guns. If you would prosper in the battle of life be a Hotspur rather than a kid-gloved courtier. You should be so full of work, and of desire to do what is right and to be what is right, as to leave neither leisure nor inclination to trouble yourselves about such petty matters further than to acknowledge once for all their fitness and the fitness of conformity to discipline. Such dainty dislike to rough work springs from idleness, for there is nothing truer than that Satan provides mischief for idle hands.

As you would exclude the evil one keep your hands full of honest work, your heads full of useful knowledge, and your hearts full of pure affections.

Pure motives and earnest work give dignity to every duty. As regards the mere name (trade or profession), true worth is satisfied with any title conveniently descriptive.

Your business will include some things which you may feel to be drudgery, but should not include anything really derogatory. The drudgery will be much lightened by your culture enabling your minds to be occupied with thoughts which are pleasant, pure, refined, and elevating, while your hands are occupied with the so-called menial work of making the shop clean and orderly.

My subject has grown in treatment more lengthy than I intended, but I trust it has not grown dreary or unprofitable.

I have endeavoured to enforce the importance of beginning, at once and in earnest, that course of moral and intellectual development which is one perpetual achievement, but knows no end. I have listened to the teaching of the generation which has gone to the front, and I have endeavoured to reflect upon you an echo which has not lost vitality in its passage. I look to you in the future to roll on this echo to another generation—not like the echoes of the physical world, which grow fainter and fainter as they pass from hill to hill, but strengthened by your earnest and your honest work, by your love of truth and your zeal for progress.

Thus shall—

> "Our echoes roll, from soul to soul,
> And grow for ever and for ever."

At the conclusion of the Address, the PRESIDENT said it was hardly necessary to move a vote of thanks to Mr. Proctor for his excellent and telling address, but they were all much obliged to him for it. Not only the young but the oldest amongst them might draw valuable lessons from it, and he trusted the example he had set before the students would not be lost on those whom of course it was Mr. Proctor's desire most to encourage.

The meeting then adjourned.

Notes and Queries.

[527]. COMPOSITION POWDER (Dr. COFFIN'S). We have received from a correspondent the following recipe for this preparation:—

Powd.	Bayberry Bark	8 ozs.
„	W. Poplar „	4 „
„	Ginger	2 „
„	Cinnamon	1 „
„	Pip. Cayenne	1 „

Correspondence.

"*Aide-de-Camp.*"—(1) One of the numerous cultivated species of *Aster*, known under the name of Michaelmas Daisy; (2) *Centranthus ruber*; (3) *Œnothera biennis*; (4) *Tanacetum vulgare*; (5) Possibly *Spiræa salicifolia*: it is not possible to say with certainty from so small a specimen; (6) *Eupatorium cannabinum*; (7) *Lithospermum officinale*; (8) *Origanum vulgare.*

H. M. Hadfield.—Your specimen is the seed of some species of *Amomum*. It comes nearest in size and appearance to that of *Amomum Clusii*, Sm. The Curator of the Society's Museum would be glad to receive an entire fruit, or specimens of the seed in a recent state.

"*Apprentice.*"—Squire's 'Companion to the Pharmacopœia,' published by J. and A. Churchill.

J. G. Candy.—The only difference in the composition is in the substitution of treacle for conserve of red roses.

"*Saline.*"—The powders must be dried separately, either in a hot water oven or upon a pan heated by a water or steam bath. Each to be passed through a fine hair sieve separately, and finally mixed and put into bunged jars or stoppered bottles.

A. L. F. B.—*Lycopsis arvensis.*

J. H. A.—(1) *Ranunculus sceleratus*; (2) *Scrophularia aquatica.*

"*Fides.*"—We believe that a little turmeric or saffron is used.

"*Hampton.*"—We cannot understand from the terms of your question what is precisely the information you seek.

B. W. W.—The difference in behaviour is due to the fact that the preparation which precipitates with water has been properly prepared, while the other is but an imitation of the officinal preparation. We believe cinchona barks containing only cinchonidine and cinchonine are often used for the official fluid extract instead of quinine-yielding cinchona bark. The difference is important, and in this respect the precipitation upon dilution with water is no distinguishing test.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Morris, Mr. Clarke, Mr. J. Garrett, Mr. Butt, Mr. J. Wright, "Ignorans," "One who has known the Drug Trade more than Thirty Years."

NOTES ON INDIAN DRUGS.

BY W. DYMOCK.

(*Continued from page* 190.)

BRIEDELIA MONTANA.—*Local name*, ASAUNA.

A short thick tree with spreading branches. The bark is externally of a light brown colour, and has little fungous protuberances of dead suber; internally it is smooth and fibrous and of a light cinnamon colour; taste purely astringent. If soaked in water it gives out much mucilage. The fibrous portion of the bark is very tough and strong. Sections placed under the microscope show the outer portion to be made up of thin-celled reddish parenchyma; in the inner portion there are numerous vessels the external surface of which is incrusted with large crystals arranged in regular columns. Briedelia bark is not mentioned in the Indian Pharmacopœia, but it is well known as a valuable astringent in the Bombay Presidency.

BERGERA (MURRAYA) KÖNINGII.—*Local name*, KURWA NIMB or KARIPAK.

The bark and leaves are mentioned in the Indian Pharmacopœia. The leaves are in common use, but more as a condiment than as a medicine; they enter into the composition of curries and green chutnies. The leaves are pinnate, the leaflets 19 to 21, 1¼ inch to 2 inches long, alternate, unequally oblique at the base, irregularly ovate, serrated, pubescent, upper surface dark-green dotted, under surface of a lighter colour, venation reticulated prominent, petioles red, odour powerful penetrating, and peculiar taste, moderately pungent, bitter, and acidulous. The bark has the same taste and odour as the leaves; the thin walled cells of its parenchyma contain numerous minute oil globules.

The leaves of *Murraya exotica*, a small evergreen shrub, with large white sweet smelling flowers, smell like box leaves, and have a very pungent taste. They have from 5 to 8 elliptic, ovate, tapering leaflets, acute at the base, shining, coriaceous, and dotted with prominent venation. The bark of this shrub is insipid, but its parenchyma abounds in oil globules.

CISSAMPELOS PAREIRA, TINOSPORA CORDIFOLIA, and COCCULUS VILLOSUS,

Are all three very common in this neighbourhood. *C. Pareira* is seldom used, its local name is Mibishee. *T. cordifolia* has a very peculiar habit; if a portion of the stem be severed and hung upon a bush, it will remain alive during the dry season, and as soon as the rains commence send forth shoots and long aerial roots about the size of a piece of whip cord; these eventually reach the ground and develop into stems. The local name is Goolwail. The drug is described in the 'Pharmacographia,' and is much used in this country. *C. villosus* is seldom used, the leaves are sometimes employed to make an emollient fomentation; the local name is Lamtanee. The structure of the root and stem of all three plants is of a similar character.

AILANTHUS EXCELSA.—*Local name*, MAHAROOK.

The bark is very brittle and granular, the external surface brown, marked with scars formed by the exfoliation of dead bark, internal surface of a cinnamon colour; numerous nodules of stony cells are visible to the naked eye. Under the microscope the bark is seen to consist of an outer reddish-brown epidermic layer, the cells of which appear to contain resin, a parenchyma of thin-walled cells which are loaded with starch granules, and which, towards the outer part of the bark contain much green colouring matter; the inner circle of the bark is mostly occupied by the masses of stony cells already mentioned. The odour and taste resemble that of cinnamon. The bark has been strongly recommended as a tonic in dyspepsia. The alcoholic tincture when evaporated yields a dark reddish-brown extract which appears to consist of a wax and resin mixed. It has a strong cinnamon odour.

GYMNEMA SYLVESTRE.—*Local name*, KAVLEE.

A shrubby climbing plant. Upper surface of leaves dark green, shining, under surface pale green; their shape varies from ovate-lanceolate to obovate; the venation is transverse and reticulate with a marginal vein; length four to five inches; taste saltish and acrid. The root is about the size of the little finger or less, not unlike Hemidesmus; it has a tough central wood, and when fresh a soft spongy bark, which is reddish brown and fissured longitudinally; it loses much bulk in drying and becomes loose and transversely fissured; the taste is acrid and saltish; the whole plant abounds in milky juice. Under the microscope the central woody portion of the root is seen to have a radiated structure and to be traversed by large vessels; the extension of the medullary rays into the bark is distinct; the latter is made up of a thin-walled parenchyma, the cells of which contain much starch and tolerably numerous crystalline concretions. There are many laticiferous vessels, especially towards the inner part. The epidermis consists of several layers of flattened cells of a deep reddish brown colour. I am unable to confirm Mr. Edgeworth's statement that chewing the plant destroys the power of the tongue to appreciate the taste of sugar. Sugar taken into the mouth after chewing the fresh plant, more especially the root bark, has a saltish taste. The medicinal properties of Gymnema require investigation.

VITIS (CISSUS) LATIFOLIA.—*Local name*, KOLE ZAN.

A large climbing plant, with perennial tuberous roots; fruit exactly like bunches of small black grapes; very common in this part of India. The whole appearance of the plant reminds one of the vine. The roots form large bunches of tubers attached to a central root-stock; the tubers are from one to two feet long, tapering at both ends, with a maximum diameter, when fresh, of from two to three inches; externally they are covered by a light brown epidermis, and marked with small wart-like protuberances arranged in circular rings; internally they are red and juicy. A section shows a thick stringy cortical portion easily separable, and a central fleshy part of the consistence of a parsnip. Under the microscope the root is seen to be made up of a thin-walled parenchyma, the cells of which contain large oblong starch granules and numerous bundles of needle-shaped crystals; the outer portion of the root and root-bark is traversed by numerous very large fenestrated vessels. The taste is sweetish, mucilaginous and astringent. This drug is used by the country people as an alterative; they consider that it purifies the blood and renders the excretions healthy. The form of administration is a decoction of the dried tubers.

ASPARAGUS ASCENDENS?—*Local name for the dry tubers*, SUFFED MOOSLI.

I place a query after the botanical name, as I have not seen the plant. The drug consists of shrivelled decorticated tubers, from two to two and a half inches long, the largest being about a quarter of an inch in diameter; they are of an ivory white colour, often twisted, hard and brittle; adhering to some of the pieces may be seen portions of a yellowish epidermis; when soaked in water they swell up and become spindle-shaped, the thickest part being about the size of a lead pencil. Under the microscope these tubers present a delicate cellular structure, the cells of which contain nothing but a little fine granular matter; this surrounds a central vascular column the middle part of which is entirely occupied by jointed vessels, the outer portion consisting of scalariform—the portions of adherent epidermis already mentioned are silicious. Suffed Moosli has an agreeable mucilaginous taste; it contains no starch. I have used it largely as an article of diet; it is far nicer than Salep, and is generally relished by Europeans. To prepare it, take 200 grains of the powder, 200 grains sugar, pour upon them slowly a large teacup of boiling milk, stirring constantly all the time. Two varieties of asparagus are found in this neighbourhood; *A. sarmentosus* which has a woody root stock, to which are attached a number of ovate tubers, and *A. racemosus* having also a woody root stock and bearing a large number of fleshy vermicular tubers. The local name of the first is Makhee, of the second Satawree.

ARISTOLOCHIA INDICA.—*Local name*, SAPSUN.

The drug as found in the shops consists of the root and stem, the latter principally. It is in pieces about three inches long and one quarter of an inch or more in diameter, and has a central woody column made up of about ten wedge-shaped portions. The bark is thick and corky, marked with longitudinal ridges and numerous small warty projections; it is of a yellowish brown colour. Under the microscope the central wood is seen to be traversed by large vessels, the medullary rays are distinct and easily traced into the bark; in the latter, which consists of a corky parenchyma loaded with starch, there is a circular zone of large yellow stony cells. Sapsun is very bitter and has a pungent camphoraceous taste; it is met with in all the shops. The plant grows in this neighbourhood but is not very common; it is largely used as a stimulant tonic. An alcoholic tincture evaporated yields a quantity of yellow bitter resin, and some yellow colouring matter soluble in water.

ARISTOLOCHIA BRACTEATA.—*Local name* KEERAMAR.

The drug consists of the leaves, stem, root, and ripe capsules. The portions of stem are striated, slender, and about as thick as a piece of whipcord; the root is of the same size but not striated; the leaves are uniform, glaucous when fresh; the capsules are ovate, three-quarters of an inch long, ribbed, depressed at the apex, six-celled; each cell contains a column of heart-shaped flat seeds, closely packed. The appearance of the seeds is peculiar; they look as if they had been cut out with a punch; one side is flat, black and rough from a number of irregular projections; the other is almost entirely occupied by two brown, comparatively smooth lobular projections of a soft corky structure; these, under the microscope, are seen to be entirely made up of ovate empty dotted cells. The whole plant is nauseously bitter; it is much used as an anthelmintic. Its reputed antiperiodic properties require investigation.

BALSAMODENDRON ROXBURGHII.

Through the kindness of Mr. Woodrow, in charge of the Botanical Gardens at Hewra, in the Deccan, I have been favoured with fresh specimens of the stem and exudation of this tree, collected near Prit, about thirty miles north of Poonah. Description: The epidermis consists of several rows of delicate elongated cells containing a little granular matter; the cells beneath this, which form the green bark, are loaded with chlorophyll and starch. Proceeding inwards the chlorophyll gradually diminishes, and a few bundles of liber cells are met with, forming a broken irregular zone. Within this the cells contain granular matter, starch, and globules of balsam; the cells throughout the bark are of an oblong form; laticiferous ducts permeate the bark at intervals, and the medullary rays are distinctly traceable; a few conglomerate crystals are met with. The wood which is white, soft and brittle, consists of elongated thin-walled cells, divided into zones; in the zone next the bark the cells (eighteen to twenty rows) are empty or contain a little starch; in the next they are smaller and loaded with large starch granules. The same structure is continued to the central pith, which consists of similar cells full of starch. The examination of sections of the wood and bark is much facilitated by coloration with an aniline dye. The exudation of this tree is at first opaque and milky; as it dries it becomes greenish and translucent, and very closely resembles the gum resin sent to me from Sind as the produce of *B. Mukul*, the only difference I observe is that it has a more terebinthinate odour; I identify it as forming part of the Bysabol Googul of the shops, which I have described in "Some Remarks upon Myrrh and its allied Gum Resins," as Indian Bdellium. I think it quite possible that the same trees in Arabia may produce genuine Bdellium. Carter, in his 'Geography of the South East Coast of Arabia,' mentions "the Moql tree, the gum of which is called Tabka, and its companion the *Balsamodendron pubescens*." In Arabic and Persian works on Materia Medica, the different kinds of Bdellium are described under Moql, and Googul is sometimes given as the Indian equivalent. In a former article I have shown that true Googul is the produce of *Boswellia serrata*. In some parts of India the term appears to be applied to different kinds of dammer.

(*To be continued.*)

FERRIC CITROPHOSPHATE.*

BY R. ROTHER.

Citric acid is one of the most remarkable of the organic acids. Its constitution is so peculiar and unintelligible that synthetic chemistry has failed to produce it; neither has any process of disruption yielded it from more complicated compounds. It is, in our present knowledge of the substance, most emphatically an organic acid. It is, however, a noticeable fact that, considering the interest and importance attaching to the citrates as a class, they have been but imperfectly studied.

The marvellous property possessed by citric acid of rendering metallic bases insusceptible to many of the ordinary reagents has long been known. This action has been interpreted in various ways, and given rise to some most striking theoretical speculations. From the time that H. Rose first observed the ready solubility of dry ferric citrate in presence of normal monad citrates to the present, no definite and reliable knowledge existed in regard to the constitution of these compounds. The opinion largely prevailed that they were but mechanical mixtures; that is, mere solutions of one salt in the other without reference to equivalency. The first step in the direction of a comprehensive view of this heretofore hopelessly intricate subject was made by the writer (*Laboratory*, February, 1876), in showing that ferric salts with monobasic radicals formed, by a combination of double decomposition and additive affinity, a peculiar green double citrate of iron and the monad metal, whilst the monobasic or dibasic radical passed to the base of the citrate actually decomposed. By means of dialytic experiments (*American Journal of Pharmacy*, April, 1876), the writer added further proof in confirmation of this result, but also showed that in case of the citrophosphoric compounds a rearrangement of more complicated character takes place. All compound salts may be divided into two classes. Double, triple and quadruple salts are formed from dibasic, tribasic and tetrabasic acids when each individual unit of equivalency is saturated by a distinct basic radical. Secondary, tertiary and quarternary salts are produced when each independent unit of equivalency of a polyatomic metal is saturated by distinct acid radicals of corresponding basicity.

The writer's process for preparing ammonio-ferric citrophosphate (*Pharmacist*, August, 1871) indicates that two equivalents of ferric orthophosphate and one equivalent of triammonic citrate react upon each other in the production of a soluble amorphous compound readily obtainable in splendid brown green scales. The solution, when subject to dialysis, gave no evidence of dissociation, showing that no crystallizable salt is present. The formation of the compound, therefore, determines a basic condition made apparent by the presence of ferric oxycitrate or free ferric hydrate (*Pharmacist*, May, 1876). Its generation may then be represented as follows:—

$$4(FePO_4)+2\,(NH_4)_3C_6H_5O_7+3\,(OH_2)=FeC_6H_5O_7(NH_4)\\C_6H_5O_7,\ Fe(OH)_3+2\,(FePO_4),\ (NH_4)_3H_3(PO_4)_2.$$

As this reaction assumes the production of an ammonio-ferric phosphate in which one equivalent to each monammonic and diammonic phosphate are seemingly united, the writer endeavoured to produce this double phosphate independent of the citrate by dissolving freshly precipitated ferric phosphate in a mixture of the two ammonium phosphates, but no solution appeared to take place. Ferric citrate was then substituted for the ammonium phosphates, when rapid solution was effected, thus enabling the writer to add one more interesting iron salt to the list of those already discovered by him. The ferric citrophosphate obtained by this combination is a secondary anhydrous salt having the composition $Fe_2(PO_4)\ (C_6H_5O_7)$, and easily obtainable in beautiful brown green scales. It forms in long slender blades, a shape characteristic of ferric citrate. In concentrated solution it is absolutely permanent, showing also, in this respect, one of the properties of ferric citrate. It has a sweet, acidulous taste, free from metallic flavour and the saline nauseousness of some of the ferric double citrates now in use. There can be no doubt of its complete superiority over all other citroferric phosphates at present so largely employed, either in a pharmacal or therapeutic aspect. On the assumption that this salt is one of the components of the ammonio-ferric citrophosphate above described, the formation may be written as follows:—

$$2\,(FePO_4)+(NH_4)_3C_6H_5O_7=\\Fe_2(PO_4)\ (C_6H_5O_7)+(NH_4)_3PO_4.$$

This result seems quite probable, since, as the basicity of the acids is apparently alike, a possibility of closer union is not precluded, and hence we may have the actual combination of the two constituents in the condition of a secondary double salt,

It is a remarkable fact, worthy of note in this connection, that ferric pyrophosphate is practically insoluble in ferric citrate. This property, therefore, supports the writer's constitutional formula of the officinal pyrophosphate, making it a mixture of ammonio-ferric pyrophosphate, ammonio-ferric citrate and free ferric citrate.

As previously suggested by the writer (*American Journal of Pharmacy*, April, 1876), it was found that the most practical and expeditious process of preparing the ferric citrophosphate consisted in precipitating the iron as a mixed phosphate and oxycarbonate, and dissolving the mixture in citric acid. Ferric oxycarbonate (*Pharmacist*, December, 1873) is so incomparably superior in every respect to the ordinary ferric hydrate that no operator who has once employed it will ever abandon its use. The compact ferric phosphate (*Pharmacist*, December, 1873,) is equally an improvement on the gelatinous kind. In the production of ferric citrophosphate the writer combined the processes of the two iron salts as follows:—

Take of Solution of Ferric Sulphate ...one pint.
Disodic Orthophosphate Cryst. 7 troy ozs.
Disodic Carbonate „ ...9 „ „
Citric Acid „ ...3 „ „
Water sufficient.

Add the sodic phosphate to the solution of ferric sulphate and apply heat until solution is effected; now place the sodic carbonate into a capacious vessel, pour on half a pint of water and apply heat until the salt has dissolved; then add in rapid succession the former solution, one-fourth at a time, and maintain the heat, with constant stirring, until effervescence has ceased; dilute the mixture with water to the measure of eight pints, and when the precipitate has perfectly subsided decant the supernatant liquid, and mix the sediment again with a fresh portion of water, as before; after three or four washings in this manner, pour the precipitate upon a muslin strainer and press it thoroughly; place the residue into a porcelain capsule, add the citric acid and apply a water bath heat until perfect solution has occurred; finally, pour the liquid upon plates of glass or porcelain and expose it in the open air to dry. The yield is about 6½ troy ounces.

In this formula a slight excess of sodic phosphate is employed, since the sodium carbonate has a tendency to take away the acid of the ferric phosphate. Hence, the two precipitates may also be prepared separately, mixed after washing, and dissolved as above. With the adjusted quantity of sodium phosphate, as directed in the above formula, the final result, however, agrees very closely with the theoretical yield.

If desirable, the salt may be retained in solution, which, if sufficiently concentrated, will remain absolutely

* From the *Pharmacist* for September, 1876.

permanent. A solution containing one-half a troy ounce of the salt in the fluid ounce appears to be the most convenient form.

This salt, similar to the officinal pyrophosphate, when mixed with any acid stronger than the citric, is completely decomposed, ferric phosphate being precipitated. The officinal pyrophosphate, when mixed with orthophosphoric, pyrophosphoric, metaphosphoric, chlorhydric, nitric or sulphuric acid, is instantly precipitated. The white gelatinous precipitate is insoluble in either of the phosphoric acids, but any of the latter three acids, when in sufficient excess, again dissolve it. The erroneous belief is still abroad that the officinal pyrophosphate of iron should form a clear solution when mixed with diluted phosphoric acid. It is, however, about time now that it was generally understood that any citrophosphoric compound is incompatible with free orthophosphoric acid, by reason of the fact that any citrate present will be decomposed, its acid being liberated; and as free citric acid fails to dissolve the various ferric phosphates, these must of necessity be thrown out of solution.

EXTRACT OF MALT.*

Extract of malt has become a popular dietetic remedy, and is particularly esteemed as a demulcent and nutritive food for children. Its syrupy appearance, however, offers many inducements to fraud. The simplest and cheapest adulterant is glucose (syrup), which is in general use by brewers to increase the amount of extractive matter in beer. But there is no ready method known to detect this admixture. And as a complete analysis is in most cases impracticable, the consumer must generally rely upon the honesty of the manufacturer.

Hager reports having received a sample of malt extract, which in external appearances resembled the genuine completely, although it had a peculiar faint foreign taste.† From its behaviour towards reagents, in which it greatly differed from the genuine, it was judged to be a mixture of glucose, glycerine, and about thirty per cent. extract of malt. To confirm these results, comparative reactions were made with three samples of extract of malt, one of which had been evaporated in an open vessel, and had a darker colour than the others. The main difference between extract of malt and glucose (syrup) is probably the amount of soluble modifications of proteïn-bodies in the former. It might be conjectured that the adulteration with glucose would produce a greater amount of reduction in alkaline copper solution. But the results obtained do not permit any such conclusion to be drawn; one gramme of the three last named extracts reducing respectively 43, 44·5, and 46 c.c. of the copper solution, while the submitted sample (X) reduced 48·5 c.c.

The presence of glycerine in moderate quantity, say up to 10 per cent., cannot be called an adulteration, as it is no doubt added for the purpose of preserving the extract; but then the glycerine must be employed in a pure state. The above mentioned sample of extract (X), however, contained 26 per cent. of glycerine (extracted by ether-alcohol), which could not have been very pure, owing to the considerable quantity of calcium chloride present.

Hager considers the examination of the following points sufficient to decide on the genuineness and qualities of a malt extract.

1. The extract must have its own peculiar sweet taste and the refreshing odour of fresh bread.

2. The watery solution must be nearly clear. On dissolving 5 gms. of the extract in 45 gms. of distilled water, under stirring and without heat, a slightly cloudy solution is obtained, which may be filtered without difficulty. The insoluble matters were found to be different under different circumstances, and consisted of amorphous coagulum, ferment-bodies, and columnar, four or six-sided (sometimes also star-shaped) crystals.

3. 10 c.c. of the filtered solution, prepared as just stated, are placed into a test-tube, 1·5 cm. (= $\frac{3}{5}$ inch) wide, and mixed with 10 cc. of an aqueous cold saturated solution of picric acid. In the case of good extracts, a strong cloudiness appears at once, which gradually increases, and after ten minutes has become so intense as to prevent the passage of daylight through the liquid. The adulterated sample (X) showed only a slight cloudiness with picric acid, nor did it after ten minutes become so intense as to be impervious to light.

If it is desired to determine the quantity of the protein compounds in solution, 10 gms. of the extract are digested for half an hour at a gentle heat in 100 gms. of cold saturated aqueous solution of picric acid, and the whole set aside to allow the precipitate to deposit. The latter is collected in a tared filter, washed and dried in the water-bath. Its weight, divided by 2, is approximately equal to the quantity of the proteïdes.

4. Another portion of the filtered 10 per cent. solution is mixed with tincture of galls in excess, and well shaken. A copious whitish precipitate, remaining suspended in the liquid, and making it impervious to light, must make its appearance. Sample X gave only a slight cloudiness.

The same relationship which exists between pepsin and fibrin, or other animal proteïn-compounds, holds good between the diastase of extract of malt and vegetable starches. The latter, which form a main constituent of our vegetable diet, are converted by diastase into dextrin. Extract of malt, therefore, owing to its proteïdes and to diastase, is an excellent adjunct in the nutrition of infants.

Various other remedies have been combined with the extract of malt, to modify its action, or it is used as a pleasant disguise for disagreeable medicines. But since those agents which are capable of arresting or preventing fermentation would exert the same influence upon the diastase, and consequently would prevent the latter from acting upon starch, they should not be given in combination with malt extract, or at least only in very small quantities. Tannic acid, salts of quinine, salts of iron (ferric) with organic acids, and potassium iodide should be given in comparatively large quantities of the extract. Hager mentions the following compounds or preparations as in use in Germany:*

Extractum malti chininatum (or *quinatum*), *Malt extract with quinia*, was formerly prepared by adding 1 part of quinia sulphate to 250 parts of the extract; but the bitterness of the mixture caused it to be frequently rejected by children. At present the usual method is to add 1 part of quinia tannate to 100 parts of the extract. A trial with a perfectly neutral extract, prepared by J. D. Riedel, yielded a solution, which had not deposited any sediment after eight days, and which exerted but a very slightly diminished action upon starch. Hager proposed to call this *Extractum malti tannochinatum*.

Extractum malti ferratum, *Ferrated malt extract*. A formula for this preparation is given by the German Pharmacopœia. It is best prepared by dissolving 2 parts of soluble ferric pyrophosphate in five parts of pure glycerine, and adding it to 93 parts of the extract. The taste of the resulting product is, however, slightly modified, and Hager recommends to use saccharate of iron 3 parts, glycerine 7 parts, and extract 90 parts.—This would be *Extractum malti saccharoferratum*.

Extractum malti iodatum, *Iodized malt extract*, is a solution of 1 part of potassium iodide in 10,000 parts [rather dilute! Ed. N. R.] of extract.

Extractum malti pepsinatum, *Malt extract with pepsin*, is said to be more nutritious than the simple extract, and

* From *New Remedies*, August, 1876.

† In the course of the paper, this sample is distinguished by X.

* A number of preparations, besides those enumerated above, are in use in the United States.

to be especially valuable in dyspeptic complaints. For this purpose a saccharated pepsin of 50 per cent. is recommended. Two parts of this are rubbed with 5 parts of glycerine, and added to 93 parts of the extract. It is best to prepare this mixture only when wanted.

Extractum malti lupulinatum, Extract of malt with hops, is a preparation made by J. D. Riedel, of Berlin. Although originally intended to be added to weak malt liquors or beers for the purpose of giving "body," it may be used medicinally. It has an agreeable aromatic taste, and is probably a solution of alcoholic extract of hops in extract of malt.

NOTES ON THE GENUS TEUCRIUM.*

BY JOHN M. MAISCH.

In the search for remedial agents, physicians sometimes resort to drugs which have been formerly employed medicinally and have fallen into disuse on account of their indifferent properties, or because other more active and reliable medicines have taken their place; occasionally a remedy is neglected and forgotten, and its valuable qualities have to be, as it were, rediscovered, or it comes to the surface once more, merely, as it seems, for the purpose of proving that we can well get along without it. Such thoughts came to my mind when, a short time ago, a prescription was shown to me calling for *Extractum Teucrii scordii fluidum,* an almost obsolete European remedy in an American form.

Teucrium scordium, Lin, *germandrée aquatique* of the French, *Lachenknoblauch* of the Germans, is usually called water germander in English, because it grows in moist, swampy meadows, near ponds, etc. It is found in Western Asia, and throughout a large portion of Europe. Forty years ago it was officinal in most pharmacopœias of continental Europe, but since then has been dismissed in the revised editions of nearly all, retaining a place in a few only.

The plant belongs to the natural order of Labiatæ, a family of plants which is characterized by the complete absence of deleterious properties, the active constituents found in them being chiefly volatile oil, associated in many with more or less of a bitter, non-alkaloidal principle, and occasionally with a little tannin. The medical properties of the labiatæ are therefore mainly carminative and stimulant, and frequently tonic and stomachic. They are mostly indigenous to the temperate regions of the old world, the number indigenous to the United States being comparatively small; but many species have been introduced here from Europe, and completely naturalized in some sections of the United States.

The genus Teucrium is classed with the tribe *Ajugoideæ,* which has the upper lip short, or deeply notched and turned forward so as to appear wanting, the four ascending stamens projecting through the slit in the upper lip. Several of the European species formerly enjoyed a high reputation, among them the one mentioned, which, together with the allied species *T. scordioides,* Schreb., is regarded to be the Σκόρδιον of Dioscorides. The plant is softly pubescent, attains a height of twelve to eighteen inches, has sessile, oblong, serrate leaves, and rose-coloured flowers, two or three of which are found in the axils of the leaves. The second species differs mainly by being villous and having cordately ovate, somewhat clasping leaves. Both possess a bitter taste, and, in the fresh state, a distinctly alliaceous odour; it was formerly in repute as an antiseptic and diaphoretic internal remedy, for gargles, and as a dressing for foul ulcers. 'The New London Dispensatory,' printed in 1676, says of it: "It is lyptintick, abstersive, traumatick, alexipharmick, sudorific, anodyne and pectoral; it opens obstructions of all the principal parts, cleanseth the intrails and old ulcers; provokes urine and the terms; expectorates rotten matter out of the chest; helps old coughs, asthmas, pleurisies, inward ruptures, biting and stinging of serpents, and potently resists poison, plague, and all pestilential diseases. It exhilarates the heart, cures the bloody-flux, comforts the stomach, and drives out the small pox and measles. Outwardly, it cleanseth and heals wounds and ulcers, and cures pains of the gout. The essence is most effectual to the intentions aforesaid."

Similar but more feeble virtues were attributed to *T. scorodonia,* Lin., s. *Scorodonia beteromalla,* Moench, likewise a European plant, which differs from the former in having petiolate, cordate-ovate leaves, a more distinctly two lipped calyx and yellow corolla.

The fluid extract of water germander may be made by the U.S. officinal process for fluid extract of chimaphila, and may be given in doses of one-half to one teaspoonful.

The following European species were formerly employed medicinally for their stimulating and tonic properties, and some still enjoy some popularity as domestic remedies in localities where they occur.

T. polium, Lin., with sessile, linear-lanceolate, crenate and tomentose leaves and terminal white flowers.

T. montanum, Lin. Leaves similar, with a revolute margin and terminal yellowish flowers.

T. creticum, Lin., resembling the preceding, but the bluish flowers axillary and single. The closely allied *T. rosmarinifolium,* Lam., has the branches longer and more slender, and the flowers in cymules of three in the axils of the bracts.

T. flavum, Lin., has its greyish-yellow flowers similarly arranged; but the petiolate leaves are ovate and crenate.

T. fruticans, Lin., is the *Erba di S. Lorenzo* of Southern Italy, and has entire, oblong or oval, sub-coriaceous leaves, and single axillary flowers with bluish corolla.

T. chamædrys, Lin., the χαμαίδρυς of Dioscorides; leaves short petiolate, ovate to obovate, cuneate at base, crenately serrate; flowers, one to three, axillary with purplish-red corollas.

T. botrys, Lin. Leaves triangular-ovate in outline, pinnatifid; flowers axillary, in threes; corolla pale red, punctate in the throat.

These and a few other species, indigenous to Southern Europe and the basin of the Mediterranean, most probably do not differ in their medicinal properties from *Teucrium Canadense,* Lin., the wood sage or germander of the United States and Canada.

Somewhat different properties are met with in *T. marum,* Lin., cat thyme, or Syrian herb mastich, which is found in the countries bordering on the Mediterranean. Its leaves are petiolate, ovate or ovate-oblong, rather acute, white tomentose beneath; the rose-red flowers are single in the axils of the bracts, and form a terminal one-sided, raceme. It has a strong aromatic, somewhat camphoraceous odour, and an aromatic, bitterish and acrid taste. It has been employed internally, in doses of twenty to sixty grains, in various spasmodic and other nervous disorders, and externally chiefly for its errhine properties; it constituted the active ingredient of the *Pulvis sternutatorius* of some old European 'pharmacopœias,' which was composed of sweet marjoram three parts, cat thyme, lily of the valley and orris root, of each one part. Cat thyme is prescribed in Europe under the name of *Herba mari veri.*

SANTONATE OF SODA*.

BY M. LEPAGE.

The author having failed to get satisfactory results with either of two published processes for preparing santonate of soda, proposed the following mode of operating, which he finds to give a satisfactory result:—

* Read at the Meeting of the Philadelphia College of Pharmacy, held August 15th; from *Amer. Journ. Pharm.*

* Abstract of a paper in the *Journal de Pharmacie* [4], vol. xxiv. p. 311.

Take—

Powdered Santonin	100	grams.
Alcohol (90°)	500	„
Distilled Water	500	„
Unslacked Lime	80	„
Carbonate of Soda	90	„

Dissolve the santonin in the alcohol and water at the temperature of a water-bath; then add the lime, previously slacked and suspended in a very small quantity of water, and stir frequently. The liquid immediately takes a magnificent rose colour, but after about ten or fifteen minutes it loses its colour and presents the appearance of a clear soup. This is due to the formation of santonate of lime, which is but slightly soluble in the alcohol and water. Allow the mixture to remain in the water bath some minutes longer, to ensure the complete combination of the calcium oxide and santonin; then pour in the carbonate of soda dissolved in double its weight of pure water, agitate briskly, allow the liquor to deposit, and filter. Distil the filtrate in a water-bath to recover the alcohol; concentrate the residue in a dish placed in hot water until of the consistence of a syrup, weighing 200 or 220 grams. After about twelve hours, when it has solidified, powder it and suspend it in 800 grams of 90° alcohol; agitate frequently to facilitate solution, and after some hours of contact decant the clear liquid. Wash the portion remaining undissolved (excess of carbonate of soda) with 200 grams of fresh alcohol and add this to the other alcohol, filter, distil to recover about three-fifths of the alcohol, and terminate the operation by concentrating the residue in a water-bath until reduced to about 400 grams. Let this stand, and at the end of twenty-four to thirty-six hours it will form a crystalline mass of small prismatic needles, which after drying will weigh 150 to 160 grams. The mother-liquor, by further concentration will still yield 20 to 25 grams of the salt.

The santonate of soda thus obtained is perfectly white, and contains, according to the author's analysis, 51 per cent. of santonic acid. It dissolves completely in three parts of water at the ordinary temperature and in four parts of alcohol at 90° C. The aqueous solution possesses a marked bitter taste and presents an alkaline reaction with litmus paper. No turbidity or precipitation should be caused by oxalate of ammonia, chloride of barium, or carbonate of soda. Acids added in slight excess precipitate the santonic acid.

Syrup of Santonate of Soda.

The author recommends the following formula for a vermifuge syrup, which from its taste resembling sugar syrup could be administered without difficulty to children:—

Powdered Santonate of Soda	5	grams.
Simple Syrup	900	„
Syrup of Orange Flower	100	„

Suspend the santonate in 250 grams of the simple syrup and heat it over a spirit lamp until dissolved; add the remainder of the syrup, then the syrup of orange flower; and mix carefully. A tablespoonful, or 20 grams of this syrup, will contain 10 centigrams of santonate, or the equivalent of 5 centigrams of santonin. For adults the dose might be doubled, or a syrup made containing 20 centigrams to the tablespoonful.

THE PREPARATION OF SOME COLOURED FIRES (BENGAL LIGHTS) USED IN PYROTECHNY.*

BY SERGIUS KERN, ST. PETERSBURG.

In preparing coloured fires for fireworks by means of the usual formulæ given in many manuals of pyrotechny it is often very necessary to know the quickness of burning of coloured fires, as in some cases, such as decorations and lances, they must burn slowly, in other cases, as wheels, stars for rockets, and Roman candles, they must burn quicker. Working for some months with many compositions of such kind, I prepared three tables of coloured fires (red, green and violet), where every formula with a higher number burns quicker than a fire with a lower number. For instance, No. 5 burns quicker than No. 6, and slower than No. 4. These tables will, I think, be of much assistance in the preparation of fireworks:—

Green-coloured Fires.

No.	Potassium Chlorate. Per cent.	Barium Nitrate. Per cent.	Sulphur. Per cent.
1.	36	40	24
2.	29	48	23
3.	24	53	23
4.	21	57	22
5.	18	60	22
6.	16	62	22
7.	14	64	22
8.	13	66	21
9.	12	67	21
10.	11	68	21
11.	10	69	21
12.	9·5	69·5	21
13.	9	70	21
14.	8·5	70·5	21
15.	8	71	21

Red-coloured Fires.

No.	Potassium Chlorate. Per cent.	Strontium Nitrate. Per cent.	Sulphur. Per cent.	Carbon Powder. Per cent.
1.	40	39	18	3
2.	32	46	19	2
3.	27	51	20	2
4.	23	55	20	2
5.	20	58	20·5	1·5
6.	18	60	21	1
7.	16	61·6	21·2	1·2
8.	15	63	21	1
9.	13	64	22	1
10.	12	65	22	1
11.	11	66	22	1
12.	10	67	22	1
13.	10	67·25	22	0·75
14.	9·25	68	22	0·75
15.	9	68·35	22	0·65

Violet-coloured Fires.

No.	Potassium Chlorate. Per cent.	Calcium Carbonate. Per cent.	Malachite Powdered. Per cent.	Sulphur Per cent.
1.	52	29	4	15
2.	52	28	5	15
3.	52	26	7	15
4.	52	24	9	15
5.	52	23	10	15
6.	52	21	13	15
7.	51	20	14	15
8.	51	18	16	15
9.	51	16	18	15
10.	51	15	19	15
11.	51	13	21	15
12.	51	11	23	15
13.	51	10	24	15
14.	51	8	26	15
15.	51	6	28	15

---

* From the *Chemical News*, September 29, 1876.

THE PHARMACOLOGICAL GROUP OF PIPERIN.*

Professor R. Buchheim has shown, several years ago,† that black pepper contains two substances which are of analogous chemical constitution, and have similar action. One of these is piperin, which was discovered by Oerstedt in 1819, and was first supposed to be the acrid principle until Pelletier (1821) showed that it was tasteless, when quite pure, and that the biting taste resided in the accompanying resin. To settle this question, Professor Buchheim lately exhausted 2000 gms. of black pepper with alcohol, removed the alcohol from the percolate by distillation, and treated the residue with water, which dissolved only traces thereof, without assuming any sharp taste. The extract was now shaken with ether as long as the latter became coloured thereby. The residuary part of the extract consisted almost wholly of impure piperin, which was deprived of a little adhering resin by potassa solution, then dissolved in hot alcohol, decolorized by animal charcoal, and re-crystallized from hot alcohol and petroleum ether. The pure piperin thus obtained consists of almost colourless rhombic cylinders, with a faint yellowish tint, which could not be removed. They were tasteless when merely placed upon the tongue, being entirely insoluble in aqueous fluids, but exhibited the sharp taste of pepper when chewed, or when introduced in alcoholic solution.

The ethereal solution obtained above was then shaken with solution of potassa, which removed chlorophyll, fatty acids, and an acid resin. On distilling off the ether a residue of an intense yellow colour was left behind, which was dissolved in alcohol and treated with animal charcoal. It was, however, impossible to decolorize it entirely; and, besides, a little piperin accompanied it, from which it was exceedingly difficult to separate it. In this condition the residue appeared as a yellowish-brown mass of the consistence of thick turpentine, and of extremely biting taste. The yield was about two-thirds of that of piperin. Treatment with alcoholic potassa and supersaturation with sulphuric acid produced from it a substance which was recognized as piperidin sulphate.

There exist, therefore, in black pepper, two bodies, which yield piperidin with alcoholic potassa—namely, *piperin*, and the new body here obtained, for which the name *chavicin* is proposed, from *Chavica officinarum*, Mign., or long pepper. On account of its amorphous condition this substance has heretofore been denoted merely as "resin," and had not been investigated. While *piperin*‡ may be regarded as piperidin, $C_5H_{10}HN$, in which one H is replaced by piperic acid—$C_5H_{10}(C_{12}H_9O_3)N$—we may consider *chavicin* in a similar manner as piperidin, in which one H is replaced by *chavicic* acid.

These piperidin compounds exist in nature, also, in other plants. Pellitory (*radix pyrethri*) contains a body, which Professor Buchheim has named *pyrethrin*, and which he ascertained to be decomposable into piperidin and pyrethric acid. *Herba spilanthis* (from *Spilanthes oleracea*, Jacq., paracress) also contains a body which may be split up into an acid and piperidin.

CYPRESSUS PYRAMIDALIS.§

BY N. HARTSEN.

The author has published a note relative to an amorphous and a crystalline substance that he has found in the *Cypressus pyramidalis*. The amorphous substance was obtained by macerating the stems in alcohol, then distilling off part of the alcohol until the resinous matters were precipitated, separating the liquid and further heating it to drive off the alcohol. A yellowish powder was precipitated that was insoluble in water, acetic acid, and ether (the last could be used for separating it from adherent resinous matter); in alcohol it was slightly soluble.

Sulphuric acid converted it into a brown substance. It was dissolved by ammonia, forming a citron yellow liquid. Its alcoholic solution gave a yellow precipitate with an alcoholic solution of acetate of lead.

The crystalline substance was obtained from ripe or nearly ripe fruits, by macerating the peeled fruits in alcohol, and allowing the tincture to evaporate spontaneously, when the crystals were left mixed with resinous matter. This substance crystallized in beautiful prisms, which had a light emerald green tint; treatment with animal charcoal failed to remove this colour. When heated upon platinum the crystals melted and afterwards volatilized, giving off irritating vapours. The crystals were insoluble in water, but soluble in alcohol and ether. An alcoholic solution was precipitated by an alcoholic solution of acetate of lead.

NEW ITALIAN VARIETY OF LIQUORICE EXTRACT.

In the *Pharmaceutische Zeitschrift f. Russland* (vol. xv., p. 257), A. Peltz notices a new variety of liquorice extract which he had received for examination from a Russian wholesale house. It occurs in irregular masses, is rather tough, but can be cut with a knife, has a dull appearance, and possesses a purely sweet, not burnt, taste. On dissolving it in water it leaves only a very small residue. whilst the solution evaporated over a water-bath yields 75 per cent. of extract dried at 90° C. The undissolved residue was washed with a weak solution of ammonia, then boiled in water, and the liquid then gave indications of starch with tincture of iodine.

To ascertain the amount of glycyrrhizin 10 grams of the liquorice were dissolved in water, filtered, the filtered solution mixed with a sufficient quantity of dilute sulphuric acid, and the precipitate collected on a filter and washed. As this did not give the glycyrrhizin sufficiently pure, the precipitate was again dissolved in weak solution of ammonia and reprecipitated with sulphuric acid. This precipitate was dried, triturated with one-third of its weight of barium carbonate, and extracted with hot absolute alcohol. The alcoholic extract evaporated to dryness gave 1·5 gram of glycyrrhizin.

The amount of sugar was ascertained by means of the copper solution to be 10 per cent.; the loss in moisture when dried at 100° amounted to 14 per cent.

The following table shows the position of the new substance in relation to other commercial liquorices:—

Variety.	Moisture Per cent.	Dried Extract Per cent.	Glycyrrhizin. Per cent.	Starch. Per cent.	Sugar. Per cent.
English .	1·2	38	2·44	27·10	13
Calabrian	2·0	47	1·33	35·50	11
Bayonne .	3·7	48	2·19	35·10	14
Astrachan	7·3	50	18·14	1·33	12
Spanish .	4·12	55	3·15	8·35	14
Kasan .	4·5	57	14·74	2·62	14
Sicilian .	4·1	60·5	4·67	5·00	16
Baracco .	3·7	67·5	4·95	13·12	15
Morean .	—	79·0	11·88	5·33	16
Italian .	14·0	75·0	15·0	2·50	10

It will be seen that though the Morean variety yields more extract it is accounted for by the amount of sugar; whilst the Kasan variety which contains almost the same amount of glycyrrhizin as the Italian has the disadvantage of an unpleasant, almost tarry taste. The new article, notwithstanding its good qualities, is said to have been offered at a low price.

* From *New Remedies*, September, 1876.

† *Archiv f. Pathol. Anatomie*, LVI., 9.

‡ The formula of piperin is $C_{17}H_{19}NO_3$, or doubled, $C_{34}H_{38}N_2O_6$.

§ *Journal de Pharmacie* [4], vol. xxiv. p. 304.

THE BRUSSELS CONGRESS.

USE OF DEFINITE CHEMICAL PRINCIPLES IN MEDICINE.

We have been favoured with the following letter upon the above subject by Dr. Julius Morel, of Ghent:—

"My dear Editor,—I wish to chat with you for a few minutes to-day respecting one of the questions discussed at the Medical Congress, held at Brussels last year. It is only within the last few days that the *Compte-Rendu* of the sittings has appeared, and that the interested public and the press, who did not take part in the sittings, have been able to make acquaintance with scientific discussions which there took place.

"The question is, 'Is it necessary to extend the medical use of chemically definite immediate principles and to multiply the preparations of them in the Pharmacopœias?' Mr. Van Bartelaer, who presented to the pharmacy section the report upon this question, stated the following conclusions:—

"'(1) That it is eminently desirable that the employment in medicine of chemically definite immediate principles should be extended in such a manner that, progressively, the usage should become established of substituting for the employment of the crude vegetable substances that of their isolated active principles.

"'(2) It would be useful, with this object, to multiply in the Pharmacopœia formulæ suitable to aid the movement.

"'(3) The medicinal forms which would lend themselves best to the employment of immediate principles and facilitate their administration to the sick are—For internal use: the *grain* and *granule*, containing one milligram of active substance; and, for external use: the *alcoholate*, 1 in 50, which would correspond pretty closely with a milligram per drop measured by the *compte-goutte*.'

"Warm partisan as I am of the extension of the use of the active principles in medicine, I cannot, as a medical man, hide from myself the great difficulties that would arise from the too general adoption of the first conclusion of the reporter. Mr. Van Bartelaer, whilst admitting the differences which exist between an active principle of a plant and the official preparations of it as given in the Pharmacopœias, shows himself to be a zealous defender of the generalization of the administration of active principles, and seems to have a very limited confidence in the pharmaceutical preparations of the present day. He alleges the confusion and want of clearness in the action of complex medicines, and the variability in the therapeutic power of plants, dependent upon collection. He refers to the small confidence which the first principles of the art of pharmacy inspire in respect to the time at which a plant should be collected. He asks,—Do you know the age of the plants which you use as a drug? Do you know the conditions, the soil, the climate, in which the plant has lived? The flowers, fruits, roots, etc., have they been collected at the time ordered by the Pharmacopœia? Does the drug come from a plant that has been cultivated or one that has grown wild? Have the extracts always the same strength, or do they possess always the same therapeutic value? I comprehend easily the different arguments with which the honourable reporter defends his thesis, and, with him I also say that there is a variability in the therapeutic power of plants, due to the Galenical preparation, and that the same Galenical preparations have a variable action dependent on their preservation.

"But all these arguments have not convinced me, and notwithstanding the eulogy uttered upon the facility with which active principles can be administered to the sick,—a facility which no one contests,—I cannot admit, or believe, that at this moment there is any urgency for the modification of our ordinary mode of procedure. We know well, and Mr. Van Bartelaer admits, that there are medicines which hitherto it has not been possible to replace by active principles and that it would be necessary in respect to them to make exceptions. Unfortunately these exceptions would be so numerous that the nineteenth century would not see the complete abandonment of barks, roots, etc., in favour of medicines of a simpler composition.

"No person more than myself, I repeat, is a partisan of the generalization of active principles in medicine, and I watch with pleasure the incessant labours of chemists, pharmacologists, and toxicologists, who make known to us from time to time fresh information upon the composition of drugs and new experiences in the action of medicines. I admire the splendid modern investigations of the chemists who help to give us the chemical composition of drugs as completely as possible, who seek to isolate and to introduce their active principles into therapeutics. But a consideration of the different arguments has induced me to rest *in statu quo*; that is to say, not to recommend the generalization of the active principles except so far as experiments shall have shown, in an irrefutable manner, that these substances present an action identical with that of the drug from which they are derived, or, to speak more clearly, answer the same therapeutic object. I am convinced that all professors entrusted with the teaching of therapeutics, will look upon the question in the same light.

"Another point in the report of Mr. Van Bartelaer that deserves to be challenged, is that where he speaks of the unfaithfulness of the Galenical preparations and the impossibility of exercising any control over their value. This is an error, a profound error. It is sufficient to recall the fact that on the occasion of the Pharmaceutical Congress held at St. Petersburg in 1874, Dr. Dragendorff, professor at the University of Dorpat, presented a *brochure* entitled, 'The Chemical Valuation of some Active Drugs and of Medicinal Preparations made from them' (*Die chemische Werthbestimmung einiger Starkwirkender Droguen und der aus ihnen angefertigten Arzneimischungen*), which has already been translated into French; and in which fourteen drugs and their preparations are examined, not only from the qualitative point of view, but from the quantitative. Professor Dragendorff is pursuing his work, and soon we shall have another memoir dealing with the chemical study, qualitatively and quantitatively, of another series of drugs. Besides this, information is now met with scattered throughout most periodical pharmaceutical works which make it possible for the pharmacist who desires to assure himself of the value of his products to examine a large number of Galenical preparations. Science is always progressing, but while hoping in a prompt renaissance of the art of pharmacy, I believe that we should be taxed with exaggeration and exclusiveness in trying at present to generalize the use of active principles to the extent desired by the reporter. The control of Galenical preparations is for the most part possible, and it is for the pharmacist to exercise this in his laboratory. Further, modern Pharmacopœias, which have been compiled both by medical men and pharmacists, prove sufficiently that the second conclusion of Mr. Van Bartelaer,—that it would be useful to multiply in the Pharmacopœias formulæ suitable to promote the movement—would not receive an unanimous adhesion.

"What shall be said of the third conclusion, recommending for internal use the grain and the granule containing a milligram of active matter, and for external use the alcoholate, 1 in 50°? Here, without consulting the medical profession, every serious pharmacist would see the impossibility of adhering to such a conclusion. He knows, on the one hand, that the use of such granules would only favour the development of industrial pharmacy, and on the other, that the pharmacist prefers to leave the preparation of the medicines to the decision of the physician, who prescribes them according to the particular circumstances of which he alone can be the judge. As to the employment of the alcoholate for external use, experiments would have to be instituted to ascertain which is the best menstruum to facilitate the absorption of the medicine. Concerning this Mr. Van Bartelaer is silent."

The Pharmaceutical Journal.

SATURDAY, OCTOBER 14, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

POISON SCHEDULES AT HOME AND ABROAD.

A SIMILAR question to that which has been mooted in this country, as to the desirability of extending the existing restrictions of the sale of poisonous articles, has, during the past few years been under consideration in France with regard to the proposed addition of nux vomica to the list of articles which are not allowed to be sold except on the order of a medical practitioner.

The Sanitary Committee of the Government having been appealed to, came to the conclusion that before taking any decisive measures, and at the same time with the view of making at once any other necessary alterations in the list of articles subject to restriction, the Departmental Sanitary Committees throughout the country should be consulted on this matter, and with that object a circular was sent out requesting communications in reply to the question, "Whether it would not be opportune to include in a supplementary decree, not only nux vomica, but also some other poisonous substances which do not appear in the list, and which should be included out of regard to the public safety?"

The result of this inquiry has recently been made public, and a *résumé* of the different opinions expressed will not be without interest at the present time. In the first place it will be necessary to state that the present state of the law relating to this subject in France is as follows:—

Previous laws relating to poisons were superseded by the articles 34 and 35 of the law of 21st Germinal an XI.

The 34th article refers in a general way to all poisonous substances, but does not give any definition of them; it does not contain any schedule of the articles to which it relates, but merely indicates, for illustration, arsenic, corrosive sublimate, and realgar; moreover, this article applies only to pharmaciens and grocers, without any mention of the other vendors of poisonous substances, such as wholesale dealers and manufacturers who employ poisonous substances and have considerable quantities of them at their disposal. Lastly, it imposes a uniform penalty of about £120 for any infringement of its provisions—a circumstance that caused difficulty in enforcing the penalty in minor cases of infringement or of mere negligence, which on this account frequently escaped the degree of punishment they merit.

In order to remedy these defects the law was supplemented with a subsequent enactment, the special object of which was to establish a scale of penalties proportionate to the various circumstances under which the law relating to poisonous substances might be disregarded, and it left the duty of regulating the sale, purchase, and use of those substances to be dealt with by the Government.

The penalty of infringement was according to this law from £4 to £120, with a term of imprisonment varying from six days to two months, and in all cases confiscation of the articles sold contrary to law.

In conformity with this law regulations were laid down in 1846, and they specify under three distinct heads all the obligations affecting commercial transactions relating to poisonous substances, the sale of such substances by pharmaciens, and the general arrangements and proceedure fitting to ensure the observance of the regulations in question. They comprise, moreover, a schedule of the particular articles to which they apply, numbering in all sixty-two, which are specially named, but in reality comprising many more, since in many instances the names include all the preparations into which the scheduled substances enter as ingredients.

The schedule was greatly modified by the decree of 1850, and the number of articles specially named was reduced to twenty. Lastly, a decree in 1864 added to this schedule coculus indicus, which was used for killing fish. It is to this modified schedule that the Ministry has called the attention of the Departmental Sanitary Committees by inviting them to specify the substances which they think should be added to it.

The alterations that have already been made in the schedule of poisons, and the necessity of revision, which is now deemed to be desirable, are in themselves sufficient evidence of the difficulty that is experienced in reconciling the requirements of trade and industry with those of public safety. If, from the latter point of view alone, it be desired to have a schedule of all poisonous substances that are capable of being misused with criminal intent, it would be necessary to add to the schedule salts of lead and of copper and a host of articles which are staple commodities of the drysalter, colour dealer, and chemical manufacturer, as well as a great number of materials employed in the arts or in domestic economy, and even then the object in view would be far from being attained.

If, on the contrary, the question be regarded merely from a free trade point of view, there is a tendency to limit as much as possible the restriction and to do away altogether with formalities which are in any way troublesome to those who use, sell, or purchase poisonous articles.

An official schedule, whatever may be its scope, will therefore always appear to some to be insufficient, while it is regarded by others as being to a great extent superfluous, if not altogether so, and it is precisely this conflicting result that has been arrived at by the inquiry instituted by the French Government.

The greater number of the reports sent in by the Departmental Sanitary Committees express the opinion that the schedule appended to the regulations of 1846 is incomplete and that it should be to some degree extended, and at the same time a smaller number demand on the contrary that it should be reduced, while some others, but it is true only three, demand that it shall be altogether done away with.

The principal argument put forward against the existing state of the law is to the effect that the regulations of 1846, having for their object the prevention of criminal poisoning and having failed to attain that object, are to be regarded only as useless hindrances of trade which ought to be removed. This view of the matter, however, leaves out of consideration the fact that it is not only criminal poisoning that is sought to be prevented, but likewise those accidents which may result from mistakes, ignorance, or negligence on the part either of the vendors of poisonous substances or of those who make use of them. It is to the point that the regulations are directed where it is provided that manufacturers using poisonous substances shall control their application in their establishments and register the use of them as directed by law; also that poisonous substances shall always be kept by dealers, manufacturers and pharmaciens in a place that is locked up. These precautions cannot always prevent the misuse or accident, but they impose a great responsibility upon those persons who have the control of poisonous articles, and in case of crime or accident they afford means of ascertaining whether reasonable care has been taken.

On the whole, one of the most striking results of this inquiry is the evidence afforded by the reports of the Sanitary Committees as to the slender confidence inspired by the law, and the little zeal that is exercised to carry it out. It is evident, too, that considerable ignorance prevails as to the actual state of the law, for in some instances recommendations are made to add to the schedule articles which are already comprised in it. In this respect the state of affairs seems to be much the same in France as in this country, where there is constantly occasion to remark that the provisions of the law relating to the sale of poisons are misunderstood or ignored by public officials.

ANALYTICAL DISCORD.

SINCE the establishment of the analyst as a public official his existence has not been a very peaceful one, and the recognition of his labours for the public good has certainly in most cases secured for him more kicks than halfpence. Of late, less has been heard of analytical cases and contests than when those proceedings had the charm of novelty: but the habit of fighting developed on butter, milk, and bread, appears to have become so inveterate that these officials, having started a Journal of their own, are now commencing to attack one another, and their natural enemy, Mr. HOLBORN, may eventually have the satisfaction of seeing them share the fate of the proverbial cats of Kilkenny. For some time past, a contest has been going on about an analysis of butter, and in reference to some comments on this matter in the *Analyst* a letter appears in the *Chemical News* of last week, from Mr. WANKLYN, in which he takes the "opportunity of making known that the Society of Public Analysts has no real control over the *Analyst*, which is the property of Mr. WIGNER and Dr. MUTER, who alone are responsible for the contents of the paper." We are at a loss to understand the announcement from Mr. WANKLYN, since his name appears on the title-page of the *Analyst* as a member of the Committee of Publication. Still more remarkable is the statement in the same letter that an indirect vote of censure on the Committee of Publication was passed at the Glasgow Meeting of Public Analysts, for Mr. WANKLYN, we believe, presided at that meeting, and would appear to have superintended the condemnation,—partly of himself,—which he now tells us was not half so severe as he thinks it should have been.

LIVERPOOL CHEMISTS' ASSOCIATION.

WE are informed by the President of the Liverpool Chemists' Association that Mr. THOMAS WILLIAMS, F.C.S., will deliver a Course of Lectures on Chemistry, at the Laboratory, 23, Lord Street, Liverpool, on Friday evenings, commencing the 13th instant. Arrangements have also been made for the teaching of Practical Chemistry.

AMERICAN PHARMACEUTICAL ASSOCIATION.

THE twenty-fourth annual meeting of the American Pharmaceutical Association was commenced on Tuesday, September 12th, in the Lecture Room of the Philadelphia College of Pharmacy, under the presidency of Professor MARKOE. About 250 members were present. The programme extended to the following Tuesday. We hope to be able to give further details of the meeting in the Journal for next week.

PHARMACY IN NEW SOUTH WALES.

WE are glad to learn that a Pharmaceutical Society has been established in New South Wales for the purpose of uniting the chemists and druggists in the colony "in one ostensible, recognized, and independent body, for protecting their general interests, and for the advancement of pharmacy by furnishing such a uniform system of education as shall secure the profession and public the safest and most efficient administration of medicines." The new Society has speedily obtained legislative recognition, and an Act has been passed entrusting to a Board of Pharmacy elected from the Council of the Society power to control all matters relating to the conduct of pharmacy, sale of poisons, etc., throughout the colony.

Provincial Transactions.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

The Opening Meeting of the above Society was held on Friday, September 23. The chair was taken by Mr. G. C. Druce. The election for Council and Class Conductors was first taken, when the following were chosen :—*President*, Mr. G. C. Druce; *Vice President*, Mr. G. C. Osborne; *Secretary and Treasurer*, Mr. J. Townsend; *Council*, Messrs. Holdgate, Holloway, and Northen; *Class Conductors*, Mr. Mayger (Botany); Mr. Holdgate (Materia Medica; Mr. Druce (Chemistry); and Mr. Townsend (Pharmacy).

The President said he was not prepared that evening with an address, but he must express his thanks to so many members for their support and assistance during the time he had been Secretary. Nor could he allow the kindness and help rendered by the principals to pass unnoticed. He greatly regretted the Association could not show better results after the initiation of earlier closing last winter, but from various causes the number of assistants in the town had been reduced by 20 per cent. in the last three years, and as it happened some three or four were rendered comparatively useless to the classes by the *pons asinorum* of pharmacy, which they had to cross; so that after Christmas the attendance at the classes had become so bad as to render it necessary to discontinue what might have been a good programme. But an analytical class was carried on for some time weekly. He believed, judging from the present meeting, that a desire was now felt to keep the Association going by making the classes a success. He concluded by thanking the members for electing him and by welcoming the new members.

The Secretary thanked the members for electing him as secretary, and expressed a hope that the ensuing session would be a success in every respect. He then read the following:—

"REPORT.

"The Council in placing the report of their fifth year's work before the members, regret that the attendance during the past year was so poor that a great portion of the classes had to be omitted, a result perhaps partly owing to the comparatively few who were eligible to prepare for the minor examination. But in the opinion of the Council it would be unwise to let the partial failure of a session be the cause for a discontinuation of the classes; it has therefore arranged a series of classes on botany, materia medica, pharmacy, prescriptions, practical and theoretical chemistry, which will be alternately studied on Mondays and Thursdays. The room will also be available for use on any other week night. The Council takes this opportunity of thanking the principals for meeting the wishes of the members by closing their establishments at 7·30 last winter, and trusts that they may not find it detrimental to business if they give the same advantage in future. Thanks are also due to P. Jeyes, Esq., for the continued use of room; to James Barry Esq., for gift of 20 bound vols. of *Pharmaceutical Journal*; to the Pharmaceutical Society for gift of Journal and Calendar, and to the Mechanics' Institute for loan of Oertling's Balance. The Council sincerely hopes that the members will give their support to the Association by regularly attending the classes, thus showing to the class conductors that their efforts are appreciated."

BALANCE SHEET.

	£	s.	d.
Balance in hand...	8	17	10
Eighteen Members' Subscriptions	4	10	0
Interest	0	2	0
	£13	9	10

	£	s.	d.
Books and Binding	1	15	2
Apparatus and Chemicals	2	7	5
Gas Stove	0	12	6
Printing, Stationery, etc.	1	9	3
Gas...	0	12	10
Balance in hand, 1876	6	12	8
	£13	9	10

Mr. Holdgate in a short speech alluded to the way in which the Minor examination was conducted, and said it only needed determination and work, to successfully pass it.

The meeting then terminated with the usual vote of thanks to the Chairman.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A numerously attended meeting of members of the above Association was held on Thursday, the 21st inst., at the Halford Street Chambers, in order to listen to a lecture on the microscope, delivered by Mr. James Edwards. The President, Mr. W. B. Baron, occupied the chair. As the optical portion of the subject had been fully treated upon by the President near the close of the last session the lecturer confined himself to the elucidation of the mechanical principles involved in the construction of the microscope, the precautions to be observed in its manipulation, and to an enumeration and illustration of the various uses to which it might be advantageously applied. He lucidly explained the construction and method of using not only the ordinary binocular, but also some of its more important accessories, including polarizing prisms, paraboloid illuminator, graduated mechanical stage, camera lucida, micrometer, etc. The manifold uses subserved by the microscope in the prosecution of physiological research, both in the animal and vegetable kingdoms, its value to the anatomist in making minute dissections, to the physician in tracing the progress of renal and kindred diseases, to the analyst in enabling him to detect impurities in food and drugs, and as a means of mental discipline, inducing in the observer habits of carefulness, exactitude, and close observation, were all enlarged upon by the lecturer. Finally, a collection of objects was exhibited, including among other things the circulation of the blood in the foot of the frog, also specimens of Sarcoptes scabiei, Stylops Spencii, elytron of Curculis imperialis, spermatozoa, crystals of salicin, chlorate of potash, etc. The whole of the lecture was admirably illustrated by a very fine binocular by Crouch.

On the termination of the lecture a hearty vote of thanks was moved by the Chairman to Mr. Edwards for his services, and the motion was carried by acclammation. The meeting then broke up after spending a couple of hours in a most profitable manner.

At the meeting of the Association on the 28th of September, Mr. Cocking, of Sittingbourne, Kent, exhibited his double-action pill machine to the members.

Proceedings of Scientific Societies.

PARIS SOCIÉTÉ DE PHARMACIE.

A meeting of this Society was held on Wednesday, August 2, under the presidency of M. Marais.

Action of Phosphorus upon Iodates in Presence of Atmospheric Air.—Amongst the papers read was one by M. I. Corne on this subject. On a former occasion the author had stated that the reduction of iodine observed when a fragment of phosphorus is brought into contact with a solution of an iodate was not due to the phosphorus, but to a phosphorus acid. This statement having been challenged by M. Pollacci, fresh experiments have been made by the author. A solution of pure potassium iodate, some starch paste and chloroform, were placed together in a barometer bulb, any air contained in the liquids driven off by ebullition, and the whole covered with naphtha. A piece of phosphorus being introduced, no sign of blue coloration took place, although the chloroform dissolved a sufficient quantity of the phosphorus to have allowed it to have taken place had it been possible. But the blue colour became clearly manifest five minutes after the introduction of a few bubbles of air, and the reduction appeared to be complete in ten minutes. A similar result was obtained when phosphorus that had been dipped into oil of turpentine to prevent oxidation was brought into contact with a solution of an iodate and starch mucilage. These experiments the author considers to authorize the conclusions (1) that phosphorus is absolutely without action upon iodates, and (2) that where reduction of the iodate does take place it is subsequent to an oxidation of the phosphorus. Phosphorus and phosphoric acid being excluded from being the cause of the reaction, the author is engaged in ascertaining whether it is due to the action of phosphorous acid or of some other oxygenated compound.

Glass Cotton.—M. Limousin brought before the notice of the meeting a specimen of glass cotton (*Glaswolle*) which is now used in Germany, and especially in Austria, for filtering purposes. It consists of very finely spun glass, and the advantages gained by its use are that filtration takes place through it rapidly, that it is not acted upon by concentrated acids or alkaline solutions, and that there is no danger of organic substances being injured by its use.

Protosulphide of Iron.—Dr. Méhu exhibited a sample of protosulphide of iron which had been prepared by heating together in a crucible for half an hour at a red heat two parts of finely divided pyrites and one part of unoxidized iron filings. The reaction that takes place is represented by the equation $FeS_2 + Fe = 2FeS$. A greyish mass is thus obtained, which is easily powdered, and which disengages torrents of sulphuretted hydrogen when treated with hydrochloric acid.

Tayuya.—M. Yvon presented a note in which he assigned the following percentage composition to tayuya root, recently referred to in this Journal*:—Water, 11·57; organic matter, 79·96; inorganic, 11·47. The organic portion consists of—

Glucose	0·84
Crystallizable matter, soluble in Alcohol	0·24
Bitter Resin	1·17
Essential Oil	—
Starch	17·32
Organic Acids, Ligneous Matter, and Loss	57·39

The inorganic portion consists of—

Silica	1·02
Lime	4·71
Iron and Alumina	1·23
Potash and Soda (by difference)	1·39
Sulphuric and Hydrochloric Acids not estimated.	

The resin slightly resembled bees-wax in consistence. It was greenish-yellow in colour, had an excessively bitter taste, and melted at 49° C. It had an acid reaction, dissolved partly in alkalies, microscopic crystals being perceptible in the solutions. The author considers the resin to be the active principle of the plant. The root, exhausted with alcohol, imparted to the solvent a clear yellow colour; the tincture had a freely acid reaction, and when concentrated by evaporation deposited crystals after several days. Like M. Martin, the author failed to detect the presence of an alkaloid in the root.

* Vol. vi., p. 401.

BRITISH ASSOCIATION.

Address to the Chemical Section.

BY WILLIAM HENRY PERKIN, F.R.S.,

President of the Section.

There can be no doubt that chemistry and the allied sciences are now being recognized to a much greater extent in this country than in former years; and not only so, the workers at research, though still small in number, are more numerous than they were.

In 1868 Dr. Frankland, in his address to this Section at the meeting at Norwich, commented upon the small amount of original research then being carried on in the United Kingdom; but, judging from the statistics of the Chemical Society, this state of things became even worse; for in 1868 there were forty-eight papers read before the Society, but in 1872 only twenty-two. Since then, however, there has been a considerable increase in the number; and at the anniversary meeting in March last it was shown that the number of communications for the session had risen to sixty-six, or three times as many as in 1872.

Of course these figures only refer to the Chemical Society; but I think they may be taken as a very safe criterion of the improved state of things, though it would be very gratifying to see much greater activity.

It is also very pleasing to find that the aids to and opportunities for research are increasing, because it must be remembered that, in a pecuniary sense, science is far from being its own rewarder at the time its truths are being studied, although the results very often become eventually of the greatest practical value; hence the wisdom of a country encouraging scientific research.

But little, however, has been done in this direction in past years—the grants made for general science by this Association, and that of the Government of one thousand pounds annually to the Royal Society, being the most important.

The Chemical Society has also been in the habit of giving small grants for the purpose of assisting those engaged in chemical research. In the future, however, it will be able to do much more than hitherto. One of the original members of the Society, Dr. Longstaff, offered in the early part of the year to give one thousand pounds provided a similar sum could be raised, the united amount to be invested and the interest applied for the encouragement of research. I am happy to say that rather more than the required sum has been raised, and it is hoped that it may be still further supplemented.

In addition to the Royal Society grant the Government have given this year a further annual sum of four thousand pounds. Of course this is for science generally.

Mr. T. J. Phillips Joddrell has also placed at the disposal of the Royal Society the munificent sum of six thousand pounds to be applied in any manner that they may consider for the time being most conducive to the encouragement of research in physical sciences.

When we consider how much of our science is of a physical nature, we must be grateful for this bequest; and it is to be hoped that these helps will more and more stimulate research in the United Kingdom; and if we have any hope of keeping pace with the large amount of work now being carried on in other countries, we must indeed be energetic.

The employment of well-trained chemists in chemical works is now becoming much more general than heretofore, especially on the continent, where in some cases a considerable staff is employed and provided with suitable appliances, etc., for the purpose not only of attending to and perfecting the ordinary operations which are in use, but to make investigations in relation to the class of manufacture they are engaged in. A conviction of the necessity of this is gaining strength in this country, though not so quickly as might be desired; nevertheless, these things are encouraging.

With reference to the progress of chemistry and what have been the fruits of research of late years, it will be impossible for me to give even a general outline, the amount of work being so large; in fact, to recount the list of investigations made during the past year would take up most of the time at my disposal.

Amongst the most interesting, perhaps, are those relating to isomerism, especially in the aromatic series of organic bodies; and it is probable that a more intimate knowledge of this subject will be found of really practical value.

As I am unable to give an account of the work done during the past year on account of its quantity and diversity, I propose to refer to some of the practical results which have already accrued from organic chemistry, as a plea for the encouragement of research; and those I intend to speak of are of special interest also on account of their close connection with the textile manufactures of Great Britain. I need scarcely say I refer to the colouring matters which have been obtained from the products found in tar.

It was in 1856, now twenty years since, that this industry was commenced by the discovery of the "mauve," or "aniline purple;" and it may be of interest to state that it was in Scotland, in the autumn of the same year, that the first experiments upon the application of this dye to the arts of dyeing and calico-printing were made at Perth and Maryhill.

I need scarcely remind you of the wonderful development of this industry since then, seeing we now have from the same source colouring matters capable of producing not only all the colours of the rainbow, but their combinations. I wish, however, to briefly refer to the date and origin of the products which have served to build up this great industry.

It was in 1825 that Faraday published in the 'Philosophical Transactions' his research on the oily products separated in compressing oil-gas, and described a substance he obtained from it—a volatile, colourless oil, which he called bicarburetted hydrogen. Mitscherlich some years afterwards obtained the same substance from benzoic acid, and gave it the name it bears—viz., "benzol." This same chemist further obtained from benzol nitrobenzol, by acting upon it with nitric acid. Zinin afterwards studied the action of reducing agents upon nitrobenzol, and obtained "aniline," which he at that time called benzidam.

Again, Pelletier and Walter discovered the hydrocarbon toluol in 1837. Deville produced its nitro-compound in 1841; and Hofmann and Muspratt obtained from this "toluidine," by the process used by Zinin to reduce nitrobenzol.

I might mention other names in connection with these substances, such as Runge, Unverdorben, etc.; but I would now ask, did any of these chemists make these investigations with the hope of gain? was it not rather from the love of research, and that alone? and now these products, which were then practically useless, are the basis of the aniline colours. But to go further: Doebereiner a long while ago obtained from alcohol a substance which he called "light oxygen ether," now known as aldehyd. Gay-Lussac produced iodide of ethyl in 1815. Dumas and Peligot discovered the corresponding substance, iodide of methyl, in 1835; but, as in the cases I have previously referred to, these bodies had no practical value, and were never prepared but in the laboratory. Hofmann, in his researches on the molecular constitution of the volatile organic bases, discovered in 1850 the replacement compounds of aniline containing alcohol radicals.

All these compounds have now been manufactured on the large scale and used in the further development of the industry of these artificial colouring-matters.

Other substances might be mentioned; but I think these are sufficient to show how the products of research which, when first discovered and for a long period afterwards, were of only scientific interest, at last became of great practical value; and it is evident that, had not the investigations and discoveries I have referred to been made as they were solely from a love of science, no aniline colours would now be known.

The colouring-matters I have hitherto spoken of are nitrogenous, and derived from benzol and its homologues. There are a few others, however, of the same origin which contain no nitrogen; but they are of secondary importance.

I now pass on to another class of colouring-matter, which is obtained from anthracene, a coal-tar product differing from benzol and toluol in physical characters, inasmuch as it is a magnificent crystalline solid.

The first colouring-matter derived from anthracene which I wish to draw your attention to is alizarin, the principal dyeing agent found in madder-root. This substance was for a long time supposed to be related to naphthaline, inasmuch as phthalic acid can be produced from both of them; and many were the experiments made by chemists in this direction; it was not, however, until 1868 that this was proved to be a mistake, and its relationship to anthracene was discovered by Graebe and Liebermann, who succeeded in preparing this coal-tar product from the natural alizarin itself.

Having obtained this important result, they turned their attention further to the subject, hoping to find some process by which alizarin could be produced from anthracene; in this they were soon successful.

The discovery of the artificial formation of alizarin was of great interest, inasmuch as it was another of those instances which have of late years become so numerous, namely the formation of a vegetable product artificially; but the process used by Graebe and Liebermann was of little practical value, because too expensive for practical purposes.

Having previously worked on anthracene derivatives, it occurred to me to make some experiments on this subject, which resulted in the discovery of a process by which the colouring-matter could be economically produced on the large scale; Messrs. Caro, Graebe, and Liebermann about the same time obtained similar results in Germany; this was in 1869. Further investigation during that year yielded me a new process, by which "dichloranthracene" could be used in place of the more costly product anthraquinone, which was required by the original processes. I mention this, as most of the artificial alizarin used in this country up to the end of 1873, and a good deal since, has been prepared by this new process.

It was observed that when commercial artificial alizarin prepared from anthraquinone, but more especially from dichloranthracene, was used for dyeing, the colours produced differed from those dyed with madder or pure alizarin; and many persons therefore concluded that the artificial colouring-matter was not alizarin at all. This question, however, was set at rest by separating out the pure artificial alizarin from the commercial product and comparing it with the natural alizarin, when it was found to produce exactly the same colours on mordanted fabrics, to have the same composition, to give the same reactions with reagents, and to yield the same products on oxidation.

But whilst examining into this subject it was found that a second colouring-matter was present in the commercial product, and in somewhat large quantities, especially when dichloranthracene had been employed in its preparation; and to this was due the difference in shade of colour referred to.

This substance, when investigated, was found to have the same composition as "purpurin," also a colouring-matter found in madder, but of very little value on account of the looseness and dulness of some of the colours it produces. This new substance, being derived from anthracene, was named anthrapurpurin; unlike its isomer purpurin, however, it is of great value as a colouring-matter. I do not think I shall be going beyond the results of experience if I say it is of as great importance as alizarin itself; with alumina mordants it produces reds of a more scarlet or fiery red than those from alizarin. In fact so fine are the colours produced that, with ordinary alumina-mordants on unoiled cotton, it gives results nearly equal in brilliancy to Turkey-red produced with madder or garancine; and I believe the rapid success of artificial alizarin was greatly due to its presence. Most of that consumed at first was for Turkey-red dyeing; and the colours were so clear that it was mostly used in combination with madder or garancine, to brighten up the colours produced by these natural products

The purple colours anthrapurpurin produces with iron mordants are bluer in shade than those of alizarin, and the blacks are very intense. Its application is practically the same as alizarin, so that they can be used in combination.

As already noticed, the commercial product called "artificial alizarin" first supplied to the consumer was always a mixture of alizarin and anthrapurpurin; and various mixtures of these two colouring-matters are still sent into the market; but, owing to the investigations that have been made and the study and attention that have been given to it by manufacturers, nearly pure alizarin and anthrapurpurin are also sent into the market—the first being known as "blue-shade alizarin," and the second as red or "scarlet alizarin."

The formation of anthrapurpurin in the manufacture of alizarin may to some extent be said to have arisen from a want of knowledge of the true conditions required for the production of the latter.

It is now well known that alizarin is a dioxyanthraquinone, or, in other words, anthraquinone in which two atoms of hydrogen are replaced by hydroxyl.

$$\underbrace{C_{14}H_8O_2}_{\text{Anthraquinone.}} \qquad \underbrace{C_{14}H_6(HO)_2O_2}_{\text{Alizarin.}}$$

If we want to introduce hydroxyl into a compound, there are several processes which can be used; but I will only refer to those connected with the history of this colouring-matter.

The first process which I will refer to has been used by chemists for a long period. It consists in first replacing the hydrogen by bromine, and then treating the resulting body with potassic or other metallic hydrate; and according as one, two, or more atoms of hydrogen have been replaced by the bromine, so on its removal by the metal of the metallic hydrate, a compound containing a corresponding number of atoms of hydrogen replaced by hydroxyl is obtained.

Graebe and Liebermann acted upon this principle in their experiments on the artificial formation of alizarin; and as it was necessary to replace two atoms of hydrogen in anthraquinone, they first of all prepared a dibrominated derivative, called dibromanthraquinone,

$$C_{14}H_6Br_2O_2.$$

By decomposing this with potassic hydrate at a high temperature, they obtaimed a violet-coloured product, which, when acidified to remove the alkali, gave a yellow precipitate of alizarin,

$$C_{14}H_6(HO)_2O_2.$$

The second process I wish to speak of for the replacement of hydrogen by hydroxyl in a compound is by converting it into a sulpho-acid (usually by means of sulphuric acid), and subsequently decomposing this with potassic or other hydrate; and according as a mono- or disulpho-acid is employed, it yields on decomposition a compound with one or two atoms of hydrogen replaced by hydroxyl.

The discovery of sulpho-acids of anthraquinone, and their use in place of the brominated derivative originally employed by Graebe and Liebermann, constituted the great improvement in the manufacture of alizarin already referred to.

From what has just been stated, it was naturally supposed that a disulpho-acid of anthraquinone would be required to produce alizarin; and this was believed to be the case for some time; but further experiments have proved it to be a mistake, and shown that the monosulpho-acid is required to produce alizarin, the disulpho-acid yielding anthrapurpurin.

But how are we to explain this apparent anomaly? It would take up too much time to enter into a discussion respecting the constitution of the sulpho-acids of anthraquinone in reference to the position of the HSO_3 groups. I will therefore confine my remarks to their decomposition.

Monosulphoanthraquinonic acid,

$$C_{14}H_7(HSO_3)O_2,$$

when heated strongly with caustic alkali, as potassic or sodic hydrate, decomposes in the ordinary way, and we get "monoxyanthraquinone,"

$$C_{14}H_7(HO)O_2,$$

which is a yellow body possessing no dyeing properties. On further treating this, however, with caustic alkali it changes, being oxidized, and yields alizarin,

$$C_{14}H_6(HO)_2O_2.$$

Disulphoanthraquinonic acid,

$$C_{14}H_6(HSO_3)O_2,$$

when subjected to the influence of caustic alkali, at first changes into an intermediate acid,

$$C_{14}H_6(HO)\ (HSO_3O)_2,$$

and then into a dioxyanthraquinone,

$$C_{14}H_6(HO)_2O_2,$$

now known as "isoanthraflavic acid,"—a substance having the same composition as alizarin, but being only an isomer of that body and possessing no affinity for mordants; like monoxyanthraquinone, however, when further heated with alkali it becomes oxidized and yields a colouring-matter, which is "anthrapurpurin,"

$$C_{14}H_5(HO)_3O_2.$$

Looking at these reactions, it appears rather remarkable that Graebe and Liebermann should have succeeded in preparing alizarin from dibromanthraquinone. It can only be explained on the assumption that the hydrogen atoms replaced in the disulpho-acid are different in position from those replaced in the dibromanthraquinone; and of course it is possible that a disulpho-acid isomeric with that now known may be discovered that will yield alizarin as a first product on treatment with alkali.

In the reaction which takes place when monoxyanthraquinone or isoanthraflavic acid become oxidized and change into alizarin and anthrapurpurin nascent hydrogen is formed; and this causes a reverse action to take place—ordinary anthraquinone, or its hydrogen derivative, being formed, and a loss of colouring-matter resulting. A small amount of potassic chlorate is now used with the caustic alkali, just sufficient to overcome the reducing action, which has resulted in an increased yield of colouring-matter, the percentage obtained being now not very much below the theoretical quantity.

When the process for making commercial artificial alizarin by treating anthraquinone with sulphuric acid was first adopted, the product from that treatment was a mixture of the mono- and disulpho-acids of anthraquinone. Consequently the colouring-matter prepared in this manner was a mixture of alizarin and anthrapurpurin; and the reason why dichloranthracene, when used in place of anthraquinone, yields a product very rich in anthrapurpurin, is on account of the readiness with which it forms a disulpho-acid of dichloranthracene, which afterwards changes into the disulpho-acid of anthraquinone.

At first it was supposed by many that the quantity of coal-tar produced would not yield a sufficient supply of anthracene for the manufacture of artificial alizarin. Experience has, however, proved that this supposition was groundless, as now the supply is greater than the demand.

Moreover some very interesting experiments have lately been made, by which anthraquinone and its derivatives have been obtained without the use of anthracene. The most interesting are those in which phthalic anhydride is employed with benzolic derivatives; for example, this anhydride gives with hydroquinone a colouring-matter having the same composition, as well as most of the other properties of alizarin. It is called quinizarin. Baeyer and Caro have also obtained from phthalic anhydride and phenol oxyanthraquinone; and by using pyrocatechin in place of phenol they got alizarin itself.

Although these products have not been obtained in sufficient quantities by these processes to be of any practical value, we do not know what further research may do. Already one of the substances used is being prepared on the large scale for the manufacture of that beautiful colouring-matter "eosine;" I refer to phthalic anhydride.

Now, with reference to the origin of the products which are used for the manufacture of artificial alizarin, we find the first researches made in reference to anthracene were by Dumas and Laurent in 1832; subsequently Laurent further worked upon this subject, and obtained, by the oxidation of this hydrocarbon, a substance which he called anthracenuse; he also obtained dichloranthracene. Dr. Anderson also made an investigation on anthracene and its compounds in 1863, and assigned to it its correct formula; he re-examined its oxidation-product, which Laurent called anthracenuse, and named it oxyanthracene, the substance we now know as anthraquinone.

All these substances were without any practical value until 1868; but we now find them of the greatest importance, and used daily in immense quantities.

But to bring out more clearly the practical importance of these fruits of scientific research, it will be well perhaps to see what has been their influence on the colouring-matters which were in use before them, and also the extent of their present consumption.

The influence of the so-called aniline colours on dye woods, etc., has been remarkably small. It is true that at first magenta had a depreciating influence upon cochineal; but this has passed away, and now the consumption of that dye is as great as ever; certainly its price is much lower than it used to be; but this is due to a variety of causes, especially the great increase in the cultivation of the insect at Teneriffe. And perhaps this want of influence is not so very remarkable, when we consider the aniline colours are entirely new products, differing in composition and properties from the old colouring-matters, and therefore could only displace them to a certain extent.

But whilst this is the case, the aniline colours have been more and more used, until at present it is computed that their annual sale in the United Kingdom and on the Continent exceeds £2,000,000. This is probably due to new applications and increase of trade.

When, however, we come to consider the influence of the anthracene colours alizarin and anthrapurpurin, more generally known as "artificial alizarin," we find we have a very different tale to tell.

Here, in the case of alizarin, we have a competition, not between two colouring-matters, but the same from different sources—the old source being the madder-root, the new one coal-tar. And when we introduce the consideration of anthrapurpurin, which produces such magnificent reds, much brighter than alizarin or ordinary purpurin, we see we have not only a replacement but an improvement, so that these new colouring-matters throw the old ones into the shade. The products being purer, the clearing processes for goods dyed with them are also necessarily easier and simpler.

It will be interesting to examine into the statistics of the madder and garancin trade in a brief manner, to see what has been the influence of artificial alizarin on their consumption. The following figures are mostly calculated from the Board of Trade returns.

During the ten years immediately preceding the introduction of artificial alizarin the average annual imports of madder into the United Kingdom were 15,292 tons, and of garancin 2278 tons. Estimating the value of the former at £2 2*s.* 6*d.*, and the latter at £8 per cwt., which were about the average prices during that period, the annual value in round numbers was about one million sterling.

The introduction of artificial alizarin, however, has so influenced the value of madder that its price is now less than one half; and thus a saving of over half a million sterling per annum has been effected to the manufacturers of the United Kingdom, one half of which may be put down to Glasgow.

So much for its effect in reducing prices; but what has been its influence on the consumption of these dye-stuffs?

I have already stated the average quantity of these substances imported per annum prior to the discovery of the artificial product, and will now compare it with the imports of last year and this. That for the present year of course will be an estimated quantity, and calculated from the returns for the first seven months.

	Average Annual Imports.		
	1859-1868.	1875.	1876.
	tons.	tons.	tons.
Madder . . .	15,292	5014	3653
Garancin . . .	2,278	1293	813

These figures speak for themselves.

The money value, which was formerly £1,000,000 per annum, is now, calculating from the estimated quantity for the year, only £138,105, say £140,000, taking garancin at £4 per cwt. and madder at £1 per cwt., prices slightly in excess of their present value.

At the present prices the cultivation of madder-roots is unremunerative; and it is to be expected that madder-growing will soon be a thing of the past, thousands of acres of land being at the same time liberated for the growth of those products we cannot produce artificially, and without which we cannot exist. The quantity of madder grown in all the madder-growing countries of the world prior to 1868 was estimated to be 70,000 tons per annum; and at the present time the artificial colour is manufactured to an extent equivalent to 50,000 tons, or more than two-thirds of the quantity grown when its cultivation had reached its highest point.

I might have referred to other subjects besides the coal-tar colours which have resulted from scientific research; but I know of no other of such interest and magnitude. From the brief history I have given, we see that the origin of these colouring-matters is entirely the fruit of many researches made quite independently by different chemists, who worked at them without any knowledge of their future importance; and on looking at the researches which have thus culminated in this industry, it is interesting to notice that many, if not most of them, were conducted for the purpose of elucidating some theoretical point.

These facts certainly ought to be a great encouragement to chemists, and stimulate them to greater activity. It would be very pleasing to see more work emanating from the chemical schools of the United Kingdom; and I think no student should consider his chemical curriculum finished until he has conducted an original research. The knowledge obtained by a general course of instruction is of course of very great value; but a good deal of it is carried on by rule. In research, however, we have to depend upon the exercise of our judgment, and, in fact, of all our faculties; and a student having once conducted one, under the guidance of an efficient director, will find that he has acquired an amount of experience and knowledge which will be of the greatest value to him afterwards.

It is hoped these remarks will encourage young chemists to patiently and earnestly work at whatever subject they may undertake, knowing that their results, although sometimes apparently only of small interest, may contain the germ of something of great scientific or practical importance, or may, like a keystone in an arch, complete some subject which before was fragmentary and useless.

Parliamentary and Law Proceedings.

Suspected Poisoning by Strychnia.

On Tuesday last, Mr. W. Carter, the Coroner of East Surrey, resumed at Vauxhall an adjourned inquiry relative to the death of Ellen Sloper, aged 27, who died on the 11th ult., under circumstances leading to the arrest of a man named Silas Barlow, *alias* Smith, for murder. It appeared that the deceased woman had cohabited with the prisoner Smith and had had a child by him, that he visited the woman twice at her lodgings, and that after each visit she became sick and convulsed, dying in his presence, apparently from poison. The day after her death he took away the child, saying he was about to put it under the care of his cousin. The baby was not again seen until its dead body was discovered in a reservoir at Battersea, and at the inquest on the body a verdict of wilful murder was returned. The child was subsequently identified, the prisoner arrested on suspicion, and an inquest opened on the body of the woman and adjourned for an analysis of the contents of the stomach and of the lees in some bottles found in the lodgings of the man Barlow. Mrs. Jessie Wilson, the wife of a waiter, deposed that on the 21st of August last the deceased came to her house with a baby, and representing that she was married, engaged a room giving her name as Mrs. Smith. The prisoner came to the house on the 2nd of September, and stopped all night. On the 3rd of September the prisoner visited deceased, and stopped with her for nearly two hours, but after he left she became suddenly ill; she said the prisoner had given her some sarsaparilla to strengthen her. On the 10th the prisoner again visited her, and she was then perfectly well. About 9·30 that night the prisoner came down to witness and said that his wife, meaning deceased, had had two fits. On going upstairs she found deceased lying across the bed apparently in a fit. She was very stiff, and her feet were getting white, and the moment she was touched she had a strong convulsion. She became conscious shortly afterwards and said to the prisoner, "Oh, it is the sarsaparilla water you gave me." The prisoner replied, "Oh, no; I took more of it than you did." A doctor was sent for, who came and prescribed for her. Shortly after she appeared to be drawn backwards, and her back to become arched, and she died apparently in great agony. Mr. James Miller, M.R.C.S., said that when he was called to see the deceased he found her conscious. She complained of pains in the head and cramp in the lower limbs. He found her hands clenched, muscles rigid, and the feet turned inwards, and he prescribed for epilepsy and hysteria. She died shortly after he left. There was no arching of the back while he was there. He had seen the result of tests made by Dr. Lees, and was of opinion that strychnine had been found in one of the bottles of sarsaparilla. Dr. Joseph Lees, of Walworth Road, deposed that he had analysed the contents of the bottles found at the prisoner's lodgings, and in the small one, which was almost empty, had discovered the strychnine crystals produced. The jury, after half an hour's deliberation, returned a verdict of "Wilful murder" against Silas Barlow, *alias* Smith, and the Coroner issued his warrant committing the prisoner for trial at the next Old Bailey Sessions.—*Times.*

Poisoning by Chloral Hydrate.

An inquest was held in Carlisle on Wednesday September 27, before Dr. Elliott the City Coroner, respecting the death of John James, aged 70. It appeared from the evidence that the deceased had for some time suffered severe pains through illness, and was in the habit of taking chloral hydrate to obtain sleep. A bottle was produced which it was believed had contained the chloral taken by deceased. On the bottle was the instruction, "One-half to be taken to-night and the other half to-morrow night." Deceased had stated that it contained twopence worth.

John Richard Raffles said he was 18 years of age, and had served three and a half years as an apprentice druggist. The assistant druggist of Mr. James Shaw Pattinson, Botchergate, having gone to spend his holidays, witness, a week past last Wednesday, went to the shop in Botchergate to work there. (Shown the bottle which contained the chloral.) He remembered having seen it. He served deceased with chloral several times, he could not say positively how often. He half filled the bottle about five or six times, and filled it twice. The first time he got the bottle filled was on Saturday night last, and the second time on Monday night. The strength of the chloral was always ten grains to a drachm of syrup.

The Coroner here explained that chloral hydrate was a preparation of chloroform with pure alcohol, which was very much stronger than spirits of wine. It was a white crystallized substance. If they were to weigh that substance by any kind of weights that could be divided by a hundred, or say by ten, which would answer their purpose just as well, then eight-tenths of the whole would be chloroform. It really was chloroform. It could be dissolved in water, and sold as had been stated. When swallowed and distributed over the body, the blood sustained serious injury, in fact, it was not really blood for a very considerable time afterwards. He could only express his deep regret that it was sold so freely, and so much used as a means of procuring sleep. Laudanum and other preparations of opium were assuredly bad enough, but chloral seemed to be still worse.

A Juror asked if there were any restrictions upon the sale of chloral.

Witness: No. He had seen none. The same label which was put on the bottle when Mr. James got twopence worth was allowed to remain when he got double that quantity.

The Coroner: Suppose the label remained and a double quantity supplied, the deceased would take half each night.

A Juryman: Thus doubling the dose.

Another Juryman: But the deceased would know what the dose was.

Witness continued: He did not put the label on the bottle; it was on when it was first presented. When deceased came for the chloral he brought no prescription. Deceased explained to witness what he was taking chloral for. He gave him his opinion. He could not say how long the deceased had been in the habit of taking chloral. On Monday night, when deceased was leaving the shop after being supplied with a bottleful, he raised his hand to get hold of the door to steady himself. He did not see deceased take anything out of the bottle. He did not look like a person the worse for drink. On Tuesday at dinner time he got a note from Mr. James S. Pattinson, asking if the deceased had got any chloral, and witness sent an answer saying that he had. He did not supply many persons with chloral.

A Juryman: If deceased got a bottleful on Monday night, that would be four doses?—Yes.

Another Juryman: And if he got the bottle filled on Saturday night that also would be four doses?—Yes.

The Foreman: That means that he had eight doses within forty-eight hours.

Witness continued: Mr. Pattinson was from home at the time the chloral was sold to the deceased, and the only person in the shop when Mr. James came into the shop was the errand boy. He was not aware of any restrictions on the sale of chloral. There was a list of the name of the drugs on which restrictions were placed in the shop, but chloral was not mentioned. The list was a leaf in the poison book which had to be signed by people getting poison. If choral had been mentioned in the list he was sure he would have seen it.

Dr. Walker said deceased suffered from a painful disease in the bladder. He never prescribed chloral for deceased, and lately he had not given him any narcotics for the purpose of making him sleep. When he saw deceased on Tuesday morning he was quite insensible and breathing rather heavily. Witness tried to rouse him, but could not. (Shown bottle). It would contain about an ounce, that was about 8 drams, or 80 grains of chloral. He thought 80 grains was not an excessively fatal dose, but such a dose had proved fatal. The last dose taken by deceased would be all the more likely to prove fatal on account of his having taken some before. He was of opinion that an overdose of chloral had caused the death of Mr. James. He was satisfied with this, and he did not think that a *post mortem* examination was necessary.

The Coroner summed up the evidence, excluding the idea of suicide, and strongly advising that chloral should be included in the list of poisons named in the Act of Parliament.

A Juryman: Are you sure that this chloral is not on the list?

The Coroner: I am not acquainted with the list. It is sent to all druggists not to medical men. The boy says it was not on the list. Of course if it be on the list it would alter the case most materially against himself.

A Juryman: We might recommend that there should be more restriction put upon the sale of chloral. It appears to be very carelessly sold.

Another Juryman: This chloral is much used in the south of England under the sobriquet of "pick-me-up"—evidently a misnomer.

The Foreman: I am inclined to condemn the practice of selling such large quantities of that deadly drug.

The Jury returned the following verdict:—Deceased died from an overdose of chloral taken for a relief from pain."—*Carlisle Express.*

Singular Death of a Chemist and Druggist.

On Monday last an inquest was held at Bradford, by Mr. Thomas Taylor, Coroner, on the bodies of Edward Clarkson Pearson, chemist and druggist, and William Pearson, his son.

Mr. Robert Soppitt said he was a chemist's assistant, and resided at Kensington Street, Girlington. He last saw Mr. Pearson alive about five minutes to four o'clock on the previous Friday afternoon. He had with him the deceased child, William Pearson. Mr. Pearson said he was going to Leeds to buy drugs, and he promised to be back at a quarter past seven, but as he did not return at the time witness locked up the shop and went away at his usual time. For months the deceased had complained about pains in his head and feet. In consequence of a message which he had received he went to Mr. Pearson's house in Hanover Square. A woman gave him a screw-driver and he prized open the door of Mr. Pearson's bedroom. Witness thought there was no one in the room at first, but on going to the far side of the bed he saw Mr. Pearson lying with the child underneath him. He was lying partly on his side. He was in his night-dress. Witness moved Mr. Pearson and got the child from under him, and then Mr. Pearson was lying on his face. The child was lying on his face. Both the deceased were quite cold and very stiff. There was a mark on the child's face. There was a child's cot near the bed, and the deceased was lying between it and the bed, so that they could not move without going under the bed. Witness then went for Doctor Taylor, and after his arrival he requested witness to put the child on the bed. Witness had never seen Mr. Pearson tipsy, but he had seen him when he had had drink. The deceased had been in bed, because the bed-clothes were disordered and lying on the opposite side to which the deceased were. The disease from which Mr. Pearson suffered would make him appear to be intoxicated. There was nothing whatever in the room. He had often complained at the shop of pains in the head, and witness had given him potash and sal volatile. He had seen Mr. Pearson take potash and sixpennyworth of brandy. There was a will of Mr. Pearson's on the floor near his clothes. It was ordinary parchment. There was no reason that witness knew of to cause Mr. Pearson to commit suicide. There was no trouble about the business. He was particularly fond of his youngest child (the deceased), and said that if he had a leaning to any of his children it was to that one. Mr. Pearson had money in gold and silver in his pockets.

Dr. C. H. Taylor, in the course of his examination, deposed that he had known Mr. E. C. Pearson about ten years, and had attended him professionally about four or five years ago. On Saturday, about noon, he was called to Mr. Pearson's house. Witness went into the bedroom and found the deceased in much the same position as described by the previous witness. He was laid on his left side with his head on his left arm, and his right arm was under the bed. The bodies were very rigid. The child was lying on the floor a little distance away from Mr. Pearson. Witness examined them to see if there were any external wounds or anything to cause the deaths. He came to the conclusion that the deceased must have been dead about eight or ten hours. He looked round the room to see if he could find any bottles or anything else. In the room he did not find anything of the sort. He made a *post mortem* examination of the bodies on Saturday. There were no external bruises on anything to account for death. There was blood oozing from the right ear. With regard to Mr. Pearson he found the scalp congested, and on opening the skull he found the brain very much congested. There were about four ounces of bloody serum on the base of the brain. The brain substance was normal and healthy. The extravasation of the blood and serum was entirely independent of external violence. The liver was very much enlarged, weighing nearly 15 lbs., and of a very dark colour. There were no marks of inflammation. He could not trace any irritant poison, either by what he saw or could smell. He had placed some of the principal organs in the hands of Mr. Rimmington, so that an analytical investigation could be made if it was thought desirable. He could see no other cause of death than congestion of the brain, caused by the flow of blood to the head. From the state of Mr. Pearson's liver it was probable he had taken stimulants for a length of time, which had, to some extent, accelerated the congestion of the brain and liver. When he saw the bodies on the Saturday there was a strong smell of brandy. There was nothing inconsistent with death from natural causes. The deceased might have walked about the room feeling unwell before he died, and have fallen down. If he had taken some preparations of opium the same *post mortem* appearances might have been produced.

Emily Leach, domestic servant, said the boy went to bed about half-past nine and Mr. Pearson about ten. The boy slept in the same bed with his father. Mr. Pearson was perfectly sober and witness could not say that he had anything to drink before going to bed.

George Edward Pearson said he was nine years of age. About three o'clock on Saturday morning he heard his brother William screaming for about five minutes. Witness went to the servant's bedroom to wake her, but he could not. He could not get into his father's bedroom because the door was locked. He told the servant next morning that he heard the screaming. Just as his brother had given up screaming he heard a noise as of something falling in the bedroom.

The Coroner briefly summed up, and asked the jury if they were not satisfied that the death of Mr. Pearson was the result of natural causes, and that the boy was smothered by his father falling on to him. If the jury wanted more information they could have the contents of the stomach analysed.

The jury consulted for about three-quarters of an hour, and it was then decided to adjourn the inquiry until Monday evening next, so that in the meantime the contents of the stomach could be analysed by Mr. Rimmington.—*Bradford Daily Telegraph.*

Reviews.

ΕΛΛΗΝΙΚΗ ΦΑΡΜΑΚΟΠΟΙΙΑ *κατα Βασιλικην Διὰταγην και κατ' εγκρισιν του Β. Ιατρικοὺ Συμβουλιου εκδοθεισα. Συνταχθεισα δε παρα Ιοαννου Βουρου, Ξανεριου Λανδερερου καὶ Ιωσηφ Σαρτοριου. Εκδοσις β'.* Athens: K. Antonias. 1868. From Professor Landerer.

Having lately received a copy of the Greek Pharmacopœia from Professor Landerer, of Athens, it was with some degree of curiosity that we opened it, to see if it would throw any light upon the state of pharmacy in that country, for a national pharmacopœia should always to a certain extent reflect the existing state of both medicine and pharmacy. The work before us is written in modern Greek and a Latin translation is placed side by side with the Greek text. It is the second Pharmacopœia which has been issued in Greece under government sanction, and differs from the first in the following particulars. It contains an appendix which includes many new remedies, with description and formulæ for their manufacture, as well as for several known patent medicines; a short list of poisons and their antidotes; and an etymological lexicon explaining the derivation of the names of various plants, metals, and technical terms. The index is less full than in the previous edition, the synonyms not being separately indexed. One curious feature in the Greek Pharmacopœia is a Greek-Latin and Latin-Greek lexicon of the terms used in the body of the work. The Pharmacopœia, as was formerly the case in this country, is divided into two principal parts, the one being a list of the materia medica and the other a list of preparations, with formulæ for making them, the pharmaceutist being expected to prepare himself unless he can obtain them equally pure and good in commerce, but of which in any case he is expected to test before using.

In the first part the drugs are classed alphabetically first according to their commercial names, then their scientific names; in the case of plants, the Linnæan class and order as well as the natural order to which they belong are given, also their synonyms in the Italian, French English, German, and Turkish languages. Following these comes a description of the drug, with appropriate tests for ascertaining its purity. As a rule the English synonyms are well rendered, but in a few cases they would hardly be recognized. Thus fike-leaved, sharp, small barnett, dried pitch, vomiting nut, cherry bay tree, would hardly be considered, in this country, the English names for *Œnanthe Phellandrium; Rumex obtusifolius, Pimpinella Saxifraga, Resina alba, Nux vomica* and *Prunus Lauro-cerasus.* Printers' errors are very numerous throughout the work, and the matter is much more crowded in the last edition; the arrangement of the type also is not good, so that it is rather difficult to distinguish the headings from the text. The pharmacology is not quite up to date in many instances. Thus we find Chinese rhubarb attributed to "*Rheum australe* seu *R. Emodi,*" and ammoniacum is attributed doubtfully to *Heracleum gummiferum* and *Ferula orientalis,* while the description of the drug applies rather to Persian than to African ammoniacum. It would be interesting to ascertain whether African ammoniacum is really used in Greece to the exclusion of the Persian. Camphor is attributed to *Dryobalanops Camphora* and *Laurus Camphora,* so that both Borneo and Chinese camphor must be official; kino is said to come from the East Indies and to be derived from *Eucalyptus resinifera.*

In the list of materia medica many of our wild plants still esteemed by herbalists in this country, as well as numerous garden herbs, find a place, among which may be mentioned masterwort, tansy, hedge hyssop, elecampane, soapwort, feverfew, fumitory, German chamomile, greater celandine, scurvy-grass, buck-bean, centaury, ivy leaves, ground ivy, dock-root, burdock-root, wormwood, mugwort, yarrow, and many others. A trace of ancient pharmacy is seen in the presence of such articles as crabs-eyes, teucrium marum, oyster-shells, Roman nettle, white agaris, flea seed, gypsum, graphite, and other remedies now found in this country only in museums or the collections of the curious. Other articles are still used to a certain extent in this country, such as Galangal, China root, *Triticum repens, Anemone Pulsatilla, Phellandrium aquaticum,* etc., while others are used on the continent in several countries although not at all in England.

In a few cases the botanical sources of drugs differ slightly from those of this country; thus, oak bark is derived from *Quercus Œgilops* and aconite root from *A. neomontanum* as well as from *A. Napellus.* As no botanical authority follows the name, and as the name *neomontanum* has been applied to nine different species by different botanical writers, it is rather difficult to say which species is here intended. In Greece, salep appears to be obtained from *Orchis mascula, O. pyramidalis, O. longibracteata* (*O. Robertiana.* Desleng?) and *O. latifolia;* spearmint is replaced, as in Germany, by *Mentha crispa.*

The second part, containing the preparations, presents several points of interest. The nomenclature used is very old, but nevertheless leaves little room for mistakes to be made. Thus, calomel is called hydrargyrum muriaticum mite; and corrosive sublimate; hydrargyrum muriaticum corrosivum; carbonate of potassium, kali subcarbonicum, and the bicarbonate, kali carbonicum acidulum. Certain preparations appear to be much more in favour than others; thus we find no pill masses so called, very few liniments, infusions, spirits, wines, or confections, while there are more than fifty each of extracts, plasters, and waters, and a large number of tinctures, liquors, syrups, and oils. A few preparations much used in this country are conspicuous by their absence, such as spirit of sal volatile, ipecacuanha wine and the scaled preparations; while others, such as the serums or wheys made with vinegar, alum, or cream of tartar, and the soaps of jalap, resin, guaricum, and sulphide of antimony, the elæosaccharums and robs or inspissated pulps of fruits, have no representatives in this country.

As might be expected from a work which is only the second of its kind that has been published in that country, the Greek Pharmacopœia still retains a number of old and comparative useless or absurd preparations, such as cephalic water, theriaca, spiritus formicarum, pulvis antiepilepticus (composed of mistletoe, crabs'-eyes, and peony root), and some others.

On the other hand, some preparations which have only lately been added to our own Pharmacopœia have been official in that of Greece since 1837, such as acetic ether, phosphorated oil, and compound liquorice powder; while the facts which recent researches have brought to light concerning compounds of ammonia and glycyrrhizin have had a practical application for many years past in the elixir e succo liquiritiæ.

The processes prescribed for making some of the preparations vary somewhat from those of the British Pharmacopœia. Thus, acetic ether is made by distilling a mixture of alcohol, acetate of lead, and sulphuric acid, and rectifying the product after treatment with lime water. Sweet spirit of nitre is directed to be rectified from hydrate of calcium and preserved in small bottles quite filled, and containing a small quantity of calcined magnesia. Sulphur præcipitatum is made by precipitating a potassic solution of sulphur with sulphuric acid. It would be desirable to know whether the Greek preparation is free from the objections lately raised against the B.P. article. Many other interesting details will be found in perusing the work.

Of preparations bearing names or synonyms familiar to English ears, several differ either in composition or strength. Thus oleum camphoratum is only half the strength of the B.P. article, while tinctura opii is considerably stronger, six parts representing one part of opium, and oleum phosphoratum is said to contain about 9 grains of phosphorus in one drachm of the oil. Prussic acid is an alcoholic solution of the acid made by decomposing Prussian blue with phosphoric acid. Compound decoction of sarsaparilla is of two strengths; the one known as "fortius" contains mercury probably in the state of perchloride, the other distinguished as "mite" differs considerably in flavour from the B.P. preparation, since it contains cinnamon, cardamoms, and other aromatics.

The number of agreeable vehicles and dietary articles manifest an evident tendency in the direction of elegant pharmacy. Most of the disagreeable medicines appear to be given in the form of pills as far as possible, since they enter largely into the extracts, while the syrups of raspberries, almonds, cinnamon, balsam of Peru, various palatable jellies, Iceland moss chocolate, pâte de guimauve, numerous aromatic tinctures and elixirs, all testify that the Greeks possess quite modern notions with regard to agreeable medicines. The appendix manifests an endeavour to keep pace with other countries in the use and knowledge of new medicines. These seem to have been culled from various pharmacopœias as well as from other and perhaps questionable sources. A certain amount of want of judgment is displayed in the selection of the formulæ here given. Everything that could be called for, from chloral and digitalin down to well-known patent medicines, find a place here. Benzine, mineral waters, bisulphide of carbon, caffeine, tooth stopping, James' powder, Vienna paste, pepsine, Holloway's pills and ointment, powder for hydrophobia, propylamine, and Blancard's pills follow one another in a most heterogeneous fashion. We must confess to a little curiosity as to the cases in which the formulæ for Holloway's pills are intended to be used. Are pills thus made prescribed by Greek physicians? Are they to be supplied when Holloway's pills are asked for? Or are they used to avoid the sale of patent medicines? These are questions which naturally occur, but which must remain unanswered until we know more of the state of pharmacy and medicine in Greece.

Chloral is latinized as chlorelayllum, and glycerine appears to be used chiefly as a solvent for the alkaloids. We fear that those who desire a universal pharmacopœia would of necessity spend a considerable time over the Greek Pharmacopœia, and that there would be considerable difficulty in reducing some of the preparations to anything like uniformity with other pharmacopœias. Those who are interested in the progress of pharmacy in different countries will find much that is suggestive and interesting in the perusal of this work, and particularly in that portion relating to the preparations.

BOOKS, PAMPHLETS, ETC., RECEIVED.

A Systematic Handbook of Volumetric Analysis: or the Quantitative Estimation of Chemical Substances by Measure applied to Liquids, Solids, and Gases. By Francis Sutton, F.C.S., etc. Third Edition. London: J. and A. Churchill. 1876. From the Publishers.

Chemia Coartata, or The Key to Modern Chemistry. By A. H. Kollmyer, A.M., M.D., etc. London: J. and A. Churchill. 1876. From the Publishers.

Les Richesses de la Nature. Le Règne animal. Etude de ses Matières premières et des Procédés industriels modernes qui en permettent l'Exploitation. Par P. L. Simmonds. Traduit de l'Anglais, refondu et augmenté par Dr. Jul. Morel. Ghent: A. Hoste. 1877. From the Author.

Brief Considerations on Diseases of the Ear. By Lewellyn Thomas, M.D. Second Edition. Wyman and Sons. 1876.

Note sur quelques Accidents industriels développés sous l'Influence de l'Acide picrique. Par M. Delpech.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

The Chemists and Druggists' Trade Association.

Sir,—However strange it may appear, it is no less a fact, that a great number of the trade most determinedly hold aloof from giving any support to the Pharmaceutical Society or to its Benevolent Fund, and as I can testify, whenever appealed to on behalf of either giving the one or assisting the other, the reply generally given seemed to have something of the spirit of those mentioned in your leader as belonging to the "ignoble army of grumblers." Whether Mr. Mee will be able to educate us into a better state of things, or what system he may adopt, I cannot say, but if he be the divinity or spirit that is going to collect together every member of the trade into one great comprehensive unity—in fact to make this pharmaceutical wilderness to blossom like the rose—there is a great work before him and all must wish him success.

I cordially coincide with your other correspondent, Mr. Greaves, that there does seem a need for "The Trade Association." Many of his reasons seem to me unanswerable; at the same time, whilst it is my clear conviction that this association, if adequately supported and judiciously carried out, may, and ought to strengthen the Pharmaceutical Society, still I strongly agree with you that the great need of the body at large is want of union.

Certainly one does not exactly see why the happy state of things just brought to pass in Chesterfield and East Derbyshire could not have been equally as well done, although the Birmingham meeting had never taken place; but be this as it may, the great thing needed is to follow this example.

Mr. Greaves, strangely enough, speaks of the trade being the victims of unscrupulous customers, but it always seems to me under similar circumstances that we are rather the victims of reckless members of the trade, for if we have not sense enough to look after our own interests the public will not be likely to do so.

It was thought years ago by Mr. Bell and others that this ruinous competition in starvation prices would cease when men became better educated, and consequently more appreciative of their position; but such is not the case, for "Mr. Parnassus after having done the Square," seems to have just as little respect for his calling and to be less versed in political economy than his neighbour.

Two instances in this somewhat aristocratic city (having somewhere about six practising physicians), which have just occurred, may perhaps illustrate what I desire to say. A short time since one of the largest and handsomest shops in the place, and of some years' standing, having changed hands, a notice duly appeared that the new-comer was a pharmaceutical chemist by examination, certificates of which, nicely framed, stood in the window, but there was very little else of pharmaceutical pretensions—hair brushes, combs, soap, occupying a good share of the remainder of the space. Another handsome shop, where the business has been larger and of many years' standing, also just lately found a new owner; pharmaceutical chemist by examination again appears, this time with a notice that the occupier intends to apply for a magistrate's licence to sell beer (wine and spirits being already introduced); the handsome plate-glass windows are filled with bills offering orange quinine wine in wine bottles at 1s. 10*d*. "made of Howard's quinine, and in strict accordance with the British Pharmacopœia." Happy is Mr. Greaves that his town and neighbourhood have learned to see the folly of such miserable work, and that a good understanding and determination to act together for the general good has been arrived at.

This is the want of the trade, as much elsewhere as in Chesterfield. I wish every member of the trade would study and consider what Mr. Greaves says about our foolish jealousies. The truth is, we want protection from gross inroads upon our trade rights; we want protection from medical illiberality and tyranny; we want to protect ourselves from wholesale houses, who fill the windows of grocers and others with drugs; but more than anything else we need a proper feeling amongst ourselves, and getting this all the others will be attainable either directly or indirectly. On former occasions, as well as the present, my object in writing to the Journal has ever been to promote the interests of a trade in which more than thirty-five years of a somewhat laborious life has been spent. I would then state that the two great curses of our business are just these, low prices and long hours. The only cure for them that I can see is the abandonment of indifference, the forming in each town associations similar to that mentioned by Mr. Greaves, and whilst we may see our need of a trade association, never allowing the claims of the Pharmaceutical Society or its Benevolent Fund to be placed upon so low a footing as "what do we get out of it?" Perhaps in this, as in many other things, we get just a proportion as we desire and strive for.

For the well-being of the trade at large, for our own personal good, for the interest of those we have educated and are introducing into the business, do let the "ignoble army of grumblers" haul down their flag and disband themselves forthwith.

Mr. Greaves says the Act of Parliament of 1868, did not provide for the supply of drugs in districts too small to support a chemist, nor did the Medical Act provide for the supply of medical advice under similar circumstances. The fact is, no Act of Parliament could do this; it must almost entirely be left to individual management; the house separated by distance from the market needs to be provided beforehand with goods for emergencies. If the Act is a failure at all it is the same in all cases and under all circumstances so, and just because it is not sufficiently restrictive. This, however, requires great consideration, and it ought to be one of the great questions with the trade association.

Mr. Mee has evidently not had a very extensive range of vision, or he would see that there are numerous places and even districts where the carrying on of pharmacy pure and simple could never be done, and if it could I fear the greed of gain would influence men more than the love or pharmacy.

Some time since I was engaged with a friend upon the purchase of a very extensive concern in the North of England, the shop large and lavishly fitted up, and it will startle some of your readers to learn that out of returns of about £2000 per annum, £600 was from the sale of gingerbread nuts. At the annual fair great quantities were exhibited in the window, an illumination, and a band of music in the window of an upper room.

One Who has known the Drug Trade more than Thirty Years.

Sale of Poisons by Unregistered Persons.

Sir,—The sale of laudanum and other poisons seems to have largely increased of late. The remedy is in the hands of the chemist himself, and I think if the following suggestion were acted upon we should soon have little to complain of under this head. That each local secretary should wait upon the chemists in his district and obtain their signatures to a form stating, "That they would not supply any unregistered person—being a shopkeeper—with laudanum, or any of the poisons mentioned in the Act," I think there would be very few who would decline signing it.

Grantham, September 26, 1876. Jno. Cox.

Effects of Long Hours.

Sir,—The Obituary notices on Saturday week were a sad record of the shortness of a chemist's life. Five—and all under forty years—viz., 26, 34, 36, 36 and 39. This ought to be a warning to the advocates of long hours. I am often shocked by hearing of the death of young chemists, who, when I last saw them, were fine hearty looking fellows. And the cause—"want of fresh air and daily exercise."

Wolverhampton. Robert Henry Lowe.

A New Pill Excipient.

Sir,—May I be allowed a little of your valuable space in reply to the objections urged by Mr. Greenish against my paper on a new pill excipient, read at the recent Conference Meeting at Glasgow, and published in your issue of the 23rd ult.

I beg leave to say there is a wide difference between a mixture of tragacanth and glycerin and the excipient in question; and I have yet to learn that it is a matter of no moment which of the two is employed.

A mixture of 1 part of powdered tragacanth and 19 parts of glycerin does not gelatinize in the cold; but, upon heating in a water-bath, forms a jelly of similar consistency to that which I still designate "the new excipient."

Fifteen gr. of the former mixture are requisite to form a coherent mass with ℨij P. Ipecac. Comp. which is a little in excess of the amount needed of "new excipient." If, however, it be attempted to roll the mass thus formed into pills, the difference in the properties of the two "mixtures" will be at once apparent. While one rolls out with the greatest ease, the other forms a kind of tube which is very much larger in the middle than towards the extremities,—a pleasing and peculiar formation, doubtless; not, however, conducive towards pill-making. This behaviour of a mixture of tragacanth and glycerin is sufficient to demonstrate that it possesses but little adhesive properties.

As to the observation that "oil of pimento is unnecessary and a bar to its general employment," I have to say that if the trouble be taken to make the excipient from month to month it is unnecessary,—but not otherwise,—as "mould" forms upon it when kept for some months exposed to air. The excipient, however, forming the subject of the paper at Glasgow, will keep good for "five years" at least, and the amount of oil of pimento contained in it is so infinitesimal as to be of no account whatever, since in a few weeks its odour is barely perceptible.

It is scarcely necessary to enter into the question as to whether the "excipient" is new or old, but, I may say that at all events it was new to me.

The Dispensary, Grantham. George Welborn.

S. N. O.—(1) According to Professor Wayne, in the United States the extemporaneous sugar coating of pills is effected by making the pill as dry and hard as possible, coating it with a solution of tolu, and then covering it with a powder containing equal parts of milk sugar and ordinary sugar, and drying. (2) See a paper on arsenical sheep washes in *Pharm. Journ.* (o.s.), vol. xviii., p. 511.

"*Improver.*"—There is no method by which you can dispense your mixture with those ingredients. Consult the prescriber and tell him the quinine is sure to be precipitated, and will coat the sides of the bottle as a resinous substance—pure quinia.

W. H.—The use of the title Pharmaceutical Chemist by such a person in Great Britain would be illegal.

"*Chemicus.*"—Section 12 of the Pharmacy Act, 1852, makes it illegal "for any person, not being duly registered as a Pharmaceutical Chemist according to the provisions of this Act, to assume or use the title of Pharmaceutical Chemist or Pharmaceutist, in any part of Great Britain, or to assume, use, or exhibit any name, title, or sign implying that he is a person registered under this Act."

"*Pax.*"—Candidates for the office of Dispenser in Her Majesty's Naval Hospitals must make written application to the Director-General of the Medical Department of the Navy, Admiralty, Whitehall.

E. Nuthall.—In a memoir published in the *Neues Repertorium f. Pharmacie*, 1868, pp. 513—534, Dr. Urner discusses the value of chloracetic acid as a medicinal agent, and states that he found dichloracetic acid to be a powerful cauterizer, well adapted for large and small surfaces.

"*Cathcart.*"—Divide it into five equal parts, and allot three-fifths to one person and two-fifths to the other.

"*Registered Apprentice.*"—(1) We were not aware that salicylic acid was yet used in cattle medicine. (2) We are obliged to you for the particulars. (3) Probably your solution of ammonia was too weak. The making of the preparation requires care, as there is some iodide of nitrogen formed which settles to the bottom of the bottle, and should be separated. This is a very explosive substance when dry, and it is to it your explosion was due.

Y. Z.—It is probably grape sugar that is formed and crystallizes out. Try heating a little carefully, set aside to cool, and then see if it crystallizes out again. Be careful not to employ too much heat.

Pharmacist.—There seems to be some resin and essential oil in the pills which absorbs the ether causing expansion so that in time this mixture will crack the coating and the pill mass will exude. Try a solution of gum arabic.

Communications, Letters, etc., have been received from Mr. Martin, Mr. Jackson, Mr. Corder, Mr. Gilmour, Mr. Proctor, Pen Gwyn, Hampton, S. P. A., "Juvenis."—Try almond oil,

TEST FOR SPERM OIL.

BY W. GILMOUR.

In the course of some recent investigations into the properties and reactions of some of the fixed oils I had occasion to observe their behaviour on the addition of sulphuric acid in certain proportions and under various circumstances. Some of the experiments were exceedingly interesting, and brought out features in these oils quite characteristic, and not observed hitherto, so far as I am aware, by other investigators, and which after further verification I may take another opportunity of pointing out. What I wish, however, in the meantime to suggest is the probability of the purity of sperm oil being determined in a very simple manner by the amount of *cetin* which it contains, and which I found might be liberated by the action of sulphuric acid.

The cetin thus proposed to be estimated is not derived from any artificial mixture of spermaceti with the oil due either to imperfect exhaustion or clarification. It is apparently, judging from all the experiments which I have made, a proper constituent of the oil itself in the natural state, and present in genuine oils nearly always in a uniform proportion. According to Hofstadter, sperm oil contains spermaceti, oleic, valerianic, and physetoleic acids, whilst, according to Stenhouse, its composition appears to be isomeric with spermaceti fat. I have not, however, been able to ascertain that the relative proportions of the several constituents are anywhere stated, probably owing to the fact that this oil, like most of the other fatty oils, is somewhat unstable in character. In the samples which I have examined I have recovered from about 4 per cent. of cetin downwards, according, I believe, to the genuineness of the oil; and the proportion in several experiments on the same sample was in every case nearly uniform.

The mode of procedure, which is very simple, is as follows:—Take one part by weight of sulphuric acid, sp. gr. 1·84, to four parts of oil, and mix thoroughly. Let it stand for about twenty minutes, shaking once or twice in the interval, and then add about three ounces of distilled water. On now shaking the mixture a very thick saponaceous-like compound will be formed which should be throughout of uniform colour, showing that the mixture is complete. After letting this stand for about eight hours it will be found to have separated into two layers, the one underneath being clear and colourless, and the one above a dark-brown viscous mass, in which the cetin, if present, will be found floating, giving it a mottled appearance. It should now be set aside for a further interval of eight or twelve hours so that all the cetin may separate, on which it should be transferred to a larger vessel containing three or four times its volume of water, and the whole thoroughly shaken. The cetin will now be found floating on the surface of the liquid and should be filtered out and thoroughly washed until the filtrate ceases to have a milky appearance, and then dried spontaneously. As thus obtained the cetin is light, crystalline, pearl-white, not unlike quinine in appearance, but more glistening, and has neither taste nor smell. According to Christison, it is a pure proximate principle, intermediate between wax and the concrete oils, and presenting all the leading properties of spermaceti, but less greasy and fusible only at the higher temperature of 120°. It undergoes partial saponification when boiled with caustic potash solution, forming a brittle soap only in part soluble in water and composed chiefly of palmitate of potash, oleate of potash, and a crystalline principle called ethal.

The following table gives the amount recovered from one ounce by weight of ten different samples, with the specific gravity of each oil respectively:—

Sample.	Spec. Grav. 60° F.	Cetin in grains.
1.	·884	16·2
2.	·880	15·5
3.	·886	11·
4.	·883	7·1
5.	·881	6·5
6.	·884	6·
7.	·889	4·2
8.	·885	3·
9.	·882	none.
10.	·896	none.

As already stated, all the foregoing oils have been tested in the manner indicated more than once (in most instances repeatedly) with nearly uniform results, so that it appears reasonable to assume the utility of this mode of determining their purity.

I may state that I have endeavoured to extract the spermaceti, previously known by this means to be present in some of these oils, by boiling in rectified spirit and subsequent crystallization. Spermaceti, it is well known, is soluble in boiling rectified spirit, whilst sperm oil is not, and therefore I thought it might be obtained by dissolving in that menstruum and afterwards crystallizing out. I have, however, failed in every attempt thus to extract the spermaceti; but whether from some adulterations of these oils with other oils soluble in rectified spirit, or from other impurities still, or from some defect in the manipulation, I have been unable to determine. It shows, however, not only how prevalent adulteration is in this valuable oil, but also how defective the means are for its detection, when dealers in every case prudently refrain from giving any opinion on its purity, and when further *it is known that the annual consumption is much in excess of the amount actually imported.* In circumstances such as these the test may prove of some practical utility; but be this as it may, it is put forward in the meantime more as a suggestion, in the hope that some one with greater facilities for investigation may be induced to take the matter up and carry it to a proper conclusion.

NOTE ON SUMBUL.*

BY KARL WITTMANN

After referring to a notice which appeared last year in the *Pharmaceutical Journal* (vol. vi. p. 43), respecting the blooming of the Sumbul plant at Kew, the author, who is Secretary to the Military Medical District Administration of East Siberia, gives the following information.

The *Euryangium Sumbul* is found in large quantities in the neighbourhood of Chabarowka, a military post on the river Amur, in the province of Küsten, East Siberia, 9000 versts from St. Petersburg. It is a perennial umbellifer, and grows to the height of from 3 to 5 feet. Its root is branched, fleshy, about 11 inches in circumference at the base, and

* From the *Pharmaceutische Zeitschrift für Russland*, vol. xv. p. 545.

3⅝ inches in diameter, with numerous rootlets and covered with a brown bark. The root has a strong smell of musk, which by moistening with water is considerably increased. The stalk of the plant is always fleshy, equal in circumference at the base with the root, becoming gradually more slender towards the top. The leaves are more than twice pinnatifid, the pinnæ lancet-shaped, sharply serrate; the umbels with 30 to 50 rays; the flowers white and small.

Besides the *Euryangium Sumbul*, the author has met with another umbellifer, which resembles it very much in its entire habit, but may be distinguished by its smaller size, lighter leaves, and the absence of the musk-like smell of the root.

The Eastern Russian inhabitants call the *Euryangium Sumbul* "Bärenklaue" (bears' claw), and use the root as a medicine. The Chinese living in the district use the root of the plant against various diseases and call it "Lsóuma-tschen-tuk." It is also used by the natives internally as a remedy for swellings; with them it bears the names "Ofuokgi" and "Ouchi."

The author promises a future communication, giving the results of an examination of the separate constituents of the root as it is found in the district of Chabarowka.

REGENERATION OF SPENT ALBUMIN BY MEANS OF PEPSIN*.

BY J. WAGNER AND G. WITZ.

The property of an aqueous solution of albumin to deposit the albumin in the insoluble form on application of heat is applied to the fixing of a variety of important colours upon cotton. Both soluble and insoluble colours are mixed with the cold solution, printed on the cotton-piece, and the latter is then steamed, which converts the soluble albumin into the insoluble variety, forming a kind of fixed and elastic varnish upon the cloth, and mechanically fixing the colouring matter. Both egg- and blood-albumin pass into the insoluble form, *either wholly or partially*, if the temperature of the drying chamber has passed 35°, or even if exposed to the sun accidentally, or after allowing it to stand too long. Now the problem has been, "How to recover albumin which has thus become insoluble and is lost, so as to obtain it again in the soluble form for further service." Dilute alkaline carbonates or hydrates could bring such albumin into solution again, but such a solution lacks the power of coagulating on application of heat; in fact the constitution of the albumin is altered by the alkalies, a portion of its sulphur being abstracted, and the substance in solution is therefore not albumin at all. This prejudicial action of alkalies is at times experienced in working; thus if the basic lead chromate be not completely freed, by washing, from adhering lime, and be then thickened with albumin and printed, not a bright orange is obtained on the cotton on steaming, but, through presence of lead sulphide, a muddy-brown. At length J. Wagner devised the following successful method:—He brought 350 to 400 grams of such unserviceable albumin into contact with 30 grams of calf's stomach, cut into little pieces and distributed through 1 litre of water. The water was treated with 10 grams of concentrated hydrochloric acid, and had a temperature of 37·5°. After 24 to 36 hours' standing the whole was passed through a fine sieve, and the filtrate neutralized with ammonia, and thus an albumin solution was obtained which answered every purpose completely. Witz uses a sheep's stomach, and to 1 litre of acidified water nearly 125 grams of dry insoluble albumin. He states that pigs' stomachs are even more active than sheep's. He further digests for 40 hours at a temperature of 35° to 40°, whereby somewhat more than half the albumin goes into solution. The dissolved portion being separated by a sieve, the insoluble portion is treated once more with acidified water in the same manner, to bring a further portion of albumin into solution. The solution so obtained is without odour, and but little coloured, a fact worthy of note as regards blood-albumin. It has also the property, after neutralization by ammonia, to become coagulated either by boiling or by addition of alcohol. Experiments as to the use of this albumin in ultramarine printing, showed that on steaming, a pure, fast blue is obtainable, unaffected by boiling soap solution. There is one reaction which marks a difference between albumin recovered by pepsin and ordinary albumin. The former treated with acetic acid, before or after neutralization with ammonia, either does not at all become turbid, or only slightly, and in no case gelatinizes, even after long standing. On the contrary, one part of egg-albumin dissolved in ten parts of water, so that the filtered solution has a sp. gr. of 1·027, and treated with an equal or half volume of acetic acid of sp. gr. 1·050, immediately forms a solid, transparent jelly. This also takes place if hydrochloric acid be added. Witz has proved conclusively that under no circumstances whatever is coagulated albumin soluble in acetic acid. The text-books usually state that albumin-solutions are not precipitated at all by acetic acid, and are thus in great error. Digestion with pepsin is thus a certain method of bringing coagulated albumin again into solution. Just as cloth, which has undergone some injury in finishing, may be quite freed from its size by digestion with malt, and much more easily than by long treatment with boiling water, so by the help of pepsin, printed albumin colours, even after steaming, can be completely removed from the fabric.

For this purpose the piece is placed in warm, slightly acidified water, together with some pieces of the membrane of a calf's stomach. The pepsin in presence of the dilute acid dissolves the albumin, and the colouring matters, as chrome-green, lamp-black, chrome-yellow, ultramarine, ochre, etc., are now readily removed by washing. Pepsin can bring about the solution of albumin coagulated by boiling, as well as that of otherwise insoluble albumin, but the two solutions differ, as the former will not coagulate on boiling, but the latter will. The presence of a small quantity of free hydrochloric acid is indispensible in aiding the solution of the albumin by the pepsin. Dilute hydrochloric acid (1 part of sp. gr. 1·169, in 100 of water) alone, after some days, at a temperature of 38°, can effect the solution of insoluble albumin. The solution will coagulate on boiling, and answers well in printing. By digesting blood-fibrin in dilute hydrochloric acid, a fibrin solution is obtained, which coagulates on boiling, exactly as the albumin solution above mentioned does. It is thus possible that fibrin would make a good substitute for egg-albumin. Coagulated fibrin, like albumin, on treatment with acidified pepsin-solution, dissolves, but apparently in an altered or modified form, as the solution will not coagulate on boiling. Coagulated fibrin can also be dissolved gradually, by dilute hydrochloric acid (1 part of sp. gr. 1·169 to 100 of water). On heating, the solution precipitates the fibrin as a thick, solid jelly.

* From *Journal of the Chemical Society*, August, 1876 (*Dingl. polyt. J.*, ccxix, 166–171).

NOTE ON THE GUMS OF SENEGAL.*

BY DR. A. CORRE.

In commerce the gums of Senegal are distinguished according to the district which yields them, or the port from which they are exported.† They are (1) GOMMES

* *Journal de Pharmacie* [4], vol. xxiv., p. 318.

† These gums are not very often met with in general commerce, the greater part of them being imported into and used in France.—ED. PH. J.

BAS-DU-FLEUVE (Bas-du-fleuve, Degana, and Podor; gums from the desert of Bounoun and the country of the Braknas); and (2) GALAM GUMS, or GOMMES HAUT-DU-FLEUVE (Galam, Podor, Bakel, and Medina). These gums, when carefully sorted, yield very different products, which the author classifies as follows:—

A first group includes the gums in round pieces (*en boules*, so called because of their form). The subdivisions of this group are regulated by the degree of consistence and resistance, size and colour, of the balls.

A. *Hard Gums* (*Gommes dures*), of firm consistence, with large, clear, shining fracture:—(1) *grosse blanche:* pieces large or medium sized, entire, white or yellowish-white; (2) *petite blanche:* pieces small, entire or in fragments, generally whiter than the preceding; (3) *grosse blonde:* pieces large or medium sized, entire, yellowish or reddish-yellow; (4) *petite blonde:* pieces small, entire, or in fragments, yellowish or reddish-yellow; (5) *deuxième blonde:* pieces more or less large, entire or in fragments, reddish; (6) *fabrique:* pieces more or less large, entire or in fragments, reddish or brownish, moderately limpid, grumous or tearlike on the surface, with a fracture often resinoid, uneven, and dull.

B. *Soft or Friable Gums* (*Gommes molles ou friables*).—(7) *blanche;* (8) *blonde;* (9) *fabrique.*

In a second group the author places the gums occurring in elongated masses, a form which results, doubtless, through delay in the solidification of the gum upon the tree, caused by rains or humidity of the atmosphere:—(10) *larmeuse:* in mammillated or undulated masses, clear light yellow colour, shining at the surface, fracture clean, hard; (11) *vermicelle:* rather dull white, surface corrugated, fracture pretty clean and shining, friable; this gum is remarkable for its convolute form, which resembles that of vermicelli.

To a third group belong the gums in fragments and powder, the *débris* and residue of the preceding:—(12) *gros grabeaux;* (13) *moyens grabeaux;* (14) *menus grabeaux;* (15) *grabeaux triés;* (16) *grabeaux fabrique;* (17) *poussière.*

To a fourth group is allotted (18) *marrons* or *bois*, a largish gum, frequently of resinoid aspect, yellowish or brownish, mixed with, or adherent to, fragments of bark.

The Senegal gums are collected from a great variety of plants. The acacias (*Acacia nilotica*, *Verek*, *Adansonii*, *albida*, *dealbata*, *Sing*, *Seyal*, etc.) yield the greater part, and the finest qualities. They are also obtained from the *Khaya senegalensis*, certain *Spondias*, some *Sterculiaceæ*, and perhaps *Bassia*, etc.

As the result of the study of the mode in which the gum is produced from the verek, the author is of opinion that the starting point is certainly in the cambium. When a transverse incision is made in a young branch, there is observed at first a sort of exudation, badly defined, between the wood and the bark. As the exudation becomes more considerable it raises the bark, and makes its way to the exterior through any cracks or fissures. But as there are two layers in this zone—a ligneous and a cellular layer—the question arises in which layer does the gum take its origin? For the following reasons, the author believes it to be formed in the ligneous layer at the expense of the crude sap circulating therein.

(1) Upon different specimens of verek he has observed that at the level of the base of the gummy exudations the exterior woody bundles become deviated in the form of a capsule, and present traces of an erosive or destructive action. In very young branches, by the aid of a microscope, these bundles may be distinguished, dissociated and jagged, in the midst of the gummy matter.

(2) The balls of gum are frequently marked with very regular cavities, similar to those produced in a viscous mass by blowing air into it through a slender tube. These cavities cannot be due to the penetration of a gas coming directly from without, for they face inwards, *i.e.*, towards the base of the exudations; they could only be produced by the air from the vessels of the sap wood, ruptured and dissociated at the same time as the woody fibres.

(3) The mineral elements of gum (lime, etc.), belong to the crude sap.

Gum, however, is not simply water charged with salts, neither is it a highly concentrated saline solution. It is a product that presents great analogy of chemical composition with lignose. The author, therefore considers gum to be the result of a kind of liquefaction of the elements of the sap wood by the crude sap.

It is incontestable that the formation of gum is connected with an anomalous state due to excess of nutrition. It is observed more particularly at the points of budding, and at the bifurcation of the branches, and it acquires a remarkable development upon abnormal nodosities—in fact, wherever the nutritive action exists in the greatest intensity. Beyond certain limits, this energy in the rising of the sap is accompanied by a slackening of the circulation, which leads to a stagnation of the liquid through the engorgement of the channels; hence, perhaps, by absorption, leading to the softening and liquefaction of the fibrous and vascular element of the sap wood.

In this phenomenon the easterly winds have a share, their high temperature and dryness favouring the determination of the sap to the exterior. Their influence, is not, as often stated, limited to the production of cracks in the bark. It will be seen that there is a great analogy between the mode of the formation of verek gum and that of the gum of Rosaceae, as described by Trécul.

Recently an important part in the production of the Senegal gums has been attributed to a loranthaceous parasite, which is met with frequently in eastern Africa, not only on gum trees, but also on guava trees, palms, etc. The author has never observed the least exudation of gum at the points of implantation of this parasite, which itself takes up sap and leaves no excess for the plant on which it is developed. The nodosities, which have probably been attributed to the action of this parasite, and thus led to the suggestion, the author considers to be the results of insect punctures.

ARICINE AND ALLIED SUBSTANCES.*

BY O. HESSE.

The author reviews the experiments made by Pelletier and Coriol in 1829 on a bark of doubtful cinchona nature, from which these chemists obtained a base crystallizing in white transparent crystals soluble in alcohol and ether, insoluble in water, and capable of forming an acid and a neutral sulphate; by Leverköhn, who obtained from false calisaya bark (cinchona from Cusco) a gelatinous apparently non-crystalline sulphate of a base termed by Buchner *cusconine*; by Manzini, who extracted from pale tenchina bark an alkaloid which he called *cinchovatine*, but which the author subsequently found to contain also cinchonine, and which was subsequently found by H. Bourchardat and Winckler to be identical with aricine; and by David Howard, whose results the author considers to be due to his having obtained an impure *paricine* (containing cinchonine ?).

The alkaloids of a Cusco bark obtained from De Vrij were extracted by the author in the ordinary way; the concentrated neutral sulphuric acid solution yielded crystals of cinchonidine sulphate, and then gelatinized to a mass of microscopic prisms of the same containing a little quinine sulphate; the filtrate from these contained cinchonine and amorphous bases from which nothing characteristic could be isolated. Other samples of Cusco bark yielded only cinchonidine and traces of amorphous bases; the author considers De Vrij's bark not to have

* From the *Journal of the Chemical Society*, September 1876 (Liebig's *Annalen*, clxxxi, 58).

been genuine Cusco bark. Another Cusco bark (*China de Cusco vera* of Wiggers) identical with that employed by Pelletier and Coriol yielded cinchonine, a little cinchonidine, and amorphous bases, but no other crystallizable alkaloid.

Commercial "pale tenchina" bark carefully examined and selected by Wiggers yields no cinchovatine or aricine, but only cinchonine and traces of quinidine (the conchinine of the author), and amorphous bases. Other pale tenchina barks from France yielded cinchonidine also; but this bark appeared to contain an admixture of other varieties, although specimens could be readily picked out agreeing in all respects with the sample obtained from Wiggers.

Cinchovatine prepared by Winckler and examined by the author gave no blue fluorescence when dissolved in sulphuric acid; it formed fine white prisms which gave numbers agreeing with those required for cinchonidine; it melted at 208° (not corrected) and gave the rotation $(\alpha)_D = -107{\cdot}25$, whilst pure cinchonidine melts at 205° (not corrected) and gives the rotation $(\alpha)_D = 106{\cdot}89$ under the same conditions. It gave a hydrochloride indicated by $C_{20}H_{24}N_2O.HCl.H_2O$, a platinum salt $C_{20}H_{24}N_2O.2HCl.PtCl_4$, a sulphate $(C_{20}H_{24}N_2O)_2H_2SO_4$ anhydrous after drying in the air, and giving the rotation $(\alpha)_D = -172{\cdot}20$, whilst pure cinchonidine sulphate gave $(\alpha)_D = -172{\cdot}37$, and finally the hydrochloride and the sulphate gave with phenol water compounds precisely resembling those obtained with cinchonidine.

Aricine sulphate of commerce consisted mainly of a sulphate forming on recrystallization a gelatinous mass of minute needles, together with some cinchonine and quinine sulphates and a trace of resinous matter insoluble in water. The base in these small crystals gave on analysis numbers agreeing with cinchonidine; it melted at 205°, and gave the rotation $(\alpha)_D = -107{\cdot}25$; the sulphate crystallized from a large bulk of water, formed crystals containing $(C_{20}H_{24}N_2O)_2H_2SO_4.3H_2O$; with phenol water and Seignette salt it formed difficultly soluble compounds precisely agreeing in all respects with those from cinchonidine.

Hence the author concludes that the bodies described as aricine and cinchovatine are simply more or less pure cinchonidine, as is also a lævo-rotatory crystalline base extracted in 1873 by De Vrij from Jamaica bark.

EARTH-NUT, OR GROUND-NUT, CAKE.*

BY RICHARD V. TUSON, F.C.S. LONDON AND BERLIN,

Professor of Chemistry and Toxicology in the Royal Veterinary College.

Having, in the course of my analytical practice, had occasion to examine some samples of Marseilles earth-nut cake, I take the opportunity of communicating the results obtained, in the hope of furnishing interesting information respecting a material which is chiefly employed in the sophis tication of the more expensive feeding cakes, but which I think might in some instances be with advantage substituted for them.

The seeds from which earth-nut cake is manufactured are the product of a leguminous plant growing in the East, and which, according to Lindley, is called the *Arachis hypogœa*, or under-ground kidney bean. It is so named from the circumstance of its pods forcing their way into the ground and there ripening.

Arachis seeds constitute one of the varieties of food termed pulse, and the oil, which exists in them to the extent of from 40 to 50 per cent., is much used in India as a substitute for olive oil. The oil is also an article of the Indian Pharmacopœia, and is rapidly being introduced in the making of soap in this and other countries.

By pressure the seeds yield all but about 7 per cent. of their oil, and the material which remains after the expression of the greater part of the oil is sent into commerce as earth-nut, or ground-nut, cake.

Sometimes the husks of the seeds are first removed and only the kernels subjected to pressure for the sake of the oil, the cake so produced is called "decorticated earth-nut cake," at other times the entire seeds are submitted to this treatment, and then the resulting cake is known as "undecorticated earth-nut cake."

The following table shows the composition in 100 parts of both descriptions of cake, as well as that of linseed cake of first rate quality; the last analysis being added for the sake of comparison.

Table showing the Centesimal Composition of Decorticated and Undecorticated Earth-Nut Cake and Linseed Cake.

		Decorticated Earth-nut cake.	Undecorticated Earth-nut cake.	Linseed cake.
Moisture		9·58	9·28	11·72
Fat and Heat producers	Oil	7·40	6·99	12·09
	Starch, digestible fibre, etc.	27·63	23·67	*25·29
Flesh-formers (Albumenoids)		†42·81	‡32·81	32·64
Indigestible fibre		7·87	23·80	11·79
Ash		4·71	3·45	6·47
		100	100	100

From the foregoing analyses it will be seen that both descriptions of earth-nut cake are exceedingly rich in flesh formers, and that they contain a moderately large amount of oil. They also possess a sweet agreeable flavour, and are, I believe, very digestible. As these may, I am informed, be bought at from £6 to £8 per ton, it is evident that farmers would do well to give earth-nut cakes a trial in the feeding of their stock.

SURFACE BIOLOGY.§

BY ALFRED RUSSEL WALLACE, F.R.G.S., F.L.S.

The range of subjects comprehended within this Section is so wide, and my own acquaintance with them so imperfect, that it is not in my power to lay before you any general outline of the recent progress of the biological sciences. Neither do I feel competent to give you a summary of the present status of any one of the great divisions of our science, such as Anatomy, Physiology, Embryology, Histology, Classification, or Evolution—Philology, Ethnology, or Prehistoric Archæology; but there are fortunately several outlying and more or less neglected subjects to which I have for some time had my attention directed, and which I hope will furnish matter for a few observations of some interest to biologists, and at the same time not unintelligible to the less scientific members of the Association who may honour us with their presence.

The subjects I first propose to consider have no general name, and are not easily grouped under a single descriptive heading; but they may be compared with that recent development of a sister science which has been termed Surface geology or Earth-sculpture. In the older geological works we learnt much about strata, and rocks, and fossils, their superposition, contortions, chemical constitution, and affinities, with some general notions of how they were formed in the remote past; but we often came to the end of the volume no whit the wiser as to how and why the surface of the earth came to be so wonderfully and

* Reprinted from the *Veterinarian*, October, 1876.

* Pure linseed cake does not contain starch, but in its stead mucilage. The feeding qualities of starch and mucilage are, however, very similar.

† Containing 6·85 of nitrogen.

‡ Containing 5·25 of nitrogen.

§ Presidental Address delivered to the Biological Section of the British Association, at Glasgow, on September 6th, 1876.

beautifully diversified; we were not told why some mountains are rounded and others precipitous; why some valleys are wide and open, others narrow and rocky; why rivers so often pierce through mountain-chains; why mountain lakes are often so enormously deep; whence came the gravel, and drift, and erratic blocks so strangely spread over wide areas while totally absent from other areas equally extensive. So long as these questions were almost ignored, geology could hardly claim to be a complete science, because, while professing to explain how the crust of the earth came to be what it is, it gave no intelligible account of the varied phenomena presented by its surface. But of late years these surface-phenomena have been assiduously studied; the marvellous effects of denudation and glacial action in giving the final touches to the actual contour of the earth's surface, and their relation to climatic changes and the antiquity of man, have been clearly traced, thus investing geology with a new and popular interest, and at the same time elucidating many of the phenomena presented in the older formations.

Now just as a surface-geology was required to complete that science, so a surface-biology was wanted to make the science of living things more complete and more generally interesting, by applying the results arrived at by special workers to the interpretation of those external and prominent features whose endless variety and beauty constitute the charm which attracts us to the contemplation or to the study of nature. We have the descriptive zoologist, for example, who gives us the external characters of animals; the anatomist studies their internal structure; the histologist makes known the nature of their component tissues; the embryologist patiently watches the progress of their development; the systematist groups them into classes and orders, families, genera, and species; while the field-naturalist studies for us their food and habits and general economy. But till quite recently none of these earnest students, nor all of them combined, could answer satisfactorily, or even attempted to answer, many of the simplest questions concerning the external characters and general relations of animals and plants. Why are flowers so wonderfully varied in form and colour? what causes the Arctic fox and the ptarmigan to turn white in winter? why are there no elephants in America and no deer in Australia? why are closely allied species rarely found together? why are male animals so frequently bright-coloured? why are extinct animals so often larger than those which are now living? what has led to the production of the gorgeous train of the peacock and of the two kinds of flower in the primrose? The solution of these and a hundred other problems of like nature was rarely approached by the old method of study, or if approached was only the subject of vague speculation. It is to the illustrious author of the 'Origin of Species' that we are indebted for teaching us how to study nature as one great, compact, and beautifully adjusted system. Under the touch of his magic wand the countless isolated facts of internal and external structure of living things—their habits, their colours, their development, their distribution, their geological history,—all fell into their approximate places; and although from the intricacy of the subject and our very imperfect knowledge of the facts themselves, much still remains uncertain, yet we can no longer doubt that even the minutest and most superficial peculiarities of animals and plants either, on the one hand, are or have been useful to them, or, on the other hand, have been developed under the influence of general laws, which we may one day understand to a much greater extent than we do at present. So great is the alteration effected in our comprehension of nature by the study of variation, inheritance, cross-breeding, competition, distribution, protection, and selection—showing, as they often do, the meaning of the most obscure phenomena and the mutual dependence of the most widely-separated organisms—that it can only be fitly compared with the analogous alteration produced in our conception of the universe by Newton's grand discovery of the law of gravitation.

I know it will be said (and is said), that Darwin is too highly rated, that some of his theories are wholly and others partially erroneous, and that he often builds a vast superstructure on a very uncertain basis of doubtfully interpreted facts. Now, even admitting this criticism to be well founded—and I myself believe that to a limited extent it is so—I nevertheless maintain that Darwin is not and cannot be too highly rated; for his greatness does not at all depend upon his being infallible, but on his having developed, with rare patience and judgment, a new system of observation and study, guided by certain general principles which are almost as simple as gravitation and as wide-reaching in their effects. And if other principles should hereafter be discovered, or if it be proved that some of his subsidiary theories are wholly or partially erroneous, this very discovery can only be made by following in Darwin's steps, by adopting the method of research which he has taught us, and by largely using the rich stores of material which he has collected. The 'Origin of Species,' and the grand series of works which have succeeded it, have revolutionized the study of biology; they have given us new ideas and fertile principles; they have infused life and vigour into our science, and have opened up hitherto unthought of lines of research on which hundreds of eager students are now labouring. Whatever modifications some of his theories may require, Darwin must none the less be looked up to as the founder of philosophical biology.

As a small contribution to this great subject, I propose now to call your attention to some curious relations of organisms to their environment, which seems to me worthy of more systematic study than has hitherto been given them. The points I shall more especially deal with are—the influence of locality, or of some unknown local causes, in determining the colours of insects, and, to a less extent, of birds; and the way in which certain peculiarities in the distribution of plants may have been brought about by their dependence on insects. The latter part of my address will deal with the present state of our knowledge as to the antiquity and early history of mankind.

On some Relations of Living Things to their Environments.

Of all the external characters of animals, the most beautiful, the most varied, and the most generally attractive are the brilliant colours and strange yet often elegant markings with which so many of them are adorned. Yet of all characters this is the most difficult to bring under the laws of utility or of physical connection. Mr. Darwin—as you are well aware—has shown how wide is the influence of sex on the intensity of coloration; and he has been led to the conclusion that active or voluntary sexual selection is one of the chief causes, if not the chief cause, of all the variety and beauty of colour we see among the higher animals. This is one of the points on which there is much divergence of opinion even among the supporters of Mr. Darwin, and one as to which I myself differ from him. I have argued, and still believe, that the need of protection is a far more efficient cause of variation of colour than is generally suspected; but there are evidently other causes at work, and one of these seems to be an influence depending strictly on locality, whose nature we cannot yet understand, but whose effects are everywhere to be seen when carefully searched for.

Although the careful experiments of Sir John Lubbock have shown insects can distinguish colours—as might have been inferred from the brilliant colours of the flowers which are such an attraction to them—yet we can hardly believe that their appreciation and love of distinctive colours is so refined as to guide and regulate their most powerful instinct—that of reproduction. We are therefore led to seek some other cause for the varied colours that prevail among insects; and as this variety is most conspicuous among butterflies—a group perhaps better known than any other—it offers the best means of studying the subject. The variety of colour and marking among these insects is something marvellous. There are probably about ten thousand different kinds of butterflies now known, and about half of these are so distinct in colour and marking that they can be readily distinguished by this means alone. Almost every conceivable tint and pattern is represented, and the hues are often of such intense brilliance and purity as can be equalled by neither birds nor flowers.

Any help to a comprehension of the causes which may have concurred in bringing about so much diversity and beauty must be of value; and this is my excuse for laying before you the more important cases I have met with of a connection between colour and locality.

Our first example is from tropical Africa, where we find two unrelated groups of butterflies belonging to two very distinct families (Nymphalidæ and Papilionidæ) characterized by a prevailing blue-green colour not found in any other continent.* Again we have a group of African Pieridæ which are white or pale yellow with a marginal row of bead-like black spots; and in the same country one of the Lycænidæ (*Leptena erastus*) is coloured so exactly like these that it was at first described as a species of *Pieris*. None of these four groups are known to be in any way specially protected, so that the resemblance cannot be due to protective mimicry.

In South America we have far more striking cases; for in the three subfamilies *Danainæ, Acræinæ* and *Heliconiinæ*, all of which are specially protected, we find identical tints and patterns reproduced, often in the greatest detail, each peculiar type of coloration being characteristic of distinct geographical subdivisions of the continent. Nine very distinct genera are implicated in these parallel changes—*Lycorea, Ceratinia, Mechanitis, Ithomia, Melinæa, Tithorea, Acræa, Heliconius,* and *Eueides*, groups of three or four (or even five) of them appearing together in the same livery in one district, while in an adjoining district most or all of them undergo a simultaneous change of coloration or of marking. Thus in the genera *Ithomia, Mechanitis,* and *Heliconius*, we have species with yellow apical spots in Guiana, all represented by allied species with white apical spots in South Brazil. In *Mechanitis, Melinæa* and *Heliconius*, and sometimes in *Tithorea*, the species of the Southern Andes (Bolivia and Peru) are characterized by an orange and black livery, while those of the Northern Andes (New Granada) are almost always orange-yellow and black. Other changes of a like nature, which it would be tedious to enumerate, but which are very striking when specimens are examined, occur in species of the same groups inhabiting these same localities, as well as Central America and the Antilles. The resemblance thus produced between widely different insects, is sometimes general, but often so close and minute that only a critical examination of structure can detect the difference between them. Yet this can hardly be true mimicry, because all are alike protected by the nauseous secretion which renders them unpalatable to birds.

In another series of genera (*Catagramma, Callithea,* and *Agrias*), all belonging to the Nymphalidæ, we have the most vivid blue ground, with broad bands of orange-crimson or a different tint of blue or purple, exactly reproduced in corresponding, yet unrelated species, occurring in the same locality; yet, as none of these groups are protected, this can hardly be true mimicry. A few species of two other genera in the same country (*Eunica* and *Siderone*) also reproduce the same colours, but with only a general resemblance in the marking. Yet, again, in Tropical America we have species of *Apatura* which, sometimes in both sexes, sometimes in the female only, exactly imitate the peculiar markings of another genus (*Heterochroa*) confined to America; here, again, neither genus is protected, and the similarity must be due to unknown local causes.

But it is among islands that we find some of the most striking examples of the influence of locality on colour, generally in the direction of paler, but sometimes of darker and more brilliant hues, and often accompanied by an unusual increase of size. Thus in the Moluccas and New Guinea we have several Papilios (*P. euchenor, P. ormenus,* and *P. tydeus*) distinguished from their allies by a much paler colour, especially in the females, which are almost white. Many species of *Danais* (forming the subgenus *Ideopsis*) are also very pale. But the most curious are the Euplœas, which in the larger islands are usually of rich dark colours, while in the small islands of Banda, Ké, and Matabello at least three species not nearly related to each other (*E. hoppferi, E. euripon,* and *E. assimilata*) are all broadly banded or suffused with white, their allies in the larger islands being all very much darker. Again, in the genus *Diadema*, belonging to a distinct family, three species from the small Aru and Ké islands (*D. deois, D. hewitsonii,* and *D. polymena*) are all more conspicuously white-marked than their representatives in the larger islands. In the beautiful genus *Cethosia*, a species from the small island of Waigiou (*C. cyrene*) is the whitest of the genus. *Prothoë* is represented by a blue species in the continental island of Java, while those inhabiting the ancient insular groups of the Moluccas and New Guinea are all pale yellow or white. The genus *Drusilla*, almost confined to these islands, comprises many species which are all very pale; while in the small island of Waigiou is found a very distinct genus, *Hyantis*, which, though differing completely in the neuration of the wings, has exactly the same pale colours and large ocellated spots as *Drusilla*. Equally remarkable is the fact that the small island of Amboina produces larger-sized butterflies than any of the larger islands which surround it. This is the case with at least a dozen butterflies belonging to many distinct genera,* so that it is impossible to attribute it to other than some local influence. In Celebes, as I have elsewhere pointed out,† we have a peculiar form of wing and much larger size running through a whole series of distinct butterflies; and this seems to take the place of any speciality in colour.

From the Fiji Islands we have comparatively few butterflies; but there are several species of *Diadema* of unusually pale colours, some almost white.

(*To be continued.*)

HANBURY MEMORIAL FUND.

SUBSCRIPTIONS RECEIVED.

	£	s.	d.
Amount previously acknowledged	319	13	0
Andrews, Dr. T., F.R.S.	1	1	0
Bishop, Thomas ..	0	10	6
Blomefield, Rev. L. ..	1	1	0
Brandis, Dr., F.R.S.	1	1	0
Caley, Albert Jarman	1	1	0
Coster, Dr. D. J. ...	1	1	0
Craig, Dr. W.	0	10	6
Cranwell, W. B., and Co.	1	1	0
Davies, Robt. Higgins	1	1	0
Duthie, J. F.	0	10	6
Dyer, M. T. Thiselton	1	1	0
Gibbons, Thos. Gilks	1	1	0
Haaxman, P. J. ..	0	5	0
Herring, J. B.	1	1	0
Howorth, James ..	0	10	0
Hunter, John	0	5	0
Jones, E. Powell ..	0	10	6
Kemp, D. S.	1	1	0
Kemp, D. S. and Co.	1	1	0
Mason, William W. ..	0	10	0
Mathews, J. H. ..	0	10	6
Mouton, Dr. J. T. ..	0	10	6
Netherlands Society of Pharmacy	1	1	0
Opwyrda, R. J. ..	0	5	0
Oudemans, Prof. C. A. J. A.	0	10	6
Peterson, Dr. Robert E.	1	1	0
Pitlo, W. P.	0	5	0
Robertson, W. A. ..	0	10	6
Society of Pharmaceutical Students, Amsterdam	0	10	6
Thorp, William	1	1	0
Tyler, Charles	1	1	0
Van Aukum, C. H. ..	0	10	6
Waring, Dr. E. J. ..	1	1	0
Wills, G. S. V.	1	1	0

* *Romaleosoma* and *Euryphene* (Nymphalidæ), *Papilio zalmoxis* and several species of the *Nireus*-group (Papilionidæ).

* *Ornithoptera priamus, O. helena, Papilio deiphobus, P. ulysses, P. gambrisius, P. codrus, Iphias leucippe, Euplœa prothoë, Hestia idea, Athyma jocaste, Diadema pandarus, Nymphalis pyrrhus, N. euryalus, Drusilla jairus.*

† 'Contributions to the Theory of Natural Selection,' pp. 168—173.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 21, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

XANTHIUM SPINOSUM.

SOME little interest having been excited with respect to the *Xanthium spinosum*, which has lately been lauded as a remedy for hydrophobia, it may be of use to our readers to present them with a short description of the plant, and such particulars as may help those who are called upon to make preparations of it, to obtain and recognize the right plant.

Xanthium spinosum, L., is a common weed in the south of Europe, growing in waste places, at the foot of walls, and by roadsides. In this country it is not a native and is very rare, but it has been found in waste places near Kenilworth and Hereford, and in Wales. The stem grows from 2 to 3 feet high, and is branched at the base. The dark green leaves, greyish-white beneath, and the long yellow spines at the base of the leaves at once mark out the plant. The leaves are alternate, from 2 to 4 inches long, and about ½ to 1 inch broad in the middle, and taper at both ends. About the middle of the leaf there are two or more teeth, usually one on each side of the leaf, which thus give the lower half of the leaf a wedge-shaped outline. The leaf is dark green above, with a distinct midrib, and usually two well marked lateral veins, one running to each tooth. These veins are whitish, and contrast strongly with the dark green colour of the leaf. The under side of the leaf is white and downy.

On each side of the base of the leaf, and occupying the place of stipules, are sharp yellow spines, usually in pairs; each spine is branched into three from near its base like that of the barberry, but the bright yellowish colour and polished appearance render them much more conspicuous.

The plant belongs to the Compositæ, but is a somewhat anomalous member of that large and usually well marked family. It is remarkable for having monœcious capitula and for the pistillate capitulum consisting of only one or two flowers: these are without a corolla and are enclosed in an involucre, the scales of which become welded together into what looks like a capsular fruit. This capitulum is about the size of a horsebean or rather larger, and is sessile either in or near the axils of the leaves. When the capitulum occupies the place of the stipule it usually replaces the branched spine on the side on which it occurs. It is covered with small hooked bristles, which are about half as long as the capitulum is wide.

The plant flowers in July and August and could probably be obtained from any port in the south of France or Italy. A specimen of the plant, collected near Kenilworth by Mr. A. WHEATLEY, is in the Herbarium of the Pharmaceutical Society, Bloomsbury Square.

It will be remembered that in a paper printed in this Journal a few weeks since (before, p. 249), M. GUICHARD gave the results of treatment of the plant with alcohol and with water, and that from these he was induced to believe that an alcoholic extract would probably prove the most active preparation. M. GUICHARD also considered that his experiments demonstrated the presence of an alkaloid, which, however, he had not succeeded in isolating. Since then, in a note on the analysis of *Xanthium spinosum* M. YVON has expressed a doubt as to the existence of such an alkaloid, he considering the indications that might lead to such a supposition to be due to a resin, soluble in ether and in alcohol, which occurs to the extent of two per cent. M. YVON found 76½ per cent. of organic matters (including 10 per cent. of starch), 11½ per cent. of mineral matters, and 12 per cent. of moisture.

ERYTHROXYLON COCA.

THE uses of the leaves of the coca plant (*Erythroxylon coca*) have occupied so much attention of late that some details on the characters of the different kinds and of the traffic in these leaves may be of interest. The coca plant, as is well known, is very largely grown in Peru. Peru nevertheless takes large quantities from Bolivia, where the coca is said to be of a much superior quality; to such an extent are the Peruvian purchases that in one year the value of introduced coca amounted to 205,600 francs. In the two provinces of Salta and Jujui the consumption is enormous; in the former it is usually sold for seven francs the pound of sixteen ounces, but the price varies according to the quality and condition of the harvest; latterly, however, the price has risen considerably and the cultivation has very much extended.

Thus, though coca is chiefly at the present time used in Peru and Bolivia, and in the two provinces of Salta and Jujui in the Argentine Confederation, it is being gradually introduced into other provinces, and it is considered very probable that in a few years its use may extend over the whole of the Argentine Republic. It has been asserted that coca is used as a currency in Peru, but this seems doubtful; indeed, modern travellers do not mention it as a fact. It has also been stated that the revenues of the cathedral of Cuzco were entirely derived from the tithes on coca. With regard to quality, the best coca is said to be produced in the province of Yungas. Some of it is sold at a very high price; the most inferior quality is that produced in Peru. Good quality coca should have its leaves unbroken, of a medium size, bright green in colour, and of an odour somewhat combining those of hay and chocolate. The taste is bitter, and when masticated coca is said to yield easily to the teeth. Infused in hot water it has a beautiful green colour, which, however is much darker from inferior leaves. A decoction made in the form of tea is said to have a pleasant taste peculiar to itself. An infinite number of varieties are recognized between the best and the lowest quality, which has a disagreeable smell and a colour resembling roasted coffee. The leaves are also bent and broken, scarcely a whole leaf being found amongst them. It is stated that the numerous varieties "cannot be distinguished except by connoisseurs, who bring to this matter a delicate taste, acquired by indulging in a luxury and studying its effects for many years. The inexperienced European druggist who wishes to deal in coca must judge it by its two most appreciable qualities, the green colour, and the small delicate leaf."

CHINESE VIEWS ON ENGLISH PHARMACY.

Now and then, when English pharmacists have been favoured with a glimpse of the style of Pharmacy that obtains favour with their Celestial brethren, their interest has been somewhat tinged with surprise and amusement at the nature of some of the preparations. But a letter from the Shanghai correspondent of *The Times*, published last week, seems to indicate that the Chinese have been enjoying a *quid pro quo* in this respect. It appears that an anti-Christian book, called the "Ki-Kinglu," has been published in the province of Szechuen, in which it is stated that the skill and intelligence of foreigners have been obtained by robbing the Chinese. One method of doing this, it is there represented, has been the making of an extract from the eyes of Chinese who have become Christians, and touching the eyes of foreigners with it, by which they have been enabled to understand astronomy and perceive the mineral wealth of the earth. Another valuable medicine for the promotion of intelligence has had for one of its ingredients the brains of a Chinese girl who has embraced Christianity. Other medicines have been mixed with the brains and the compound made up into pills, which received their final touch in the shape of certain incantations instead of a sugar coating. The *bona fides* of the author is attested by his statement that he has himself lived three years in England, during which time he had three princesses given him to wife by the Queen, and that he was only permitted to return to China upon giving a promise not to expose the improprieties he had witnessed in this country.

A PRICE LIST FOR THE WEST OF ENGLAND.

At a large and influential meeting of the Chemists and Druggists of Plymouth, Devonport, and Stonehouse, held at Plymouth at the end of June last, it was resolved to form a Chemists and Druggists' Association for the district, and Mr. F. Codd was elected President, Mr. A. P. Balkwill, Vice-President, and Mr R. J. Clark, Honorary Secretary and Treasurer. One of the first things done by the new Association was to send an invitation to the British Pharmaceutical Conference to meet next year at Plymouth, which was accepted. Another resolution was that a Price List should be published. The work of compiling this List was entrusted to a committee, by whom it had been promptly issued with a wish—which we fully endorse—that as the prices adopted in it are fairly remunerative, it will prove acceptable to the trade and be widely adopted and generally adhered to. Where the prices suggested are higher than those hitherto obtained it is not expected that an immediate and abrupt advance shall be made, but that each chemist and druggist shall endeavour to work as nearly as possible up to the standard, so that some approach to uniformity may be gained. One useful piece of advice is also given, that, when necessary, the public should be given to understand that, dispensing being skilled labour of a high class, involving the gravest responsibility, the mere retail price of the ingredients in a prescription would be very inadequate remuneration to the competent dispenser. We congratulate the young Association on the vigorous signs of life it is showing.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

A circular has been issued by the Council of the above Association announcing the following arrangements:—(1) That a "Tutorial Class" for instruction in English, Arithmetic, and Latin, conducted by Mr. Archibald Fairlie, C.M., will be held on Tuesday and Friday evenings, from 8·45 to 10·45 o'clock, from the beginning of November to the end of April; fee for the entire course, 10*s.* 6*d.* (2) A Practical and Theoretical Pharmaceutical Chemistry Class will be held under the superintendence of Dr. A. T. Machattie, on Tuesday and Thursday evenings, from 8·30 to 10 o'clock, from the beginning of November to the end of April; fee for the course, £2 2*s.* Should there be a satisfactory number of entries to the above classes, a Materia Medica and Pharmacy Class will be commenced early in the New Year, and a Botany Class in the Spring. The opening meeting of the Association for the session will be held on Wednesday, November 8th, when the introductory address will be delivered by the President, Mr. Daniel Frazer.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The First Meeting of the above Association for the session of 1876-77 will be held at 17, Bloomsbury Square, on Thursday evening, October 26th, Professor Attfield, President, in the chair.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

October 2, 1876.

Two hundred and thirty-five candidates presented themselves for examination of whom *one hundred and twenty* failed. The following *one hundred and fifteen* passed and have been duly registered as Apprentices or Students (arranged alphabetically):—

Adamson, Wm. Stuart............Edinburgh.
Akers, John ....Leighton Buzzard.
Allison, William Alfred ....Harrogate.
Appleyard, John ....Bradford, Yorks.
Atkins, Alfred Edward ....Newport, Mon.
Audus, William George ....Dumbarton.
Austin, Alfred ....Birmingham.
Bailey, John Henry...............Wanstead.
Barnett, Walter James ....Coventry.
Beckett, Harry Rumbold ......London.
Beckett, Louis ....London.
Bellingham, Benjamin............Dawley.
Blakie, James A. ....Newbury.
Blaylock, Richard ....Maryport.
Bloodworth, Thomas ....Bourn.
Bright, Richard H. D.............Peterborough.
Caldecott, Clement Guest ......Whitchurch, Salop.
Carter, Henry Ayling ....Winchester.
Clarke, Richard ....Ruthin.
Clarke, Wm. Henry...............Sleaford.
Clayton, John William ....Preston.
Colam, Fred.........................Hull.
Coleclough, John Arthur.........Tiverton.
Colegrove, John Thomas F......Liverpool.
Cooper, George Townson.........Church.
Cutmore, Frank ....Totnes.
Dix, James Edward...............Croydon.
Dyer, Sidney Reginald............Chiswick.
Elstob, John ....Richmond, Yorks.
Evans, Richard.....................Dinas Mawddwy.
Farnsworth, Percy Harrison ...Codnor.
Fisher, John Hutcheson ....Edinburgh.
Fleming, Ebenezer ....Castle Douglas.
Foster, Morris ....London.
Foster, William.....................Dewsbury.
France, James Mead ....Clapham.
Gordon, William George ....Aberdeen.
Granger, Harold ....Nottingham.
Griffiths, John ....Carmarthen.
Griffiths, John ....Newcastle Emlyn.
Guest, George Robert ....Brentwood.
Gwyn, William Alexander ......Taunton.
Hague, Fred..........................Lees.
Hall, John Thomas ....Manchester.
Heath, Robert Philip ....Norwich.
Heynes, Sydney Gawler ....Bromsgrove.
Holifield, Edward Joseph ......Faringdon.
Houfe, Robert William ....York.
Hughes, Edward ....Sarn.
Hughes, Evan ....Chelmsford.
Hughes, James ....Liverpool.
Humble, Charles Henry ....London.
Hunter, William ....Stockton-on-Tees.
Innes, David.........................Stalybridge.
Joyner, Arthur George ....Cheltenham.
Lowe, Moses H. ....Great Barr.
Lowe, Sam. Peter ....Sheffield.
Loxton, James Stokes ....Cannock.
Lyon, Thomas ....Edinburgh.
Marshall, Percy Wm. ....Uxbridge.
Martland, Thomas ....Wigan.
Mathias, James R. H.............Tenby.
Matthews, Charles William......London.
Metcalf, Rowland Alfred.........Uxbridge.
Millson, William Jarvis ....Boston.
Morkill, Arthur James ....Leicester.
Nance, William Clarke de ......Glasgow.
Nethercott, Walter John.........Stroud.
Norman, William Francis ......Towcester.
Owen, Robert ....Dowlais.
Parish, Henry ....Birmingham.
Peat, Joseph ....Accrington.
Perkins, Thomas Frampton ...Bristol.
Pilsbury, William..................Eccleshall.
Pope, Albert Harry ....Southport.
Power, William.......................Greenwich.
Presbury, Herbert Henry ......London.
Radford, James Alfred ....Birmingham.
Rees, David ....Haverfordwest.
Richards, John William ....Pontypridd.
Sagar, Hartley ....Nelson-in-Marsden.
Shacklock, James Harvey ......South Cave.
Shaw, Frank...........................Nottingham.
Silk, Thomas..........................Burton-on-Trent.
Smith, Frederic William ....Wellington (Salop).
Smith, Norman Sellers ....Birmingham.
Snell, Charles James B. V. C...Brookwood.
Stableforth, John William ......London.
Steel, Alexander ....Torquay.
Stevens, Charles ....Upper Norwood.
Stevens, Robert ....Bristol.
Stott, Walter Henry ....Wednesbury.
Stredwick, Augustus ....Bristol.
Suart, George ....Lancaster.
Sumner, John ....Wilmslow.
Swan, Michael Edward ....London.
Taggart, Herbert Wm. Ashton.Manchester.
Taylor, Arthur Bertie ....Sheffield.
Thomas, James Morris............Whitland.
Thomas, Joseph Arden ....Cambridge.
Thompson, Arthur Stevens......Barking.
Thompson, Frederic ....Scarborough.
Trezise, William Augustus .....Sheffield.
Trickey, Robert Harding.........Weston-super-Mare.
Tyndall, Francis ....Newcastle, Staffs.
Tyson, Thomas Balmforth ......London.
Walker, Charles ....Birstwith.
Warrell, Edmund ....London.
Watts, John Manning ....London.
Williams, James Boden ....Manchester.
Williams, William Jesse ....Crickhowel.
Wilson, Samuel.......................Hanley.
Wood, William Arlington ......Bradford.
Worts, Harry Augustine.........Harwich.
Young, William Ferguson ......Elgin.

First or Preliminary Examination.

October 2, 1876.

(*Time allowed: Three hours for the three subjects*).

I. LATIN.

1. Translate into English:—Genus hoc erat pugnæ, quo se Germani exercuerant. Equitum millia erant sex: totidem numero pedites velocissimi ac fortissimi; quos ex omni copia singuli singulos, suæ salutis causa, delegerant. Cum his in prœliis versabantur, ad hos se equites recipiebant: hi, si quid erat durius, concurrebant: si qui, graviore vulnere accepto, equo deciderant, circumsistebant: si quo erat longius prodeundum, aut celerius recipiendum, tanta erat horum exercitatione celeritas, ut, jubis equorum sublevati, cursum adæquarent.

2. Decline throughout *genus, pugnæ, equites, cursum,* and together *graviore vulnere.*

3. Select in the above passage the adjectives and adverbs which are in the comparative or the superlative degree, and give the three degrees of comparison in each instance.

4. Give the present, the infinitive, the perfect, and the supine of *exercucrant*, *delegerant*, *recipiebant*, *concurrebant*.

5. In what case will you put the place (*a*) *where*; (*b*) *whither*; (*c*) *whence*?

II. ARITHMETIC.

(The working of these questions, as well as the answers, must be written out in full).

6. Find the value of 3 oz. 5 drams 2 scruples at £1 6*s*. 8*d*. per oz.

7. Simplify $\frac{\frac{21}{22}}{97} \div \frac{2}{3} \times \frac{7}{13}$.

8. Reduce $\frac{10}{21}$ to a decimal. Divide 3·7514 by ·067.

6. Define the *gramme* and the *litre* of the Metric System. How many cubic inches does the *litre* contain?

10. What is the sum of $\frac{1}{7}$th of a yard, $\frac{1}{7}$th of a foot, and $\frac{1}{7}$th of an inch? Express the answer—1st, in inches; 2nd, as a fraction of a yard; 3rd, as a decimal of a yard.

III. ENGLISH.

11. How does an adjective differ from an adverb?

12. Give the past indefinite tense, and the complete participle of each of the following verbs: *sting*, *shoe*, *fly*, *flee*, *lay*.

13. Parse the following lines:—

> "We look before and after,
> And pine for what is not:
> Our sincerest laughter
> With some pain is fraught."

14. Write a short account of William the Conqueror, *or* Queen Elizabeth, *or* a short essay on Coal, *or* Telegraphs, *or* the War in Turkey.

The following is a list of the Centres at which the examination was held, showing the number of Candidates examined at each Centre, and the result:—

	Candidates. Examined.	Passed.	Failed.		Candidates. Examined.	Passed.	Failed.
Aberdeen	3	1	2	Leeds	11	5	6
Aberystwith	1	1	0	Leicester	3	1	2
Barnstaple	1	0	1	Lincoln	3	1	2
Birmingham	28	11	17	Liverpool	6	1	5
Boston	2	1	1	London	45	26	19
Brighton	4	0	4	Macclesfield	1	0	1
Bristol	6	4	2	Manchester	13	8	5
Cambridge	4	2	2	Newcastle	4	0	4
Canterbury	1	0	1	Northampton	1	1	0
Cardiff	3	2	1	Norwich	2	1	1
Cardigan	2	1	1	Nottingham	3	3	0
Carlisle	4	1	3	Oxford	2	1	1
Carmarthen	4	4	0	Peterborough	1	1	0
Carnarvon	1	1	0	Plymouth	3	1	2
Cheltenham	2	2	0	Preston	7	4	3
Chester	3	2	1	Reading	1	0	1
Colchester	3	1	2	Scarborough	3	1	2
Darlington	3	2	1	Sheffield	5	3	2
Dumfries	1	1	0	Shrewsbury	5	1	4
Edinburgh	10	3	7	Southampton	3	1	2
Exeter	2	2	0	Stafford	3	3	0
Glasgow	5	2	3	Swansea	1	0	1
Hereford	1	1	0	Taunton	2	2	0
Hull	3	2	1	Truro	1	0	1
Inverness	1	1	0	Worcester	3	1	2
Leamington	1	0	1	York	4	1	3

Addendum.—To the list of persons on p. 298, col. i., to whom a Certificate of Merit was awarded in respect to the Ten Months' Course in Botany and Materia Medica, add—Thomas Ridgley.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The annual meeting of the twenty-seventh session of the Liverpool Chemists' Association was held at the Royal Institution, September 28, the President, Mr. A. H. Mason, F.C.S., in the chair.

After confirmation of the minutes of the previous meeting, the Honorary Secretary, Mr. Thomas Williams, F.C.S., read the report of the council for the past session, of which the following is an abstract:—

In reviewing the proceedings of the twenty-seventh session of the Liverpool Chemists' Association, the council congratulated the members upon its steady progress. It was stated that the great impetus which has been given of late years to scientific inquiry had evidently extended itself to the business of the meetings, and that the session had been marked by increased activity and a larger attendance. During the past session one honorary member, seventeen ordinary members, and one associate, had been elected, and one of the most esteemed honorary members, Dr. Inman, had died. The council also paid a tribute to the memory of one of the founders of the Association, Mr. Robert Clay, who had been called away, and who was president during the first two sessions of its existence. The chemistry classes in connection with the School of Pharmacy had been conducted by Mr. Thomas Williams, F.C.S., and the number of students had been above the average of recent sessions. An examination had been conducted, in which Mr. W. H. Edwards had been the successful candidate, and he had since passed the Minor examination of the Pharmaceutical Society. By permission of the committee of the Liverpool Royal Infirmary School of Medicine, students of the Liverpool School of Pharmacy had been admitted to the lectures on botany conducted by Dr. Carter, and the lectures on materia medica conducted by Dr. Nevins. The papers read at the meetings and the published proceedings of the Association were reported to have attracted more than usual interest, and much information had been elicited during the discussions which followed. Miscellaneous contributions, which have always formed an attractive feature of the proceedings, have been numerous and valuable, some original. The question box had been used more frequently during the session.

The museum had been enriched by a handsome contribution of specimens of rare chemicals, from Messrs. T. Morson and Son, of London; by a valuable collection of opium alkaloids and their derivatives, from the President, and several novelties from the discoverers or proprietors. The librarian reports that 230 books have been taken out during the session. The twelfth conversazione is considered to have been a success, and the council expressed its indebtedness to several scientific friends for their services.

A suggestion that it may be desirable to alter the title of the Association had received the consideration of the council, but it was felt to be a question to be decided by the members. The following members of council retired by rotation:—Messrs. Armstrong, Davies, Murphy and Williams.

The treasurer presented his report of the finances of the Association, which showed a credit balance of £3 11*s*. 1*d*.

The President moved "That the reports, as read, be adopted, and, together with the list of members and abstract of proceedings of the past session, be printed and circulated among the members." He reviewed the various paragraphs in the report, and impressed upon the members the importance of doing their utmost to maintain the position of the Association, inviting the students to use all diligence to render the session of the School of Pharmacy successful. He also congratulated the Association upon the success of the past session, and upon the satisfactory change in the condition of the finances of the Association.

Mr. W. H. Edwards seconded the motion, which was carried *nem. con.*

The meeting then proceeded to the election of four members of council. Messrs. E. Davies, F.C.S., Thomas Williams, F.C.S., James T. Armstrong, F.C.S., and Martin Murphy, F.C.S., were duly elected.

Mr. Joseph Woodcock moved "That the best thanks of the meeting be given to the donors to the library and museum, and to the authors of papers during the past session."

Mr. E. Davies, F.C.S., seconded the motion, which was carried unanimously.

Mr. Haddock moved—"That the best thanks of the meeting be given to the officers and council for their services during the past session."

Mr. E. F. Morton seconded the motion which was carried by acclamation.

The President, Treasurer, and Honorary Secretary returned thanks.

The President then presented to Mr. W. H. Edwards the prize awarded by the council for chemistry. It consisted of a handsomely re-bound copy of Hanbury and Flückiger's 'Pharmacographia."

This concluded the business of the session.

The first general meeting (twenty-eighth session) was held at the Royal Institution, Colquitt Street. The President, Mr. A. H. Mason, F.C.S., in the chair.

After the minutes of the previous meeting had been read and signed, the Honorary Secretary announced the list of officers for the session.

President, Mr. A. H. Mason, F.C.S.; Vice-President, Mr. Joseph Woodcock; Council, Messrs. J. Abraham, J. T. Armstrong, F.C.S., E. Davies, F.C.S., Charles Jones, Martin Murphy, F.C.S., E. W. Parnell, F.C.S., A. Redford and J. Shaw; Hon. Treasurer, Mr. R. Sumner, 50, Lord Street; Hon. Sec., Mr. Thomas Williams, F.C.S., 23, Lord Street.

The donations received during the recess were announced and the thanks of the Association unanimously accorded to the donors.

Messrs. Conroy, Sumner, Bevan, Hughes, and Longshaw, were elected members. Messrs. Evans, Ellis, and Taylor, associates.

The President then delivered his inaugural address.

President's Address.

Gentlemen,—As the first occupant of this chair elected by the members of your Association under the altered law, permit me to thank you most sincerely for the elevated position which by your kindness I have the honour to hold. Labouring under a deep sense of my obligation to you and feeling the additional responsibility of delivering an address under these circumstances worthy your Association, I crave your indulgence, conscious of my insufficiency to discharge the duties of so important an office.

During the twenty-seven years your Association has been established it has experienced the various vicissitudes of time and progress. The records show that in 1855 half the members and associates of the Pharmaceutical Society of Great Britain in this neighbourhood were members of this Association, and it was at that time your museum was formed. For this object a grant of fifty pounds was made by the Council of the Pharmaceutical Society, subject to the condition that the members and associates of the Pharmaceutical Society have free access to the museum. This privilege was granted by the Committee of the Royal Institution, subject to the applicants holding an admission from our Secretary. This donation was about one-fourth the cost of the museum; other donations of money and specimens were liberally provided by pharmacists, chemists and druggists, medical men, and scientific and manufacturing chemists in the town and neighbourhood. Your library was built up by donations of books from the same sources and from the funds of the Association. At first your assumed objects were strictly pharmaceutical, and your government was confined exclusively to chemists and druggists, but the papers read were not all of this nature, and I find your circulars after 1855 announced "meetings" and "pharmaceutical meetings;" hence outsiders lectured and read papers and were eventually admitted as members, and it is probable had not this been the case that your Association would not have maintained the high position and scientific reputation it now holds. Its constitution, perhaps fortunately, is now almost as comprehensive as the science with which we are so intimately associated. At the same time it still fills its mission and provides quite as much information for the pharmacist as it did formerly. Having suggested the desirability of altering our title you will at once perceive my object in the foregoing observations. I have on previous occasions stated reasons for my suggestion; since then it has been decided to form one hundred and thirty chemists' associations throughout the kingdom, united in one object—self-defence and protection of trade interests. I now leave this matter entirely in your hands, simply stating that probably substituting the word "society" for association would accomplish the desired result. We stand now in connection with the Pharmaceutical Society as an educational body (having a recognized school of pharmacy), and related to the Pharmaceutical Conference, and the Chemical Society of London, in the various qualifications of our members and in the practical results of our meetings.

Having thus far trespassed upon your time, I purpose inviting your attention now to some of the more important results of the investigations which are of interest to us, which have been announced since I had the honour to address you twelve months ago; and although I fear I can only refer to what is well known to you, I hope we may all profit by freshening our memories and perhaps be stimulated to follow up the investigations of some of those champions of our profession of whom we may well feel proud.

Salicin and Salicylates have occupied considerable attention, the announcement that salicin was proved a specific against rheumatism caused the demand for that substance to be greatly in excess of previous production. Hence an enormous advance in pecuniary value, and as fresh supplies cannot be produced until the spring, probably the administration of salicylic acid as a substitute was suggested. You are aware that according to Laveran and Millon (*Ann. Ch. Phys.* [3], xiii. 145) that after the ingestion of salicin into the animal body, salicylol and salicylic acid are found in the urine.

Salicin ($C_{13}O_{18}O_7$) (Leroux, *Ann. Ch. Phys.* [2], xliii., 446) exists ready formed in the barks of several species of willow (17) and poplar. It appears also to be contained in the flower buds of meadowsweet (*Spiræa ulmaria*) and in the green parts of this and other herbaceous spiræas, inasmuch as these plants yield salicylol by distillation with water (Buchner, *N. Repert. Pharm.* ii. 1). Salicin is produced artificially in several ways, see 'Watts,' vol. v. 147).

Salicylic Acid ($C_{14}H_{10}O_4$) may be obtained in various ways. The specimens I exhibit are (*a*) from Ol. gaultherii (oil of wintergreen) in which it exists as salicylate of methyl. The oil is heated with strong potash ley till no more methylic alcohol is given off from it and the residue is precipitated with hydrochloric acid; the precipitate is washed with cold water and crystallized from alcohol. (*b*) Artificial salicylic acid from phenol, by Kolbe's patent process, to which I alluded in my address last year. English physicians have been testing the efficacy of this medicine, and Dr. Maclagan of Dundee, and others, have clearly proved its efficacy, whilst the observations of

Fürbunger, Reiss, Tischer and Stricker have proved that salicylic acid is equally efficacious. On the other hand, English experimenters object to salicylic acid on account of its being caustic, and causing irritating sensations in the throat. (Probably artificial salicylic acid has been used.) As a remedy against this the substitution of sodic salicylate, or of salicylic acid combined with carbonate or phosphate of soda, has been experimented with, and on account of its being soluble and much less nauseous is preferable. At the same time experiments made by Mr. John Williams, F.C.S.,* show that the artificial productions are not easily obtained at present of definite constitution. He therefore suggests *sulphosalicylate of sodum* as a substitute, and in the paper referred to details his method for production. Salicylic acid and its salts give as is well known a striking reaction with perchloride of iron, producing a dark purple coloration. The sulphosalicylates produce exactly the same reaction, proving that the salicylic acid radical is still intact in the compounds, and it is fair to infer that the medicinal properties of these sulpho-salts will be found in practice to be identical with or perhaps superior to simple salicylates.

Kolbe's artificial acid has proved a commercial success, its efficacy as an antiseptic and to arrest fermentation being established.

Alkaloids of Aconitum Napellus.—Dr. Wright has renewed his chemical examination of aconite, and the ultimate conclusion he arrives at is, that the method which ought to be adopted for the production of a pharmaceutical product of constant composition and properties is 1st, percolation by alcoholic tartaric acid and evaporation to a small bulk of the percolate at as low a temperature as possible, probably in a vacuum pan would be best; 2nd, crystallization from ether of the base separated by sodium or potassium carbonate from the aqueous solution of the extract, after separation of resin, etc.; in this way the crystallizable alkaloid if present will be separated; and 3rd, participation by conversion of the crystalline salt, for which purpose the hydrobromide is well fitted; in this way small quantities of another base which obstinately adheres to aconitine when crystallized from ether are separated. The base obtained in this way is a simple body expressed by the formula $C_{33}H_{43}NO_{12}$ in a state of great purity and possessing high physiological activity.†

Erythroxylon Coca.—Whether this is likely to become an important article of materia medica, or not, remains to be proved. Sir Robert Christison has published some interesting details respecting its action, and is, I believe, making further practical investigations. Its chemical analysis shows that it contains a crystallizable basic substance, *cocaine*; a volatile odoriferous alkaloid, *hygrine*; a peculiar tannin, *coca-tannic acid*; a waxy body named coca wax. It is also said to contain a substance analogous to *theine*. To an exhaustive paper by Mr. B. Shuttleworth I refer you for further information.‡

Gelsemium sempervirens.—Chemical examination shows that it contains an alkaloid, *gelsemine* ($C_{11}H_{19}NO_2$), and an organic acid, isolated by Dr. Wormsley, which he named *gelseminic acid*, but Sonnenschein has proved that this acid is perfectly identical with æsculin, and has the formula ($C_{30}H_{34}O_{19}$).§

Jaborandi.—Continuing Gerrard's investigations, Kingzett has proved the formula of pilocarpine to be $C_{23}H_{34}N_4O_4$, and has discovered and analysed a crystalline salt of formula $C_{23}H_{34}N_4O_4 2HCl,PtCl_4$.

Aloin.—Dr. Tilden‖ has proved that this substance, whether obtained from Barbadoes, Socotrine, or Natal aloes, has the chemical composition $C_{16}H_{18}O_7$; this substance has been worked upon by chemists abroad with very trifling deviation from the same result. Mr. Dobson, M.R.C.S., has tested the therapeutic value and concludes that all three are decidedly uncertain and variable in their action, and that they seem to possess no advantage over an equal dose of aloes, excepting, perhaps, that griping was rather less common than when aloes alone were given.

Capsaicin.—Thresh has isolated this active principle of capsicum fruit, but has not yet given its formula.

Cortex Rhamni Frangulæ.—The fact that this bark requires to have been gathered twelve months before its therapeutic virtues are developed is rather remarkable, and suggests that it may be a desirable substance for chemical investigation,

Ergot.—Tanret claims to have discovered the active principle of ergot, a new alkaloid which he designates *ergotinine*. Professor Dragendorff does not agree that this represents a chemically distinct substance, and states that the active principle is an acid which he names *sclerotic acid.*

Opium Derivatives.—Beckett and Wright still continue their valuable researches on the opium bases, from which we trust in time to learn the constitutional formula of these interesting compounds. I called your attention to these researches as far as they had gone, last year; since then "narcotine" ($C_{22}H_{23}NO_7$), "cotarnine" ($C_{12}H_{13}NO_3$), hydrocotarnine ($C_{12}H_{15}NO_3$) have been investigated by them, and their experiments show that it may be inferred that these bases yield definite ethiodides and other ethyl compounds like most other alkaloids, and that they are nitril bases. In these investigations the authors found that on repeating the experiments of Matthiessen and Foster, of fusing opianic acid with caustic potash, as they had stated, it is converted into meconin and hemipinic acid, but that the latter contains a small quantity of another acid, which gives a blue tint with ferric chloride, and which is methylnormeconin ($C_9H_8O_4$). On heating dry sodium hemipinate with dry soda-lime, a heavy oil was obtained, which on examination proved to be dimethyl-pyrocatechin, the reaction being—

$$(COOH)_2C_6H_2(OCH_3)_2 = 2CO_2 + C_6H_4(OCH_3)_2,$$

when treated with strong hydriodic acid the dimethyl-pyrocatechin is converted into pure pyrocatechin with simultaneous formation of methyliodide. If hemipinic acid is fused with caustic potash the following reaction takes place:—

$$C_{10}H_{10}O_6 + 3KHO = C_7H_5O_4K + K_2CO_3 + 2CH_4O,$$

potassium protocatechuate being produced. These results conclusively prove that hemipinic acid is a carboxyll-dimethyl-protocatechuic acid $(COOH)_2C_6H_2(OCH_3)_2$. It seemed probable from the results obtained with hemipinic acid that on heating sodium opianate with soda-lime methyl-vanillin $(COH)C_6H_3(OCH_3)_2$ would be produced, and on making the experiment such was found to be the case, although the yield was comparatively small. By the action of oxidizing agents, methyl-vanillin is converted into dimethylprotocatechuic acid, $COOH,C_6H_3(OCH_3)_2$, and when treated with hydrochloric acid it yields *vanillin*, $COH,C_6H_3(OCH_3)(OH)$, and methyl-chloride. The action of hydriodic acid on hemipinic acid has also been studied by these investigators, and they find that methyl-norhemipinic acid $(COOH)_2C_6H_2(OCH_3OH)$, is first produced, and that by a continuance of the action this is then converted into methyl-protocatechuic acid, and finally into protocatechuic acid; somewhat analagous results were obtained with hydrochloric acid. The decomposition which methyl-norhemipinic acid undergoes when fused with potassic hydrate results in the formation of protocatechuic acid, and when heated alone it yields methylprotocatechuic acid.

The concluding portion of the paper of which the foregoing is an abstract (see *Journal of the Chemical Society* for March, 1876) describes the action of fused potash on meconin with similar results.

Tiemann and Haarmann when publishing their paper announcing the discovery of artificial vanillin from coniferin ('Proceedings Royal Society,' June 18, 1876.

* *Pharm. Journ.* [3], vol. vii., p. 280, 1876.
† *Pharm. Journ.* [3], vol. vii. p. 259.
‡ *Pharm. Journ.* [3], vol. v., p. 483.
§ *Pharm. Journ.* [3], vol. vii., p. 269.
‖ *Pharm. Journ.* [3], vol. vii., p. 264.

vol. xxii) demonstrated that their vanillin is the methylated aldehyde of protocatechuic acid. The importance of these investigations, therefore, I trust needs no apology for my troubling you with so much detail. It is probable that a further important result will accrue from this investigation. On examining this specimen of crude vanillin from opianic acid you will perceive crystals; it occurred to me that these crystals might be identical with those yielded by or exuded from the natural pods of vanilla. Hitherto, I believe, the true chemical constitution of these crystals has not been definitely demonstrated; they are, however, supposed to consist of benzoic or cinnamic acid or coumarin. The suggestion has been submitted to Dr. Wright, and he believes them to be identical, reserving demonstration for the next meeting of the Chemical Society.

Dr. Wright has further succeeded in obtaining a new opium alkaloid. During the preparation and purification of narceine from opium liquors an indistinctly crystalline mass is often left undissolved on boiling the partially purified narceine with water; the results of experiments tend to show that this crude product contains the new alkaloid, bearing to narcotine the relationship of benzoic acid to benzoic aldehyde. Dr. Wright calls the new base *oxynarcotine*. Oxynarcotine crystallizes in micaceous sandy crystals, whose composition is $C_{22}H_{23}NO_8$. It forms a hydrochloride, $C_{22}H_{23}NO_8HCl\ 2H_2O$. Oxynarcotine differs from narcotine in containing the carboxyl group instead of the aldehyde group. (Full details of these investigations will be found in the *Journ. Chem. Soc.*, April.)

Of course you are aware that the object of these investigations is to endeavour to find a method of building up the constituents of the natural alkaloids by synthesis, and thus produce morphine artificially, and it is believed that ultimately success will follow; meanwhile we must all admire the persevering energy with which Messrs. Beckett, Wright, and others are labouring to accomplish this result. I desire to acknowledge the courtesy with which Dr. Wright has enabled me to exhibit those specimens to you. The other derivatives are specimens which illustrate the investigations of the anhydrides on bases.* In a paper which Mr. David Brown, F.C.S., read to the Conference at Glasgow, he announced the presence of free *acetic acid* in opium, and he has kindly enabled me to exhibit to you a quantity that he has extracted; he also confirms by independent investigations the statement made by Professor Flückiger in 1869, regarding the presence of a member of the pectin series in opium.

There is a general tendency to the supposition that natural alkaloids will supersede the administration of crude drugs, and we, perhaps, have no more formidable instance of the necessity of an uniform standard in the administration of therapeutic agents, such as the use of alkaloids would secure, than the drug opium. The variable percentages of morphia to be found in the tincture, extract, and liquid galenical Pharmacopœial preparations were demonstrated by Mr. Dott, in a communication read at Glasgow, and whilst I would with some reserve advocate the administration of active principles whenever it can be shown that their effects are identical, it is necessary to add that care should be taken these bases are absolutely pure, otherwise the same danger will be present; for instance, morphia might not be entirely free from codeia, etc., in which case its potency would be modified—a resinoid such as podophyllin might be reduced by admixture with the powdered root; of course these constitute frauds, but, unfortunately, some foreign competitors are not too scrupulous in this matter. This leads me to ask your consideration of an hypothesis which may not be unreasonable. It is known in some instances, take opium and the cinchonas as examples, that the crude drugs have a specific therapeutic action; they yield different alkaloids of different proportions in different samples, whereas the total amount of alkaloids may be with slight deviation of the same percentage. It has been shown that these different alkaloids produce modified effects from the principal one. Is it fair to assume that nature has not had time to develop these alkaloids when the crude substance is gathered,—for instance, one poppy capsule may be in a more matured state than another when tapped,—and will not the statement that our new Indian cinchona plantations only yield the inferior alkaloids, but that it is supposed that age will develop the more formidable properties, help to substantiate the hypothesis? Of course we must not overlook nature's assistance in the quality of the soil and the climate. It is only fair to add that I have not any practical experience to bring to bear upon the question.

* See *Journ. Chem. Soc.*, 1875.

Butyl-Chloral.—Kramer and Pinner, in the course of their researches on the substance commonly called crotonchloral, have ascertained that it contains two more atoms of hydrogen than was supposed, and that it is in fact butylchloral. When soda or another alkali is mixed with it it undergoes decomposition, chloride of sodium, formate of soda, and bichlorallylene being produced, $C_4H_5Cl_3O + NaO = NCl + CH\ NaO_2 + H_2O + C_3H_4Cl_2$. Regarding the administration of butylchloral, Dr. Liebrich says that at first he tried an alcoholic solution but he has found that after long standing some change takes place which greatly impairs its action. He now prescribes it combined with glycerine—you will perhaps remember that in a paper I read to you three sessions ago on this substance I advocated the use of glycerine as a vehicle for its administration.

Chloral Hydrate maintains its position as a valuable hypnotic, the demand has become stationary, and large continental factories which were constructed for its manufacture have now arranged for the production of chloroform from this substance to a large extent; the chloroform is reported to be absolutely free from chlorine compounds. Reference to the manufacture of chloroform in this country with alcohol and methylic alcohol calls my attention to the fact that there is not any chemical test to detect the difference. Of course the resulting product is chloroform of exactly the same chemical composition ($CHCl_3$), but it is stated that the administration of the alcoholic chloroform is attended with greater safety than chloroform from methylic alcohol. How can this be? Surely it is imaginary, and if so, a large amount of money is thrown away in its use. It may be argued that in studying economy here I am treading on tender ground, and that in the administration of a substance like chloroform absolute purity is of such importance that price is no object; but surely a desire to prove what appears to be an anomaly is reasonable,—chemistry has failed hitherto.

One of the most important chemical communications of social interest during the year has been the exhaustive paper by Dr. Frankland on "Some Points in the Analysis of Potable Waters," in which he advocates what is known as the "combustion process." This paper led to one of the most important and exciting discussions which have taken place at the Chemical Society for some years. Thudichum and Kingzett have published some trials of Frankland's and Armstrong's method of combustion which show that this process can be relied on, even in its employment in elementary organic analysis, for determining the relation of nitrogen to carbon in very minute amounts of substance. They have also shown that this is an excellent method for determining the amount of nitrogen in any ammoniacal salts, as nitrate, sulphate, and chloride. In further relation to this subject Thudichum and Hake have estimated the amounts of hydrogen occluded by copper, and have shown that by passing a stream of carbonic acid gas through red hot copper which has been reduced by hydrogen, that no hydrogen is then left behind.

Professor Andrews has communicated to the Royal Society more of his elaborate researches, proving the remarkable continuity of the liquid and gaseous states of matter.

Time does not permit of my entering into the chemical investigations of commercial interest, but Newland's application of sulphate of alumina to beet-root sugar, by which the sweet principle is retained, and the application of vanadium salts in the production of pure aniline black, are worthy of note; and the year has perhaps demonstrated the success of Hargreave's process for making salt cake direct, SO_2+ air + steam over NaCl.

Mr. W. H. Hatcher, F.C.S., in experimenting on the setting points of mixtures of the fatty acids with one another and with various other fatty substances, found that they generally differed to a considerable extent from those obtained by calculation. In a communication to the Chemical Society, March 16, 1876, he called attention to some curious points about the solidification of fatty mixtures, which are at present difficult to comprehend; he suggested the application of photography to solve the mystery, and has kindly given me an opportunity to exhibit to you this evening the series of beautiful photographs of the crystalline structure of mixtures of palmitic and stearic acid which he has prepared. He will shortly announce the results of his further investigations, to which I hope to call your attention on a future occasion.

The importance of the loan exhibition at South Kensington is well worthy of our notice, its advantages from an educational point, and its historic interest considerably increasing its value. The student can see, side by side with the highly finished apparatus now used in teaching or investigation, some of the sacred relics contributed by various museums or sent from private collections, which, though rude in appearance, have been rendered immortal by being the first of their kind or having been employed by some of our grand predecessors in the investigations which we still cherish as the ground work of all our scientific knowledge. Here in a few minutes we may see the gradual steps made towards the summit of our present stand point, and how each little improvement in its day acted as the stepping stone for some other, which probably has since quite thrown a shade over the older one. If we glance for instance at the progress which has been made in the manufacture of scientific instruments, we see the great disadvantage under which our predecessors laboured, and also the enormous strides made by mechanical skill within the last twenty years. This exhibition may be regarded as a hopeful symptom, as a proof that the importance of science as a main factor in national power and prosperity is approaching nearer to recognition. Let us hope that this may become a permanent exhibition by which the nation may benefit. This leads me to a consideration of the idea so nobly advocated by the President of the British Association,—the duty of England to provide national opportunities for original research. There are many obstacles to contend with in this; for instance the government could not satisfactorily provide for the endowment of research, but they might provide laboratories for special researches, and competent directors in those laboratories. We have a good example of the feasibility of such a suggestion in the pathological laboratory of London, of which Dr. Thudichum is the director, and Mr. Kingzett and Dr. Hake are the assistants. A glance at the *Journal of the Chemical Society* for the last twelve months will show the amount of original research conducted there. Thudichum and Kingzett's various researches have greatly advanced physiological chemistry; thus besides the brain chemistry which we had the opportunity of having fully demonstrated to us last session, they have established the identity of the phosphorized matter in blood corpuscles with one of the phosphorized bodies (myelin) in brain matter. Kingzett's theory of the effect of alcohol on the brain commands considerable atttention, the question whether there exist in living brain any tissues which would nullify his hypothesis has to be demonstrated. Perhaps the examination of the brain of a subject who died under the effect of delirium tremens will help to substantiate the theory. Again, in this laboratory investigations have been conducted by Kingzett on the limited oxidation of terpenes and allied bodies, and he has studied also the atmospheric oxidation of ethers. The production of peroxide of hydrogen from ethylic ether is submitted as the genuine isolation of the radical hydroxyl. Already I have called your attention to work done by these investigators of more immediate interest to us. True, we have the science department at South Kensington, and in Professor Frankland we have another instance of the desirability of government aid,—but should not the government think well when pressure is brought to bear upon them to help science in this way. May we not look to the ancient Universities of England, and suggest that they should identify themselves more with the science of chemistry than they have done in the past and offer facilities for the chemical student such as he specially requires. The foundation, out of the enormous resources of Oxford and Cambridge, of a college where science should be the special feature of the course, and in which the chemical element should be strong, would be a proceeding fraught with very great consequences and would be beneficial to all. For on the one hand the university life would not be broken up and those links would be maintained which unite all departments of learning with one another; and on the other there can be little doubt that those ancient seats of learning would in turn derive new lustre from those on whom they set their seal and impress.

Already throughout the country, several educational centres are striving to supply the demand for scientific instruction, and unless Oxford and Cambridge wish to be entirely set aside in this competition, they ought to bestir themselves to remedy this defect in their educational course. Failing this, and if it should continue to be the case that practically only the sons of the rich can be admitted, there will be left no alternative to us but to found other colleges,—such as Owens College,—elsewhere, which will provide what we so much require and what the wants of the time demand. A start has been made in Liverpool in this matter and I trust the scheme suggested will ultimately prove successful.

In a work entitled 'British Manufacturing Industries' (edited by G. Phillips Bevan, F.G.S. London: E. Stanford), Professor Church, in noticing some of the minor chemical products of Great Britain, suggests some reflections from which the following is a quotation:—

"Although the United Kingdom maintains its pre-eminence over all other countries in the number and magnitude of its vitriol and alkali works, yet this is far from being the case with respect to factories devoted to the finer and more delicate preparations of the chemist. Here German, French, and Austrian manufacturers are ahead of our own, and still continue to make remarkable progress. If a rare and curious substance discovered by a scientific chemist and made in his laboratory painfully, grain by grain, be found useful in medicine or dyeing, or some other art, straightway the foreign manufacturing chemist makes it, not by the ounce or pound merely, but by the hundredweight or even by the ton. The success of foreign manufacturing chemists in this direction may be accounted for without difficulty. One reason is to be found in the cheapness of pure alcohol, so necessary in the preparation or purification of most of the products to which I am now referring, but I cannot help thinking that the chief reason is quite of a different sort. To foreign chemical works a sound well trained scientific chemist is attached, with a salary of £300 or £350 a year; sometimes several such chemists are employed by one manufacturer to improve old methods of manufacture and to discover new ones. According to Dr. Lunge, of the Newcastle Chemical Society, one German chemical factory has six assistant chemists (not practical managers) and one chief chemist, a distinguished man of scientific reputation to whom is given a salary approaching £2000 a year simply for investigation and original work in the laboratory, not for superintending the manufacturing operations. Two points connected with the products of these continental factories are of special interest, one being the fact that much of the crude material necessary for making some of these products is exported from England for that purpose; and another point is that the original discoveries on which some of these discoveries have been based were made in our own country."

Surely these facts are humiliating to us as Englishmen, and we should strive to remedy the evils. There is no reason why national prudence or private munificence may not supply us with schools of science from which we may obtain workers as efficient as those on the continent. Already private munificence has provided means whereby original researches may be undertaken; and our manufacturers are alive to the necessity of employing skilled labour, and to some extent government aid helps this forward by the science classes established throughout the country, so that we may certainly hope there are better times in store for the scientific reputation of England.

Gentlemen,—I feel I have already trespassed too long upon your patience; I wish my crude and imperfect remarks had been more worthy of your consideration. I have been able to tell you little that is new and nothing that is original; it is only given to the gifted few to originate ideas and to introduce innovations. But still I may hope to have completed a far from useless task if I have succeeded in interesting this meeting in one or two important chemical notices, for it is only by the accumulation of facts, and by the interchange of experiences, that we can hope to throw light upon those delicate and difficult problems in which the profession we love so well abounds. Wholly occupied, as many of us are, in the pressing work of our daily duties, too little time can frequently be devoted to the scientific and more attractive side of our profession; and yet the humblest worker in our great field of labour, diligently and conscientiously doing his daily work, may reap a rich reward—far even before wealth and honour, welcome as they are in the appreciation of our fellow men, for benefits conferred upon them.

At the conclusion of the address a lengthy discussion took place, and on the motion of the Vice-President, Mr. Woodcock, seconded by Mr. Shaw, and supported by Messrs. Fingland, Armstrong and Davies, an unanimous vote of thanks was accorded to the President for his valuable address. The President, in returning thanks, spoke of the prospects of the present session, after which the meeting closed.

Proceedings of Scientific Societies.

AMERICAN PHARMACEUTICAL ASSOCIATION

The twenty-fourth meeting of this Association was commenced in the College of Pharmacy, Philadelphia, on Tuesday, September 12th. The meeting was called to order at half-past three o'clock in the afternoon by the President, Professor Geo:ge F. H. Markoe, of Boston. The following is an abstract of the report of the proceedings given in the New York *Druggists' Circular*, for October:—

Some business in connection with committees having been transacted, including the appointment of a committee of nine members to report upon the objects of Chemical and Pharmaceutical interest exhibited at the Philadelphia International Exposition, the President read his Address. This consisted mainly of a review of the work of the Association during the last quarter of a century and notes on the progress of pharmacy. The Address, together with the Report of the Executive Committee, giving the statistics of members elected, deceased, etc., and the Report of the Permanent Secretary, were referred to a committee to report on.

The reports of the committees being called for, the following were read by title and afterwards read in detail: Drug Market, Papers and Queries, Revision of Bye-Laws, Ebert Prize, Maximum Doses and Sign for Unusual Doses, Legislation, Adulterations and Sophistications, Liebig Memorial, Metrical Weights and Measures, Photograph Album, Complaints of Julius Fehr, and the Report on the Action of the Tennessee College of Pharmacy.

The delegates then present named each one member to act as a Committee on Nominations, to which five were added by the President.

The Executive Committee presented the names of seventy-six persons for membership, and they were duly elected.

Second Session.—Thursday Morning, Sept. 14th.

The meeting was called to order at 9·30, Vice-President F. Hoffman in the chair. The minutes were read and approved. Letters were read from the Denmark Apothecaries' Association, Swiss Apothecaries' Society, and the German Apothecaries' Society, thanking the Association for the invitation extended to their respective bodies.

Professor J. P. Remington on behalf of the Committee on Entertainment introduced Mr. S. Nagayo, Mr. H. Meiyake, Mr. S. Juranga, members of the Imperial Board of Health, Japan, and all distinguished men of science, who were received with applause, and invited to seats in the body.

The Committee on Nominations presented their Report, recommending for officers for the ensuing year:—

President.

Charles Bullock, of Philadelphia.

Vice-Presidents.

Messrs. S. A. D. Sheppard, Boston; George J. Luhn, Charleston, S.C.; J. D. Wells, Cincinnati, O.

Treasurer.

C. A. Tufts, Dover, N.H.

Permanent Secretary.

Professor J. M. Maisch, Philadelphia.

Reporter on Pharmacy.

Professor C. Lewis Diehl, Louisville, Kentucky.

Local Secretary.

Henry J. Rose, Toronto, Canada.

Executive Committee.

George W. Kennedy, Pottsville, Pa.; C. H. Dalrymple, W. H. Crawford, John Ingalls, Professor J. M. Maisch.

Committee on Drug Market.

William Saunders, London, Ontario; W. H. Wickham, Professor J. F. Judge, Professor N. G. Bartlett, Charles F. G. Meyer.

Committee on Papers and Queries.

William McIntyre, Philadelphia; Louis J. Dohme, Joseph L. Lemberger.

Business Committee.

Joseph Roberts, Baltimore, Md.; H. D. Welcome, Charles Rice.

The report of the committee was accepted, and by a vote of the Association was adopted.

By request of the Chairman, Dr. E. R. Squibb and Dr. F. Hoffman conducted the President-elect to the chair.

In accepting the position, Mr. Bullock tendered his thanks to the members for their kindness; and in a few words of welcome to their city, their college and the enjoyment of the hospitalities provided, and requested the meeting then to proceed with business.

The Treasurer's report was then read. It stated that the receipts during the past year were as follows:—

From Members	4,248·00 dols.
" Certificates	420·00
" Sale of Proceedings	64·80
Balance from 1875	1,174·11
	5,906·91
Expenses and disbursements . . .	4,181·69
Balance on hand	1,725·22

The report was accepted, and on motion referred to an auditing committee, which subsequently reported that it found the accounts of the Treasurer correct.

It was moved and adopted that the Treasurer be authorized to ask for all certificates of membership now held by persons formerly members of this Association, but who now retain them contrary to the provisions of the constitution.

The Committee on Revision of the Bye-laws presented a report recommending certain alterations in the bye-laws; one being to the effect that the committee on legislation should keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines; also, that it should report to each stated meeting of the Association what has been the legislation on the subject during the previous year.

The Committee on Maximum Doses and Signs for Unusual Doses reported that some progress had been made, but owing to the fact that there had not been sufficient conference with the delegates from the American Medical Association, the subject would need the further attention of a committee. On motion the committee was continued.

The Committee on Legislation reported that no great changes had occurred in this direction during the past year. In two States the law had been amended. In Baltimore the law permits the sale of patent and proprietary medicines by anyone, as also the sale of medicines put up in bottles or packages by wholesale druggists. In South Carolina the examinations were formerly conducted by the medical colleges, but now the board is constituted by four pharmaceutists and two physicians, and the receipts of the board are divided equally between the Pharmaceutical Association and the medical colleges. No other changes of note were alluded to in the report, which was then adopted.

The Report on Metrical Weights and Measures was read by Dr. F. Hoffman. The system was reported feasible. and the committee recommended that it be adopted for all wants, and that the government should fix a time after which it should be the legal standard of the country. Mr. T. S. Weigand, one of the committee, read a short note stating his reasons for signing the report; also giving other reasons why he was not in full accord with all its conclusions. On motion, both reports were directed to be published in the proceedings.

The Committee on Photographic Albums reported that the Association now had the photographs of over four hundred of its members. It recommended that the care of the albums should be entrusted to the Chairman of the committee.

Shortly afterwards an unpleasant incident occurred during the discussion of the report of a committee appointed to consider some complaints made by a member. The committee reported adversely to the complaining member, and in the course of some disputation, this person said that some remarks made by another speaker were false, whereupon it was moved and carried by 106 votes to 19 that he should be expelled from the Association, for using indecorous language.

Third Session—Afternoon.

The greater part of this sitting was taken up by the discussion of a proposed resolution offering to the American Medical Association the co-operation of the American Pharmaceutical Association, in preparing the next edition of the United States Pharmacopœia. Eventually action was deferred until the meeting next year.

Fourth Session—Evening.

The meeting was called to order at 8·30 p.m. The sitting was devoted principally to the reading of papers.

Fifth Session—Saturday Morning.

During this sitting the committee appointed to select a time and place for the next meeting reported, recommending that it be held in Toronto, Ontario, Tuesday, September 4th, 1877, at 3 o'clock p.m. The report was unanimously adopted.

Mr. Shoemaker read selections from the Report of the Committee on Drug Market. The report alluded to the changes in values, amount and character of many of the articles used in the wholesale trade. It was stated that the total imports for the fiscal year were 476,000,000 dols., while the total exports were 596,000,000 dols., leaving a balance in our favour of 120,000,000 dols. The character of many of the powdered drugs of the market was alluded to and their quality hinted at by the comparative prices at which they were sold, and the value of good crude drugs. Borax was exported to the extent of 3,000,000 pounds, California and Nevada have produced in all during the year 6,000,000. The Pacific Coast has furnished during the year 54,000 flasks of mercury, while less than that has been produced by all the other nations of the world combined. The product of opium was stated to be smaller in amount for the year than was anticipated, and it would probably advance in price still further. Many other interesting subjects were touched upon. The report concluded with a list of import of drugs for the past fiscal year. It was accepted and referred for publication.

Professor Diehl then read some extracts from his annual report on the progress of pharmacy

Some papers were also read.

Sixth Session—Afternoon.

The meeting was called to order by Vice-President S. A. D. Shepherd, at 2·45 p.m. The Committee on the President's Address, the Report of the Executive Committee, and that of the Permanent Secretary, as also of the Auditing Committee, were read and adopted. The greater part of the Session was devoted to the reading of papers.

Seventh Session.—Evening.

This being the closing session the remainder of the papers were read by title only, and after several votes of thanks had been passed, the meeting came to an end.

The following notes refer to some of the papers read at the meeting:—

Papers in Answer to Queries.

Senega Root.—In an essay on Senega Root, embracing the history of its introduction, its geographical range, and its importance as an article of commerce, Mr. J. D. Wells (the writer), stated that the name of the root is derived from an Indian tribe at one time in Western New York, and called the Senecas, who held it as a remedy against the bite of the rattlesnake. This secret was obtained by Dr. Tennant of Virginia, in 1735, and he subsequently received a reward from the State of Pennsylvania for making it known. Its geographical range is as far north as Canada, along the west slope of the Alleghany, in Indiana, Kentucky, Virginia, North Carolina, Georgia, Tennessee, Alabama, and Texas, scarcely found in Missouri, but abundant in Iowa and Minnesota, and not known to exist in the extreme western territories or on the Pacific coast. The exports are difficult to determine, but the writer was informed by a New York house that over 2000 pounds were annually exported.

After the reading of this paper, attention was called by M. W. Saunders to a so-called Senega root, of handsome appearance, which, when chewed, failed to produce the full and decided taste peculiar to *Polygala Senega*, and when made into a fluid extract gave a liquid possessing a more feeble taste, and having a decided fluorescence.

Syrup of Ferrous Iodide.—Five grams of citric acid added to the finished product of the formula of the U. S. P. for syrup of ferrous iodide are said to preserve *unchanged* the appearance of the syrup. Is this addition admissible? The experiments of Dr. Wilson H. Pile, in answer, failed to satisfy him as to the value of citric acid as a preservative for this changeable syrup, and his paper was chiefly a negative result. Discussion which followed gave more favourable results as to its tendency to protect this syrup from its proneness to change.

Paullinia Sorbilis.—In a treatise on this article, furnishing a formula for a liquid preparation of the drug, Mr. George W. Kennedy stated that in exhausting this drug he selects a menstruum containing two parts of stronger alcohol and one part each of glycerine and water, which, when mixed, give nearly the strength of dilute alcohol.

Take paullinia in moderately fine powder, 16 troy ounces.
Take stronger alcohol, 8 fluid ounces.
„ glycerine 4 fluid ounces.
„ distilled water, 4 fluid ounces.

Proceed by careful percolation to obtain twelve fluid ounces (adding above the magma, as may be necessary, dilute alcohol), which set aside, continue the percolation until exhausted, evaporate the second percolate to four fluid ounces and mix with the reserved percolate. In the hands of the writer, this method produced results entirely satisfactory.

Fluid Extract of Cotton-root bark occasionally gelatinizes on keeping. Can a modification of the process for making this fluid extract be suggested which will prevent such a change? To which principle, and to what influences is it due, and has the bark of the green root any superiority over that of the dry in the preparation of the fluid extract? Mr. J. M. Lloyd detailed many very careful experiments in the manufacture of fluid extract of cotton-root bark, both dry and fresh. He gives preference to an an alcoholic menstruum but obtained satisfactory results, in making an extract which, in his experience, *never gelatinized*, when the menstruum used was alcohol ten parts (fluid) to glycerine six parts (fluid). Numerous trials by physicians indicate plainly the *unreliability* of any preparations made from the dried cotton-bark. On the other hand, when the *fresh* bark was used, and a fluid extract made from this was tried carefully by a large number of physicians, the almost universal report was favourable, the action being to facilitate parturition, and in other cases where it was sought to re-establish suppressed menstruation, it scarcely ever failed. His conclusions, therefore, point clearly to the use of the *fresh bark only*.

Cinnamon Water.—In reply to a query whether Ceylon oil of cinnamon is used in the preparation of cinnamon water, as directed by the U. S. P., Mr. Edward C. Jones stated that the almost universal practice of pharmaceutists was to make this preparation from oil of cassia.

Scilla maritima.—The ground bulb of *Scilla maritima* when moistened with diluted alcohol and worked with the hands causes for a time an intolerable itching. In seeking to ascertain to what principle in the bulb is thi effect to be ascribed, Mr. Edward D. Chipman separated the acrid bitter principle, and also the resinoid matter from fresh and green squill, and came to the conclusion that the itching effect alluded to is due entirely to the resinoid matter.

Professor Maisch remarked that it is stated that squill root contains oxalate of lime in fine sharp crystals, and that it is thought by some that the itching is caused by the abrasion or cutting of the skin by these sharp crystals.

Commercial Phosphorus.—In answering a query as to what extent the phosphorus of commerce is contaminated with arsenic and in what proportion is it present in the various brands of phosphorus found in the American market, Mr. Louis Dohme stated that he had examined the brand of phosphorus made by an American firm, and also two samples made by an English firm, one of the samples being quite recent, the other being probably several years old. By careful examination, the details of which are given in his paper, he found that the American phosphorus gave no signs of arsenic with the most careful tests, while samples No. 2 gave ·562 per cent. and No. 3, 1·065 per cent. of metallic arsenic.

Official Aromatic Spirit.—In answer to a query as to whether it is advisable to have an officinal aromatic spirit that will represent a fine refreshing Cologne to be used in lotions and for the sick room, if so, the formula and name for the preparation, Mr. George Leis came to the conclusion that any aromatic spirit to be grateful in the sick room must be devoid of odours that are too sweet, and that a plain odour is more lasting in its usefulness for the sick room. He therefore proposes a spirit in which bergamot, cassia and lavender are the odours. In connection with its intended use in the sick room, he deemed it absolutely necessary that it should contain some ingredient which should act as a deodorizer and preventative of foul odours. This would indicate an addition of some of the well known disinfectants or deodorizers, and he thinks the addition of salicylic acid accomplishes the purpose. The formula contributed included, therefore, this acid to the extent of ten grains to the ounce of the perfume given. The name proposed was "Lotio Antiseptica Fragrans," which would, he thought, sufficiently indicate its character and uses. The best results were to be obtained by freely using it as a "Spray" in the sick room.

Parts by Weight.—The question, What advantages would result from the substitution of parts by weight for absolute quantities in the revision of the Pharmacopœia, and if any disadvantages other than those incident to change, what are they? was discussed by Professor S. P. Sharples. He objects *in toto* to the use of parts by weight, on the ground that it is neit her convenient nor practicable. He instances a few preparations which it would seem almost impossible to bring to such proportions as would make them manageable or meet the exigencies of the average apothecary. The additional objection is made to the trouble of frequent weighing of many of the fluids in use as being more tedious and not as accurate for common use as that of measuring. Considerable discussion followed this paper, but several members expressed themselves as favouring the change.

Tinctura Ferri Chloridi.—Would it be desirable to introduce liquor ferri chlor. dilut. of the same iron strength in place of the tincture? Mr. S. Bidwell concluded from his investigations that a watery solution would not be as acceptable to the medical faculty; that it would take too much trouble and time to introduce; but favours the reduction of the alcoholic strength to correspond to dilute alcohol.

Lacto-Peptin.—Mr. Emil Scheffer read a paper in answer to the question, what is lacto-peptin? He reported that taking the published formula as stated on the label, and trying the experiments suggested by the makers, they failed to prove or produce the results claimed. The digestive power of the powder proves the presence of pepsin, and as coagulated albumen is dissolved by lacto-peptin, the presence of pepsin is confirmed. Pancreatin in dilute alkaline solution, when added to a small quantity of neutral lard, will produce acidification. Pancreatin is coagulable by heat, but neither of the above results are found when lacto-peptin is tested in a suitable manner. When starch paste was used, it was not converted into sugar by lacto-peptin, which fails to prove the presence of diastase. The experiments of Mr. Scheffer he considers to prove the presence of pepsin, sugar, lactic acid, hydrochloric acid, starch, cellular tissue, mucus and fat, but *no pancreatin or diastase*, and that it is inferior in digestive strength to the saccharated pepsins of the market.

Wine of Tar, by Charles A. Heinitsh, who said a formula which had proved very satisfactory, and most easily prepared was to take eight ounces of tar, and add it to three pints of beer, which after twenty-four hours may be separated for use. Several other formulæ were given; but where *wine* is desired, one and one-half troy ounces of tar are triturated with one-half troy ounce carbonate of magnesia and one pint of sherry wine, and afterwards filtered.

Emulsions.—In reply to a query how much acacia is needed to emulsify perfectly the fixed or volatile oils and balsams, Mr. E. Gregory gave several detailed processes of manipulation, as laid down in the various works that come under notice of pharmaceutists. His judgment is that three parts of acacia are needed to readily emulsify volatile and fixed oils and balsams, and that mucilage which is kept already made is not so good as that made freshly for the purpose. The process of manipulation preferred is that in which powdered acacia, one part, is mixed with two parts oil, and water one and one-half parts afterwards added at once. Numerous other experiments were given; but this in his hands had proved most rapid, the whitest, the oil globules most readily divided, and the emulsion to be longest retained in intimate mixture without separation.

Medicated Wafers.—In an essay on wafers for the administration of powders, including mode of manufacture, working formula, and samples of product, Mr. G. A. Zwick said that to manufacture the wafers it was necessary to have a fine quality of wheaten flour as a first indispensable. This is mixed with water to a cream, strained and poured on hot polished steel plates which have a suitable concavity on one plate, with corresponding projection on another plate to match. The wafer is then baked, and afterwards cut to the appropriate size by a suitable steel cutter made like a gun-wad cutter. The imported wafer has a superiority in thinness, tenacity, and appearance, which it is believed to be due mainly to the Hungarian flour used abroad.

Cacao Butter.—In an investigation having for its object to ascertain the best way of detecting adulteration in oleum theobromæ, Mr. Gustavus Ramsperger prepared cacao butter by expression, by ether and by bisulphide of carbon, as a standard and for the application of tests. The specific gravity of the three samples, though made from the same cacao butter, was not uniform; therefore, the sp. gr. cannot be considered a test. Pure cacao butter is soluble quickly in two parts of ether at the ordinary temperature, forming at first a clear solution, but after a while it sometimes separates into two layers. Ether was found to be the best test of pure cacao butter, as neither will small portions of tallow, wax, paraffin, if in combination, give a clear solution in two parts of ether. Ox-marrow is not thus affected, but gives the clear solution as does cacao butter. Of twelve commercial samples tested, nine were pure; the other three were not much adulterated.

American Vesicating Insects.—In answer to questions, what species of insects are found in America which could be used for vesicating purposes? whether any of them are to be had in sufficient quantities to become an article of commerce? and how they compare in strength with the *Cantharis vesicatoria*, and other species, found in commerce? Mr. Saunders gave an interesting reply, stating the several varieties of vesicatorial insects that he had secured, and illustrating the insects as cabinet specimens, and also presenting a steel plate in illustration of them for inserting in the next volume of Proceedings.

Santonin has been seen in the market in thick prisms, very different in appearance from the usual flat crystals. To ascertain whether this is due to crystallization from a different liquid than that generally used, Mr. O. Eberbach operated with alcohol, dilute alcohol, water, benzole, rectified fusel oil and ordinary fusel oil, and finally concludes that the differences in the form of crystals are due mainly to the quantities of santonin operated upon, and the conditions under which the crystallization takes place. The crystals obtained from fusel oil bears some resemblance to the form in question.

Volunteer Papers.

Phosphorus as a Remedial Agent.—Dr. Edward R. Squibb commenced his paper with very full accounts of the reputed therapeutic properties of phosphorus as stated by various authors. Both sides of the question were fully drawn from, and the comments of the writer were mainly as the character of the formulæ for its administration. He does not advocate, but rather rejects, the idea of giving it in the form of pills or in volatile liquids, and maintains that a fixed solvent, such as some of the oils, is the most appropriate. His own preference was for cod liver oil as a vehicle, and his careful experiments are detailed, giving full particulars of the mode of treatment by which it is freed from air during the process. The preparation does not keep well in quantity, nor should it be kept long. The solution exhibited was stated to contain 1 per cent. of phosphorus. Pills may be made from this oil, and some were exhibited, and their formula was described. In these pills there can be no possible separation of phosphorus in solid form.

Ammoniacal Glycyrrhizin.—Mr. Henry N. Rittenhouse follows the details of Mr. Roussin's paper published in the *Pharmaceutical Journal*, July 17, 1875, with the exception of the final solutions in alcohol and precipitation with ether, which add unnecessarily to the expense. Attention is called to the excellence of this preparation for masking the taste of quinia either in powder, pill, or solution. Ammoniacal glycyrrhizin is sixteen times as strong as liquorice root, and one hundred times sweeter than sugar.

Notes on Pancreatin, Diastase and Ptyalin.—Mr. Emil Scheffer finds that his assertion at Boston last year, that pancreatin in presence of acidulated pepsin is destroyed, is confirmed by subsequent experiments. As diastase is found in malt in a neutral state, and both pancreatin and ptyalin are secreted in a neutral or alkaline state, it is to be pre-supposed that these are the natural conditions under which they act. Hydrochloric acid impedes the action of diastase upon starch, and destroys it. The experiments detailed by the writer with this acid prove conclusively that the presence of a small quantity of the acid so far destroys diastase that starch is not changed into sugar. Pepsin converts diastase into peptone, and in an acidulated solution of pepsin, diastase cannot convert starch into sugar. Freshly secreted saliva alters starch paste into sugar, but when a minute quantity of acidulated pepsin is added no such change occurs. Other concurring experiments led the writer to a firm conviction that in the presence of acidulated pepsin all albuminoids are converted into peptone.

Pycnanthemum linifolium.—Mr. Charles Mohr says that this plant is used in Alabama for debilitated and impaired conditions of the digestive organs by the negroes of that section. In attempting a chemical examination the author obtained an acid which by all the tests given appears to be identical with caffeotannic acid. Besides this acid were found a volatile oil, a caoutchouc-like resin, chlorophyll, a bitter resin, colouring matter, gum and sugar. The writer gives also a very complete botanical description of the plant itself.

Michigan Opium.—Mr. Joseph P. Remington having recently received some of this article took the trouble to examine it. Its physical properties pointed to a product like extract of lettuce, and on fully examining it no morphia whatever was found.

Ergotin.—Mr. Chas. L. Mitchell, stated some of the physiological and chemical reasons which led him to deviate from the published formulæ in making an active, solid extract to represent the medicinal virtues of this drug

The product of the following formula yields a result in *every way* satisfactory:—

Ergot, in fine powder . . .	8 troy ounces.
Acetic Acid	2 fluid drachms.
Alcohol	4 fluid ounces.

Moisten the ergot with a mixture of the acid and 8 fluid ounces of water; let it stand twenty-four hours; pack in percolator, and exhaust with water; evaporate to 4 fluid ounces, add the alcohol, let it stand several hours, filter and evaporate to an extract. Result, about 480 grains; 1 grain is equal to 8 grains of ergot.

Adulteration of Milk and Testing for its Purity.—Mr. S. P. Sharples, without claiming originality, gives the following process as entirely satisfactory. The specific gravity being first determined, five grammes are weighed out in a flat platinum dish, and dried by water-bath for one and a-half hour at a temperature of 212° F.; then by an air-bath at 220° F. for one-half hour; when weight will be constant. The weight of the dish and contents deducted from the weight of the dish and the milk together, gives the total weight of solids. The dish is then treated with benzine for one-half hour, and the operation being carefully repeated twice, it is dried for half an hour, till the weight is constant. The weight of the dish and contents deducted from the last previous weight gives the weight of the fatty matters. The dish is now heated to ignition, its contents are converted into ash, and the weight of this is ascertained. These determinations are all that is necessary to settle the question of the purity of the milk. If sugar is required to be determined this may be accomplished by a test solution of copper tartrate of such strength that 20 c.c. of the solution =0·67 gramme of milk sugar. The above examinations give the weight of *milk solids*, the weight of *milk solids not fat*, the difference between these weights of *the fat*, the weight of *ash*, and that of the sugar. The addition of the weights of fat, sugar and ash, deducting these from the weight of the milk solids, gives the weight of casein and albumen.

Parliamentary and Law Proceedings.

Supposed Poisoning by Infants' Cordial.

On Monday last, October 16th, Mr. Malcolm, Leeds Borough Coroner, held an inquest respecting the death of a child, five weeks old, named Alice Pinder. The child's mother stated that it had been suffering from diarrhœa, and on the previous Friday she sent a neighbour for some "Meconio," or infants' cordial, which she had been in the habit of giving to her other children. She was supplied with what she supposed to be "Meconio," in a spoon, and gave the child a few drops of it. The child slept for several hours afterwards, but awoke screaming and in convulsions. Mr. Smith, surgeon, saw the child in the evening, and prescribed castor oil and milk, but it died about seven o'clock the following morning. Mr. Smith made a *post-mortem* examination of the body, and found the venous circulation of the brain much loaded. Although he detected no trace of poison in the stomach, yet he was of opinion that death was the result of vegetable poisoning. The castor oil or milk would have the effect of absorbing or passing off the poison. In the then state of the child's health the poison would be more likely to take effect. He knew that "Meconio" was very frequently administered to children in that neighbourhood. He had not analysed the liquid, part of which had been given to the child. An empty bottle was produced (but not that from which the liquid had been taken), bearing a label marked "Meconio—infant cordial." Mrs. Wade was examined, and stated that a friend of her husband's at Northowram, having written for a bottle of "Meconio," she got one. That bottle was wrapped up as it had come from the chemist's, when Mrs. Pinder sent for some "Meconio." Her husband tore off as much of the wrapper as enabled him to take out the cork, and poured out a teaspoonful of the liquid. He could not have seen what was on the bottle. The bottle was recorked, and sent to the friend at Northowram. The jury returned a verdict to the effect that the child was accidentally poisoned, and recommended that the bottle supposed to contain "Meconio" should be looked after, and its contents analysed for the benefit of the public. The Coroner said that he had already given instructions that the person at Northowram to whom the battle was sent should be communicated with.—*Leeds Mercury.*

The Singular Death of a Chemist and Druggist and his Son.

The adjourned inquest respecting the death of Mr. Edward Clarkson Pearson and his son (see before, p. 325) was held at Bradford on Monday last.

Mr. F. M. Rimmington reported that he had made a toxicological examination of the stomach and other organs. The stomach was free from any signs of irritant poison. It contained about two or three drachms of a thick fluid of chocolate red colour, having but little smell, and consisting entirely of amorphous unorganized matter, but free from all remains of food. Neither was there any blood present. He had made a chemical examination of this matter, and found it free from any metallic or irritant poison, and also from any narcotic or vegetable poison. He had also made analyses of the stomach itself, and also of the liver and the kidney, without finding any trace of any poisonous substance. The jury concurred with the Coroner, and a verdict of "Accidental death" was returned in regard to the death of the boy. —*Leeds Mercury.*

Obituary.

JOHN PALMER TYLEE.

Another old friend of the Pharmaceutical Society has passed away in Mr. John Palmer Tylee, Pharmaceutical Chemist, of Bridge Street, Bath, who died at an advanced age on the 10th inst. In 1841 the first meeting of the chemists and druggists of Bath in support of the newly formed Pharmaceutical Society of Great Britain was held in Mr. Tylee's house, and he was elected local secretary, the duties of which office he discharged so well for twenty years, that when he resigned a suitable testimonial was presented to him by the Bath members. At the time of the visit of the British Pharmaceutical Conference to Bath, in 1864, Mr. Tylee was President of the Bath Chemists and Druggists' Association. A local newspaper says of him:—"As one of the founders of the Bath Microscopical Society, and ever an active and valuable member, Mr. Tylee will long be remembered for his generous disposition and constant willingness to help forward all younger students. A man of keen perception and marked sagacity, he was diffident to a fault, and through taking little share in public life, his loss in this respect will be less regarded. The genuine character of the man, and the singular simplicity of his life, will embalm his memory among all who knew him."

Notice has also been received of the deaths of the following:—

On the 21st of September, 1876, Mr. George Lent, Chemist and Druggist, Rotherham. Aged 38 years.

On the 24th of September, 1876, Mr. Charles John Cann, Chemist and Druggist, of Alma Terrace, Hammersmith. Aged 26 years. Mr. Cann had been an associate of the Pharmaceutical Society since 1869.

On the 26th of Sept., 1876, Mr. George Nicol, Pharmaceutical Chemist, of Wick. Aged 76 years. Mr. Nicol had been a member of the Pharmaceutical Society since 1852.

On the 29th of September, 1876, Mr. Geo. Peter Ogilvie, Chemist and Druggist, of Arbroath. Aged 57 years.

On the 7th of Oct., 1876, Mr. Edward Clarkson Pearson, Chemist and Druggist, of Bradford. Aged 39 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

THE LATE NORWICH CHEMISTS' ASSOCIATION.

Sir,—It is my unpleasant duty to inform you that after an existence of six years the Norwich Chemists' Association has entirely failed. This unfortunate circumstance, is due, not to any want of a suitable room provided with appliances for chemical research, the nucleus of a museum and library, with excellent charts for botanical study, or from lack of means, or from the absence of willing and efficient teachers, but after a thorough and careful canvass of the assistants and apprentices of the city it was found that only seven were willing to enrol their names as students in the course of classes for the ensuing session—twenty-two having joined the previous year. This is much to be regretted as Norwich from its central position affords numerous facilities to the student.

The members of the Committee have been informed from time to time by those who have in previous sessions attended the classes that their present knowledge has been mainly acquired under the auspices of this Association. It is now too late to point out to Norwich students that the instruction here proffered would have been in most cases sufficient to enable them to pass the requisite examinations of the Society. It is worthy of remark that the fall of the Norwich Chemists' Association is simultaneous with the opening of a fashionable skating rink.

OCTAVIUS CORDER.

THE ABSENT FACTOR.

Sir,—With the whole of your remarks in the Journal of September 30th, I to a certain extent agree, but those with which you conclude I, from experience, heartily endorse, viz.: "But for this result (the attention of pharmacists bring given to the dispensing of prescriptions, etc.) an important factor is at present much wanting,—the prescriptions. As soon as these are forthcoming there is little doubt that they will command the attention of pharmacists."

This is perfectly true, and I believe will be the opinion of numerous chemists and druggists in country towns all over the kingdom.

In this town, the medical men, seven or eight in number, as a rule, make up their own medicines and we do not see half-a-dozen prescriptions in the course of the year. Those from strangers too are comparatively rare, therefore if we depended upon prescriptions for a living, we should have been dead long ago, instead of struggling for an honest existence, as we are at the present time.

W. T. MARTIN, A.P.S.

16 *and* 17, *Cliffe, Lewes.*

THE "NEW" EXCIPIENT FOR PILL MASS.

Sir,—In the January number of the *Pharmaceutical Journal* for 1870, there is a note by Mr. S. B. Turney of Plymouth, of which the following is a summary:—

"*Excipient for Pills.*

Pulv. Tragacanth.	ʒij
Glycerini	ʒvj

Mix in mortar and keep in covered jar. In the course of a few hours this becomes a firm tenacious mass. 24 grains of quinine require 10 grains. ʒj iodide of potassium 6 grains only. ♏ 24 creasote, grains 36 pulv. glyc. decort. require 6 grains.

"A softer kind made with

Tragacanth	ʒij
Glycerine	ʒj

is useful, and when added to a refractory mass renders it generally manageable."

At that time, 1870, I made some according to this latter form, and have still a little left, of which I enclose a sample. It has become darker in colour, but in other respects is perfect.

ALFRED P. BAKER.

33, *Norfolk Terrace, W.*

Sir,—In reference to Mr. Welborn's letter headed "A New Pill Excipient" in last week's Journal, I would suggest that however much he may be disappointed to find he is not the original inventor of a glycerine and tragacanth excipient, such is certainly the case. His formula, however, differs from the one I have been accustomed to use in the possession of two ingredients, which, I venture to think, are equally unnecessary, and one of which I consider, notwithstanding his statements to the contrary, must be an objectionable addition to any excipient intended for general use. I refer to the water and oil of pimento.

I was present at the Conference during the reading of his paper, and could not help wondering—and, indeed, to the present moment remain in doubt—as to whether or not Mr. Welborn intended the ingredients to be incorporated by the means of heat; but certainly I see no reason why he should jump to the conclusion that Mr. Greenish, in referring to the fact that a similar mixture of tragacanth and glycerine had been in use for some time in London, necessarily implied that those two articles were merely used in a state of simple admixture, without the application of heat.

It is a pity to have to disabuse Mr. Welborn's mind in respect to "the pleasing and peculiar formations" into which he gives us poor Londoners credit for getting our pill masses, but if he will try the following formula I think he will find it in all respects equal, and in some superior, to his own:—

℞ Pulv. Tragacanth	ʒj
Glycerini	fl. ʒvi

Mix and apply heat by means of a water-bath till the mixture is converted into a thick jelly.

The product, on cooling, is a very stiff jelly, and may be kept for months—and, I believe, for years—in an ordinary covered pot.

When necessary a small quantity of glycerine can be added at the time of dispensing, the proportion of course depending on the nature of the ingredients in the formula under manipulation.

The above possesses all the good qualities claimed on behalf of Mr. Welborn's "New Excipient" without the presence of the oil of pimento, to which Mr. Greenish so naturally took exception.

Whilst recommending this excipient for use in those instances in which the choice is left to the dispenser, or where (as we do occasionally find) the one prescribed lacks the powers attributed to it by a too confiding physician, I think we should be careful in making too liberal a use of any such preparation in preparing the Pharmacopœia masses, for by the employment of such substitutions we shall either greatly increase the proportion of active ingredients in any given weight of the mass, or shall experience some difficulty in persuading customers that their pills are of the same actual strength as the larger—and, indeed, correctly dispensed—ones to which they have been accustomed.

Indeed, as regards any improved excipient for the Pharmacopœia pill masses, we cannot do better than leave the subject in the hands of the esteemed editor of the Pharmacopœia, who, I feel sure, will be only too pleased when opportunity offers to adopt any suggestion calculated to render more complete and valuable the work in which he takes so much interest, and of which, notwithstanding some few imperfections, he has just cause for pride.

"VESPA."

"*Syrupus, B.P.*"—(1) See *Pharm. Journ.*, May 6 last, p. 881; (2) 'Origin, Nature, and Uses of Wine,' by Thudichum and Dupré, published by Macmillan.

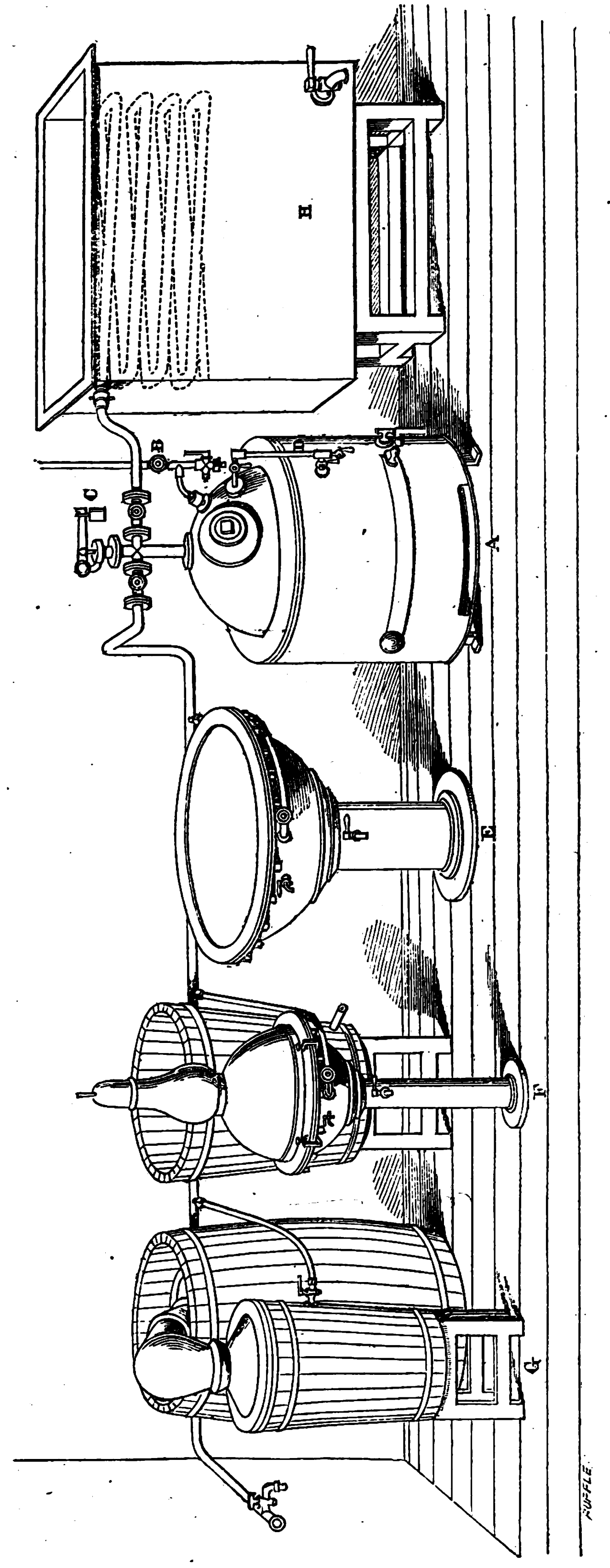
"*Alpha.*"—(1) See *Pharm. Journ.* for October 23, 1875, p. 322; (2) *Pharm. Journ.*, July 19, 1876, p. 666.

F. Harrison.—The book is published by Maw, Son and Thompson.

"*Promove.*"—*Viburnum Opulus.*

W. M. (1) *Achillea Ptarmica*; (2) *Hieracium vulgatum*; (3) *Scabiosa succisa*; (4) *Geranium Robertianum*; (5) *Geranium dissectum*; (6) *Chenopodium Bonus-Henricus.*

COMMUNICATIONS, LETTERS, etc., have been received from Dr. Méhu, Mr. Wigner, Mr. Baring, Mr. J. C. Pooley, Mr. Snell, Mr. Ridgley, Mr. Hartland, X., Bicyclist, Theta, Country Student, Devonia.



PHARMACEUTICAL APPARATUS.

BY OCTAVIUS CORDER.

It has been frequently urged upon the Council of the Pharmaceutical Society, to provide at Bloomsbury Square a set of apparatus suitable for the use of retail establishments for the making all such pharmaceutical preparations as may reasonably be expected by a chemist of the present day. Whether it is the duty of the Council to act the part of an educating body, either for students or mature pharmacists, I leave for the present (although I have a very decided opinion on the subject), my object on the present occasion being to assist those who may be in the same difficulty which I have felt. Having no set of apparatus to guide me I should have been glad of information. I therefore send a short description of what I have found to answer my purpose, with a drawing of the apparatus.

A is a copper boiler holding about 12 gallons, fixed in a wrought iron jacket and heated by a ring gas-burner. I used copper for the boiler, because being made thinner than iron the water is brought to a boil much more rapidly; it does not foul so soon, and is altogether better adapted for the purpose. I chose gas as a heating power, not that it was so cheap as coal, but from its being clean, free from smoke, and at once lighted, lowered, or put out, as occasion may require.

The boiler is supplied with water direct from the main by merely turning on the tap, B. The boiler is provided with steam gauge, C, which blows off at 5 lb. pressure; also, with a water gauge, D, and with a suitable arrangement for blowing out the boiler whenever it becomes foul by deposit of lime, etc. H is a galvanized iron tank, provided with a tin worm, so that all waste steam may be condensed as distilled water; those who are accustomed to use distilled water for all dispensing purposes, making tinctures, infusions, decoctions, indeed all pharmaceutical preparations, will fully appreciate this part of the arrangement. The whole of the pans, etc., being copper tinned all the condensed steam is available as distilled water. The pan, E, holds 16 gallons, and is adapted for decoctions, etc.; its evaporating power is about 2 gallons per hour. The pan, F, holds 6 gallons, and being fitted with a suitable head and worm is used for all the distilled medicated waters, such as dill, cinnamon, peppermint, etc., also for recovering the spirit from ext. colocynth and such like preparations. It distils about 1 gallon per hour. G, is one of Doulton and Watts' make, fitted with an earthenware still (holding about 3 gallons) with head and worm of the same material, fixed in an oval jacket. This is only used for sp. ammon. arom., for which purpose it is well adapted; being the furthest from the boiler the steam power is less, and there is but little risk of the luting being displaced, especially if the carbonate of ammonia is added at several times in small quantities.

The amount of gas used is about 50 feet per hour, costing somewhat less than 3*d.*, but by saving the condensed steam sufficient distilled water will be obtained to more than pay the heating. If the full steam of the boiler is turned into the worm, H, about 4 gallons of water per hour are obtained. Two gallons of sp. ammon. aromat. may be run over during the day in conjunction with other preparations. The whole of the work, as far as the boiler, gas burner, pans and pipe fittings, were made for me by Messrs. Pontifex and Wood, Farringdon Works, Shoe Lane, who have not only paid every attention to what I required, but have also executed it in a substantial and most satisfactory manner. I would add, that it is well to cover the top of the boiler, and the sides of the pans and pipes, with felt, which effectually prevents a considerable loss of heat by radiation.

Norwich.

NOTES ON INDIAN DRUGS.

BY W. DYMOCK.

(*Continued from page* 310.)

COLEUS AROMATICUS.—*Local name*, OWA.

Although this name is in general use it is not properly applied to the plant under notice, it is the name of *Ptychotis Ajowan.* The leaves, which are broad, ovate, crenated, and very thick, are about three inches long, and thickly studded with hairs; those on the upper surface are principally jointed and tapering, with a few simple ones surmounted by a globular, transparent, brilliant gland like a minute dewdrop. On the under surface the glandular hairs are much the most numerous and give rise to a frosted appearance. The epidermis is provided with numerous simple stomata. The venation is reticulate and remarkably prominent on the under surface of the leaf. A few oil globules are met with in the parenchyma, but the aroma is chiefly situated in the glandular hairs. The taste of the leaf is at first pleasantly aromatic, afterwards very pungent; the odour is agreeable and refreshing. In Bombay the Owa is found in almost every garden; it is often used with success in colic and dyspepsia, and is mixed with articles of food by the natives and with drinks by Europeans. I have never heard of its producing any intoxicating effect; if it ever does, it must be when taken in much larger quantity than is usual.

ZINGIBER MACROSTACHYUM.—*Local name*, NEESUN.

A plant resembling ginger, but larger. Stem and under surface of leaves pubescent, spikes several, with long peduncles. Flowers yellowish white, middle lobe of lip marked with diverging purple lines. Fruit obvate, pubescent, red, about ½ inch long. Rhizome 1—2 inches in diameter when fresh-jointed, compressed, with numerous radicles, each joint furnished with a bud. Epidermis scaly, light brown. Cut surface of the fresh root a rich golden yellow. Odour powerful, like a mixture of camphor and turmeric; taste hot and camphoraceous. Under the microscope the epidermis is seen to be formed of many layers of compressed and obliterated cells. The parenchyma consists of large polyhedral cells; those in the cortical portion of the root are nearly free from starch, but those in the central portion are filled with large ovoid starch granules. In all parts of the rhizome large cells full of a golden yellow essential oil abound. The vascular system resembles that of turmeric. Neesun is common in the Konkon and is a popular remedy in diarrhœa and colic.

CASSIA TORA.—*Local name*, TAKLA.

This is a common annual weed in cultivated ground. Leaflets 3 pair, obovate, obtuse, glabrous, the terminal pair being much the largest, all folding up closely at night. Flowers axillary, generally in pairs, dull yellow. Legumes about 6 inches long, narrow, quadrangular, about ⅛ of an inch in diameter, containing numerous elongated seeds. The whole plant has a fetid smell. In good soil it attains a height of about three feet. The leaves are mucilaginous and have a nauseous taste, they are very generally used as a remedy for the so-called Indian ringworm, and as a poultice to boils, etc. They are also purgative.

CRATÆVA RELIGIOSA.—*Local name*, VAIVARNA.

A small tree, with 3-foliolate leaves on long petioles, leaflets lanceolate acuminate, thin, smooth, upper surface dark green, under of a lighter colour, about eight inches long and three broad. Green bark of young shoots and petioles of leaves marked with small white prominent specks. The bruised leaves have a disagreeable smell something like Hellebore; they are slightly bitter and very pungent, causing a tingling sensation in the tongue; not aromatic. In Bombay the bruised leaves are used as a remedy for swelling of the feet and burning of the soles. They are popularly considered to be efficacious in such cases.

VERNONIA ANTHELMINTICA.—*Local name*, KALEE JEEREE.

The seeds and their properties are sufficiently and correctly described in the Pharmacopœia of India. They contain no alkaloids or glucoside. The active principle appears to be a resin.

PSORALIA CORYLIFOLIA.—*Local name*, BAWACHI.

The seeds are well described in Moodeen Sheeriff's Appendix to the Pharmacopœia of India. The oil expressed from them has been a good deal used in Bombay as an alterative in leprosy, and, it is said, with very favourable results. The seeds contain no alkaloid or glucoside, but a large quantity of oil and resin.

MORINDA CITRIFOLIA.—*Local name*. AAL or BARTUNDIE.

M. TOMENTOSA.—*Local name*, ASA.

The first is distinguished by its large oval oblong shining leaves, and the second by the young branches and leaves being tomentose. Both have white flowers with a long infundibuliform corolla, and in both the berries are fused into an oblong fleshy fruit. That of *M. citrofolia* is the largest, being often more than three inches in length. It is pale green, smooth, and when fully ripe fetid beyond description. In the pulp are imbedded a number of black seeds, somewhat like apple pips. The leaves are used as a healing application to wounds and ulcers. They are very bitter, and are said to be tonic and febrifuge.

TRICHOSANTHES CUCUMERINA.—*Local name,* JAUGLI PUDWAL.

Leaves broadly cordate, generally seven-lobed, serrated, fetid; tendrils three-cleft; flowers like those of the cultivated snake gourd; fruit 3—6 inches long, ovate, pointed at both ends, greenish white, marked with broken longitudinal lines of darker green; seeds large, from 20—30, surrounded by a thin fetid, bitter, watery pulp. The natives consider the fruit to be antiperiodic. It abounds in the Konkon, and matures in September and October. This plant is noticed in the Pharmacopœia of India under the name of *T. cordata,* and the root is said to be used in Bengal as a tonic.

(*To be continued.*)

OCCURRANCE OF A SUBSTANCE RESEMBLING COLCHICINE IN BEER.

In a recent report on an examination of Melbourne ales undertaken on behalf of the colonial government,* the analysts stated that in some ales they had met with a crystalline substance resembling crystals of picrotoxin and likely to be mistaken for it, but which a chemical and physiological examination had shown not to be picrotoxin, either modified or unmodified, but a saccharine substance having some relation to the formation of fusel oil. In a paper in the *Archiv der Pharmacie,*† Herr Dannenberg, an apothecary in Fulda, has since stated that he has found in beer a substance resembling closely another substance alleged to be used as an adulterant,—colchicine.

Being employed professionally to examine a sample of beer that was suspected to contain colchicine, and was the subject of legal proceedings, Herr Dannenberg sought directly for that alkaloid, and he obtained a body that in its solubility and in its behaviour towards several reagents showed the greatest similarity with it. Six litres of the beer were evaporated in a water-bath to about one third, taking the precaution, at the commencement, to make the hot liquor alkaline with sodium carbonate, and then faintly acid with tartaric acid. The cooled dark brown liquid was precipitated with basic lead acetate, and the lead removed with sodium phosphate. The then very light wine-yellow filtrate being strongly acid was again treated with sodium carbonate and tartaric acid, and evaporated to the consistence of an ordinary extract. This extract was carefully rubbed up with about three times its volume of absolute alcohol, when the portion which remained undissolved aggregated together in lumps. As soon as this took place the mixture was allowed to settle, and the clear brown liquor poured off, and concentrated by distillation and evaporation; the lumps were then treated with a fresh quantity of absolute alcohol, and this operation was repeated four times. The alcoholic extract thus obtained was completely freed from alcohol in a water-bath, and after cooling formed an almost pulverizable mass, which in aqueous solution had an acid reaction. Ether dissolved out from this too much extractive to be suitable for testing with reagents. It was, therefore, shaken with chloroform, when a thin layer of colourless extract was obtained that upon evaporation left only a very small residue. The remainder of the alcoholic extract was then dissolved in water sufficient to make a thin liquid, and this was shaken successively with three equal volumes of chloroform, carefully freed from alcohol. After distilling off the chloroform the residue was dried as thoroughly as possible in a water-bath, when it was left as a thin, light-brown, glutinous coating on the side of the dish. This was dissolved in water, and—as its passage into ether from an acid aqueous solution is an essential character of colchicine,—the distinct, though not strong, acid reaction of the solution was noted. The solution was first shaken with three times its volume of ether, and then three times more with five to six times its volume. The united ethereal solutions gave a coating to the dish, similar to, though weaker than, that from the chloroform solution. This substance had a bitter taste, and no crystallization could be detected in it with a glass.

The ethereal residue was used for testing with different reagents, a solution of pure colchicine being used at the same time for comparative experiments. The behaviour of tannin, solution of iodine, platinic chloride, gold chloride and phosphomolybdic acid, was exactly the same with both. Flückiger's test with potassio-hydrargyric iodide behaved similarly in Professor Otto's hands, but was not tried by the author. Nitric acid dissolved the substance with a dirty yellow colour, but an addition of strong sulphuric acid to this, instead of producing a blue colour, as is the case with colchicine, gave a red-violet colour. The production of this reaction, however, seems to be dependent upon some at present unknown conditions, as it only took place in two out of five experiments. Strong nitric acid (sp. gr. 1·48) also dissolved the extract with a beautiful violet colour, instead of the blue or blue-violet of colchicine, and the colour is produced even by contact with the vapour of the acid. This colour reaction took place, but with much greater intensity, in the aqueous solution that had been shaken with ether, which if colchicine had been present, might be supposed still to contain some, as colchicine is very incompletely taken up by ether. Consequently it was only in the red coloration with nitric acid that the substance in question differed from colchicine. Soluble in water and alcohol, and passing from an acid aqueous solution into chloroform and ether, less readily into the latter, in its behaviour towards the other reagents mentioned it might pass for colchicine.

The author is not at present prepared to say what this substance is, or whether the only reaction noticed at present in which it differs from colchicine is dependent upon some other constituent of the beer. With respect to the latter point, however, he states that he has repeatedly seen the same red-violet colour produced upon treating with nitric acid colchicine that has been in contact with fleshy substances.

The above communication has been succeeded by

* See *Pharm. Journ.* [3], vol. vi., p. 50.

† *Archiv der Pharmacie* [3], vol. viii., p. 411.

another from Herr Van Geldern,* a Dutch military apothecary, who states that being engaged in 1874 in the examination of some beers he found a substance which in many respects presented a similarity to colchicine. The substance was yellow, and dissolved with a yellow colour partially in water and entirely in ether. The aqueous solution gave a precipitate with tannin and solution of iodine; the dried substance was coloured an intense yellow by concentrated sulphuric acid and a moderate, but not a fine, red by concentrated nitric acid. The last liquid, diluted with water, became light yellow, and orange-red with excess of potash solution. Chlorine water added to the aqueous solution gave a precipitate which dissolved with an orange-yellow colour in ammonia. Herr Van Geldern therefore came to the conclusion that colchicine was present in the beer. But while experimenting afterwards upon some samples of hops, some of them collected by himself, he obtained from them a yellow substance which also gave the above colchicine reaction, except that no precipitate was produced by solution of iodine or tannin. But when some mucilage, which is a never failing constituent in beer, was added, all the reactions were obtained. The reaction with nitric acid, however, was not always the same, sometimes a magnificent red-violet colour was produced and sometimes the colour was not bright.

In an experiment upon two dogs, one of which was injected with colchicine and the other with the substance obtained from hops, the latter was found to be non-poisonous.

THE USE OF METRICAL WEIGHTS IN PRESCRIPTIONS.†

BY PROFESSOR JOHN M. MAISCH.

The desirability of uniform values of the weights and measures in use among civilized nations, and the admirable simplicity of the French or metrical system, are so apparent that this standard is now not merely legalized, but has been adopted, and is actually used, by a large majority of the nations of Continental Europe. The inconveniences attending such a change are more due to the alteration of values than to the introduction of the system with which, through the Arabic numeration, every one is familiar, and the practical application of which we have in our monetary system. The intimate acquaintance with the latter must doubtless facilitate the comparison of values, the multiples and divisions of which are based upon the same system of decimal numeration. While the general introduction of the metrical system in the United States must be regarded merely as a question of time, it cannot be denied that considerable progress towards this end would have been made, if, in accordance with a resolution passed by the National Convention of 1870, for revising the Pharmacopœia, the Committee of Revision had "abandoned in the Pharmacopœia, measures of capacity, and expressed the quantities in all formulas, both in weights and in parts by weight." Coupled with the direction, "to include some part of the metrical system in the list of officinal weights and measures," the parts by weight could scarcely have been expressed otherwise than upon the basis of the metrical weight.

The different value of the *grain*‡ as formerly used occasioned many difficulties in adapting formulas and doses to the weights of other countries; and for similar reasons the use of local values in measures and weights has long since been abandoned in all physical sciences, in favour of the metrical system. Medicine and pharmacy only lagged behind until a few years ago, when it was adopted also in the two branches named, by nearly all civilized nations, except those speaking the English tongue, and the labour of translating the values contained in formulas and prescriptions is now almost exclusively confined to the systems of the troy weight, and the English and American apothecaries' measures, as arraigned against the metrical weight.

It may be remarked in this place that the Pharmacopœias of Continental Europe and the prescriptions of physicians in those countries express all quantities by weight only, whether the material directed be solid or liquid. The greater exactness of gravimetric over volumetric measurement needs scarcely any argument, if the variation in volume under the influence of temperature is considered, and the difficulty of exact measurement in glass vessels of large diameter is taken into account. Moreover, weighing is more convenient, and those who have accustomed themselves to this method will only reluctantly change it for measuring again, if compelled to do so.

From long custom, physicians are apt to over-estimate the difficulties of writing prescriptions for liquid medicines by weights instead of measures. Medicines can be given in absolutely definite doses only, if divided by the apothecary; but their division by him is impracticable in case liquids are employed, and the familiar tea-, dessert- and table-spoons are then resorted to for dividing the medicines at the bedside. How widely these approximate measures differ from each other, and to what extent the difference is increased by the manner of measuring with them, is well known. The apportioning of doses of liquid medicine would, therefore, offer no greater difficulty as long as these convenient and handy, but variable, measures must be employed in the sick-room.

Of the officinal liquid preparations which are prescribed for internal use, the alkaline solutions (of soda, potassa and ammonia), the diluted acids, and the solutions of some salts (ammonium acetate, potassium citrate, etc.), do not differ materially in bulk from an equal weight of distilled water, this difference being less, particularly for the quantities representing their medicinal doses, than the variations of the popular approximate measures by which liquid medicines are taken. Tinctures and fluid extracts vary to a great extent in density, not only from water, but likewise among themselves. The apportioning of their doses by weight, however, would be an easy matter if the resolution of the National Convention above referred to had been carried out; for a given weight of the preparation would then represent a definite weight of the drug, and the proportion of the weight of the drug to that of the preparation would, for tinctures, most likely be 1 : 5 or 1 : 10, the standard generally adopted in Europe. Our present tinctures made with alcohol and diluted alcohol in the proportion of two troyounces to the pint, are very nearly of the strength 1 : 6½ and 1 : 7 respectively; and those containing three troyounces to the pint, 1 : 4¼ and 1 : 5. Tinctura opii is in the proportion of 1 : 11½, and tinctura opii camphorata, 1 : 250 (for opium). It will be observed that the changes necessary in the officinal formulas to bring them in harmony with the metrical system are by no means as great and revolutionary as is sometimes supposed, particularly if the necessary, or at least desirable, change in the alcoholic strength of the menstruum is taken into consideration.

A uniform standard of strength for fluid extracts would most likely be the proportion of 1:2; or, to give it in the metrical system, 5:10; for the proportion 1:1 is unattainable in all cases where sugar or much glycerin is requisite for preservation; and it appears to be desirable to adhere to an adopted standard, also, for those in the

* *Archiv der Pharmacie* [3] vol. ix., p. 32.

† From the *American Journal of Pharmacy* for October.

‡ The variation from our troy grains ranged in different countries between —11 and +46 per cent.

preparation of which alcohol or stronger alcohol is exclusively employed.

Of the remaining liquid medicines, the doses by weight can be as easily acquired as by minims or fluidrachms; but for those who have already become conversant with the measures now in use in the United States, the following observations will offer all requisite facilities for converting them into weights. Ether, having the specific gravity ·750, occupies precisely the same volume as $1\frac{1}{3}$ time its weight of water, and the difference in the volume of stronger ether (specific gravity ·720) is considerably within the limits of variation of the approximate measures; or, in other words, three parts by weight of ether occupy the same space as four parts by weight of water. The relation of the weight of spiritus ætheris compositus (specific gravity ·815) and spiritus ætheris nitrosi (specific gravity ·837) to volume is very nearly as 4:5, that is to say, four parts by weight of the preparations named occupy (a little less than) the same space occupied by five parts of water.

Glycerin (specific gravity 1·25) has a proportion of weight to volume as 5:4; syrups (specific gravity 1·317) nearly as 4:3; chloroform (specific gravity 1·48) nearly as 3:2, *i.e.*, $1\frac{1}{4}$ part by weight of glycerin, $1\frac{1}{3}$ part of syrup, and $1\frac{1}{2}$ part of chloroform, occupy, approximately, the same volume as 1 part of water.

If the relative density of the officinal liquids is not lost sight of, it will be seen that there is no great obstacle in the way of prescribing by metrical weights even the preparations of our present Pharmacopœia, except in the cases of fluid extracts, which vary so considerably that no reliable rule can be given for their relative proportion of weight to volume. But, with this exception, the task is comparatively easy, if it is remembered that for all practical purposes one gram equals 15 grains—that two tablespoonfuls, *i.e.*, 1 fluidounce, of water weigh 455·69 troy grains, or (within less than 8 grains) precisely the same as 30 grams (468 grains). Fifteen grams of water, or its equivalent in bulk of other liquids, is, therefore, to be taken as equal to the tablespoonful; 7·5 to 8 grams of water, or its equivalent, to the dessert-spoonful; and 3·7 to 4 grams to the teaspoonful.

Applying these values to the heavier and lighter liquids, it will be seen that—

$15 \times \frac{3}{4} = 11{\cdot}25$ grams ether.
$15 \times \frac{5}{4} = 18{\cdot}75$ grams glycerin.
$15 \times \frac{3}{2} = 22{\cdot}50$ grams chloroform.
$15 \times \frac{4}{5} = 12$ grams spir. æther. comp. (or nitr.).
$15 \times \frac{4}{3} = 20$ grams syrup,

are, in measure, equal to about half a fluidounce, and that the deviation from this measure is in each case considerably less than the difference in the amounts obtained by scant and full measurement with the same tablespoon, or between different patterns of that useful domestic utensil.

The average doses of these liquids, expressed in metrical weights, are, therefore—

Ether	11·25 : 8 = 1·40	grams	or	$\frac{1}{2}$	teaspoonful.
Spr. æth. comp., and					
Spr. æth. nitr.,	12 : 4 = 3·00	„	or	1	„
Chloroform,	22·50 : 8 = 2·80	„	or	$\frac{1}{2}$	„
Glycerin,	18·75 : 4 = 4·70	„	or	1	„
Syrups (some),	20 : 4 = 5	„	or	1	„

For the conversion of grain weights of solids into grams, close approximations to the correct weight, within the fraction of $\frac{1}{34}$, are obtained by dividing the number of grains by 15. The error resulting from this rule is best appreciated by comparing the results obtained with the larger weights, thus:—

	Correct weight.	Difference. Grams.	Difference. Grains.
grs. lx give $\frac{60}{15} = 4{\cdot}00$	3·887	0·113	1·7436
℥i „ $\frac{480}{15} = 32{\cdot}00$	31·100	0·90	13·89

The actual difference obtained by the above rule amounts, therefore, to rather less than a plus of $1\frac{3}{4}$ grain for the drachm, and 14 grains for the troy ounce.

A few examples may yet be added to show the insignificance of this difference for smaller weights; thus we obtain for—

	Actual weight.	Difference. Gram.		Difference. Grain,
grs. x, $\frac{10}{15} = 0{\cdot}66$	0·648	0·012	less than	$\frac{1}{6}$
grs. viii, $\frac{8}{15} = 0{\cdot}53$	0·518	0·012	„	$\frac{1}{5}$
grs. iii, $\frac{3}{15} = 0{\cdot}20$	0·194	0·006	„	$\frac{1}{10}$
grs. ii, $\frac{2}{15} = 0{\cdot}13$	0·129	0·001	nearly	$\frac{1}{65}$
grs. i, $\frac{1}{15} = 0{\cdot}066$	0·065	0·001	„	$\frac{1}{65}$

In prescribing by metrical weights, the amounts should in all cases be expressed in grams and decimal fractions of grams, and with Arabic numerals, in which case no signs or abbreviations are required; a few examples of prescriptions, written in the usual manner, with their (practical) equivalents in metrical weights, will readily explain this, and show the greater clearness of the latter method, and the less liability to error from indifferently made signs and Roman numerals.

℞	Potassii iodidi	ʒii	8·00
	Iodinii.	gr. ii	0·13
	Aquæ	f℥ss	15·00
	Syr. sarsap. comp. . . .	f℥iiss	140·00

Dose.—One tablespoonful, containing one gram (15 grains) potassium iodide, and 0·016 ($\frac{1}{4}$ gr.) iodine.

℞	Potassii nitrat	ʒiss	6·00
	Vin. antim.	♏xl	2·66
	Tinct. digitalis	fʒi*	3·50
	Mucil. acaciæ	f℥ss	20·00
	Aquæ	f℥iii	90·00
	Syrup aurantii	f℥i	40·00

A tablespoonful of this mixture contains 0·66 (10 grains) of potassium nitrate, 0·0012 ($\frac{1}{54}$ grain) tartar emetic, and 0·055 ($\frac{5}{6}$ grain) digitalis.

℞	Morphiæ sulphat. . . .	gr. i	0.066	
	Pulv. digitalis	gr. vi	0·40	
	Sacchari albi	℈iss	2·00	M.

Divide in chart. No. 12.

Each powder contains 0·0055 ($\frac{1}{12}$ grain) morphia, and 0·033 ($\frac{1}{2}$ grain) digitalis.

℞	Quiniæ sulph.	gr. xii	0·80
	Pulv. opii	gr. iii	0·20
	Syrupi	q. s.	

Fiant pil. No. xii.

Each pill contains 0·066 (1 grain) quinia, and 0·016 ($\frac{1}{4}$ grain) opium.

℞	Atropiæ	gr. ss	0·033
	Alcohol	q. s.	
	Adipis	ʒi	4·00 M.

Atropia ointment.

It is the writer's opinion that physicians could very materially promote the introduction of the metrical weights, since by writing their prescriptions in the manner indicated, they would at the same time compel apothecaries to procure a suitable set of weights, which would save them the trouble of calculating the grams into grains and troy ounces; such a movement would be a great step toward carrying out the resolution of the Convention of 1870, and toward harmonizing the strength of the various pharmaceutical preparations with those of other Pharmacopœias, or at least bringing them into a simpler relation.

* Representing $7\frac{1}{2}$ grains of digitalis; menstruum diluted alcohol.

THE CONSTITUENTS OF BALSAM OF TOLU.*

It has long been a disputed point whether balsam of Tolu contains only cinnamic acid, or a mixture of this with benzoic acid. The presence of the latter had been denied by Frémy,† and although Deville afterwards obtained benzoic acid from the balsam, yet, according to Kopp, this did not pre-exist therein, but was produced during the process of extraction. The latest researches of Carles‡ likewise seem to prove the absence of benzoic acid.

The question has been again taken up by E. Busse, who attributes the conflicting results to the fact that the various investigators employed methods which caused chemical changes in the pre-existing constituents. He employed the method pursued by Kraut in his examination of balsam of Peru, by which such decompositions are avoided as much as possible.

One kilogramme of strongly resinified balsam of Tolu was dissolved in 2 litres (about 68 fl. ℥) of ether, the solution filtered from the trifling residue, and shaken for some time with 2 litres of soda solution, containing 100 gm. anhydrous soda. The decanted ether was repeatedly washed with fresh soda solution, and finally with water, until all alkalinity had disappeared. The clear ethereal liquid was deprived of its ether by distillation in the water-bath, when it left behind 85 gm. of a neutral liquid, which was subjected to fractional distillation. During this process three separate portions distilled over, part at near 200°, another at 250°—300°, and most at over 320° C., from which latter separated, on standing, a crystalline mass, exhibiting, after purification, the melting point of cinnamic acid. In order to remove this product, which had probably been formed by the action of heat and water, the several distillates were once more dissolved in ether, deprived of acid by shaking with dilute soda solution, washed, and after removal of the ether, dehydrated with calcium chloride. Each product was then again rectified and immediately analysed.

The first distillation yielded figures which led to no certain formula. But the reaction seemed to indicate that it consisted of impure benzyl alcohol.

The second distillate, which boiled at 300° C., yielded the formula $C_{14}H_{12}O_2$, corresponding to benzoate of benzylic ether, and after treatment with potassa, and addition of sulphuric acid, yielded an acid, having the melting point 121° C., and proving to be undoubtedly *benzoic acid.*

The third distillate, boiling at over 320°, yielded the formula $C_{16}H_{14}O_2$ (cinnamate of benzylic ether), and yielded an acid, melting at 133° C., which was therefore *cinnamic acid.*

These results prove that balsam of Tolu contains the same constituents as balsam of Peru, but in smaller quantities and in different proportions—cinnamic acid predominating in the former, in the latter benzoic acid.

The alkaline solution was deprived of resin and divided into two portions, one of which was treated with milk of lime, and the resulting calcium salt, after re-crystallization, decomposed. It yielded cinnamic acid. The liquid filtered from the difficultly soluble calcium cinnamate yielded another salt, the acid of which was found to be benzoic acid. The other portion was dissolved in alcohol and converted by hydrochloric acid gas into the corresponding ethylic ethers.

Balsam of Tolu therefore contains cinnamic and benzoic acids, neutral benzoate and cinnamate of benzylic ether, and a peculiar resin, which, however, requires further investigation.

* From *New Remedies*, September, 1876.

† 'Gmel. Handb.,' 4th ed., VII., 1802.

‡ *Journ. de Pharm. et de Chim.*, 19, 112. Flückiger and Hanbury, 'Pharmacographia,' p. 179.

PRELIMINARY NOTE ON LITMUS.*

BY HOWARD W. MITCHELL.

Wartha† has separated four organic bodies from litmus. The first is obtained by treating commercial litmus with alcohol of about 90 per cent., filtering cold, and boiling the clear tincture; whereupon indigo is precipitated as a fine powder, according to the author. The second body is obtained by evaporating the violet-red mother-liquor; it is a beautiful red, or, from many varieties, green, fluorescent substance, indifferent to acids. The litmus residue left after the above treatment with alcohol, and which is insoluble in that fluid, is digested with distilled water for twenty-four hours, after which the deep-coloured solution is evaporated to dryness on the water-bath, the residuary extract treated several times with absolute alcohol containing a little glacial acetic acid and again evaporated, until it forms a brown powdery mass. This brown powder is now extracted with absolute alcohol and acetic acid, whereby a large quantity of a scarlet-red body is dissolved, which resembles orceine and becomes purple-red, in place of blue, with ammonia. The portion of the brown powder insoluble in the acidified absolute alcohol consists of the litmus colouring matter in a state of great purity—so pure, in fact, that by means of it the carbonated alkaline earths contained in spring waters may be titrated with as great delicacy as by the use of cochineal tincture, which is far from being the case with crude litmus.

To get this perfectly pure, it is first washed with absolute alcohol, then dissolved in a small quantity of water and thrown into a large excess of alcohol, the flocculent purple precipitate collected and again thoroughly washed with alcohol.

I have repeated Wartha's experiments as here stated upon some samples of litmus obtained from Bullock and Crenshaw, of Philadelphia, and said to have come from Pettitt, Aimee, and Co., Paris, France. My observations confirm his results in every particular, save as regards the indigo. No deposit of indigo was obtained upon boiling the alcoholic tincture, not even after repeated ebullitions, with intervals of rest and cooling.

The fluorescent body which he mentions is violet or purple, as I have obtained it, and gives a solution in alcohol of a similar colour, which shows a beautiful green fluorescence with sunlight, even when very dilute, and with the spectroscope gives a very characteristic absorption band in the green, together with an almost total absorption of the violet end of the spectrum.

It is soluble in water, amylic alcohol, and common ether to some extent, extremely soluble in alcohol, but seems to be wholly insoluble in bisulphide of carbon, chloroform, petroleum-naphtha, and oil of turpentine, imparting neither colour nor fluorescent property to those liquids.

The solutions in amylic alcohol and in ether both exhibit a beautiful fluorescence, but the ethereal solution shows the absorption band in the green only very faintly, even when the solution is thoroughly saturated. The solubility of the substance in both of these liquids is probably due to the trace of common alcohol, which they both contain, as found commercially. The body which resembles orceine shows a very faint fluorescence and in alcoholic solution gives a spectrum in which the absorption is characteristic, and quite distinct from that of the last. It is slightly soluble in water, very soluble in alcohol, but seems to be insoluble in ether, chloroform, bisulphide of carbon, and petroleum-naphtha.

The pure colouring matter proper of litmus is insoluble in alcohol, ether, chloroform, bisulphide of carbon, and petroleum-naphtha, both in the cold and upon boiling; it is very soluble in water, and its aqueous solution yields

* From the *American Chemist*. Read before the American Chemical Society, June, 1876.

† 'Ueber den Lakmusfarbstoff. v. Wartha,' *Ber. Chem. Ges. Berlin*, 9, 217.

an absorption spectrum differing from that of each of the preceding substances.

This substance turns blue with ammonia, and seems more like the azolitmine of Kane than either of the other substances, but I obtained no ammonia from it by heating with sodic or calcic hydrates, that is, sufficient to show its presence by odour or by reaction upon reddened litmus paper.

It yields in alkaline solution a beautiful violet lake with alumina, one of a pale violet colour with stannous acetate, and deep blue lakes with calcium and barium salts.

The residue left, after extracting litmus with alcohol and then with water, is soluble to the extent of 8 per cent. in dilute hydrochloric acid, and the portion dissolved in this liquid consists of calcic and magnesic carbonates, free from colouring matter, in the proportions of about 90 per cent. and 10 per cent. of the carbonates respectively. The residue, insoluble in dilute hydrochloric acid, consists mostly of fine sand, but yields some colouring matter to strong ammonic hydrate, and forms a solution of a blue colour, with a precipitate, red and gelatinous, somewhat like alumina, upon supersaturation with an acid.

About 25 grs. of the pure colouring matter, 15 grs. of the body like orceine, and 10 grs. of the fluorescent body, were obtained per ounce of litmus.

Diagrams of the absorption spectra yielded by these several substances I reserve for a second paper.

NOTE ON THE DECOMPOSITION OF A SOLUTION OF IODIDE OF POTASSIUM BY LIGHT.*

BY M. BATTANDIER.

It has often been observed that a solution of iodide of potassium turns yellow under the influence of sunlight, and after a time contains free iodine. According to Vidau† this decomposition is due to light alone and the atmosphere takes no part in the phenomenon. In seeking to verify this statement the author has arrived at a different conclusion.

A ten per cent. solution of pure iodide of potassium was divided into three portions, and exposed (1) to sunlight in the open air, (2) to sunlight in a vacuum, and (3) to the air in the shade. Decomposition took place in No. 1 only. The liquid first turned yellow; then at the end of the third day it gave up to chloroform a small quantity of iodine which gradually augmented. The experiments were repeated three times, being continued during a fortnight each time and always with the same result.

These experiments appeared to demonstrate that the intervention of air is necessary to the decomposition. To verify this the same solution was exposed (1) to air and sunlight; (2) to air and sunlight after boiling; (3) to air and sunlight after passing through it a current of pure carbonic acid; (4) to air and light, with a little chloride of barium; (5) to air and light with a little caustic potash; (6) to sunlight and in confined air deprived of carbonic acid by lime; (7) to sunlight and in carbonic acid deprived of air.

In experiments, 4, 5, and 6, no appreciable decomposition took place. In experiment 7, on the contrary, it was quite energetic, so that in two hours the solution was already sensibly yellow, and it gradually darkened. In experiment 3, the decomposition was a little less energetic; and still less pronounced in experiments 1 and 2.

From these experiments the author concludes that sunlight and acids present in the atmosphere, and especially carbonic acid, are the principal agents of the decomposition, which results probably from the setting free of a little hydriodic acid.

Vidau found the decomposition to take place in the presence of an excess of caustic potash; this the author would attribute to the action of ozone. He has noticed that his altered solutions possessed marked decolorizing properties, a peculiarity that he has also met with in the iodide decomposed by ozone and in a liquid obtained by saturating a solution of potash with iodine.

* *Journal de Pharmacie* [4], vol. xxiv., p. 214.

† *Pharm. Journ.* [3], vol. v., p. 383.

SURFACE BIOLOGY.*

BY ALFRED RUSSEL WALLACE, F.R.G.S., F.L.S.

(*Continued from page* 334.)

The Philippine Islands seem to have the peculiarity of developing metallic colours. We find there at least three species of *Euplœa*† not closely related, and all of more intense metallic lustre than their allies in other islands. Here also we have one of the large yellow *Ornithopteræ* (*O. magellanus*), whose hind wings glow with an intense opaline lustre not found in any other species of the entire group; and an *Adolias*‡ which is larger and of more brilliant metallic colouring than any other species in the archipelago. In these islands also we find the extensive and wonderful genus of weevils (*Pachyrhynchus*), which in their brilliant metallic colouring surpass any thing found in the whole eastern hemisphere, if not in the whole world.

In the Andaman Islands in the Bay of Bengal there are a considerable number of peculiar species of butterflies differing slightly from those on the continent, and generally in the direction of paler or more conspicuous colouring. Thus two species of *Papilio* which on the continent have the tails black, in their Andaman representatives have them either red or white-tipped.§ Another species|| is richly blue-banded where its allies are black while three species of distinct genera of Nymphalidæ¶ all differ from their allies on the continent in being of excessively pale colours as well as of somewhat larger size.

In Madagascar we have the very large and singularly white-spotted *Papilio antenor*, while species of three other genera** are very white or conspicuous compared with their continental allies.

Passing to the West-Indian Islands and Central America (which latter country has formed a group of islands in very recent times) we have similar indications. One of the largest of the Papilios inhabits Jamaica,†† while another, the largest of its group, is found in Mexico.‡‡ Cuba has two of the same genus whose colours are of surpassing brilliancy;§§ while the fine genus *Clothilda*—confined to the Antilles and Central America—is remarkable for its rich and showy colouring.

Persons who are not acquainted with the important structural differences that distinguish these various genera of butterflies can hardly realize the importance and the significance of such facts as I have now detailed. It may be well, therefore, to illustrate them by supposing parallel cases to occur among the Mammalia. We might have, for example, in Africa, the gnus, the elands, and the buffaloes, all coloured and marked like zebras, stripe for stripe over the whole body exactly corresponding. So the hares, marmots, and squirrels of Europe might be all red with black feet, while the corresponding species of Central Asia were all yellow with black heads. In North America we might have raccoons, squirrels, and opossums, in parti-coloured livery of white and black, so as exactly to resemble the skunk of the same country; while in South America they might be black with a yellow throat patch, so as to resemble with equal closeness the tayra of the Brazilian forests. Were such resemblances to occur in any thing like the number and with the wonderful accuracy of imitation met with among the Lepidoptera, they would certainly attract universal attention among naturalists, and would lead to the exhaustive study of the influence of local causes in producing such startling results.

* Presidental Address delivered to the Biological Section of the British Association, at Glasgow, on Sept. 6, 1876.

† *Euplœa hewitsonii, E. diocletiana, E. lætifica.*

‡ *Adolias calliphorus.*

§ *Papilio rhodifer* (near *P. doubledayi*) and *Papilio charicles* (near *P. memnon*). || *Papilio mayo.*

¶ *Euplœa andamanensis, Cethosia biblis, Cyrestis cocles.*

** *Danais nossima, Melanitis massoura, Diadema dexithea.* †† *Papilio homerus.*

‡‡ *P. daunus.* §§ *P. gundlachianus, P. villiersi*

One somewhat similar case does indeed occur among the Mammalia, two singular African animals, the Aard-wolf (*Proteles*) and the hyæna-dog (*Lycaon*), both strikingly resembling hyænas in their general form as well as in their spotted markings. Belonging as they all do to the Carnivora, though to three distinct families, it seems quite an analogous case to those we have imagined; but as the Aard-wolf and the hyæna-dog are both weak animals compared with the hyæna, the resemblance may be useful, and in that case would come under the head of mimicry. This seems the more probable because, as a rule, the colours of the Mammalia are protective, and are too little varied to allow of the influence of local causes producing any well-marked effects.

When we come to birds, however, the case is different; for although they do not exhibit such distinct marks of the influence of locality as do butterflies—probably because the causes which determine colour are in their case more complex—yet there are distinct indications of some effect of the kind, and we must devote some little time to their consideration.

One of the most curious cases is that of the parrots of the West-Indian Islands and Central America, several of which have white heads or foreheads, occurring in the two distinct genera, while none of the more numerous parrots of South America are so coloured. In the small island of Dominica we have a very large and richly-coloured parrot (*Chrysotis augusta*) corresponding to the large and richly-coloured *Papilio homerus* of Jamaica.

The Andaman Islands are equally remarkable, at least six of the peculiar birds differing from their continental allies in being much lighter, and sometimes with a large quantity of pure white in the plumage, exactly corresponding to what occurs among the butterflies.

In the Philippines this is not so marked a feature; yet we have here:—the only known white-breasted kingcrow (*Dicrurus mirabilis*); the newly discovered *Eurylæmus Steerii*, wholly white beneath; three species of *Diceum*, all white beneath; several species of *Parus*, largely white-spotted; while many of the pigeons have light ashy tints. The birds generally, however, have rich dark colours, similar to those which prevail among the butterflies.

In Celebes we have a swallow-shrike and a peculiar small crow allied to the jackdaw, whiter than any of their allies in the surrounding islands; but otherwise the colours of the birds call for no special remark.

In Timor and Flores we have white-headed pigeons, and a long-tailed flycatcher almost entirely white.

In the small Lord Howe's Island we have the recently extinct white rail (*Notornis alba*), remarkably contrasting with its allies in the larger islands of New Zealand.

We cannot, however, lay any stress on isolated examples of white colour, since these occur in most of the great continents; but where we find a series of species of distinct genera all differing from their continental allies in a whiter coloration, as in the Andaman Islands and the West Indies, and, among butterflies, in the smaller Mollaccas, the Andamans, and Madagascar, we cannot avoid the conclusion that in these insular localities some general cause is at work.

There are other cases, however, in which local influences seem to favour the production or preservation of intense crimson or a very dark coloration. Thus in the Moluccas and New Guinea alone we have bright red parrots belonging to two distinct families, and which therefore most probably have been independently produced or preserved by some common cause. Here, too, and in Australia we have black parrots and pigeons; and it is a most curious and suggestive fact that in another insular subregion—that of Madagascar and the Mascarene Islands—these same colours reappear in the same two groups.

Some very curious physiological facts bearing upon the presence or absence of white colours in the higher animals have lately been adduced by Dr. Ogle. It has been found that a coloured or dark pigment in the olfactory region of the nostrils is essential to perfect smell, and this pigment is rarely deficient except when the whole animal is pure white. In these cases the creature is almost without smell or taste. This, Dr. Ogle believes, explains the curious case of the pigs in Virginia adduced by Mr. Darwin, white pigs being killed by a poisonous root which does not affect black pigs. Mr. Darwin imputed this to a constitutional difference accompanying the dark colour, which rendered what was poisonous to the white-coloured animals quite innocuous to the black. Dr. Ogle, however, observes that there is no proof that the black pigs eat the root, and he believes the more probable explanation to be that it is distasteful to them; while the white pigs, being deficient in smell and taste, eat it and are killed. Analogous facts occur in several distinct families. White sheep are killed in the Tarentio by eating *Hypericum crispum*, while black sheep escape; white rhinoceroses are said to perish from eating *Euphorbia candelabrum*; and white horses are said to suffer from poisonous food where coloured ones escape. Now it is very improbable that a constitutional immunity from poisoning by so many distinct plants should, in the case of such widely different animals, be always correlated with the same difference of colour; but the facts are readily understood if the senses of smell and taste are dependent on the presence of a pigment which is deficient in wholly white animals. The explanation has, however, been carried a step further, by experiments showing that the absorption of odours by dead matter, such as clothing, is greatly affected by colour, black being the most powerful absorbent; then blue, red, yellow, and lastly white. We have here a physical cause for the sense-inferiority of totally white animals which may account for their rarity in nature: for few, if any, wild animals are wholly white; the head, the face, or at least the muzzle or the nose, are generally black; the ears and eyes are also often black; and there is reason to believe that dark pigment is essential to good hearing, as it certainly is to perfect vision. We can therefore understand why white cats with blue eyes are so often deaf, a pecularity we notice more readily than their deficiency of smell or taste.

If, then, the prevalence of white coloration is generally accompanied with some deficiency in the acuteness of the most important senses, this colour becomes doubly dangerous; for it not only renders its possessor more conspicuous to its enemies, but at the same time makes it less ready in detecting the presence of danger. Hence, perhaps the reason why white appears more frequently in islands, where competition is less severe and enemies less numerous and varied. Hence, also, a reason why *albinoism*, although freely occurring in captivity, never maintains itself in a wild state, while *melanism* does. The peculiarity of some islands in having all its inhabitants of dusky colours (as the Galapagos) may also perhaps be explained on the same principles, for poisonous fruits or seeds may there abound which weed out all white or light-coloured varieties, owing to their deficiency of smell and taste. We can hardly believe, however, that this would apply to white-coloured butterflies; and this may be a reason why the effect of an insular habitat is more marked in these insects than in birds or mammals. But though inapplicable to the lower animals, this curious relation of sense-acuteness with colours may have had some influence on the development of the higher human races. If light tints of the skin were generally accompanied by some deficiency in the senses of smell, hearing and vision, the white could never compete with the darker races so long as man was in a very low or savage condition, and wholly dependent for existence on the acuteness of his senses. But as the mental faculties become more fully developed and more important to his welfare than mere sense-acuteness, the lighter tints of skin and hair and eyes would cease to be disadvantageous whenever they were accompanied by superior brain power. Such variations would then be preserved; and thus may have arisen the

Xanthochroic race of mankind, in which we find a high development of intellect accompanied by a slight deficiency in the acuteness of the senses as compared with the darker forms.

I have now to ask your attention to a few remarks on the peculiar relations of plants and insects as exhibited in islands.

Ever since Mr. Darwin showed the immense importance of insects in the fertilization of flowers great attention has been paid to the subject, and the relation of these two very different classes of natural objects has been found to be more universal and more complex than could have been anticipated. Whole genera and families of plants have been so modified at first to attract, and then to be fertilized by, certain groups of insects; and this special adaptation seems in many cases to have determined the more or less wide range of the plants in question. It is also known that some species of plants can be fertilized only by particular species of insects; and the absence of these from any locality would necessarily prevent the continued existence of the plant in that area. Here, I believe, will be found the clue to much of the peculiarity of the floras of oceanic islands, since the methods by which these have been stocked with plants and insects will be often quite different. Many seeds are, no doubt, carried by oceanic currents, others probably by aquatic birds. Mr. H. N. Moseley informs me that the albatrosses, gulls, puffins, tropic birds, and many others nest inland, often amidst dense vegetation, and he believes they often carry seeds, attached to their feathers, from island to island for great distances. In the tropics they often nest on the mountains far inland, and may thus aid in the distribution even of mountain-plants. Insects, on the other hand, are mostly conveyed by aerial currents, especially by violent gales; and it may thus often happen that totally unrelated plants and insects may be brought together, in which case the former must often perish for want of suitable insects to fertilize them. This will, I think, account for the strangely fragmentary nature of these insular floras, and the great differences that often exist between those which are situated in the same ocean, as well as for the preponderance of certain orders and genera. In Mr. Pickering's valuable work on the 'Geographical Distribution of Animals and Plants,' he gives a list of no less than sixty-six natural orders of plants *unexpectedly* absent from Tahiti, or which occur in many of the surrounding lands, some being abundant in other islands—as the Labiatæ at the Sandwich Islands. In these latter islands the flora is much richer, yet a large number of families which abound in other parts of Polynesia are totally wanting. Now much of the poverty and exceptional distribution of the plants of these islands is probably due to the great scarcity of flower-frequenting insects. Lepidoptera and Hymenoptera are exceedingly scarce in the eastern islands of the Pacific, and it is almost certain that many plants which require these insects for their fertilization have been thereby prevented from establishing themselves. In the western islands, such as the Fijis, several species of butterflies occur in tolerable abundance, and no doubt some flower-haunting Hymenoptera accompany them; and in these islands the flora appears to be much more varied, and especially to be characterized by a much greater variety of showy flowers, as may be seen by examining the plates of Dr. Seemann's 'Flora Vitiensis.'

Darwin and Pickering both speak of the great preponderance of ferns at Tahiti; and Mr. Moseley, who spent several days in the interior of the island, informs me that "at an elevation of from 2000 to 3000 feet the dense vegetation is composed almost entirely of ferns. A tree fern (*Alsophila tahitensis*) forms a sort of forest to the exclusion of almost every other tree, and, with huge plants of two other ferns (*Angiopteris evecta* and *Aspelenium nidus*), forms the main mass of the vegetation." And he adds, "I have nowhere seen ferns in so great proportionate abundance." This unusual proportion of ferns is a general feature of insular as compared with continental floras; but it has, I believe, been generally attributed to favourable conditions, especially to equable climate and perennial moisture. In this respect, however, Tahiti can hardly differ greatly from many other islands, which yet have no such vast preponderance of ferns. This is a question that cannot be decided by mere lists of species, since it is probable that in Tahiti they are less numerous than in some other islands where they form a far less conspicuous feature in the vegetation. The island most comparable with Tahiti in that respect is Juan Fernandez. Mr. Moseley writes to me:—"In a general view of any wide stretch of the densely clothed mountainous surface of the island, the ferns, both tree ferns and the unstemmed forms, are seen at once to compose a very large proportion of the mass of foliage." As to the insects of Juan Fernandez, Mr. Edwyn C. Reed, who made two visits and spent several weeks there, has kindly furnished me with some exact information. Of butterflies there is only one (*Pyrameis carie*), and that rare—a Chilian species, and probably an accidental straggler. Four species of moths of moderate size were observed (all Chilian), and a few larvæ and pupæ. Of bees there were none, except one very minute species (allied to *Chilicola*), and of other Hymenoptera a single specimen of *Ophion luteus* (a cosmopolitan ichneumon). About twenty species of flies were observed, and these formed the most prominent feature of the entomology of the island.

Now, as far as we know, this extreme entomological poverty agrees closely with that of Tahiti; and there are probably no other portions of the globe equally favoured in soil and climate, and with an equally luxuriant vegetation, where insect-life is so scantily developed. It is curious, therefore, to find that these two islands also agree in the wonderful predominance of ferns over the flowering plants—in individuals even more than in species; and there is no difficulty in connecting the two facts. The excessive minuteness and great abundance of fern-spores cause them to be far more easily distributed by winds than the seeds of flowering plants, and they are thus always ready to occupy any vacant places in suitable localities, and to compete with the less vigorous flowering plants. But where insects are so scarce, all plants which require insect-fertilization, whether constantly to enable them to produce seed at all, or occasionally to keep up their constitutional vigour by crossing, must be at a great disadvantage; and thus the scanty flora which oceanic islands must always possess, peopled as they usually are by waifs and strays from other lands, is rendered still more scanty by the weeding out of all such as depend largely on insect-fertilization for their full development. It seems probable, therefore, that the preponderance of ferns in islands (considered in mass of individuals rather than in number of species) is largely due to the absence of competing phænogamous plants, and that this is in great part due to the scarcity of insects. In other oceanic islands, such as New Zealand and the Galapagos, where ferns, although tolerably abundant, form no such predominant feature in the vegetation, but where the scarcity of flower-haunting insects is almost equally marked, we find a great preponderance of small, green, or otherwise inconspicuous flowers, indicating that only such plants have been enabled to flourish there as are independent of insect-fertilization. In the Galapagos (which are perhaps even more deficient in flying insects than Juan Fernandez) this is so striking a feature that Mr. Darwin speaks of the vegetation as consisting in great part of "wretched-looking weeds," and states that "it was some time before he discovered that almost every plant was in flower at the time of his visit." He also says that he "did not see one beautiful flower" in the islands. It appears, however, that Compositæ, Leguminosæ, Rubiaceæ, and Solanaceæ form a large proportion of the flowering plants; and as these are orders which usually require insect-fertilization, we must suppose, either that they have become modified so as to be self-fertilized, or that they are fertilized by the visits of the minute Diptera and Hymenoptera, which are the only insects recorded from these islands.

In Juan Fernandez, on the other hand, there is no such total deficiency of showy flowers. I am informed by Mr. Moseley that a variety of the Magnoliaceous winter-bark abounds and has showy white flowers, and that a Bignoniaceous shrub with abundance of dark blue flowers was also plentiful; while a white-flowered Liliaceous plant formed large patches on the hill-sides. Besides these there were two species of woody Compositæ with conspicuous heads of yellow blossoms, and a species of white-flowered myrtle also abundant; so that, on the whole, flowers formed a rather conspicuous feature in the aspect of the vegetation of Juan Fernandez.

But this fact—which at first sight seems entirely at variance with the view we are upholding of the important relation between the distribution of insects and plants—is well explained by the existence of two species of humming-birds in Juan Fernandez, which, in their visits to these large and showy flowers, fertilize them as effectually as bees, moths, or butterflies. Mr. Moseley informs me that "these humming-birds are *extraordinarily abundant*, every tree or bush having one or two darting about it." He also observed that "nearly all the specimens killed had the feathers round the base of the bill and front of the head clogged and coloured yellow with pollen." Here, then, we have the clue to the perpetuation of large and showy flowers in Juan Fernandez; while the total absence of humming-birds in the Galapagos may explain why no such large-flowered plants have been able to establish themselves in those equatorial islands.

This leads to the observation that many other groups of birds also, no doubt, aid in the fertilization of flowers. I have often observed the beaks and faces of the brush-tongued lories of the Moluccas covered with pollen; and Mr. Moseley noted the same fact in a species of *Artamus*, or swallow-shrike, shot at Cape York, showing that this genus also frequents flowers and aids in their fertilization. In the Australian region we have the immense group of the Meliphagidæ, which all frequent flowers; and as these range over all the islands of the Pacific, their presence will account for a certain proportion of showy flowers being found there, such as the scarlet *Metrosideros*, one of the few conspicuous flowers in Tahiti. In the Sandwich Islands, too, there are forests of *Metrosideros*; and Mr. Charles Pickering writes me, that they are visited by honey-sucking birds, one of which is captured by sweetened bird-lime, against which it thrusts its extensile tongue. I am also informed that a considerable number of flowers are occasionally fertilized by humming-birds in North America; so that there can, I think, be little doubt that birds play a much more important part in this respect than has hitherto been imagined. It is not improbable that in Tropical America, where the humming-bird family is so enormously developed, many flowers will be found to be expressly adapted to fertilization by them, just as so many in our own country are specially adapted to the visits of certain families or genera of insects.

It must also be remembered, as Mr. Moseley has suggested to me, that a flower which had acquired a brilliant colour to attract insects might, on transference to another country, and becoming so modified as to be capable of self-fertilization, retain the coloured petals for an indefinite period. Such is probably the explanation of the *Pelargonium* of Tristan d'Acunha, which forms masses of bright colour near the shore during the flowering season; while most of the other plants of the island have colourless flowers in accordance with the almost total absence of winged insects. The presence of many large and showy flowers among the indigenous flora of St. Helena must be an example of a similar persistence. Mr. Melliss indeed states it to be "a remarkable peculiarity that the indigenous flowers are, with very slight exceptions, all perfectly colourless;" but although this may apply to the general aspect of the remains of the indigenous flora, it is evidently not the case as regards the *species*, since the interesting plates of Mr. Melliss's volume show that about one-third of the indigenous flowering plants have more or less coloured or conspicuous flowers, while several of them are exceedingly showy and beautiful. Among these are a *Lobelia*, three *Wahlenbergias*, several *Compositæ*, and especially the handsome red flowers of the now almost extinct forest-trees, the ebony and redwood (species of *Melhania*, Byttneriaceæ). We have every reason to believe, however, that when St. Helena was covered with luxuriant forests, and especially at that remote period when it was much more extensive than it is now, it must have supported a certain number of indigenous birds and insects, which would have aided in the fertilization of these gaily-coloured flowers. The researches of Dr. Hermann Müller have shown us by what minute modifications of structure or of function many flowers are adapted for partial insect- and self-fertilization in various degrees; so that we have no difficulty in understanding how, as the insects diminished and finally disappeared, self-fertilization may have become the rule, while the large and showy corollas remain to tell us plainly of a once different state of things.

(To be continued.)

COUNTER PRESCRIBING.

The following remarks appeared under the above heading in the editorial columns of the *Medical Press and Circular* this week:—

"It is, moreover, as we remarked on a previous occasion, only fair to consider, when talking of the chemist usurping the office of medical adviser, how many there are in our profession who trespass upon the province of the chemist and druggist. One of our medical contemporaries thinks there is far more work to be done by pharmacists whenever they will give their undivided energy and attention to the duty of preparing remedies for public use on the prescription of medical men. But to this very considerate remark the *Pharmaceutical Journal* justly retorts that 'an important factor is at present much wanting—the prescriptions.' The fact is, that the medical men who prescribe form but a very small portion of the profession, and we are sorry to say that a great number not only make up their own medicines, but sell drugs and other things indiscriminately, and carry on a trade little different from that of an ordinary chemist. Besides, the prescriptions are most wanting just in those neighbourhoods where the practice of counter-prescribing is most rife. It is not the fashionable chemist who does much prescribing business, but the chemist in the back street. The former is well supplied with prescriptions, and sells to the surrounding gentry a large amount of aërated waters, scents, and other fancy articles. The latter makes up nice cough mixtures for Mrs. Brown's only child, or liniments for her husband's sprained ankle. It stands to reason if every member of the profession were to write prescriptions, chemists could have little or no further motive for prescribing themselves, inasmuch as they would know that they must eventually make up the prescriptions of their customers. Until this is the case we cannot expect that counter-prescribing, much as it is to be deprecated, will be entirely given up, and until this is the case we are not justified in throwing all the blame upon the chemists. But the abolition of counter-prescribing would be productive of much good. As we said months ago, 'if every member of the profession tried to confine his practice to prescribing, and every chemist to dispensing only, there is reason to believe that the good intentions of the chemist will have to yield to a strong pressure from without.' This difficulty could only be got over by the general public being better educated than they are at present with respect to the respective claims of the pharmaceutical and the medical profession upon their confidence in the hour of illness."

The Pharmaceutical Journal.

SATURDAY, OCTOBER 28, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PROFESSOR HUXLEY ON EDUCATION.

ACCORDING to the dictum of the wise preacher, "To everything there is a season," and this saying represents briefly the spirit of a large part of an admirable address on educational subjects, which was delivered by Professor HUXLEY, at Baltimore, on the occasion of the opening of the John Hopkins University last month. In then expressing his views as to the amount of elementary knowledge students should possess before they enter a university, and especially its medical school, Professor HUXLEY said many things that are of interest to pharmacists, and one at least that is strictly pertinent to youths entering the chemists and druggists' business. For although in the technical education of the latter the shop should for the greater part, if not wholly, take the place of the lecture room of the University, the conditions which obtain in each are to a considerable extent similar.

Professor HUXLEY is of opinion that the time and opportunities of the University should not be wasted in conferring such elementary instruction as can be obtained elsewhere. He considers that a boy of fifteen or sixteen should already have undergone an elementary education that will enable him, among other things, to read and write his own language with ease and accuracy; to have a general acquaintance with the history of his own country and with the laws of social existence; to have acquired the rudiments of the physical and physiological sciences and a fair knowledge of elementary arithmetic and geometry. Then the work of the university,—or the pharmaceutical preceptor in shop or school,—would only be to develop, intensify and specialize the instruction in certain departments of knowledge already obtained in the elementary school. Professor HUXLEY complains that at present young men come to the medical schools,—and the same may be said of the pharmacy—without a conception of even the elements of physical science, learning there for the first time that there are such sciences as physics, chemistry and physiology. He argues that there would not be the slightest difficulty in giving sound elementary instruction in these subjects in the ordinary schools; or, in other words, that the student might come provided with as much knowledge of these several sciences as he ordinarily picks up in the first year of his attendance at the medical school.

All this applies strictly to the case of a lad who seeks to become a pupil in the art and mystery of pharmacy. It is very satisfactory to know that there has been a great advance in the recognition of the importance of this principle by pharmacists during the last few years, and that the passing of the Preliminary or an equivalent examination is now so generally made a test—to a certain extent—of a lad's fitness before he is bound. But there are many exceptions to this rule, and it is to be regretted that it is still possible to say of a city like Norwich—as is said by a correspondent on another page—that a large proportion of the apprentices have not yet passed the Preliminary examination, whilst some of them have little prospect of ever doing so. Of course, it is unsatisfactory that there should be so much difficulty in obtaining as apprentices youths who are fairly educated, but this is due to the present inferiority of middle class education in this country. It must be more unsatisfactory still for a pharmacist to waste time and trouble in doing the work of an elementary school master.

One other subject alluded to by Professor HUXLEY may be mentioned here. It may be claimed as one of the results of thirty-five years' effort by the Pharmaceutical Society, that the position of pharmacy as an art requiring special study is now much more distinctly recognized than formerly. For instance, early in the present year, on the recommendation of its board of examiners the Royal College of Physicians felt themselves justified in calling the attention of medical schools to the fact that candidates for its licence present themselves for the pass examination very imperfectly prepared, as a rule, on the subject of chemistry in its application to pharmacy, and intimated that it would be imperatively necessary in future for the candidates to present themselves as well prepared on the subject of chemistry applied to pharmacy, pathology and toxicology, as on other subjects of the examination. In the neighbourhood of Apothecaries' Hall also there have been manifested some indications of a similar spirit. But we are of opinion that so far there has been only a partial recognition of the necessities of the position. As Professor HUXLEY points out, in about four years a young man fresh from school has to acquaint himself with medicine, surgery, obstetrics, therapeutics, pathology, hygiene, as well as with the anatomy and physiology of the human body, and his knowledge should be of such a character that it can be relied upon in any emergency and always ready for practical application. Under these circumstances Professor HUXLEY would lighten the medical curriculum by cutting out of it everything which is unessential. And as his opinion as to some of the things that are unessential may assist in the more rapid maturation of the healthy state of opinion on the respective sphere of the medical man and the pharmacist we here quote a passage:—

"Undoubtedly the doctor should know the common poisonous plants of his own country when he sees them, but that knowledge may be obtained by a few hours devoted to the examination of specimens of such plants, and the desirableness of such knowledge is no justification, to my mind, for spending three months over the study of systematic botany. Again, materia medica, so far as it is a knowledge of drugs, is the business of the druggist. In all other callings the necessity of the division of labour is fully recognized, and it is absurd to require of the medical man that he should not avail himself of the special knowledge of those whose business it is to deal in the drugs which he uses. It is all very well that the physician should know that castor oil comes from a plant, and castoreum from an animal, and how they are to be prepared, but for all practical purposes of his profession that knowledge is not of one whit more value, has no more relevancy, than the knowledge of how the steel of his scalpel is made."

From the foregoing, therefore, we think it may be inferred that in Professor HUXLEY's opinion, the "season" for obtaining an elementary education is whilst at an elementary school, and that the "season" for obtaining pharmaceutical training is not whilst struggling with the multifarious subjects of a medical curriculum.

THE NORTH BRITISH BRANCH.

WE wish to call attention to the fact that amongst the official announcements will be found the details as to the classes for pharmaceutical students which commence to meet next week in connection with the North British Branch of the Pharmaceutical Society. It will be seen that this session there is a day and an evening series of classes. The former include a course of Lectures on Chemistry, by Dr. STEVENSON MACADAM, and Demonstrations on Practical Chemistry; also a course of Lectures on Materia Medica by Dr. F. W. MOINET. The Evening Classes include a class in Practical Chemistry conducted by Mr. WILLIAM J. MACADAM, a course of lectures on Materia Medica by Dr. WILLIAM CRAIG, and a course of lectures on Botany by Mr. JOHN SADLER. A special arrangement exists respecting the fees to be paid by pharmaceutical students in the above classes, the particulars of which will be found in the announcement referred to. Besides these, those students who prefer to attend the University courses can do so by entering for the classes on Materia Medica, by Sir ROBERT CHRISTISON; and on Elementary, Practical and Analytical Chemistry by Professor CRUM BROWN. For these courses the students matriculate, and in addition pay the full fee for each course.

A CRACE-CALVERT SCHOLARSHIP.

THE sum of £700 has been presented to OWENS College, Manchester, by Mrs. CRACE-CALVERT for the foundation of a Scholarship in Chemistry, of the annual value of £25, in memory of her late husband, Dr. CRACE-CALVERT, F.R.S. The scholarship will be competed for by members of the evening classes.

PRIZE IN INDUSTRIAL HYGIENE.

IT is announced that an offer has been made by Mr. BENJAMIN SHAW, and accepted by the Council of the Society of Arts, to provide a medal of the value of £20 every fifth year to be awarded "for any "discovery, invention, or newly devised method for "obviating or materially diminishing any risk to life, "limb or health, incidental to any industrial occupa- "tion, and not previously capable of being so ob- "viated or diminished by any known and practically "available means." The first award will be made in May, 1877, and persons desirous of competing should communicate with the Secretary of the Society of Arts before the 31st of March next.

AN EXTRAORDINARY CINCHONA BARK.

IN the report of Mr. VAN GORKOM to the Dutch Government upon the progress of the Dutch Cinchona Plantations in Java during the second quarter of the present year mention is made of a number of excellent seed-bearing trees of *Cinchona Calisaya Ladgeriana*. During the chemical examination of some specimens of bark from these plants one was met with that yielded 13·25 per cent. of quinine, or equal to 17·86 per cent. of quinine sulphate.

THE END OF THE CINCHONA EXPERIMENT IN ST. HELENA.

THE attempt to acclimatize the Cinchona in the island of St. Helena, which if we may judge from reports previously published in this Journal has been but a half-hearted affair from the commencement, has now been abandoned. A correspondent of the *Gardeners' Chronicle*, writing under the date of September 24, says, "The Cinchona plantation is deserted, the last labourer being taken off; more's the pity!"

THE LORD ADVOCATE ON "PATENT MEDICINES."

IN a letter addressed to Dr. J. M. CROMBIE, quoted in the *British Medical Journal*, the Lord Advocate who is now a candidate to represent the Universities of Glasgow and Aberdeen in Parliament, states that if returned he would cheerfully use his influence towards the suppression of the sale of quack medicines, professing himself to be well aware of the dangers to which the public are exposed from this cause. He would prefer a remedy by which patents should still be granted to inventors of truly useful and wholesome medicines; but he would support the total abolition of such patents if their existence could not be safely continued without affording protection to quack medicines. Apparently the Lord Advocate has to begin with the A, B, C, of the subject, and learn that the connection between most so-called "patent medicines" and patents is analogous to the *lucus à non lucendo* etymology.

A PHARMACEUTICAL BADGE.

AMONGST the business before the American Pharmaceutical Association at its recent meeting in Philadelphia was the report of a Committee to which had been entrusted the designing of a badge to be worn by the members. The design adopted consists of a "trilobed leaf, upon which is impressed a mortar and a Liebig's condenser, the latter bearing upon the cooler the inscription, 'AM. PHAR. ASS'N.'" Copies of the badge, finished in nickel-plated silver were supplied to the officers and the members of the committees at work during the meeting, and others were obtainable by ordinary members at 50 cents. each.

THE RESEARCH FUND OF THE CHEMICAL SOCIETY.

IT is stated by the *Medical Press and Circular* that the Goldsmiths' Company has voted a sum of £1000 to the Chemical Society to aid in the formation of the fund to be devoted to the promotion of original research in the science of chemistry, to which £1000 had been previously promised by Dr. LONGSTAFF.

DEATH OF M. STE.-CLAIRE DEVILLE.

WE regret to have to report the death of the eminent French chemist, M. CHARLES SAINTE-CLAIRE DEVILLE.

THE USE OF METHYLATED SPIRIT.

IN reference to the subject of the recent Memorial of the Council of the Pharmaceutical Society, the Board of Inland Revenue has issued a General Order, dated October 19, stating that "in addition to Soap and Compound Camphor Liniments as the only medicines in the composition of which methylated spirit was allowed by General Order of 24th July last, the Board now also consents to the use of such spirit in Aconite and Belladonna Liniments," and the respective officers are ordered to inform the chemists in their several stations accordingly.

THE NEXT EVENING MEETING.

AN Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, November 1, when a paper entitled "Suggestions for an Improved Method of Making Mistura Guaiaci and Similar Mixtures," will be read by Mr. GREENISH. The chair will be taken at 8·30 precisely.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

October 18th., 1876.

Present—Mr. Williams, President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Schweitzer, Southall, Taylor and Umney.

Messrs Buchanan and Kinninmont were also present as a Deputation from the Board in Edinburgh.

Dr. Greenhow attended on behalf of the Privy Council.

MAJOR EXAMINATION.

Seven Candidates were examined. *Two* failed. The following *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Helmore, William Holloway ...Stratford-on-Avon.
Kidd, William Champley ..... Malton.
Smith, George ....Sunderland.
Squire, Alfred Herbert ....London.
Turner, William Spencer.........Hingham.

MINOR EXAMINATION.

Twenty Candidates were examined. *Nine* failed. The following *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Briggs, William Henry ....Wakefield.
Cooley, Walter Bromley ....Wolverhampton.
Day, John ....London.
Jones, Thomas ....Seacombe.
Lewis, David........................Merthyr.
Lincolne, William..................Ely.
Rundle, Charles .... St. Blazey.
Short, George William...........Swindon.
Thomas, Henry James......... .Llandilo.
Weston, Matthew Frank.........Bury.
Williams, James ....St. Clears.

October 19th, 1876.

Present—Mr. Savage, Vice-President, Messrs. Allchin Barnes, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Schweitzer, Southall and Taylor.

MAJOR EXAMINATION.

Six candidates were examined. *One* failed. The following *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Bibbings, John Henry............Exeter.
Campbell, Henry ....Hammersmith.
Ferguson, William Harry ......London.
Keeling, Charles James ....Stafford.
Skinner, Kenneth Geo. Walrond Christchurch.

MINOR EXAMINATION.

Twenty candidates were examined. *Thirteen* failed. The following *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Griffith, Charles ....Weston-super Mare.
Heaton, George.....................Farnworth.
Hill, Francis ....Horncastle.
Holding, John ....London.
Littlewood, John Oscroft ....Sutton-in-Ashfield.
Nicholson, Richard ....Darlington.
Smale, Charles ....Totnes.

October 20th, 1876.

Present—Mr. Williams, president; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Schweitzer, Southall, Taylor and Umney.

MINOR EXAMINATION.

Twenty candidates were examined. *Thirteen* failed. The following *seven* passed, and were declared qualified to be registered as Chemists and Druggists :—

Beken, Alfred Edward ....Canterbury.
Blackadar, Henry William......Portsea.
Bomford, Alfred Charles.........Oxford.
Glover, William Kensit ....Aberdeen.
Parkinson, Charles ....Preston.
Richards, Philip ....Bury St. Edmunds.
Trood, Richard.....................Bath.

MODIFIED EXAMINATION.

Five candidates were examined. *Two* failed. The following *three* passed, and were declared qualified to be registered as Chemists and Druggists :—

Clark, Cornelius .. ..Calne.
Hunn, Benjamin ....Henley-on-Thames.
Sutton, William Denny ....Norwich.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's examination :—

Certificate of the University of London.

Cox, John Goodwin .. ..Bridport.

Certificates of the University of Oxford.

Bartlett, Arthur Henry ....Newport, I. of W.
Collett, William James ....Nantwich.
Palmer, Harvey .... Wingham.

Certificates of the University of Cambridge.

Barugh, Edwin.......................York.
Cox, Webster ....Liverpool.
Roberts, Henry William.........Folkestone.
Rye, Frank ....Northampton.

Certificate of the University of Durham.

Graham, Andrew Ward ....Brighton.

Certificate of the Society of Apothecaries of London.

Slipper, Joseph Octavius.........London.

Certificate of the Apothecaries' Hall of Ireland.

Shine, Alfred ....London.

Certificates of the College of Preceptors.

Bosher, Alexander ....London.
Harrison, Robert ....Stockton-on-Tees.
Rigden, George.......................Folkestone.

GENERAL MEETING—BENEVOLENT FUND.

ELECTION OF ANNUITANTS.

A General Meeting of the Members, Associates in Business, and Associates of the Pharmaceutical Society, and of the Subscribers and Donors to the Benevolent Fund was held at the house of the Society, 17, Bloomsbury Square, on Wednesday, October 25th, at twelve o'clock, for the Election of Four Annuitants.

Mr. John Williams, President, in the chair.

The notice convening the meeting was read.

Scrutineers were appointed, who examined the voting papers, and brought up the following report :—

Scrutineers' Report.

We the undersigned Scrutineers, appointed at the twelfth election of Annuitants on the Benevolent Fund of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us and report the following result :—

—	Votes Polled at Previous Elections.	Votes Polled at Election, 1876.	Total.
1. Atherton William	822	3065	3887
2. Brunton, Sophia............	....	3390	3390
3. Collins, Annie............ ..	1162	2503	3665
4. Naftel, Thomas Pradon...	817	2675	3492
5. Nichols, James	....	1048	1048
6. Trumper, Susan	257	1165	1422

4423 voting papers were received of which number 85 were informal, and were disallowed.

John Williams, *Chairman.*
Alex. Bottle.
John Robbins.
Edward Whaley.
Charles E. Turner.
J. P. Parkes.
S. C. Betty.
Thomas Greenish.
G. W. Sandford.

October 25, 1876.

The President announced that one of the candidates, Thomas Pradon Naftel, had died last week and he therefore declared the following four duly elected Annuitants:

William Atherton.
Sophia Bruton.
Annie Collins.
Susan Trumper.

Provincial Transactions.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

The Eighth Annual Meeting of the members of this Association took place at their rooms, 37, Blackfriars Street, on Thurday evening, October 12th. Mr. Mumbray in the chair. The following gentlemen were elected associates :—Messrs. J. Haddock, J. Whittaker, H. C. Major, T. W. Dean, E. Foden, C. E. Lister, J. R. Atkinson, R. Wolstenholme, F. Bradbury, J. H. Beard, Arnfield, Skinner, Blaymile, F. P. Wood, C. Challinor, Linscott, Williams, and Morris.

The Secretary (Mr. F. Baden Benger) then read the Report of the Council, and, in the absence of Mr. G. S. Woolley, the Treasurer's statement.

In the report the Council expressed its trust that from the record of the work done during the past year it would be sufficiently evident to those who look with stedfast faith to the higher scientific education of pharmacists as the surest and best safeguard of our interests, that the Association continued to merit cordial support. During the past session five papers had been read at the ordinary monthly meetings. The courses of lectures on chemistry, pharmacy and materia medica, and botany had been well attended, and the report of the lecturer, Mr. Louis Siebold, had been presented at the end of the session when the prizes were distributed. (This report, the names of the prize takers, and the questions in the examination were published in the *Pharmaceutical Journal* of June 10, 1876.) The Council reported that the Association had been again indebted to the Council of the Pharmaceutical Society for its liberality in augmenting the fees in these classes by the sum of £25. It was gratifying to observe the increasing number of entries in the school, and the hope might now be reasonably entertained that the Manchester School of Pharmacy would eventually be self-supporting. Such a condition was, in the opinion of the Council, the only satisfactory one, and its attainment would be the best evidence that the executive of the Association had been right in asking, and the Pharmaceutical Council wise, as well as generous, in promptly rendering, assistance during the establishment of the School. The following courses of lectures will be delivered by Mr. Louis Siebold during the present session:—Chemistry, including the elements of physics, thirty lectures, fully illustrated by experiments, on Friday evenings, from 7·30 to 9 o'clock, commencing on October 6th. Fee 30*s.* Materia medica and pharmacy, twenty-five lectures, on Tuesday evenings, from 7·30 to 8·45, commencing October 10th. Fee 25*s.* Analytical chemistry, twenty lectures, on Tuesday evenings, from 8·45 to 9·45, commencing October 10th. Fee 20*s.* Composition Fee, admitting the student to all three courses, £3 5*s.* Students attending these courses must be Associates of the Manchester Chemists' Association. The subscription, 2*s.* 6*d.*, may be paid with the fees. A course of lectures on botany, by Mr. Leo H. Grindon, will be commenced early after Christmas. It is intended to hold the ordinary winter meetings of members and associates in the Memorial Hall, Albert Square, and to provide tea. It is hoped that this course will ensure a larger attendance, and afford better opportunities for friendly intercourse amongst members and associates. Due notice of these will be issued by the secretary. The income of the Association derived from annual subscriptions has slightly diminished this year, and the treasurer's report shows that the balance due to him at the last annual meeting has increased. Under these circumstances the Council see no alternative but to reduce the expenditure, and they propose to effect this by giving up one of the rooms at Blackfriars Street. The Council are more willing to adopt this course, as neither the classes nor the winter meetings will in future be held in that building, and one room will afford all the accommodation required. The Council regret to state that the very small number of students who use the reading room in the evening does not warrant it in continuing to incur the expense of nightly attendance, etc. Students may obtain the keys at any time by applying to the Secretary as heretofore; the valuable reference library, specimens, etc., will always therefore be at the command of those connected with the Association. Since the formation of this Association in 1868, 568 members and associates have been connected with it—many of these being assistants. Most of the leading members of the trade in the district have subscribed regularly.

The Treasurer in Account with the Manchester Chemists and Druggists' Association.

		£	s.	d.
1875-6. March.	To Cash in hand	0	10	11
	„ „ Grant from the Pharmaceutical Society	25	0	0
	„ „ Students' Lecture Fees	62	10	0
	„ „ 101 Members' Subscriptions	50	10	0
	„ „ 51 Associates'	6	7	6
	„ „ Sale of 34 Lists by Secretary	1	14	0
	„ „ from President for Prizes	5	0	0
	„ Amount due Bank	2	2	5
	„ „ „ Treasurer	19	2	7
		£172	17	5

		£	s.	d.
1875-6.	By Balance due Bank	2	2	5
	„ „ „ Treasurer	10	12	0
	„ Cash to Mr. Siebold, in aid of Lecture Fees	25	0	0
	„ „ to Mr. Siebold, amount of Lecture Fees	62	10	0
	„ Rent	32	0	0
	„ Cash Paid Attendant	10	17	0
	„ „ Galt and Co., Books for Prizes	9	14	6
	„ „ Advertising, Stationery, and Postage	13	4	0
	„ „ Memorial Hall Meetings	1	9	6
	„ Sundries, Coal, Gas, Petty Cash, &c.	5	8	0
		£172	17	5
	By Amount due Treasurer	£19	2	7

Library Fund.

		£	s.	d.
1875-6.	To Balance in Bank	6	4	8
	„ Interest	0	1	0
		£6	5	8
	To Balance in Bank	£6	5	8

	£	s.	d.
By Balance in Bank	6	5	8
	£6	5	8

On the motion of the Chairman, seconded by Mr. J. I. Slack, the reports were adopted.

Mr. Siebold, in reply to the Chairman, said that he was very pleased with the attendance at his three courses of lectures just commenced. Already sixty entries had been made—viz., chemistry 23, materia medica and pharmacy 21, analytical chemistry 16. This was a larger number than last year, and did not include the botanical students whose course would not commence till after Christmas.

The Secretary announced that Messrs. Bostock and Waterhouse had expressed a wish to retire from the Council, as they were unable to devote the time and attention to the business of the Association which they considered to be the duty of its officers. Messrs. Fisher and Slack had consented to fill the vacancies thus caused, and Mr. Hermann Woolley had kindly allowed himself to be nominated as joint honorary secretary.

The following names were then read as proposed officers for the ensuing session, and these gentlemen were unanimously elected:—President, Mr. W. Scott Brown; Vice-Presidents, Mr. J. T. Slugg, F.R.A.S., Mr. W. Wilkinson; Treasurer, Mr. George S. Woolley; Hon. Secretaries, Mr. F. Baden Benger, F.C.S., Mr. Hermann Woolley; other members of Council, Messrs. Barnaby, Blain, Botham, Fisher, Hargraves, Hughes, Kay, Mumbray, Payne, Robinson, and Slack.

The usual vote of thanks to the retiring officers, and to the Chairman, brought the meeting to a close.

HULL CHEMISTS' ASSOCIATION.

The chemical class in connection with the above Association began the winter session on Wednesday evening last, October 18th, at the New Laboratory, Royal Chambers, Scale Lane, under the superintendance of Mr. Jas. Baynes, Junr.

Mr. C. B. Bill, the President of the Association, occupied the chair, and called upon Mr. H. T. Parson to read the inaugural address.

THE ADDRESS.

"Most of you are aware of my former connection with this Society—I mean, that of lecturer for three consecutive winter sessions, which naturally extended my sympathy with the students; and my presence in your midst again this evening shows that I am still interested in your studies, so, though my address will be brief, I wish at the outset for us to feel quite at home with each other.

"In the first place I have to congratulate the committee upon having a laboratory for your use, and I must offer you my gratulations upon the greater advantages you will consequently enjoy, which, if you make the best of, must substantially accrue to your benefit; for after all though theory is necessary and very well in itself, if not supplemented by practical example, it often falls unheeded on our ears, and a little while after the lesson passes from the mind, perhaps altogether. I rejoice to think there is such a laboratory in this town, and I think your thanks are due to Mr. Baynes for throwing it open to you. And when I say this, I intend that kind of thanks which is most acceptable to all teachers—persevering industry and an unlimited amount of diligence and attention to the lectures.

"You will meet together week by week, I suppose, for the study of chemistry, and you must try to feel interested in it, your success depending very much upon the amount of pleasure you have in your work. Chemistry is a science that is gaining ground every day, in fact making rapid strides. What is now known of the properties of matter has been discovered by men in each successive generation who have spent years in such inquiries. This knowledge has not been gained by sitting down and waiting for the turn of the tide, but by perseverance and hard toil, joined of course to a pure love for the work. In chemistry the minute particles of matter are investigated, and the manner in which atoms of one kind affect atoms of another kind of matter when they are intimately mixed—producing changes;—and it is these which are to be your chief study, and from which you will find that your greatest difficulties will come. The importance of a knowledge of chemistry is daily visible. Take for example the manufacture of iron—of all uninteresting things, nothing can be more so than a lump of iron ore (to a person unacquainted with it). But let it be subjected to the operations of the blast furnace and the metal appears. Think of the multitudinous uses to which it is applied; even the ancient wooden walls of old England have had to give place to iron; and from the mighty engine to the delicate needle how indispensable has it become. But it cannot be extracted from the iron ores, nor applied to any one object without the aid of chemical action. Seeing the importance of our subject, I have now to urge you to its pursuit. Like others who have studied before you, you will find it dry and uninteresting at first; but never mind that; persevere, and as you become more familiar with your task, it will transform itself into a pleasure and even a pastime. But there must be a great deal of careful reading and honest work if you mean to succeed, and when I talk of succeeding I don't mean merely filling your head with just sufficient facts to enable you to pass the necessary examinations—aim higher than that—at the attainment of information of every kind which will help in after life to tide you over the daily difficulties of our craft. A little learning is a dangerous thing; therefore, seek to know all you can, and make it your full determination to be thorough in everything, that you may sustain the credit of the order of pharmacists. Now let me remind you of the facilities you have in the town of Hull, such as only two or three others in the kingdom possess. The principal houses of business are closed at 7 p.m., and surely it is not too much to suggest that you devote one hour at least each evening to study; you may vary your subjects if you choose, the examiners give you that privilege by requiring a knowledge of five or six, so you cannot complain of sameness. And these lectures will help you considerably if you really wish to learn; and you must remember that they are opportunities for acquiring knowledge which, a few years ago, were not attainable anywhere in the country. I trust, therefore, you will be regular in your attendance, and at the end of the session I may hear that you have made considerable progress. Of course all cannot get prizes, but you can all try for them, and for encouragement to those of you who do not feel as if you were brilliant in any contest, just remember that in the old fable it was the tortoise that won the race though the hare could run so fast. Patient earnest plodding goes further and fares better than uneven bursts of study. I would also impress upon you that mental work cannot be replaced by anything in the world beside; all extraneous assistance can only be accessory to your own exertions.

'O! listen not to that enchantress, ease,
With seeming smile; her palatable cup
By standing grows insipid; and beware
The bottom, for there's poison in the lees....
Think we that man, with vigorous power endowed,
And room to stretch, was destined to sit still?'

"I cannot very well help saying a few words on the political prospects of the trade. Perhaps I am wrong in doing so in an address to students, if so, pardon me. Lord Hartington, some few weeks ago, expressed an opinion to the effect, that he regretted men were not trained to be politicians just as they are for any other profession; so I think his idea will bear me out in trying to impress you with the notion, that as soon as ever you begin your studies you ought to have sufficient interest in the trade you are to all appearance to follow for the rest of your life, to study its political economy as well.

"The *Pharmaceutical Journal* has informed us, that it is probable some of the chemists at Nottingham may be prosecuted by the Medical Defence Association for prescribing over the counter. I cannot but think much more good might be effected if medical men would approach us in a conciliatory manner. There certainly will have to be a radical change in this country when every trivial case that we are asked about is taken to a doctor. Surely, from the number of years that the populace have been accustomed to apply to their "druggist" for simple remedies, they will take it hard to be compelled to make a trifling headache into a formidable doctor's bill.

"Many would rather suffer. But, seriously they cannot think of asking us to cease prescribing in these minor cases without offering to meet us by ceasing to dispense. I dare say in this, as in other cases, the innocent will suffer for the guilty. I believe there are some who overstep the boundary and take upon themselves much greater responsibilities than they are justified in doing. Fair play is a jewel everywhere, and I should like to see medical men have their due. We cannot but admire those who spend their lives in trying to alleviate human suffering. We want them to continue their daily duties among the sick and afflicted, but we think it right that the public should have the liberty of asking whom they please for homely remedies. I am sure the proceedings of the Council as recently reported will be satisfactory to the members of the Society. I sometimes wish the members of the Council were more interested in country trade; also that it was customary for them to express their views on current topics before election, that we might judge how far their views corresponded with our own before giving them our countenance and support. Of course in our trade, as in every other, there are subjects upon which an endless variety of opinion is held, and there is nothing easier than to vote for a man who thinks in direct opposition to oneself, under the present system. I think it is the duty of the Society from time to time to see that our trade is protected from the attacks of outsiders. If this had been always the case I think we should not have grocers selling patent medicines at list prices, as some are doing in this town. All medicines ought to be retailed by chemists. Certainly if we are not keenly alive to our own interests we shall soon have to turn either to the profession of surgeon or to the grocery trade, for there will be nothing left of the old business. During the past year a Trade Protection Society has been established and promises to be of much service,—we wish it all possible success. In putting these things before you, I do not wish to present a gloomy view of your future prospects, but I want you to feel that the interests of the trade are already yours. The Pharmaceutical Society is and will be, whatever each member makes it, and I trust you will be useful members of it. Do not rest with being associates; rise to the full dignity of your privileges. We live in an age in which there is no room for standing still, we must either go forward or lag behind. It behoves me then to impress upon you the necessity of making the best use of time,

'That every thought and every deed
May hold within itself the seed
Of future good and future meed.'

I do hope you will not rest satisfied without learning something every day. It is very nice to have a pretty little array of works on chemistry, botany, materia medica and the like, to show your acquaintance, but they will be of little use unless their contents are fixed in the storehouse of your memory. Don't be afraid of packing too closely there—there's plenty of room yet.

"And now, gentlemen, in conclusion, I leave you to your studies. Shall these opportunities be of service to you? Shall Mr. Baynes work for and with you for results worth having? These are questions which you must answer—not in words merely but in deeds—to which both hand and brain must contribute earnestly and heartily.

'No desponding, no repining,
Leisure must by toil be bought.
Never yet was good accomplished
Without hand and thought.'"

At the conclusion, the President said that it afforded him very great pleasure to propose a most cordial vote of thanks to Mr. Parson for his address to the students, and exhorted them to be punctual in attendance and attentive to the instruction offered them. The motion was seconded by Mr. J. F. Smith, and supported by Messrs. Stoakes and Baynes, and carried unanimously.

LEEDS CHEMISTS' ASSOCIATION.

The session for 1876-77 of this Association was inaugurated on Wednesday evening, October the 18th, by a tea at the Assembly Room, Queen's Hotel, when close upon seventy of the gentlemen connected with pharmacy in Leeds spent a very agreeable evening together.

One new member and six associates were added to the ranks of the Association, and in addition to the addresses reported below, the proceedings were enlivened by a few choice songs kindly rendered by two gentlemen, the friends of a member.

In the course of a brief address, the President, Mr. E. Yewdall (who also occupied the chair), referred to the danger under which pharmacists are placed by the stringent provisions of the "Sale of Food and Drugs Act," illustrating his remarks by reference to the reports of cases which have come before the courts during the past year. Urging the claims of the Association to the support of the trade, he showed in what manner it endeavoured to promote the interests of the members and associates. He then reviewed the events of the past year more immediately affecting the chemists and druggists' business, and drew attention to the Chemists and Druggists' Trade Association, suggesting that the vexed question of prescribing by chemists might be far more easily settled at a meeting of representatives from that Association, the Medical Defence Association, and the Pharmaceutical Society. Referring to Sir William Frazer's notice of motion to amend the "Sale of Poisons Act," he remarked that absence of any knowledge whether the proposed amendment would be beneficial to the interests of chemists or place more restrictions upon the sale of poisons was a good reason why this "Trade Association" should have their support, and had the pleasure to inform them that Mr. Haydon, the secretary, had come over from Birmingham to attend that meeting, and would now lay the objects of that Association before them.

Mr. Haydon then proceeded to trace the origin, history, and objects of the Chemists and Druggists' Trade Association, an account of which has already appeared in this Journal. In the course of his remarks, Mr. Haydon said that on the 29th of last month the Association took possession of permanent offices at No. 23, Burlington Chambers, New Street, Birmingham, and that at the present time there were some 1450 members. Two of the objects of the Association, namely, the amendment of the Pharmacy Act and the exemption of all registered chemists and druggists from serving on juries could not, of course, be attempted until the Association was thoroughly organized. To accomplish them Parliament must necessarily be appealed to, and to approach the lower house until some pressure could be brought to bear on its members would be suicidal policy. Therefore, these very desirable objects must remain in abeyance *pro tem.* Meantime the best means of ultimately bringing about these desiderata would be constantly before the committee and officials, so that when the time was ripe action might be speedy and effectual. With regard to the defence of the members from vexatious and unjust prosecutions under the Adulteration and Medical Acts, and the defence of the trade from encroachments by unauthorized dealers in drugs, the Association was now able and willing to immediately carry out this portion of its programme, and any case that may reach it, for prosecution or defence, would receive the careful consideration of the solicitor and secretary. On the 6th of last month information had been received from Nottingham that a recently formed branch of the Medical Defence Association had instructed a detective to obtain the opinion of some of the local chemists respecting an imaginary cold. This functionary did so, and in several instances was successful in obtaining medicine and advice. For these misdeeds, the informant added, "summonses were imminent." The following day he (Mr. Haydon) proceeded to Nottingham and thoroughly investigated these so-called "cases." As a result, he would say, that should the summonses be served the solicitor of the Association would be in readiness. If the law did not allow chemists to give a mixture for a simple cold in the head, or a gargle for a sore throat, unless these remedies were written in the form of a prescription duly signed by a medical practitioner, then it was quite time the law should be repealed, and one more in accordance with the custom of the age and the opinion and wishes of the public take the place of such antiquated rubbish. The subject of co-operative trading had been brought before the Birmingham Conference in a very able paper by Mr. Hampson, of London, a member of the Pharmaceutical Council, and, after discussion, a resolution had been passed, urging upon the Pharmaceutical Society the necessity of testing the legality of co-operative traders selling and dispensing poisons. This resolution was duly forwarded to the Pharmaceutical Society, and the Council referred it to the Law and Parliamentary Committee for consideration. On the 6th inst., a letter had been received from the Secretary of the Pharmaceutical Society, inviting the Chemists and Druggists' Trade Association to appoint a deputation to meet the Law and Parliamentary Committee of the Council in order that the whole case may be fairly explained. The argument that the Association would be antagonistic to the elder Society had been freely used. Such was not the case; on the other hand, it would aid and assist the Society by every means in its power. Already more than half of the members of the Pharmaceutical Council were members of the Association. The county of York would be divided into 15 districts; Leeds would be the head quarters and place of election for one of these districts, which would return two members to the General Committee.

A long and animated discussion, taken part in by Messrs. F. Reynolds, Milestone, Iredale, Stead, Ward, and Clapham, followed the delivery of Mr. Haydon's address, and ultimately the following resolution, proposed by Mr. Ward, and seconded by Mr. Clapham, was passed *nem. con.*:—"That this meeting learns with satisfaction that such a trade association of chemists and druggists as that described by Mr. Haydon is formed for defending the rights of the trade, and pledges itself to support the Association to the utmost of its ability."

Mr. Brown, one of the delegates from the Leeds Chemists' Association to the meeting of the British Pharmaceutical Conference, recently held at Glasgow, next gave a short *résumé* of that meeting and its accessories. After pointing out the objects of the Conference, and the advantages of its holding its meeting yearly in the same town, and at a time contiguous to that of the British Association, he said he thought the value of the report as embodied in the 'Year Book of Pharmacy,' ought of itself to be sufficient to induce all who took an interest in pharmacy to become members. It was the first time he had attended one of its meetings, but with the many pleasant memories of his visit—the pleasure of meeting so many gentlemen of similar tastes and engaged in similar pursuits, over the breakfast table each morning; the courtesy, hospitality, and evident pleasure exhibited by the Scottish chemists in entertaining their Southern friends; the excursion down the Clyde, and other social enjoyment, combined with the intellectual entertainment of the Conference itself, still crowding upon his mind, he indulged the hope of attending many others in the future. Referring to the papers read, he thought they had been so well reported and so ably criticized elsewhere, that anything he could say about them would be superfluous. The President's address had been condemned as being too cautious, but he thought that great allowances should be made to a man holding the public position which the Professor did in handling subjects of such delicacy. He had been struck with the ability and critical acumen displayed by some of the younger members of the Conference, and believed there would be no lack of talent in the "coming men" of pharmacy. The method adopted of reading the papers seriatim had a rather narcotic effect; he would prefer their being discussed as read, when probably the discussion might be more largely entered into.

Votes of thanks to the Chairman (proposed by Mr. Richard Reynolds) and to the gentlemen who contributed the music were carried by acclamation.

Parliamentary and Law Proceedings.

Infringement of the Pharmacy Act.

The Pharmaceutical Society of Great Britain v. *Statham.*

In the Bloomsbury County Court, before George Lake Russell, Esq., the Judge, on Friday, October 20th, Henry G. Statham, of 15, Broadley Terrace, Blandford Square, was sued by the Council of the Pharmaceutical Society of Great Britain for a penalty of £5, incurred by the defendant "in selling or keeping an open shop for the retailing, dispensing, or compounding poisons or a poison contrary to the provisions of the Pharmacy Act, 1868 (31 & 32 Vic. cap. 121)."

Mr. Flux appeared for the plaintiffs, and the defendant appeared in person.

Mr. Flux, in opening the case, said that the defendant was sued under the 15th clause of the Act of Parliament for illegally trading as a chemist and druggist. He had a witness present who could prove the sale by the defendant of the poison; he had also Professor Redwood present who would prove that the mixture so sold contained prussic acid; but he believed that the defendant was prepared to admit that he sold the poison, and if so his Honour's time could be saved.

The Judge (to the defendant): Do you admit having sold this poison?

Defendant: Yes. I dispensed the prescription for my employer.

Mr. Flux: But do you admit that you were the person who sold the poison.

Defendant: Yes, for my employer.

Mr. Flux: I understand, your Honour, that the defendant will contend that the business had passed out of his hands at the time of the sale complained of; as to that I can offer evidence to show that defendant is the owner of the business.

The Judge: You will have to prove it.

Mr. Ward was then called and examined by Mr. Flux: On the 10th July last he went to the defendant's shop, 15, Broadley Terrace, Blandford Square, and saw the defendant who dispensed a prescription for him, one of the ingredients of which was prussic acid. The defendant appeared to have control of the shop. There was no other person but an old man present, whom he (witness) concluded to be acting under defendant's orders, as he entered the prescription in a book under defendant's direction. He (witness) held conversation with the defendant, and was informed by him to the purport that he had bought the business because he saw that it was going cheap, and thought it was a chance for making a good profit. He was not a qualified chemist and druggist but had intended to qualify. He (witness) had seen the landlord of the premises, who informed him that the defendant was the tenant of the house, and showed him a counterpart of a lease by him to the defendant executed by the defendant, it was dated in June last, and subsequently he had served a notice upon defendant requiring him to produce the lease in court.

Mr. Flux called on the defendant to produce to the court "a certain indenture of lease of the premises No. 15, Broadley Terrace, Blandford Square, in the County of Middlesex, granted by Thomas Claxston, Esq., to the defendant."

Defendant: I never had it in my possession. Mr. Bull would not take the business unless he got the lease, and the lease was brought to me and I signed my name to it, and that's all I know about it.

Mr. Flux: You admit that you did execute a counterpart of the lease.

Defendant: Yes.

The Judge: There is a *primâ facie* case, Mr. Flux. (To defendant) Do you wish to ask the witness any questions?

Defendant: No, only whether I did not warn him of the dangerous character of the medicine.

The Judge: That does not matter. You sold the poison, and this Act which was passed for the protection of the public very properly provides a penalty in such cases. I will hear what you have to say in defence.

Defendant: Well, I sold this business to Dr. Carter in January last and he has since sold it to Mr. Bull. Dr. Carter is a duly qualified medical practitioner, and I dispensed this prescription as Dr. Carter's assistant. I am still managing the business, and am paid a salary and have apartments on the premises.

The Judge: Can you prove this?

Defendant: I have proved it. I have stated the facts on my oath.

The Judge: You must prove the transfer; what you have stated is not sufficient. I have no doubt that you are the owner of the business and that you have offended against the law. This Act must be construed with great strictness, because its provisions are for the benefit of all of us, and we should never be safe from poisoning if any one was allowed to deal in poisons. Judgment for the plaintiffs with costs.

Mr. Flux then drew the attention of the learned judge to the provisions of the Acts of Parliament regulating the disposal of the penalties, and providing that the party which should prevail should recover the full costs of suit or other proceedings, and asked an expression of his Honour's opinion as to whether or not the words "full costs" meant anything more than the ordinary party and party costs according to the county court scale. He added that the plaintiffs had to stand in peril of costs, and in cases such as the one before the court, where a defendant occasioned great trouble regarding services and other matters, the party and party costs were far from indemnity.

The Judge said: I consider that, having regard to the provisions of the statute, I may make an order for solicitor and client costs, to be taxed by the officer of the court, and I do so accordingly.

BOOKS, PAMPHLETS, ETC., RECEIVED.

EPITOME OF SKIN DISEASES, WITH FORMULÆ FOR STUDENTS AND PRACTITIONERS. By TILBURY FOX, M.D., F.R.C.P., etc., and F. C. FOX, B.A., M.R.C.S. London: H. RENSHAW, 1876. From the Publisher.

ETUDE COMPARATIVE DU GALBANUM ET DE LA GOMME AMMONIAQUE, suivie de quelques Considérations sur l'Opoponax et le Sagapenum. Par E. HIRSCHSOHN. Traduit de l'Allemand par le docteur JUL. MOREL. Ghent: E. Todt, 1876. From the Translator.

Notes and Queries.

[526]. SULPHUR HAIR RESTORER.—I would feel obliged if any correspondent would kindly furnish me with a recipe for the above preparation.—PEN GWYN.

[527]. SURFEIT WATER.—"Ignoramus" asks for a recipe for Surfeit Water.

ARTIFICIAL IVORY.—Two parts of caoutchouc are dissolved in thirty-six parts of chloroform, and the solution is saturated with pure gaseous ammonia. The chloroform is then distilled off at a temperature of 85° C. The residue is mixed with phosphate of lime or carbonate of zinc, pressed into moulds and dried. When phosphate of lime is used the product possesses to a considerable degree the nature and composition of ivory.—T. G., in *L'Union Pharmaceutique.*

CHLORAL PLASTER.—Dr. Solari, of Marseilles, recommends this plaster as an excellent application in cases of neuralgia and certain nervous pains arising from exposure to cold. The plaster is easily prepared by powdering the chloral over a common pitch plaster—one to two scruples of chloral for every four square inches of the plaster. Care is taken not to incorporate the chloral with the pitch. It is applied for twenty-four to forty-eight hours; when removed, the skin is found covered by a number of small vesicles; these are opened and the part then covered with a cerate dressing. Generally speaking, it will be found that the pain has disappeared before the vesicles heal. Dr. Solari states that numerous cases of lumbago, intercostal, and other forms of neuralgia, etc., have been rapidly cured by this simple method.—*Medical Examiner*, from the *Paris Med.*

SPONTANEOUS DEVELOPMENT OF HEAT IN RECENTLY POWDERED MYRRH.—Mr. E. N. Butt, of Curzon Street, writes—"One evening, a short time ago, I had a quantity of large picked gum myrrh powdered and sifted through a moderately fine sieve, for the purpose of preparing some tincture. Circumstances prevented my using it when powdered, and it was left till the following morning on the paper on which it was sifted, when it was found to have formed a hard and solid lump, requiring several sharp blows to break it in pieces. It was again powdered, which was easily accomplished, and placed in a paper bag. Some twenty minutes afterwards, on proceeding to use it, I was surprised to find the bag warm, and also to find the heat rapidly increasing, so much so that I placed a thermometer in it, when the mercury quickly rose from 62° F. to 108° F., at which it remained stationary. On turning out the myrrh into the vessel in which I was going to make the tincture I found it had assumed a pasty condition, and on using my hand to remove it the heat in the lower portion of the bag was so great that I could scarcely bear it, and doubtless had I plunged the thermometer deeper into the mass should have found the temperature much higher than that above mentioned. I should be glad to know if any one else has observed the same occurrence, or can assign any reason for the rapid development of heat, other than the rapid oxidation of the oleoresin when freshly exposed to the air."

INDELIBLE INK FOR PRINTING COTTON AND LINEN FABRICS INTENDED FOR CHLORINE BLEACHING.—One part of coal-tar is to be mixed with one part of benzene and one-tenth part of lamp-black. The mixture can be made thinner or thicker by using more or less benzol.—*Chem. Centr.*, 1875, 576.

XANTHIUM SPINOSUM.—A single specimen of this plant was found near to, and within the walls of Chester last year, but this year it has not been seen in the same place. The field had had a coating of manure, ashes, etc., and it is probable that the plant was brought to the spot with the rubbish. —F.S.

Obituary.

Notice has been received of the death of the following:—

On October 14th, 1876, at his residence, Garden Cottage, Chelmsford, Thomas Fardon, Chemist and Druggist, late of Maidstone, aged 65 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

"THE ABSENT FACTOR."

Sir,—Mr. W. T. Martin, of Lewes, complains in your last number that there are seven or eight medical men in his town who dispense their own medicines, and that he does not see half a dozen prescriptions, save from strangers, in the course of a year. The passage in Professor Redwood's address at Glasgow affecting such a case tells plainly on Mr. Martin's, and I wish Mr. M. were so busy dispensing that he had no time for complaint. But what claim have we on the medical profession for prescriptions? We have come into existence comparatively recently, and long after the appointment of a legally qualified staff of dispensers, the apothecaries, a staff in which most medical men are enrolled. I certainly think that there are reasons why we can and do dispense medicines rather better than most professional men. Yet there are surgeries better conducted than many so-called dispensing establishments. If a man chooses to fit himself for dispensing, and open shop convenient to the patients of medical men, this can be no reason why people should in many instances incur additional expense by procuring their medicines from the chemist. If the doctor finds that the shallow pockets of the majority of his patients are equal only to his fees and a slight additional charge for medicine, it is not to be expected that he will sacrifice the former, either to save some extra care and cost in dispensing or in the exercise of charity to his neighbour, the chemist. The fact, in many instances, is, that he cannot do so. The next step would be advice and prescriptions gratis; and there is difficulty in medical men drawing a line between those who can afford to pay the chemist and those who cannot, to say nothing of the consideration of medical men parting with prescriptions and so parting with a repetition of opportunities for consultations that they are impressed may be as much to their patients' good as to their own. We must not shut our eyes to these things in our thirst for an influx of dispensing business. We have been steadily fitting ourselves to hold with credit the "fourth estate" in medicine, and the possession of that estate will no doubt grow and be assured as time progresses, not by constraint, but by the good will, confidence, and convenience alike of medical men and the public.

After thirty years of dispensing, both in the surgery and for the most part at the retail counter, I am of opinion that pressure on the medical profession, beyond what our ability and method in business offer, must tend only to subvert our aim and to induce an increase of those legal restraints that many chemists find to be already irksome.

Leeds. EDWARD BROWN.

RELUCTANCE TO LEARN.

Sir,—It is with regret, yet not surprise, that I read particulars of the collapse of the Norwich Chemists' Association; and I have no doubt the perusal of Mr. Corder's letter will awaken some sympathy for the members of the committee in their disappointment, after their strenuous efforts to keep alive an association which appeared to be in a thriving condition for some time back. It is strange, yet true, that an immense number of aspirants to this so-called profession show considerable aversion to any studious training, and still more is it notorious that there is much disinclination for social intercourse with their fellows. I know several towns where there is great antipathy between the pharmaciens established there, and a sort of inherited dislike amongst the assistants for any association, whether private or in connection with the business. The amount of jealousy and party feeling exhibited by both masters and their employees throughout the country is almost incredible, and I believe exists more in our association than in any other. Now, why should this be? We have lately had many advocates for a state of harmony between doctors and druggists, but "charity begins at home," and if a more fraternal spirit was displayed by the latter individually, and more good feeling by their assistants, such a condition of things would be the best stepping-stone for the attainment of such a desirable end. The capital of Norfolk, however, is not singular in its educational failures, for in Edinburgh and elsewhere, many fruitless attempts have been made to organize classes, debates, meetings and the like. Similarly, in this large town, notwithstanding many facilities for acquiring knowledge, various obstacles are thrown in the way of taking advantage of them, and all may be traced to indifference. For instance, in no fewer than seven institutions science classes have been advertised, lectures appointed, etc., yet it is with the utmost difficulty that any students can be got to enrol their names in many of the subjects (which are nearly related to pharmacy), and that in a town with about seventy chemists' shops, and nearly twice the population of Norwich. I entered my name for several, but owing to lack of numbers, no class could be carried on. I tried several schools successively, but with equally unsatisfactory results; in some cases I was the only applicant. I particularly desired to attend a course of instruction in human physiology and laws of health, and after a good deal of trouble we managed to get eight persons to join said class at one of these places, but nine students were required to ensure delivery of the lectures and continuation of the class throughout the session, in order to make it remunerative to the teacher, yet we have failed to obtain any one to complete the requisite number. No amount of persuasion will induce strangers to come, consequently the whole affair falls to the ground, and we are doomed to disappointment. It is rather discouraging to those who are willing to increase their knowledge. Few embryo pharmacists care to study any branch of education not required in the "Minor;" attention to extraneous subjects they think a waste of time. This is a fatal mistake, however, for, apart from the fact that the study of this interesting subject is calculated to improve the mind, enlarge the conceptions, and develop the power of observation, a knowledge of physiology is of great benefit to druggists, who ought to know something about the structure of the animal frame and the various uses of the several functions.

It is, therefore, a source of regret that, in this enlightened age, inclination for mental advancement, and even desire for erudition, should be at such a low ebb.

Newcastle-on-Tyne, JAMES B. L. MACKAY.
October 24, 1876.

NORWICH CHEMISTS' ASSOCIATION.

Sir,—I think one sentence in Mr. Corder's letter on this subject, in your last week's issue, requires some notice, as it conveys what I consider to be a false impression.

Mr. Corder remarks that the decay of the Norwich Chemists' Association is cotemporaneous with the opening of a fashionable skating rink. This is quite true, but the remark implies that the two facts have some connection, and this I think is not strictly true.

The two circumstances are cotemporaneous, but they have no other connection.

As a student who has been connected with the Association nearly five years out of the six of its existence, I attribute its decay to the new regulations concerning the age of Minor candidates.

All or nearly all the apprentices who were in the trade before the new regulations came into force have since left Norwich, or passed their examination; but it is worthy of note that a session or two just after that time was the most prosperous, as regards the number of students, of any that the Association has experienced since the charm of novelty wore off.

The younger apprentices, on whom the Association depends for its chief support, have but few of them passed the Preliminary examination, and those that have passed think, I need not say how wrongly, that the four or five years which must elapse before they are admitted to the Minor are much more than they need to prepare for it. The general cry is, "There's plenty of time, what's the use of sweating (!) yet."

I think that these considerations prove, at least presumptively, that the new regulations have produced an effect the reverse of what was expected by Norwich pharmacists: they have discouraged study among the younger apprentices, and to them, I think, the decay of the Association must be attributed.

It is perhaps hardly necessary to add that I do not lay the blame on the regulations but on the shortsightedness of the students, and perhaps I may be allowed to state that it is still the custom of Norwich chemists to take as apprentices lads who have not only not passed the Preliminary, but who in some cases have little chance of doing so.

WALTER G. PIPER.

M. P. S.—Several formulæ for Bow's Liniment have been published during the present year. See vol. vi., pp. 678, 638, 658.

X.—The Science Primer on Chemistry, published by Macmillan.

"Devonia."—A paper bearing upon the subject of your question will be read at the next Evening meeting, and published in the *Pharmaceutical Journal* next week.

"Spes" and T. McKay.—It is illegal for any person whose name is not on the Register of Chemists and Druggists to sell or to keep an open shop for the retailing, compounding, or dispensing of poisons under the Pharmacy Act, 1868.

C. H. Snell.—A satisfactory mixture may be prepared by mixing the one drachm of nitrite of amyl with two drachms of rectified spirit, then adding gradually with constant trituration in a mortar, four drachms of mucilage, and finally the water. Five minims being probably a large dose of nitrite of amyl it would be more safe to attach a "shake the bottle" label.

Pharmacist G.—We think you should follow the intention of the prescriber and add the acid to the chlorate.

"Theta."—(1) *Bryonia dioica*; (2) Probably the leaf of some species of *Ranunculus*; (3) *Galium cruciatum*; (4) *Artemisia vulgare*: (5) Impossible to say from such a scrap; (6) Leaf of *Solanum Dulcamara*.

"Country Student."—(1) The fruit of *Cuminum Cyminum*; (2) A mixture of the fruits of *Carum Carvi, Cuminum Cyminum*, and *Fœniculum dulce*: (3) The fruit of *Conium maculatum*; (4) *Alchemilla arvensis*.

COMMUNICATIONS, LETTERS, ETC., have been received from Mr. Gostling, Mr. Benger, Mr. Brooks, Mr. Clift, Mr. Bore, Mr. J. B. L. Mackay, Mr. Wilkes, "Captene," C. B., T. S.

SUGGESTIONS FOR AN IMPROVED METHOD OF MAKING MISTURA GUAIACI AND OTHER SIMILAR MIXTURES.

BY THOMAS GREENISH, F.C.S.

A few days ago I was asked the best mode of preparing the following mixture :—

℞	Resinæ Copaibæ	ʒiss.
	Spirit. Vini Rect.	ʒii.
	Mucilaginis	ʒj
	Aquæ ad	℥vj. Misce.

When I undertook to mix it I scarcely appreciated the difficulties I afterwards met with. To rub the resin up with the spirit and then add the mucilage first suggested itself, but that method did not prove satisfactory. After several experiments, I found that by rubbing the resin of copaiba with sugar of milk, then adding the spirit, and continuing the trituration, a homogeneous mixture was made. Powdered gum arabic was next added and the trituration continued, then gradually the water. This method succeeded perfectly, the resin of copaiba remained suspended, and an elegant mixture was the result. The formula would necessarily be slightly altered and stand thus :—

℞	Resinæ Copaibæ	ʒiss.
	Sacch. Lactis	ʒiij.
	Spirit. Vini Rect	ʒiij.
	Pulv. Acaciæ	ʒv.
	Aquæ ad	℥vj. Misce

The only addition to the prescription would be 3 drachms of sugar of milk, and 1 drachm of rectified spirit.

Where resinous substances are prescribed so as to be given in a mixture, this mode of manipulation will prove very expeditious and satisfactory. It occupies scarcely more time to make the mixture than to read this paper.

It occurred to me that probably the same method of manipulation would improve a mixture, considered a valuable, but which is not an elegant preparation, I mean Mistura Guaiaci. I followed the same course of procedure as in the copaiba mixture, and to my mind succeeded in improving this preparation. The resin of guaiacum is dissolved and retained in the form of an emulsion. Following the directions in the original formula, there is always more or less of deposit which requires to be shaken up before the pouring out of each dose.

In making up a prescription much is left to the dispenser with regard to the details of mixing, so as to carry out faithfully the intentions of the prescriber, but in an officinal formula, like that of mistura guaiaci, I can only suggest this, as I think, a better method of making the Pharmacopœia preparation, and we have been invited in this room to make suggestions for the improvement of officinal formulæ. In both these cases the solution seems to be perfect and the deposit scarcely appreciable, or of such a character as not to require the bottle to be shaken before each dose.

The formula for Mist. Guaiaci would then stand thus:—

Take of

Guaiacum Resin in powder	½ ounce.
Sugar of Milk	½ ounce.
Gum Acacia in powder	½ ounce.
Rectified Spirit	5 fluid drachms.
Cinnamon Water	to one pint.

Further experiments would be desirable to determine the best proportions of powdered gum and spirit, my present object being mainly to direct attention to that method of mixing which I have just suggested.

That the session should be opened by a paper from the dispensing counter will, I hope, be taken as an indication that subjects of a practical character will, equally with those of more scientific interest, meet with acceptance. If the habit of observation were cultivated, and the laboratory-book had its counterpart in the note-book of the dispensing counter, our evening meetings would never want a subject of general interest, in the discussion of which the younger members could take their share.

[*The Discussion on this paper is printed at p.* 381].

COMPARATIVE EXAMINATION OF THE MORE IMPORTANT COMMERCIAL VARIETIES OF GALBANUM AND AMMONIACUM GUMS.*

I. GALBANUM.

BY EDWARD HIRSCHSOHN.

1. *Historical.*—As is the case with most of the older drugs we are by no means exactly acquainted with the history of galbanum, for very diverse and sometimes directly contradictory views have been set forth by different investigators. Thus Martiny says† that galbanum is a very ancient drug which is frequently mentioned in the writings of Hippocrates; it is thought even that it was known to Moses (Ex. xxx. 34). It is the χαλβάνη of Theophrastus (ix. 7) and of Dioscorides (lib. iii. c. 97); the latter states that it came from Syria, where it was obtained from an indigenous *Ferula*, and that it was sometimes adulterated with ammoniacum. According to Dioscorides the plant was also called μετώπιον, a name that was given besides to an ointment containing galbanum. It is further mentioned by Pliny (xii. 25, 26; xxiv. 5), who speaks of its adulteration with sagapenum, and by Lucan, Celsus, Cælius Aurelianus, and others. Flückiger‡ thinks that the "chalbane" of the ancients cannot be satisfactorily identified with galbanum.

Botanical Origin.—Our knowledge respecting the mother-plant of galbanum is still very imperfect, for from the short and little characteristic descriptions, and the various appellations used by the botanists of the middle ages—C. Bauhinus, Lobelius, Parkinson, Tabernæmontanus, etc.—it is difficult, according to Borszczow,§ to understand exactly what their *plantæ galbaniferæ* actually were. Paul Hermann|| figures an umbellifer indigenous at the Cape of Good Hope, the milky juice of which was very similar to galbanum; this plant Linnæus named *Bubon Galbanum* and considered to be the true mother plant of the gum resin. But according to Don the juice of this

* From a memoir to which the gold "Suworow" medal has been awarded by the Medical Faculty of the University of Dorpat. (*Pharmaceutische Zeitschrift für Russland*, April 15, 1875, p. 225.)

† 'Encyklopedie der Naturalien und Waarenkunde,' 1854, vol. ii. p. 81.

‡ 'Lehrbuch der Pharmacognosie,' Berlin, 1867, p. 28.

§ "Die pharmaceutisch-wichtigen Ferulaceen der Aralecaspischen Wüste' (Mém. de l'Acad. Imp. des Sciences de St. Petersbourg, 1860, p. 34).

|| 'Paradisus Batavus,' p. 163.

plant possesses neither the smell nor the taste of galbanum, hence he did not adopt it as the true mother plant, but on the contrary, the *Galbanum officinale* described by him in 1829 from seeds found in galbanum.*

Lindley† would not adopt this derivation; he considered that it could not be proved that the fruit found by Don actually originated with the galbanum yielding plant, and thought it had been accidentally introduced. In 1838 MacNeill remitted to Lindley specimens of a plant which he had collected at Durrod, in the province of Chorassan, Persia, and had indicated as a second kind of ammoniacum. On the branches of this plant, which Lindley named *Opoidia galbanifera*,‡ hung pieces of a pale yellow gum resin, which Lindley considered to be galbanum, but which Pereira,§ to whom he sent some of the gum resin, declared to be not true galbanum, but a gum resin standing between asafœtida, ammoniacum and galbanum.

At present it is generally accepted that the mother plant of galbanum is the same as that collected by Aucher-Eloy and Kotschy, and described in 1844 by Boissier‖ as *Ferula erubescens*, and afterwards by Borszczow as two scarcely differing species, *Ferula gummosa* and *F. rubricaulis*.¶ This plant was again met with by Dr. Buhse** in 1850 and by Drs. Bunge and Bienert during the expedition to Chorassan. The specimens collected by Buhse and Bunge agreed, according to Borszczow,†† very well with *Ferula erubescens*, Boiss.; the depressions on the under surfaces having one very wide vitta, filled with yellowish oil and not 2—3 narrow irregular ones, as stated by Boissier; the commissure has no vittæ and is channelled. According to Dr. Buhse‡‡ the stem of the plant at its base is more than an inch thick, full of pith and round. The radical leaves are 1½ to 2 feet long and 6 inches wide; the upper cauline leaves are much smaller. All the leaves are quadripinnate and the pinnæ are egg-shaped, very small, and 5- to 7-lobed. The flowers are yellow, hermaphrodite, or, in the lateral umbels, male through abortion; they occur in compound umbels, the incised bracts of which fall off early or are entirely wanting.

The plant, according to Borszczow, is distributed here and there throughout the entire northern province of Persia; in southern Persia it was found by Kotschy in the Kuh-Baena mountains. Buhse says it occurs throughout the entire province of Elbrus-Kette from the south-east to the south-west corners of the Caspian Sea, and indeed that it is found only in this and the Demarend regions; in the latter, however, very abundantly, and reaching an elevation of 4000 to 8000 feet in the mountains. It also grows in quantity on the precipices of Alvend, near Hamadan; and according to Borszczow it is found on the margin of the great central Persian salt-waste. Professor v. Bunge has observed the plant in the mountains near Scabsivar, between Gurgen and Chaf, westward of Herat, and in the upper desert, westward of Chaf.

The entire distribution, so far as at present known, of this galbanum plant, which according to Borszczow appears to be exclusively indigenous to Persian soil, lies between 36° and 32° north latitude, and 66° and 79° longitude.

Dr. Buhse states that in some Persian provinces this plant is called "khassuch" by the inhabitants. Borszczow found another umbellifer smelling strongly of galbanum, almost a metre high, in a salt loamy waste which lies north of Fort Peroffsky (Ak-Betschet) to Syr-Darja, and runs along near the rivers Ssary-Sau and Tschu; it also occurred in larger quantities some three miles further east, in a sunny, arid, and nearly barren tract. The inhabitants called this plant "schair," which in the Kirgish dialect indicates resin also. Borszczow did not observe any spontaneous exudation of gum-resin, but an incision yielded a viscous, aromatic, bitter, milky juice, smelling strongly of galbanum. Borszczow described this plant as *Ferula Schair*.*

3. *Collection.*—Concerning the collection also of galbanum, our knowledge is still very imperfect. According to Dr. Buhse,† the galbanum exudes spontaneously from the lower parts of the stalk and at the base of the leaves. Geoffrey affirmed,‡ without giving his authority, that an incision is made in the stalk about three fingers' breadth above the root, from whence the galbanum issues in drops, which become dry and sufficiently hard for collection in a few hours. According to Landerer it is obtained by making an incision in the plant, under which a mussel shell is placed. At any rate the product appears to differ very much with the locality, the plant, or the time of the year. It will be seen from the author's notes that most kinds of galbanum contain fragments of roots, for which reason he is almost induced to affirm that most of the galbanum appearing in commerce is obtained by an incision of the root and collection of the exuded juice, which would explain the frequent occurrence of fragments of roots in the commercial gum resin.

4. *Commercial Varieties.*—According to Martiny the Levant and Persian galbanums are distinct.

a. Levant Galbanum.

(i) Galbanum in granis seu in lacrymis s. amygdaloidis.— Granular or almond shaped resin.— Fragments varying in size from that of a pea to that of a nut, irregular or roundish, not or only slightly adhering, transparent, dull or shining, whitish, partly with a greenish or brownish yellow to a reddish lustre. These have a waxy or harder consistence, and at the fracture appear to have a smooth or uneven shiny wax-like yellow or white surface, sometimes showing white or yellow specks. Martiny says that this gum is also met with in light spongy, almost frothy, non-transparent fragments. The grains soften more or less readily between the fingers, becoming pliable and sticky; but with time they become increasingly hard and friable, so that they may easily be pulverized. The smell is more or less balsamic and unpleasant; the taste is acrid, resinous and bitter. Sp. gr. 1·213.

Triturated with water galbanum forms an emul-

* Linn. Transact.' (1829), vol. xvi., p. 603.
† 'Flora Medica,' p. 51.
‡ 'Botanical Register' (1839), vol. xxv.
§ 'Elements of Materia Medica,' vol. ii. p. 1470.
‖ 'Annales des Sciences Nat.' (1844), p. 316.
¶ 'Diagnos. Plant. Orient. Nov.', ser. ii., fasc. 2 (1856).
** Loc. cit., p. 35.
†† Bull. Soc. Imp. Nat. Mosc. (1850), vol. xxiii., p. 551.
‡‡ Ibid. p. 549.

* Loc. cit. p. 37.
† Loc. cit. p. 551.
‡ 'Traité de Mat. Med.,' vol. ii., p. 623.

sion, in which Berg* says are to be observed under the microscope numerous very small resinous globules, in molecular motion, and filled with a volatile oil.

(ii) Galbanum in massis s. in placentis s. in panibus.—Mother resin, in masses, cakes, or bread.—Irregular, greenish, yellowish, light or dark brown masses, which consist of or contain agglutinated tears. It encloses fragments of stem, leaf stalks and even fruit.† In consistence this kind differs much from the former, being ordinarily softer; it is either opaque or transparent, with a dull waxlike to a dark resinous lustre. The smell is usually stronger than that of the seed galbanum.

Guibourt distinguishes two sorts of galbanum, soft and dry—"*galbanum mou et sec*"—both of which are said to occur in tears and masses.‡ His "*galbanum mou*" appears not to differ from the ordinary fresh Levant variety. Its principal character is its soft and adhesive quality. In this sort Guibourt never found any fruit. Concerning his "*galbanum sec*" he says: "Like the former it is found in masses and in tears, but it is much drier, and its tears which are neither sticky nor glossy do not unite in a mass. Externally the tears are yellow, internally whitish and often opaque, and they are discriminated from those of ammoniacum by their slight consistence and their uneven fracture. The "*galbanum sec*" contains stray fragments of stalk and the fruit of an umbelliferous plant.

b. Persian Galbanum.—Galbanum Persicum.

This kind was spoken of by Spielmann§ and Murray|| as a fluid galbanum coming from Persia, of the consistence of turpentine and varying in its odour. Nemnich¶ mentions the Persian galbanum, also East Indian, and observes that it scarcely ever appears in commerce in cakes, but contained in casks and chests, as well as hollowed portions of trees. It is inferior to the Levant galbanum, always soft, and mostly contaminated with portions of stalks.

Martiny** examined two kinds of Persian galbanum, which he described nearly as follows:—One sort consists of fragments partly run together, partly squeezed together, having a semi-transparent or opaque yellowish white or brownish appearance. Internally this galbanum appears as a soft, turpentiny, shining, very oily mass, of a yellow brown colour. It smells very strongly and disagreeably of turpentine and galbanum, and its burning acrid turpentiny taste recalls that of castoreum. The second sort, which he had obtained through a Leipzig commercial house was, according to him, a light brown, almost transparent, shining mass, contaminated only with soft yellowish fragments of stalk of very loose structure, and having a consistence which resembled closely that of turpentine. It smelt like galbanum, not offensively but agreeably, and even with somewhat of fennel-like odour. The taste was balsamic and warm. Ludewig†† described the Persian galbanum as a mass much contaminated with stalk fragments, running together at ordinary temperatures, brownish-red in colour, with white veins, never passing into green. The smell he speaks of as quite different from that of the Levant, being more disagreeably penetrating, and often resembling that of asafœtida, the taste as disagreeably acrid and bitter. Goebel gives a similar description.

Respecting the commercial route of galbanum, Wiggers is of opinion that the Levant sort is imported from Central Africa through Trieste and Marseilles, whilst that officinal in the British Pharmacopœia may be imported into London from Bombay. The Persian galbanum comes, according to Ludewig, from Astrachan and Orenburg; but, according to Goebel,* it comes chiefly from Astrachan through Nischni-Nowgorod. Goebel† saw in Astrachan large quantities packed in skins, besides being sewn up in mats, each pack weighing from 50 to 80 pounds. According to him it is only sold in large quantities, the dealer, however, occasionally opening a pack to judge of the quality of the article. The seller in Astrachan, who is simply a commission agent, knows as little as the buyer about the quality of the unopened parcel. Only when the transaction is complete is the package opened and the galbanum weighed. The price was at that time (1838) very low, 7 to 8 silver copecks per pound.

(*To be continued.*

THE QUININE-FLOWER.‡

BY J. DABNEY PALMER, M.D.

The quinine-flower is an annual from twelve to eighteen inches high, has an erect green stem, linear leaves of about one-half to one inch in length, and small white flowers. The root consists of numerous slender fibres.

It is a native of Florida, and is found most abundantly in flat pine woods, in a moderately dry soil, making its appearance in March or April, and flowering from July to September. The specimens furnished me were gathered three or four miles south of Monticello, in Jefferson county. In the lower portions of the county it is very abundant, and is successfully employed by those living in its vicinity for the cure of different types of malarious fever, the whole plant being used, either in the form of decoction or extract, and given *ad libitum*, or until the patient feels the effects of quinine in his head. It is a curious fact that persons brought under the influence of this remedy experience similar sensations—such as tension or fulness in the head, ringing in the ears or partial deafness—as when under the influence of quinia, and hence its name. Its reputation as an antiperiodic was established during the late civil war, when, owing to the scarcity of quinine, every opportunity was offered for testing the relative value of various substitutes.

The quinine-flower is intensely and permanently bitter, yielding its properties to water and alcohol. A saturated tincture in doses of one teaspoonful every two hours was found sufficient to break the paroxysm of intermittent fever. Larger quantities, however, may be given in obstinate cases, or in the remittent form of the disease.

To the foregoing the following remarks are added by the Editor of the *American Journal of Pharmacy*:—

* 'Pharm. Waarenkunde,' 4th edition, p. 546.

† This kind, enclosing fragments of stalks, fruit, etc., is not at the present time met with in commerce, all the commercial varieties from the Levant containing root fragments exclusively.

‡ 'Histoire des Drogues,' 3rd edit., vol. ii., p. 501.

§ 'Institut. Mater. Med.' (1784), p. 560.

|| 'Apparat. Medicam.,' vol. i., p. 381.

¶ 'Waaren-Lexicon,' vol. i., p. 337.

** Loc. cit., p. 84.

†† 'Nord. Centralbl. f. d. Pharm.' (1840), p. [illegible]73.

* *Annalen der Chemie und der Pharm.*, vol. xlii., p. 329.

† 'Reise in die Steppen d. sudl. Russlands,' vol. i., p. 164.

‡ From the *American Journal of Pharmacy* for October.

At our request Dr. Palmer has sent us some of the flowering plants referred to in the preceding paper. The plants are found to belong to the natural order of Gentianaceæ, and to the sub-order Gentianeæ, having the corolla lobes twisted (contorted) in the bud; the distinct style being deciduous, it must be placed into the section to which *Erythræa* and *Sabbatia* belong. Its botanical characters agree with those of the last-named genus, and more particularly with the group which has the white or purplish flowers scattered on alternate peduncles, and the corolla five-parted.

On comparing it with the American species in the College herbarium of Dan. B. Smith, it was found to correspond with a specimen of *Sabbatia Elliottii*, Steud., which is marked *ex herbar. Chapmani.* This plant is described in Chapman's 'Flora of the Southern United States' as follows:—

"Stem low, terete, paniculately much branched from near the base, the branches diffuse; leaves small, sessile, the lowest obovate, the upper linear; lobes of the corolla three to four times as long as the short filiform calyx-lobes. (*S. paniculata*, Ell.) Open pine barrens, Florida to South Carolina. Aug. and Sept.—Stems ½ to 1½ feet high. Leaves 3 to 6 lines long. Corolla 8 to 10 lines wide."

In both the herbarium specimen and the plants sent by Dr. Palmer, the calyx lobes are more prominent than might be supposed from the description given, but they are evidently described as *short*, in comparison with the much longer calyx lobes of *Sabbatia stellaris, gracilis* and allied species, in which they are about equal in length to the corolla, while in the species under consideration they are about one-third the length. The lowest leaves are obovate, those a little higher on the stem oblanceolate with an acute point, and become rapidly narrowed to a linear shape. The stems of the plants recently received are from 20 to 24 inches high, and consequently rather exceed the height as given by Chapman.

The herb has at first an herbaceous taste which gradually develops into a pure and persistent bitter, free from astringency.

The popular name *quinine-flower* appears to be confined to a small locality, probably to only a portion of Florida; at least, I have not been able to find it in any of the floras or popular botanical works of the United States. Porcher's 'Resources of the Southern Fields and Forests,' p. 556, however, mentions *Gentiana quinqueflora* under the names of *Indian quinine* and *Ague weed*—and states that "this and the *G. saponaria* are esteemed fully equal to the imported gentian; in large doses they are said to be laxative; Dr. E. P. Wood, of Wisconsin, has given this plant with success in intermittent fever." He also gives a detailed account of the medicinal properties of *Sabbatia angularis*, the American centaury, and states that *S. stellaris* and *S. gracilis* possess properties similar to the former.

This genus of North American plants is closely allied to *Erythræa*, of which several species (*E. chilensis, E. centaurium, E. linarifolia*, etc.) are still employed in different countries as tonics, and sometimes as antiperiodics; but we do not remember that effects resembling quininism have been ascribed to any of those plants, such as Dr. Palmer states are experienced from the quinine-flower of Florida.

DETECTION OF THE MINERAL ACIDS BY MEANS OF COLCHICINE.*

BY F. A. FLUCKIGER.

Mohr has observed that under certain conditions the behaviour of inorganic acids differs totally from that of the organic acids; this difference may be utilized for their discovery in presence of organic acids, for example, in vinegar or lemon juice.

Potassium sulphocyanate in a dilute solution of ferric acetate causes no change, but if there be the smallest trace of hydrochloric, nitric, or sulphuric acid present, the blood-red colour of ferric sulphocyanate is at once apparent: this, however, quickly vanishes on the addition of an acetate or oxalate; but in this case phosphoric acid acts like the organic acids in preventing the formation of ferric sulphocyanate. Another of Mohr's methods depends on the fact that iodine is precipitated from a solution of potassium iodide if a ferric salt with an inorganic acid radicle be added. Ferric acetate causes no precipitation in a solution of potassium iodide, but if the smallest trace of an inorganic acid be present the iodine is immediately precipitated.

But there is a case the reverse of this, in which the inorganic retards and the organic acid hastens the reaction. A solution of pure ferrous sulphate mixed with a saturated solution of gallic acid produces no change if the air be excluded, but acetates immediately produce in it a violet colour.

Still more remarkable effects are produced by colchicine. Some colchicine was extracted from a few grams of the seeds by means of alcohol and water, the yellowish solution was diluted till the colour was scarcely perceptible.

With concentrated sulphuric or nitric acid it gave a very distinct yellow, and on adding a drop of hydrochloric acid to this solution a bluish-violet was produced.

If some colchicine solution with a drop of nitric acid is strongly concentrated and then a fragment of sodium acetate added, an orange colour is produced.

If to a portion acidulated with sulphuric acid, a mixture of iodide of potassium and iodide of mercury in the proportion of 50 to 13·5 is added, a precipitate is formed; by means of this solution it was easy to detect ½ a per cent. of sulphuric acid in vinegar.

* From the *Journal of the Chemical Society*, September, 1876 (*N. Repert. Pharm.*, xxv, 18—23).

THE AILANTHUS GLANDULOSA IN DYSENTERY.*

BY J DUDGEON, M.D., ETC., PEKIN.

The *Ailanthus* is a very common tree in North China, growing readily and rapidly, and attaining a considerable height. The Chinese note two varieties, the fragrant and the fetid. Two synonyms for the latter tree are given—"Tiger's eye," from the resemblance of the facets, when the branches fall off from the main stem, to that animal's eye; and "Great eye varnish," from which circumstance the French name "Vernis du japon" may be derived. The Chinese name has no connection with the word *ailanto*, which is supposed in Europe to be its native name in China and India, and is thought to mean "tree of the gods." It is intensely bitter and astringent, of a lukewarm taste, free from poison, and emits a disagreeable smell, from which latter circumstances its Chinese name is derived. The Chinese medical works recommend it a an antidote against sulphur, arsenic, and gold-poisoning. It is said, also, to possess anthelmintic properties, and to be used in demonology against the supposed transfer of disease from a corpse. It is also useful in diarrhœa, prolapsus ani, and leucorrhœa. It is frequently prescribed alone; at other times in conjunction with other remedies, particularly *Radix hedysari* and the fruit of *Terminalia chebula*, favourite remedies in diarrhœa and dysentry, which increase its efficacy. It is strongly recommended in all cases of hæmorrhage, from whatever cause or locality. It is used, too, in gonorrhœa and spermatorrhœa, and, in short, in fluxes in general. The part used is the inner white bark of the root and stem of the non-fragrant species. Whether taken in infusion or in pill, it is invariably prescribed to be taken on an empty stomach, in

* Reprinted from the *Medical Times and Gazette* for October 28, 1876.

congee or with milk or soft boiled rice. In the most severe cases it is taken in conjunction with *Castus amarus* and vinegar. I refrain from adding a number of the standard prescriptions against dysentery in which the *ailanthus* plays an important part, the mode of preparation and administration and the dose being of the simplest description.

This remedy has been used in a few cases with marked success by my colleague M. Dugat, of the French Legation. It has been submitted lately to the Paris Academy for a report of its virtues. It has been brought under the attention of the French surgeons in the navy in Eastern waters, and those who have tried it have reported favourably regarding it. From its strongly astringent character, combined with rice and milk diet and rest, which are, strictly enjoined, it cannot fail, I think to do good. The rest and regimen, although important measures, do not altogether account for the results obtained. M. Dugat has published five cases in the *Chinese Customs' Half-Yearly Report* (April to September, 1875), in which marked benefit resulted.

I have personally had no experience of the effects of this remedy. Diarrhœa and dysentery are very common in North China during the summer months, arising out of errors in diet, certain habits of the people, and sudden atmospheric changes. The Chinese consume large quantities of cucumbers and the various species of the melon tribe, and unripe, raw, or salted vegetables of all sorts. They distinguish a red and a white dysentery, according to the character of the discharge; there is almost no constitutional disturbance, tenesmus and frequent stools being the chief characteristics. In the great majority of the cases I have found a full dose of castor oil and laudanum by the mouth, with an occasional enema of rice-water and laudanum, followed by one or two compound ipecac powders, all that was necessary. I have come across a large number of almost intractable cases of what is know all over China, and greatly dreaded, as opium dysentery—a severe form of this affection occurring in confirmed opium-smokers, with greatly debilitated constitutions, and caused sometimes by the deprivation of the drug, and at other times without any obvious cause during the continuance of the habit. A very large mortality from deprivation occurs amongst the criminal class in Chinese prisons. In such cases opium loses its customary astringent power; and so great is this astringency at ordinary times that the confirmed smoker may not have more than two evacuations in the month, and then only by external, artificial means.

SURFACE BIOLOGY.*

BY ALFRED RUSSEL WALLACE, F.R.G.S., F.L.S.

(*Continued from page* 358.)

Another interesting fact in connection with this subject is the presence of arborescent forms of Compositæ in so many of the remotest oceanic islands. They occur in the Galapagos, in Juan Fernandez, in St. Helena, in the Sandwich Islands, and in New Zealand; but they are not directly related to each other, representatives of totally different tribes of this extensive order becoming aborescent in each group of islands. The immense range and almost universal distribution of the Compositæ is due to the combination of a great facility of distribution (by their seeds) with a great attractiveness to insects, and the capacity of being fertilized by a variety of species of all orders, and especially by flies and small beetles. Thus they would be among the earliest of flowering plants to establish themselves on oceanic islands; but where insects of all kinds were very scarce it would be an advantage to gain increased size and longevity, so that fertilization at an interval of several years might suffice for the continuance of the species. The arborescent form would combine with increased longevity the advantage of increased size in the struggle for existence with ferns and other early colonists; and these advantages have led to its being independently produced in so many distant localities, whose chief feature in common is their remoteness from continents and the extreme poverty of their insect life.

As the sweet odours of flowers are known to act in combination with their colours as an attraction to insects, it might be anticipated that where colour was deficient scent would be so also. On applying to my friend Dr. Hooker for information as to New Zealand plants, he informed me that this was certainly the case, and that the New Zealand flora is, speaking generally, as strikingly deficient in sweet odours as in conspicuous colours. Whether this peculiarity occurs in other islands, I have not been able to obtain information; but we may certainly expect it to be so in such a marked instance as that of the Galapagos flora.

Another question which here comes before us is the origin and meaning of the odoriferous glands of leaves. Dr. Hooker informed me that not only are New Zealand plants deficient in scented flowers, but equally so in scented leaves. This led me to think that perhaps such leaves were in some way an additional attraction to insects —though it is not easy to understand how this could be, except by adding a general attraction to the special attraction of the flowers, or by supporting the larvæ which, as perfect insects, aid in fertilization. Mr. Darwin, however, informs me that he considers that leaf-glands bearing essential oils are a protection against the attacks of insects where these abound, and would thus not be required in countries where insects were very scarce. But it seems opposed to this view that highly aromatic plants are characteristic of deserts all over the world, and in such places insects are not abundant. Mr. Stainton informs me that the aromatic Labiatæ enjoy no immunity from insect attacks. The bitter leaves of the cherry-laurel are often eaten by the larvæ of moths that abound on our fruit-trees; while in the Tropics the leaves of the orange tribe are favourites with a large number of lepidopterous larvæ; and our northern firs and pines, although abounding in a highly aromatic resin are very subject to the attacks of beetles. My friend Dr. Richard Spruce —who while travelling in South America allowed nothing connected with plant-life to escape his observation—informs me that trees whose leaves have aromatic and often resinous secretions in immersed glands abound in the plains of tropical America, and that such are in great part, if not wholly, free from the attacks of leaf-eating ants, except where the secretion is only slightly bitter, as in the orange tribe, orange-trees being sometimes entirely denuded of their leaves in a single night. Aromatic plants abound in the Andes up to about 13,000 feet, as well as in the plains, but hardly more so than in Central and Southern Europe. They are perhaps more plentiful in the dry mountainous parts of Southern Europe; and as neither here nor in the Andes do leaf-eating ants exist, Dr. Spruce infers that, although in the hot American forests where such ants swarm the oil-bearing glands serve as a protection, yet they were not originally acquired for that purpose. Near the limits of perpetual snow on the Andes such plants as occur are not, so far as Dr. Spruce has observed, aromatic; and as plants in such situations can hardly depend on insect visits for their fertilization, the fact is comparable with that of the flora of New Zealand, and would seem to imply some relation between the two phenomena, though what it exactly is cannot yet be determined.

I trust I have now been able to show you that there are a number of curious problems lying as it were on the outskirts of biological inquiry which well merit attention, and which may lead to valuable results. But these problems are, as you see, for the most part connected

* Presidental Address delivered to the Biological Section of the British Association, at Glasgow, on Sept. 6, 1876.

with questions of locality, and require full and accurate knowledge of the productions of a number of small islands and other limited areas, and the means of comparing them the one with the other. To make such comparisons, however, is now quite impossible. No museum contains any fair representations of the productions of these localities; and such specimens as do exist, being scattered through the general collection, are almost useless for this special purpose. If, then, we are to make any progress in this inquiry, it is absolutely essential that some collectors should begin to arrange their cabinets primarily on a geographical basis, keeping together the productions of every island or group of islands, and of such divisions of each continent as are found to possess any special or characteristic fauna or flora. We shall then be sure to detect many unsuspected relations between the animals and plants of certain localities, and we shall become much better acquainted with those complex reactions between the vegetable and animal kingdoms, and between the organic world and the inorganic, which have almost certainly played an important part in determining many of the most conspicuous features of living things.

Rise and Progress of Modern Views as to the Antiquity and Origin of Man.

I now come to a branch of our subject which I would gladly have avoided touching on; but as the higher powers of this Association have decreed that I should preside over the Anthropological Department, it seems proper that I should devote some portion of my address to matters more immediately connected with the special study to which that Department is devoted.

As my own knowledge of and interest in Anthropology is confined to the great outlines rather than to the special details of the science, I propose to give a very brief and general sketch of the modern doctrine as to the Antiquity and Origin of Man, and to suggest certain points of difficulty which have not, I think, yet received sufficient attention.

Many now present remember the time (for it is little more than twenty years ago) when the antiquity of man, as now understood, was universally discredited. Not only theologians, but even geologists, then taught us that man belonged altogether to the existing state of things; that the extinct animals of the Tertiary period had finally disappeared, and that the earth's surface had assumed its present condition before the human race first came into existence. So prepossessed were even scientific men with this idea—which yet rested on purely negative evidence and could not be supported by any arguments of scientific value—that numerous facts which had been presented at intervals for half a century, all tending to prove the existence of man at very remote epochs, were silently ignored; and, more than this, the detailed statements of three distinct and careful observers confirming each other were rejected by a great scientific society as too improbable for publication, only because they proved (if they were true) the coexistence of man with extinct animals.*

But this state of belief in opposition to facts could not long continue. In 1859 a few of our most eminent geologists examined for themselves into the alleged occurrence of flint implements in the gravels of the north of France, which had been made public fourteen years before, and found them strictly correct. The caverns of Devonshire were about the same time carefully examined by equally eminent observers, and were found fully to bear out the statements of those who had published their results eighteen years before. Flint implements began to be found in all suitable localities in the south of England, when carefully searched for, often in gravels of equal antiquity with those of France. Caverns giving evidence of human occupation at various remote periods were explored in Belgium and the south of France—lake-dwellings were examined in Switzerland—refuse-heaps in Denmark—and thus a whole series of remains have been discovered carrying back the history of mankind from the earliest historic periods to a long distant past. The antiquity of the races thus discovered can only be generally determined by the successively earlier and earlier stages through which we can trace them. As we go back metals soon disappear, and we find only tools and weapons of stone and of bone. The stone weapons get ruder and ruder; pottery, and then the bone implements, cease to occur; and in the earliest stages we find only chipped flints of rude design, though still of unmistakably human workmanship. In like manner domestic animals disappear as we go backward; and though the dog seems to have been the earliest, it is doubtful whether the makers of the ruder flint implements of the gravels possessed even this. Still more important as a measure of time are the changes of the earth's surface, of the distribution of animals, and of climate which have occurred during the human period. At a comparatively recent epoch in the record of prehistoric times we find that the Baltic was far salter than it is now and produced abundance of oysters, and that Denmark was covered with pine forests inhabited by Capercailzies, such as now only occur further north in Norway. A little earlier we find that reindeer were common even in the south of France; and still earlier this animal was accompanied by the mammoth and woolly rhinoceros, by the arctic glutton, and by huge bears and lions of extinct species. The presence of such animals implies a change of climate; and both in the caves and gravels we find proofs of a much colder climate than now prevails in Western Europe. Still more remarkable are the changes of the earth's surface which have been effected during man's occupation of it. Many extensive valleys in England and France are believed by the best observers to have been deepened at least a hundred feet; caverns now far out of the reach of any stream must for a long succession of years have had streams flowing through them, at least in times of floods; and this often implies that vast masses of solid rock have since been worn away. In Sardinia land has risen at least 300 feet since men lived there who made pottery and probably used fishing-nets;* while in Kent's Cavern remains of man are found buried beneath two separate beds of stalagmite, each having a distinct texture, and each covering a deposit of cave-earth having well-marked differential characters, while each contains a distinct assemblage of extinct animals.

Such, briefly, are the results of the evidence that has been rapidly accumulating for about fifteen years as to the antiquity of man; and it has been confirmed by so many discoveries of a like nature in all parts of the globe, and especially by the comparison of the tools and weapons of prehistoric man with those of modern savages (so that the use of even the rudest flint-implements has become quite intelligible), that we can hardly wonder at the vast revolution effected in public opinion. Not only is the belief in man's vast and still unknown antiquity universal among men of science, but it is hardly disputed by any well-informed theologian; and the present generation of science-students must, we should think, be somewhat puzzled to understand what there was in the earliest discoveries that should have aroused such general opposition and been met with such universal incredulity.

(*To be continued.*)

* In 1854 (?) a communication from the Torquay Natural History Society confirming previous accounts by Mr. Godwin Austen, Mr. Vivian, and the Rev. Mr. M'Enery, that worked flints occurred in Kent's Hole with remains of extinct species, was rejected as too improbable for publication.

* Lyell's 'Antiquity of Man,' fourth edition, p. 116.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 4, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, *17, Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

INSTITUTE OF PROFESSIONAL CHEMISTS.

SOME months ago we gave an account of the steps that were taken with the object of establishing an organization which should control that class of chemists who apply themselves to technical matters under the designation of consulting and analytical chemists. For some years past there has been a growing sense of the want of some authoritative formal qualification of those engaged in such pursuits no less for the protection of the public against pretenders, than for the sake of providing for the interests of competent practitioners, and it is strange that the attempt to carry out some practical arrangement of the kind had not been made before. As we pointed out at the time, this is a matter which interests all persons engaged in retail trades now that the official analyst has become a public institution and the interests of the trader are liable to be seriously prejudiced if the duties of that office are not properly performed.

Naturally the attempt to carry out a project of this kind is surrounded by many difficulties, and we are by no means surprised to find that the idea first entertained of attaining this desirable end through the medium of the Chemical Society has not been found practicable. Every facility, however, was afforded by the Council of that Society for the consideration of the project, and a committee was appointed to confer with the gentlemen deputed to act on behalf of the chemists who were desirous of becoming enrolled in some body that could satisfactorily confer on its members the required stamp of qualification. Plans of procedure were suggested on both sides and discussed, but the main result arrived at was the conviction that, although the objects aimed at were approved of on all hands, there were grave objections to all of the plans for attaining them through the medium of the Chemical Society. In the first place, the legality of any alteration in the fellowship of the Society was more than doubtful, and it became a question whether the bulk of the fellows might not object to the establishment of a class of "practising fellows," on the ground that it would place them at a disadvantage as occupying an apparently inferior position.

It is at least satisfactory, however, to find that the idea of organization of a particular class of chemists was warmly sympathized with by the council and officers of the Chemical Society, and that many whose avocations lead them in other directions than the practical application of the science were willing to devote their time and energies to the consideration of plans for benefiting their fellows in other spheres of action.

A notice has recently been issued that the adjourned general meeting of the Chemical Profession is to meet at two o'clock on Saturday, the 4th November, at the Rooms of the Chemical Society, to reconsider the subject of organization. Subsequent to the reading of a report of the proceedings of the Committee appointed last June, it is expected that a motion will be made to the effect that the contemplated organization should be effected independently of the Chemical Society, and a definite proposal will be made in reference to the mode in which that should be done.

It is proposed in the first place that the new body shall be styled "The Institute of Professional Chemists of Great Britain and Ireland." The objects of the organization are to be the general advancement of Chemistry in its applications to the arts, manufactures, agriculture, and public health; secondly, to ensure that persons adopting the profession of consulting chemists or acting as analytical chemists for reward are qualified by study and training for the proper and competent discharge of the duties they undertake.

Persons desirous of membership are to give evidence of the possession of one or more of certain qualifications before being balloted for; among these it is stipulated that they shall have passed through a course of study, extending over three years, of theoretical and analytical chemistry and physics under recognized teachers, and that they shall have been subsequently engaged for three years either as assistant to some member of the Institute or some chemist of repute, or have been for the same period in the position of chemist in a chemical factory. Also that they shall have published some original research on a chemical subject of sufficient interest in the opinion of the Board. For anyone who proposes to devote himself to the pursuit of technical or professional chemistry there is nothing in these regulations which would not be undertaken almost as a matter of course, and no objection can well be urged against making the curriculum indicated a necessary one for the acquirement of membership. But the project goes further, and with a wise liberality makes provision for cases in which persons may not have commenced life with the intention of practising as professional chemists, but have by various circumstances been induced to do so at a period too late to enter upon the prescribed course of training. It is quite conceivable that persons in this position might be fully competent to act as professional chemists and that they would be entitled to recognition upon producing evidence of their fitness to become members of the Institute.

To meet such cases it is proposed that in the event of any person producing to the Council evidence of having been trained and occupied in other ways than those above specified, such that the Council considers equivalent to fulfilling the above-mentioned conditions, he shall be eligible to become a member of the Institute. It is further proposed that in cases where no such evidence can be produced candidates for membership must undergo an examination to be conducted by a Committee of the Council or such other members of the Institute as may be appointed by the Council.

In addition to these provisions for ensuring the qualification of members it is proposed that the Institute, through its Council, shall have the power of controlling the action of its members in the exercise of their professional duties. For this purpose the Council is to have the power of expelling members in cases where ten or more members of the Institute shall demand it. In such cases the Council is to inquire into the matter complained of and to seek explanations from the person charged so as to ascertain whether there be sufficient ground for expulsion before proceeding to that step.

The management of the affairs of the Institute are to be vested in the hands of a Council with a President and two Vice-Presidents (one of whom is to be the retiring president of the previous year), a Treasurer and two Secretaries, who are to be *ex officio* members of the Council. All the officers of the institute are to be elected annually, but to be eligible for re-election, with the exception of the President, who is not to be eligible for re-election for more than two successive years. One third of the Council is to retire each year and not to be eligible for re-election until the following year.

The proposed entrance fee to the Institute is to be five guineas for those persons who join during the first three months of the existence of the Institute, the annual subscription is to be two guineas a year and the fee for examination is to be ten guineas.

It is further proposed that at the meeting on Saturday the first Council of the Institute is to be elected and empowered to elect the requisite officers from their number as well as to take the various steps necessary for the formation of the Institute and the election of members.

THE USE OF METHYLATED SPIRIT.

We think ourselves justified in pointing out, what we were unable to state when referring to this subject last week, that the Commissioners of the Board of Inland Revenue in communicating to the President their decision to waive any further objection to the use of methylated spirit in the preparation of aconite and belladonna liniment (see p. 379), state that they do so "in deference to the wishes of the Council of the Pharmaceutical Society of Great Britain."

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, November 1st, 1876.

MR. JOHN WILLIAMS, PRESIDENT.

MR WILLIAM DAWSON SAVAGE, VICE-PRESIDENT.

Present.—Messrs. Atherton, Betty, Bottle, Cracknell, Frazer, Greenish, Hampson, Hanbury, Hills, Owen, Rimmington, Robbins, Sandford, Schacht, Shaw, and Stacey.

The minutes of the previous meeting were read and confirmed.

The Threatened Prosecutions at Nottingham.

Mr. Atherton said it would probably be interesting to the Council to know that the threatened medical prosecutions at Nottingham, mentioned last month, had been abandoned. He believed that there had been a revulsion of feeling on the part of the higher class of the medical profession, and that there need be no fear of further interference with chemists and druggists in their ordinary business.

Mr. Greenish said that observation only applied to Nottingham, of course.

Mr. Shaw remarked that in Manchester several persons had been prosecuted and fined, but they had been notoriously carrying on business of an improper character.

Mr. Hampson said the cases at Manchester were of a totally different character to those at Nottingham, and came under a different Act of Parliament. They really related to quack doctors of a particular class, practising openly without any qualification.

The President said it must be quite understood that the Council had no desire to support improper practices, but simply to protect respectable men who were unfairly attacked in the prosecution of their ordinary business.

The Board of Examiners.

It was moved by Mr. Sandford and seconded by Mr. Greenish—

"That as the Board of Examiners for the ensuing year must be appointed at the next meeting of the Council, it is desirable that any Member of Council desirous of nominating any Pharmaceutical Chemist as an Examiner should send the name of such person to the Secretary before the 23rd instant. That the Secretary be instructed to communicate with any persons whose names may be suggested as suitable persons for Examiners, asking if they will accept office if elected."

Mr. Bottle suggested that it would be well if the Council would elect Examiners in special subjects. Experience had shown that certain gentlemen examined in chemistry, others in botany, and so on, and it seemed to him that instead of electing the Board *en masse* and somewhat at random with regard to their special qualifications, it would be well to classify the Examiners. Otherwise, if the Council made any considerable changes in the Board, there might be a little difficulty in arranging the work.

The President remarked that the theory was that every Examiner was capable of examining in all the subjects. Practically it was known that some men were specially fitted to examine in particular subjects, but that was a matter of arrangement for the Board.

Mr. Bottle said the impression he had received from a conversation with Dr. Fowler, one of the Examiners of the Apothecaries Company, was that the system pursued at Apothecaries' Hall of each Examiner taking the different subjects in rotation was not satisfactory.

The President said the Board of Examiners did in practice allot certain subjects to certain members, but that was hardly a matter which they as a Council could consider.

Mr. GREENISH had always thought it would be an advantage if occasional changes were made in the *personnel* of the Examining Board, and he found that this opinion was also set forth in the 'Science Papers' of the late Mr. Hanbury. It was not that he was dissatisfied with any particular Examiner, but he thought it would be for the general benefit of the Board that occasional changes should take place.

Mr. SCHACHT said it was not by any means easy to get a really good Examiner, and gentlemen who were properly qualified could not always spare the time. It was not therefore desirable to push the system of change too far, and it seemed to him that the great object aimed at, namely, to prevent the Examiners getting into a groove and thus aiding the designs of crammers, would be met by following the system in use at the Apothecaries' Hall, and by letting each Examiner take the various subjects in rotation.

Mr. CRACKNELL thought the arrangement suggested by Mr. Schacht was almost impossible. He could see much in its favour, but it would be attended with a very great deal of inconvenience if it were attempted to carry it out. He did not think the Examiners as a rule worked in such grooves that any evil resulted. He believed the work would be best done by allowing the Board to apportion it according to its discretion.

Mr. GREENISH desired to repeat the suggestion he made in August last when it met with very little support, that the Examiners should be requested to furnish information as to the subject or subjects in which the majority of the candidates who failed were deficient. He found that the Examining Body of the Royal College of Physicians drew attention to the fact that their candidates were many of them ill prepared, as a rule, in the subject of chemistry and its application to pharmacy. This showed that such information could be furnished, and he thought it would be very useful if the Examiners would report once or twice a year, in what subject the deficiency mainly arose.

The PRESIDENT said the materials for such information existed in the books of the Board of Examiners. It was only a question of the trouble of preparing and the policy of publishing it.

Mr. GREENISH thought the statistics would be valuable if published.

Mr. CRACKNELL said his experience led him to believe that there would be very little difference between the different subjects.

The PRESIDENT remarked that from his short experience he should be inclined to agree with Mr. Cracknell. It must also be remembered that when a man failed hopelessly in more than one subject he was not tested in the remainder, so that the numbers would not represent a percentage. He thought the views of the Board of Examiners should be ascertained before any such step was taken.

The resolution was then passed unanimously.

The following being duly registered as Pharmaceutical Chemists were respectively granted a diploma stamped with the seal of the Society:—

Bibbings, John Henry.
Campbell, Henry.
Ferguson, William Harry.
Helmore, William Holloway.
Keeling, Charles James.
Kidd, William Champley.
Skinner, Kenneth George Walrond.
Smith, George.
Squire, Alfred Herbert.
Turner, William Spencer.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

Bibbings, John Henry............Newton Abbot.
Keeling, Charles James ....Congreve.

ASSOCIATES.

The following having passed their respective examinations and having severally paid (as Apprentices or Students) or tendered the subscription for the current year, were elected "Associates" of the Society:—

Minor.

Beken, Alfred Edward ....Canterbury.
Briggs, William Henry ....Wakefield.
Cooke, Edmund Herbert.........Northampton.
Cooper, John......................Newcastle-under-Lyne.
Day, John ....London.
Glover, William Kensit ....Aberdeen.
Heaton, George....................Farnworth.
Holding, John ....London.
Lewis, David........................Merthyr.
Littlewood, John Oscroft ......Sutton-in-Ashfield.
Parkinson, Charles ....Preston.
Richards, Philip ....Bury St. Edmunds.
Robinson, Thomas Dexter ......Bedford.
Rundle, Charles .... St. Blazey.
Short, George William...........Swindon.
Smale, Charles ....Totnes.
Thomas, Henry James......... ..Llandilo.
Weston, Matthew Frank..........Bury.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary Examination, and tendered their subscriptions for the current year were elected "Apprentices or Students" of the Society:—

Lowe, Moses Howl ....Great Barr.
Squire, Frederick John Cripps Plymouth.

Two persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was read and adopted, and various accounts ordered to be paid.

BENEVOLENT FUND.

This Committee had met twice during the month. The following grants were recommended:—

£10 to the widow of a registered chemist and druggist with 5 children.

£10 to the widow of a registered chemist and druggist, having no means of support and in ill health.

£15 to the widow of a chemist and druggist, to assist in the education of her two girls; applicant having had two former grants of £10 each for the same purpose.

£15 to the widow of a registered chemist and druggist and formerly a member of the Society. Applicant has seven children, of whom five are wholly dependent upon her.

£10 to a registered chemist and druggist, aged 64, formerly in business, but latterly has acted as an assistant, and unable to continue in the business from deafness.

£10 to a registered chemist and druggist, aged 51, formerly in business, but now confined to his bed from spinal paralysis. Four previous grants of similar amounts had been made.

£10 towards the education of the orphan children of a deceased member. £20 had been granted about twelve months ago.

£10 to the widow of a candidate for an annuity who died a few days before the recent election.

The report and recommendations of the Committee were received and adopted.

Mr. HILLS remarked that it would no doubt be satisfactory to the Council to have noticed that at the recent election of annuitants very much less canvassing than usual had been adopted.

Library, Museum, and Laboratory.

The report of this Committee included the following information. Professor Attfield had reported 45 entries in the laboratory, being the average number in the month of October since 1868.

The attendance in the library since July 11th had been day, highest 25; lowest 0; evening, highest 16; lowest 0. The circulation of books had been 238 in London; 70 to the country, 32 places.

The following books had been reported as missing:—

Barber's 'Pocket Companion to the Pharmacopœia,' 4th edition.

Haselden's 'Notes on the Pharmacopœia,' 1864.

Heaton's 'Experimental Chemistry,' 1872.

'Pharmaceutical Journal, O. S.,' Vol. i., 1841-2.

Phillip's 'Elements of Metallurgy,' 1874.

'Journal of the Chemical Society,' Vol. x.

'British Pharmacopœia,' 1867.

The following books were recommended to be purchased for the library:—

Dragendorff's 'Die gerichtlich-chemische Ermittelung von Giften,' 2e Auflage.

Dragendorff's 'Beiträge zur gerichtlichen Chemie einzelner organischer Gifte.'

Fischer's 'Synopsis Astragalorum Tragacantharum.'

Les Œuvres d'Ambroise Paré.

The Curator had reported that the attendance in the museum had been on an average in August, 3, September, 6.

The inorganic portion of the Chemical Catalogue was reported to be in the hands of the printer.

The Committee had discussed the conditions of eligibility for competition for the sessional prizes, but did not recommend any alteration in the present system. The Committee also was of opinion that the attendance of the Jacob Bell scholars should be reported monthly.

Mr. Greenish said he did not wish to re-open a subject which had been settled by the Committee, but perhaps some members of the Council were not aware of the question which had been brought forward with regard to sessional prizes. At present, at the end of *each* course of five months, a bronze medal was offered for competition, for which students who had attended more than one course were ineligible to compete. It was his wish that the silver medal, awarded at the end of the session, should be competed for by students of that session only, and not by students who had also attended a previous session.

The President said the Committee had considered this question, and had not recommended any alteration.

Mr. Sandford remarked that the Committee appeared to think that any alteration of the conditions would look like discouraging proficiency. To say that a man who had attended a previous course should not obtain a silver medal was like saying that the school only brought men up to a certain standard, as far as they could get in one session, and no farther.

Mr. Bottle added that some students commenced their studies at the end of one session and went on in the next.

Mr. Hampson thought if the arrangement for the bronze medal were the right one, that with regard to the silver one must be wrong. It seemed to him simply as a matter of fair play that this question was brought forward. If the prize were a sessional prize there was a very strong case for a revision of the regulations.

Mr. Frazer had had no knowledge of this question until the present moment, but he entirely sympathized with the sentiments Mr. Hampson had expressed. In the Scotch universities the seniors were never allowed to compete with the juniors. He saw no objection to extra prizes for work done being offered separately, but that was a different matter.

Mr. Hampson remarked that this rule already existed in the laboratory.

Mr. Greenish said that he simply wished that the silver medal should be competed for by students of the one session only in which it was awarded.

The President agreed with the decision of the Committee that it would be unwise to make any alteration at present in the prize regulations. They had been altered so frequently lately that people hardly knew what they really were. It was also a question whether it would be right for the Council to take any step to discourage the higher amount of knowledge which it was really its desire to encourage. It would be very hard to say that a man should not obtain a prize because he happened to have attended a course of lectures elsewhere, perhaps in his youth.

Mr. Greenish said it only applied to the courses of lectures delivered by Professor Redwood and Professor Bentley.

Mr. Schacht asked if the silver medal was open to competition by those only who had attended for ten months, or could it be competed for by those who had attended for five months only?

Mr. Sandford said that any student who had attended during the course of the session might compete for the silver medal.

Mr. Schacht thought in that case it would be unwise to make the change suggested. If a five months' man were allowed to compete, he could not see why a twenty months' man should be excluded. A man might be well educated elsewhere and then come in for five months and take the medal.

Mr. Robbins observed that Mr. Greenish's plan would prevent a man who studied five months in one year and five months in another from competing. The Committee thought that would be a great injustice, and it would be discouraging higher education.

Mr. Sandford said he believed the same system obtained in other institutions, as for instance at King's College. There a second year's man might go in and compete for the prizes.

Mr. Hanbury said they were very particular in the Medical Schools that a second year's man should not compete with the first year's men.

Mr. Bottle thought that even where it was strictly permissible, there was a strong feeling against such a thing being done.

Mr. Hanbury said he was hardly prepared to give a decided opinion on the question, but it seemed to him that there were two matters which were liable to be confounded. Prizes must be offered with two views, one for real excellence, and the other for relative excellence. There was a great injustice in admitting a second year's man to compete with a first year's for a prize which was really only relative. If on the other hand, like the Pereira Medal, the prize was regarded as a token of proficiency, the regulation ought not to be altered. The inevitable injustice of men trained elsewhere coming in and carrying off the prizes could not be prevented.

Mr. Greenish asked the Council to be consistent in this matter. The system he advocated in regard to the lecture classes already obtained in the laboratory.

Mr. Hampson said that the matter might be referred back to the Committee for reconsideration.

Mr. Schacht suggested that if this were done the whole question of prize regulations might be considered. It might be that in order to be consistent the regulations affecting the laboratory should be altered.

The President remarked with reference to the last sentence in the report of the Committee that it had been reported that certain of the Jacob Bell scholars had not attended the laboratory regularly. It was the opinion of the Committee that the gentlemen elected to these scholarships were bound to avail themselves of the instruction provided, or otherwise they were keeping out others who would do so.

Mr. Rimmington asked why they did not attend.

The President said he was not prepared to say at present. But he thought it well that a report of the attendance should be presented.

The report of the Committee was then received and adopted.

It was moved by Mr. Greenish, seconded by Mr. Hampson, and carried unanimously—

"That the subject of the prizes for Botany, Materia Medica, and Chemistry classes be reconsidered by the Library, Museum, and Laboratory Committee."

House.

The report of this Committee stated that the work done in the house during the vacation had been inspected and found to be satisfactory, and the payment of the tradesmen's bills was recommended accordingly.

The report was adopted.

North British Branch.

The Secretary read a letter he had received asking the permission of the Council to use the rooms of the Society in Edinburgh for the delivery of a course of lectures on Botany and Materia Medica, especially adapted for pharmaceutical students.

A resolution was unanimously passed, granting the use of the room for this purpose.

The Secretary read the report of the deputation from the Board of Examiners in Scotland to the Board of Examiners in London.

Law and Parliamentary.

The report of this Committee stated that it had received a deputation from the Chemists and Druggists' Trade Association, and had explained to the members thereof why the Council had not considered it advisable to prosecute co-operative stores for the sale of poisons.

Application of Penalties Recovered under the Pharmacy Act.

The following communication had been received from the Treasury with reference to the application of fines recovered for infringements of the Pharmacy Act, 1868.

"Treasury Chambers,
"12th October, 1876.

"Sir,—In reply to your letter of the 4th inst., preferring a request on behalf of the Pharmaceutical Society of Great Britain, that the penalties recovered by the Society may be applied to meet the cost of prosecutions instituted under the Pharmacy Acts of 1852 and 1868, I am directed by the Lords Commissioners of Her Majesty's Treasury to state that my Lords do not consider there is sufficient reason for acceding to your request.

"The Act has provided that the fines shall be paid as the Commissioners of the Treasury shall direct, and my Lords request that the amount now in your hands may be paid to Mr. T. E. Kebbel, Receiver of Fines, 2, St. Martin's Place, W.C., to be by him carried to the Consolidated Fund, as has been done with all other fines hitherto received under the Act.

"I am, Sir, your obedient servant,
"William Law.

"Elias Bremridge, Esq.,
"Registrar to the Pharmaceutical Society of Great
"Britain, 17, Bloomsbury Square, W.C."

This communication was in reply to the following letter which had been sent to Her Majesty's Treasury in compliancewith a resolution passed at the last meeting of the Council.

[Copy.]

"October 4th, 1876.

"To the Lords Commissioners of Her
Majesty's Treasury.

"My Lords,—As Registrar appointed under the provisions of the Pharmacy Act, 1852, and of the Pharmacy Act, 1868, I beg to bring under the notice of your Lordships the provisions set forth in sections 12 and 14 of the Pharmacy Act, 1852, and section 15 of the Pharmacy Act, 1868.

"Section 14 of the Act 1852 is as follows:—

"'All and every sums and sum of money which shall arise from any conviction and recovery of penalties for offences incurred under this Act, shall be paid as the Commissioners of Her Majesty's Treasury shall direct.'

"In carrying out the provisions of the above-mentioned Acts, in the interest and for the protection of the public, it has been found necessary to institute proceedings for the recovery of the penalties therein provided. Several such penalties have been recovered and are now in the hands of this Society. I am, therefore, requested by the Council to apply to your Lordships for instruction as to the appropriation of such penalties. I would draw the attention of your Lordships to the fact that, there is no provision in the Pharmacy Acts, 1852 and 1868, to meet the expenses of prosecutions under those Acts, and the Society has been, and still continues to be, put to considerable expense in the recovery of penalties, and otherwise in regard to offenders, largely in excess of the sums recovered from the defendants, and I have to ask that your Lordships may therefore be pleased to direct that the penalties may be applied towards the reimbursement of such expenses.

"I have the honour to be,
"My Lords,
"Your Lordships' obedient servant,
"(Signed) Elias Bremridge.

"*Registrar under the Pharmacy Act*, 1852 *and* 1868."

The Committee recommended that a deputation, consisting of the President, Mr. Sandford, Mr. Hills, the Secretary and the Solicitor, be requested to wait on the Commissioners of Her Majesty's Treasury, with a view to obtain a more favourable decision.

Use of Methylated Spirit.

The President stated, that in reply to the memorial to the Commissioners of the Board of Inland Revenue (see before p. 292), he had received the following communication:—

"October 2, 1876.

"Sir,—The Commissioners of Inland Revenue having had under careful consideration your letter of the 16th August last, I am desired to acquaint you, in reply, that in deference to the wishes of the Council of the Pharmaceutical Society of Great Britain, the Commissioners now consent to raise no objection on the part of the Revenue to the use of methylated spirit in the preparation of aconite and belladonna liniments. The requisite instructions have been issued to the local officers of the Revenue, as you will perceive on reference to the 4th paragraph of the enclosed general order, which has just been issued by the Commissioners.

"I am, Sir,
"Your obedient servant,
"Adam Young."
"*Secretary.*

"John Williams, Esq."

Letters were also read from the Society's solicitor, narrating the progress made in the various cases which had been placed in his hands.

After some conversation the report of the Committee was received and adopted.

Report of Examinations in October, 1876.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major	13	10	3
Minor	60	25	35
Modified	5	3	2
Total	78	38	40

SCOTLAND.

	Candidates. Examined.	Passed.	Failed.
Minor	21	10	11
Modified	3	2	1
Total	24	12	12

Preliminary Examination.

Fourteen certificates received in lieu of the Society's examination:—

1 University of London.
3 „ „ Oxford.
4 „ „ Cambridge.
1 „ „ Durham.
1 Society of Apothecaries, London.
1 Apothecaries' Hall of Ireland.
3 College of Preceptors.

Candidates. Examined.	Passed.	Failed.
235	115	120

The following letter had been laid before the Board:—

"College of Preceptors, 42, Queen Square,
"London, W.C.,
"20th October, 1876.

"Dear Sir,—I beg to forward a few remarks made by the Examiner in relation to the recent Preliminary Examination, and am, Dear Sir,

"Yours faithfully,
"C. R. Hodgson, *Secretary.*

"E. Bremridge, Esq.

"*Latin.*—The Latin translation was generally moderate. I did not notice any candidate's work as being first-rate. The grammar was generally pretty good, and in some few cases thoroughly well done.

"*Arithmetic.*—In arithmetic, too many failed in calculating the value of a given weight at a given price. But few could answer the questions on the metric system properly.

"*Grammar.*—The English grammar was on the whole satisfactory and much better than the English composition. The Spelling was generally correct."

PHARMACEUTICAL MEETING.

Wednesday, November 1, 1876.

MR. JOHN WILLIAMS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting were read and confirmed.

The following donations to the Library, Museum, and Herbarium, were announced, and the thanks of the Society were awarded to the donors:—

Library.—'Calendar of University College, London, 1876–7,' from the College; 'Zur quantitativen Bestimmung des Veratrins und Physostigmins,' von E. Masing, from Professor Dragendorff; 'Classification de 250 Fécules,' from M. Bernardin (Author); 'Étude Comparative du Galbanum et de la Gomme Ammoniaque suivie de quelques considérations sur l'Opoponax et le Sagapénum, par E. Hirschsohn,' from Dr. J. Morel (Translator); 'Aanteekeningen op het systematisch-en pharmacognostisch-Botanische gedeelte der Pharmacopoea Neerlandica,' door C. A. J. A. Oudemans, M.D., and Sundry Parliamentary Reports, volumes and numbers of periodicals, etc., out of the library of the late Daniel Hanbury, from Mr. Thomas Hanbury; 'Chemistry, General, Medical, and Pharmaceutical, by J. Attfield, Ph.D., Seventh (United States) Edition,' from Mr. H. C. Lea (Publisher).

Museum.—Fine Specimens of Crystallized Palmitic Acid, from Price's Patent Candle Co.; Specimens of the Chemical Principles extracted from Ergot, from Professor Dragendorff; Specimen of a New Variety of Benzoin, from Mr. Morson; Single Camomile flowers, from Mr. C. B. Allen; Flower of Tea, from Mr. T. B. Groves; Resin of *Terminalia angustifolia*, from the India Museum; Fruits of *Xanthoxylon fraxineum*, specimens of Dolomite, Chebulic Myrobalans, from Mr. Geo. Smith, Sunderland; Seeds of *Amomum xanthioides*, from Mr. C. Hanbury; Specimens of Nepaul, Benares, Patna, and Malwa Opium, from Mr. Morson; Specimens illustrating Fluorescence, from Mr. W. G. Lettsom.

Herbarium.—Specimen of *Primula farinosa* and other rare plants, from Mr. Geo. Smith.

The Chairman drew special attention to one of the donations to the Library viz., the seventh edition of Professor Attfield's 'Chemistry,' published by Mr. Henry C. Lea, of Philadelphia, who had presented it to the library. It was a new edition, especially adapted to American pharmacy. It was worthy of remark, and most gratifying, that every Professor of the Society up to the present time—Pereira, Fownes, Thomson, Redwood, Bentley and Attfield—had been the author of some work on his particular branch of science allied to pharmacy which had been accepted as a standard authority upon the subject.

The Centennial Exhibition at Philadelphia.

The Chairman said that there was present a gentleman who had recently returned from the United States, where he had been acting as one of Her Majesty's Commissioners to represent Great Britain at the great International Exhibition held in Philadelphia; he referred to Professor Archer, of Edinburgh. He would ask Professor Archer to kindly give the meeting some information respecting the way in which pharmacy was represented at that exhibition.

Professor Archer after stating that he was wholly unprepared for the task which he had been called upon to perform at only two hours' notice, said:—With respect to the very great exhibition at Philadelphia which will close in a few days, there are very many points from which we may look at it with great satisfaction, and there are none from which I at least can look at it with anything but satisfaction. I allude entirely to the management of that very great affair, the most magnificent exhibition the world has ever yet seen, and which I do not hesitate to say is the best managed exhibition that has ever been held. As a Commissioner there I had very arduous duties to perform which almost prevented the possibility of a minute examination into the general details of an exhibition which covered nearly 300 acres of ground, 70 of which were under a roof. But there was one thing which certainly did strike me very much indeed, viz., the wonderful perfection to which the pharmaceutical and chemical branches were carried. Had I merely seen them in the exhibition I might probably have been a little suspicious that good specimens had been collected together from any available source and displayed there, because I have known such things done; but I had the good fortune on one occasion especially to be present when the College of Pharmacy of Philadelphia, which represents the State of Pennsylvania, gave away its degrees, and I then saw a sight which I certainly shall never forget. The meeting was held in what is called the Academy of Music, a large theatre, quite equal in size to anything we have in London, having seats for between 5000 and 6000 people, and I think there were fully that number present. A more crowded theatre I never saw in my life, and as I had the honour of a seat on the stage with the Professors, I had a good opportunity of seeing, not only the immense crowd before me, but the intense interest that it took in the proceedings, viz., the distribution of degrees to over 100 graduates in pharmacy. As I sat there many thoughts occurred to me, one of the most prominent being the memory of having talked over with the great mind whom we all look upon as the founder of the Pharmaceutical Society of Great Britain, Jacob Bell, his views as to the elevation of the profession to which he belonged; and I remembered that I, with him, had thought that if this great Society could be established and carry out its objects as they are being carried out now, that would be the culminating point of our hopes. I now think that both he and I, and all who were associated with us then were in error. We did not see as far as we ought to have seen; we did not see that there was something still beyond all that, and the scene I saw in Philadelphia teaches me that we have to look to something far beyond it. Instead of the Pharmaceutical Society of Great Britain it must be some day or other the Pharmaceutical College or University of Great Britain, and degrees and honours must be given, and the whole thing must be made to assume a much more elevated aspect. Such is the case in Philadelphia. There I saw these thousands of ladies and gentlemen filling the largest theatre in that immense city of 800,000 inhabitants, all taking intense interest in the event of the evening, the distribution of prizes to those who had succeeded in passing their examination and gaining honours. There was a curious feature connected with this, showing that this enthusiasm was not the mere effervescence of the moment. Along the front of the stage, just behind the footlights, were piled more bouquets of flowers than, I will venture to say, you could find any day in Covent Garden Market, parcels of books, and boxes, containing, no doubt, something very nice, all nicely tied up with ribbons and labelled; these had been sent by those who took an interest in the proceedings as a sort of kindly mark of the delight felt by the donors at the success of the students. Now I think there is in all this something that we ought to aim at. All these things showed the young men that there was a wide interest felt in their welfare, which interest would accompany them through life provided they did as well in the future as they had done in the past. The speeches made by the Professors were such as I am sure all here would have been delighted to listen to, and none could have listened without advantage. I certainly came away with a strong feeling of respect for the position which pharmacy occupies in the United States, and I think most of you will agree with me that there is something in what I have said which ought to stimulate us to aim at even greater things than have been yet accomplished. With respect to the Great Exhibition itself, the chemical and pharmaceutical displays that were made, I do not feel that I have sufficient data before me to waste your time by attempting to detail them. All I can say is, that there was such a display as I had never seen before; a perfect grandeur of chemical art in every possible direction. But it was not altogether American. German chemists were pre-eminent in the Exhibition and the display made by them was beyond anything ever before witnessed. Pharmacy itself has certainly made very great progress in America, though in rather different ways to which it has here. It has its own peculiar materia medica to deal with, and it has to cope with the notions of practitioners, altogether different from the views of our own practitioners in these matters. It is a very important subject to look into, but all that I can say upon the subject is, that there is very much for us to learn, and perhaps for them also. When we come to compare notes it is possible that they may throw aside much of their materia medica, and we may adopt some of those which they retain. I wish it were in my power to go more into the matter, but I had not time to prepare.

The PRESIDENT proposed a vote of thanks to Professor Archer for the kind manner in which he had responded to his request, which was carried unanimously.

The CHAIRMAN said the next business was the reading of a paper entitled—

SUGGESTION FOR AN IMPROVED METHOD OF MAKING MISTURA GUAIACI AND SIMILAR MIXTURES.

BY THOMAS GREENISH.

The paper is printed on p. 369, and gave rise to the following discussion:—

The PRESIDENT said this paper showed what could be done by observing at the dispensing counter the ordinary occurrences which took place, and if the younger members and assistants would remember this, they might often bring forward papers which would elicit interesting discussions. This paper showed a new application of sugar of milk in pharmacy.

Mr. GERRARD asked if Mr. Greenish had observed that different samples of resin of copaiba had different colours. He had seen some pale green and some a deep green, and some he had prepared himself was not green at all. He was somewhat suspicious that the resin prepared by distillation obtained its green colour from the copper vessels in which it was made. If that were so they ought to see that the resin was prepared in a different manner.

Mr. UMNEY said he had on many occasions seen large quantities of the resin of copaiba contaminated with copper, but that was at a time when the resin was considered to be useless, the oil distilled from it being the important remedy. But since Dr. Wilkes's communication in the *Lancet* about eighteen months or two years ago, showing the value of the resin, there had been a demand for it, and he thought that manufacturers now distilled the oil in stills either tinned inside or made of lead or earthenware.

Mr. HODGKINSON said that the resin prepared in copper vessels was perfectly useless for pharmaceutical purposes. It should not be in the slightest degree green. Until recently, however, it had been regarded as a worthless residuum which every conscientious dealer had thrown away.

Professor REDWOOD said that the resin of copaiba consisted of resin acids which would combine with the oxide of copper. It appeared to him, therefore, that the use of a leaden still would be equally objectionable although the contamination might not be so apparent. He should recommend an earthenware or an iron still.

Mr. UMNEY said he had used both lead and tinned copper, to the latter of which he gave preference. He had not tested the resin to see whether it was contaminated with lead, but he could quite believe that it would be when a leaden still was used. He had distilled considerable quantities, and generally preferred to operate upon the particular kind of balsam known in the market as Para Copaiba. This would sometimes yield as much as 60 per cent. of volatile oil, whereas the other kind, (Marahnam Balsam,) usually preferred by druggists, would only yield 30 to 40 per cent. The essential oil came over very readily with the vapour of water.

Mr. GERRARD said when Dr. Wilkes first proposed using resin of copaiba he had the honour of preparing several mixtures for him with the object of finding what was the best way to dispense it, and they concluded at the time that a compound powder of almonds formed the most excellent emulsifying agent for the purpose.*

* See *Pharm. Journ.* [3], vol. iv., p. 63.

Mr. MARTINDALE, referring to the mixture of guaiacum prepared by Mr. Greenish, wished to know whether it had been prepared with the ordinary powder or with freshly powdered guaiacum. That made with a freshly powdered guaiacum generally showed a dirty dull white colour, but if prepared with old powder it was of a dark green.

Mr. CLEAVER thought that if there were lime salts present in the sugar of milk, a soluble compound would be probably formed with the acids present, and therefore, probably if the guiacum resin were older it would not be attacked so easily.

Mr. HOLMES asked if Mr. Greenish had tried more than one specimen of copaiba resin, because it was well known that copaiba was obtained from different trees, and that the balsam met with in commerce varied very much in consistence and appearance, and possibly might also in chemical properties.

Mr. GREENISH, in answer to Mr. Gerrard, said he had never noticed the green colour in the resin of copaiba. He always used pure resin, and he was sorry Mr. Gerrard, when he noticed this green colour, had not made a note of it, and brought it forward in a short paper. With regard to the guaiacum mixture he always took a mass of resin, broke a piece of it, and powdered it at the time. The green colour was a question of time. The principle involved which he had wished to bring forward, was this:—If the resin were put into a mortar and rubbed down with the spirit alone, it stuck to the sides of the mortar, but if sugar of milk were previously added to the powdered resin, and then the spirit, the resin could be rubbed into a minute state of division, and the whole would form a homogeneous mixture, to which the powdered gum could be added, without adhesion to the mortar, and afterwards, on the addition of water, the emulsion was obtained.

Mr. HODGKINSON asked if any gentlemen present could say whether the green colour was due to oxidation or to the action of the solar rays.

Professor REDWOOD was not aware that the exact nature of the change which took place had ever clearly been ascertained, but there were several substances which promoted that change; a piece of freshly cut potato, for instance, was used as a test, and gum arabic produced a similar change. He should be disposed to ascribe the colour present in the mixture Mr. Greenish had produced to a great extent to the action of the gum upon the resin. The resin of guaiacum, however, when exposed simply to air for a great length of time, acquired a green colour on the surface, and no doubt there were specimens in the museum showing the action, but it was much more speedily developed by contact with certain organic and other substances. He had not any experience in the preparation of mistura guaiaci, but he had heard years ago the late Mr. Ince indicate as an improvement in the way of making it, the use of unpowdered resin on account of its more readily emulsifying than the resin after it had been kept in powder for any length of time. Guaiacum as met with in commerce consisted of resinous matter and extractive matter, both of which underwent change on exposure, and would be more likely to do so when kept in powder. Whether this change affected the emulsifying properties he could not say, and should be glad to learn from any gentlemen present what their experience had been.

Mr. ROBBINS said it had been fully recognized that the change in the colour of guaiacum was due to oxidation, in fact it was used as a chemical test to distinguish ozone from antozone. It was the most delicate test known for detecting spots of blood on articles of dress, or anything of that kind. Peroxide of hydrogen did not oxidize guaiacum, but the smallest trace of blood immediately converted the peroxide of hydrogen, which was considered to be in the state of antozone, into the form of ozone, and the guaiacum immediately produced a deep blue colour. It had been used extensively as a test in this way by Dr. Day, of Geelong.

Professor ATTFIELD said the whole subject of the changes which took place in these resins and gum resins both before, during, and after mixture with certain liquids to form emulsions, required investigation. Some thirteen years ago the question of emulsions, and what they were, was introduced into the list of subjects for research issued by the British Pharmaceutical Conference. In 1864 Mr. Proctor read a paper on emulsions, and undertook further to work on the subject, provided he received from his brother pharmacists some contributions resulting from their observations of emulsions. Mr. Proctor had recently told him that he had not been much encouraged to carry on the work, and, as a matter of fact, had not done much at it; he rather feared that he had given it up altogether. There was room for a very extended series of researches on this subject. It was very desirable that practical pharmacists should bring the result of their experience to these meetings from time to time as to the best mode of making this, that, or the other emulsion; but in addition to such work, a research was needed into the nature of emulsions generally. The qualifications for such a research should obviously be competent chemical, physical, and botanical knowledge—in fact, it was just the subject which any well-educated man who had passed the Major examination might take up. They wanted all the emulsions, natural as well as artificial, brought within the range of science. In other words, what was required was a knowledge of the laws which governed matter; then the youngest pharmacist, once getting hold of the principles regulating the formation of emulsions would be able to make any and every emulsion, whether or not previously known, without a failure and without loss of time.

Mr. GREENISH said the mixture of guaiacum when first made showed no green colour, but it was developed in a short time. The colour became green more rapidly when powdered guaiacum was used. In every instance he should recommend a piece of lump guaiacum to be employed. He could not answer the question of Mr. Holmes as to the kind of resin of copaiba he had employed. He had only one specimen which was very pure.

Mr. UMNEY asked if Mr. Greenish used the drop guaiacum or the mass. There were two kinds known in the market, the drop being about the size of a small walnut and exceedingly pure, and the lump which was variable in purity.

Mr. GREENISH said he used one large piece, but it was very clear and bright.

Mr. HODGKINSON thought that if the tears had run into a block together Mr. Greenish probably would not know the difference between one and the other.

Mr. BLAND had observed that the change in the colour of powdered guaiacum proceeded much more slowly in the absence of solar light, and if the powder were kept in the dark it would remain a considerable time without undergoing any change. He could also corroborate what was said by the last speaker about block guaiacum. He had some in masses which appeared quite as pure as the ordinary tears. It broke up into small fragments with a conchoidal fracture and a transparent appearance which indicated purity.

Professor BENTLEY said they must naturally expect as a general rule that tear guaiacum would be purer than the ordinary guaiacum in mass, because it was simply the natural exudation, or one which came after incisions, and so far as he had seen, the tears were generally unmixed with any foreign substances, although not invariably so. There was no reason at all, as Mr. Hodgkinson had said, why there might not be lump guaiacum almost free from extraneous matter, but considering the very rough manner in which it was usually prepared, it would naturally happen that in most cases, pieces of bark, earth, and other impurities would be found mixed with it, although he had seen guaiacum in mass almost free from impurity. It was quite true that an agglomeration of tears might take place, but still they were never so perfectly fused together as the ordinary mass which was prepared by heat. Till lately guaiacum was generally believed to be derived from one plant only, namely *Guaiacum officinale*, but it was now known, through the investigations of their lamented friend, Mr. Hanbury, that *Guaiacum sanctum* also yielded some of the commercial guaiacum.

Mr. HALL had noticed some years ago, when more engaged in dispensing than at present, that powdered guaiacum showed a more decided change of colour in the direction in which it was exposed to the light than in any other. The same thing might be observed in the case of Pulv. Rhei. It was probable, therefore, that the actinic rays had something to do with the change.

The PRESIDENT proposed a vote of thanks to Mr. Greenish, which was carried unanimously.

PLASTERS.

Mr. MARTINDALE next drew attention to and described several varieties of plaster prepared by an American firm. They included cantharides plaster on cloth, which had been proved to act well as a vesicant, and only required oiling before application; mustard plaster, spread on cloth, made with a basis of so adhesive a character, that it left none of the mustard adhering to the skin when the plaster was removed; surgeon's adhesive plaster, very flexible and apparently a great improvement on that at present in use; this was termed india-rubber plaster, and had a strong aromatic smell, and the slight oxidation of some aromatic principles yielding peroxide of hydrogen; it possibly might act as an antiseptic. There were also porous plasters and belladonna plasters.

Mr. GREENISH inquired the reason of the dark colour of the mustard plaster.

Mr. MARTINDALE thought it was due to the basis by which it was made to adhere to the cloth. It was made with black mustard seed, and the basis was of the same composition as the surgeon's adhesive plaster, a mixture of india rubber and frankincense, or something of that kind.

Mr. UMNEY said he imagined from the odour that instead of using chloroform, petroleum had been used for the solution of the india rubber.

Mr. GREENISH said the black mustard seed had only a black skin, and, therefore, there must be something besides this to account for the colour of the plaster.

Mr. GERRARD said he had prepared a great deal of plaster and it appeared to him that there was something which gave this plaster a dark appearance; if the makers retained all the oil in the mustard that might account for it, but if the oil were extracted there must be something more than mustard present. He had on a previous occasion remarked on the superiority of india rubber to gutta percha for such purposes and believed that one part of caoutchouc dissolved in benzol was equal to ten parts of gutta percha dissolved in chloroform for the purposes of adhesion of mustard to paper or any other material, and it rendered it far more flexible and better adapted for the purpose intended.

Mr. GREENISH said it was very necessary in introducing mustard plasters to be sure there was nothing besides mustard in them, because other substances might be injurious.

Mr. MARTINDALE said he found on immersing this plaster in warm water that it immediately evolved a strong odour of essential oil of mustard. The colour he had no doubt was due to the basis with which it was made to adhere.

Mr. HOLMES next called attention to sundry articles he had placed on the table. The first was a specimen of benzoin which had a different odour to that generally met with, being more like that of tolu, and it was more translucent than usual, and contained very few tears. He had no information as to its botanical source, but it yielded a beautifully white benzoic acid by sublimation, the proportion being, he was informed, about 10 per cent. Whether or not it was obtained from the *Styrax Benzoin* he could not say. Mr. Hanbury had described in the 'Pharmacographia' two or three kinds of benzoin, but this variety was not mentioned. It was said to come from Zanzibar, but he doubted if that were its real origin. He had tested it for cinnamic acid, but it did not contain any. There was also a beautiful specimen of olibanum resin, showing the peculiar papery bark of the tree on its undersurface. It was the variety called by the natives Lubân Matti, derived from *Boswellia Frereana*, Birdw. It was distinguished from other varieties of olibanum by a peculiar whitish efflorescence on its surface and stratified opaque white layers in its interior. There were also two specimens of palmitic acid beautifully crystallized, presented by Price's Patent Candle Company; the one represented the commercial article, usually known under the name of palm stearine, and the other was nearly pure palmitic acid. There were also some interesting specimens representing the chemical principles obtained from ergot by Professor Dragendorff, as referred to in the Journal for June, 1876; a sample of single chamomile flowers collected in Cornwall by a former student of the Society; and several solutions illustrating the phenomenon of fluorescence, presented by Mr. Lettsom. These solutions included æsculin, lately shown to be identical with the fluorescent principle of *Gelsemium sempervirens*, and formerly called gelseminic acid; fraxin; aqueous infusion of lignum nephriticum; eosin, weak solution; eosin, strong solution; tincture of the seeds of *Peganum Harmala*; fluorescin; sodium salt of dichloranthracene, and æsculetin.

Professor BENTLEY remarked in reference to the so-called Zanzibar benzoin that it was doubtless only indirectly derived from that port, the only varieties at present known being from Sumatra and Siam. The present specimen appeared most nearly to resemble the variety termed by Pereira, translucent Siamese benzoin, and which he obtained from Dr. Royle, who conjectured its botanical source to be *Styrax Finlaysonianum*. He had not, however, had an opportunity at present of comparing the specimens. The great peculiarity of the specimen now exhibited was the translucency of the white tears, for as a general rule, these were opaque, and the dark substance between them transparent. The amount of benzoic acid obtained from this benzoin being only 10 per cent. it could not be regarded as a very fine variety, for the quantity usually obtained from the best kinds varied from 12 to 20 per cent. Professor Bentley said that it was generally stated that the dark portions of benzoin yielded the most benzoic acid, and if this be correct, the large amount of white translucent matter would account for the comparatively small proportion of benzoic acid in this specimen. Professor Bentley said that much still remained to be done in reference to the botanical source of the varieties of benzoin, that of Sumatra benzoin having been clearly traced to *Styrax Benzoin*, but the plant yielding the best variety of benzoin now known, namely Siam benzoin, had not been botanically determined. It was highly probable, judging from the varying appearances of the varieties of benzoin, that they were derived from different plants.

The CHAIRMAN said it was now well known as a chemical fact that the benzoic acid obtained from gum benzoin was always a mixture of benzoic acid and cinnamic acid, and that pure benzoic acid could only be obtained by decomposing hippuric acid. He would now draw attention to some specimens of opium presented by Mr. Morson, and also to a series of tubes containing solutions illustrating the phenomena of fluorescence.

Professor BENTLEY remarked that galbanum might be made to form a beautiful fluorescent solution, and he believed he could distinguish it from some of the allied gum resins by this character. Thus by taking a piece of galbanum and putting it in water for an hour or two, the water would not in itself exhibit any marked fluorescence, but on the addition of a drop of ammonia a beautiful blue fluorescence was at once observable; and this fluorescent appearance was again destroyed by the addition of an acid. Asafœtida would also cause a similar fluorescence, but not to the same extent; and with ammoniacum it was scarcely observable. This fluorescence was due to the presence of umbelliferone in the gum resins.

The CHAIRMAN then declared the meeting adjourned until Wednesday, December 6.

EXAMINATIONS IN EDINBURGH.

October 24th and 25th, 1876.

Present—Messrs. Ainslie, Borland, Buchanan, Kemp, Kinninmont, and Young.

Professor Maclagan attended on behalf of the Privy Council.

MINOR EXAMINATION.

October 24th.

Twelve candidates were examined. *Six* failed. The following *six* passed, and were declared qualified to be registered as Chemists and Druggists :—

Beveridge, William .... Edinburgh.
Blaine, Thomas James Stewart Hawick.
Croskell, William Joseph......... Liverpool.
Ferriday, Edwin Jos. Pitchford Oakengates.
Goodchild, Thomas Archibald Belfast.
Halhead, John Armstead ...... Kirkby Lonsdale.

October 25th.

Nine Candidates were examined. *Five* failed. The following *four* passed, and were declared qualified to be registered as Chemists and Druggists :—

Mann, Edwin .... Atherstone.
Munro, Hugh .... Hampton Wick.
Rowe, Sampson.................. Redruth.
Watson, Lund .... York.

MODIFIED EXAMINATION.

October 25th.

Three candidates were examined. *One* failed. The following *two* passed and were declared qualified to be registered as Chemists and Druggists :—

Beech, Thomas .... Birmingham.
Hume, Robert .... Birmingham.

Provincial Transactions.

HALIFAX AND DISTRICT CHEMISTS AND DRUGGISTS' ASSOCIATION.

This Association held its annual meeting at the Old Cock Hotel, Halifax, on Oct. 12, 1876, Mr. Robert Brook, President, in the chair. The following gentlemen, the nominations of a previous committee meeting, were elected officers of the Association for the coming year.

President, Mr. R. Brook; Vice-Presidents, Messrs. Dyer and Jessop; Treasurer, Mr. Councillor Brierley; Hon. Sec., Mr. B. Shaw; Committee, Messrs. Slott, Hebden, Farr, Swires and Blade; Librarian, Mr. Brook

Having expressed his thanks for the honour of reelection, the President delivered the following address, which was warmly received, and the meeting, having heard the Annual Report from the Honorary Secretary, decided that both should be printed and circulated.

THE PRESIDENT'S ADDRESS.

I had the honour last year of addressing a few remarks to you on the policy that should govern our prices in dispensing prescriptions, and I wish this evening to place before you a few practical reasons for the necessity of upholding and strengthening the early closing movement. When we consider how the business of shopkeepers is carried on, one is apt to come to the conclusion that a great amount of profitless expenditure both of time and money is swallowed up in the process. And although we profess to be a practical people, and on no account given to sentimental nonsense, yet many naturally arrive at the conclusion that much of this time and money might be saved, and an incalculable amount of good effected by the curtailment of the hours of business. It is a very practical question to ask what is there to prevent this reduction. The assumption I take it to be is this.

We have our shutters taken down at the earliest moment we are likely to secure custom, and they are put up again as soon as the chances for the day and night are over and gone. Here and there an enthusiast may let his gas flare through his windows out of share hilarity of spirits, or an eccentric individual out of mere opposition, or some solitary being may plead like the Apothecary of Mantua that his poverty and not his will compels; but as a rule I take it for granted that shopkeepers would be very glad to leave their counters at an earlier hour if they could so without any corresponding diminution of profits. Well, can this twofold result be obtained? What is wanted is just that amount of courage necessary to enable the experiment to be made. There are only two parties in the transaction, the customer on the one side, and the tradesman on the other. Restrict the amount of time within which the two may be brought into contact and it must follow that the one will find opportunity to sell that which the other wishes to buy. There would be less waste of time, but there would be no less custom.

This view of the subject which seems so self-evident is not yet fully comprehended by the retail tradesman; nevertheless it is very desirable to settle the question on a voluntary basis, rather than by legislative action. What is required is a little more public spirit on the part of shopkeepers, coupled with a more enlightened sense of duty on the part of the public, who have the power of making the most obstinate soon tire if he could not turn a profitable penny after eight o'clock.

In placing these considerations in the foreground, I do not wish to lose sight of what our Association has done in the matter. A dozen years ago no arrangement amongst chemists for closing existed in this town. It might be some thought nine o'clock quite late enough, or were perfectly satisfied with the contents of the till, or perhaps nature rebelled in the form of weariness both of mind and body. It might be some would let the hands slowly take their course round the dial-plate once more and nurse the idea that druggists specially were required and expected to keep open till the very last moment. But one of the first and best acts of this Association was to change all this and arrange for a plan of early and systematic closing. This was brought to a successful conclusion, and I think we have all of us benefited by the change both mentally and physically. Nay more, I say, if this Association had done nothing else than this, it would have deserved the gratitude not only of the present but also of the future generation of druggists.

If this is the case you may naturally ask, why am I bringing it under your notice this evening. For this reason, I fear there is a tendency to relax our efforts to keep well abreast of the early closing movement, and to let slip the many benefits that we have received from it, and I want therefore to stir you up to a lively remembrance of what we stand committed to. Our position as tradesmen with our superior education and responsibilities eminently fit us for taking the lead in this matter; do not then let us commit the folly of lagging behind. Bear in mind the tendency of the age is against us. For some time past we have been threatened with legislation on the subject, and much as I object to too much meddling in trade by Parliament, I should not regret to see a compulsory closing Act, so valuable would be the benefits we should receive from it.

In presiding over the meetings of our Association I have often thought that a good deal of time was wasted and a want of clearness and decision evinced in discussing the various subjects brought under its notice, owing to extraneous matter being introduced not bearing directly on the question at issue. I think a change for the better is desirable, and I would therefore suggest that the official business on the notice paper be taken first, and in discussing the various items all extraneous matter be avoided as much as possible. If this be done we shall find that we have a clearer and distinct idea as to what we are aiming at; it will be a great deal easier to comprehend and chronicle the proceedings by the Honorary Secretary, and will most certainly have a tendency to prevent us getting into—what has some seldom times occurred—a state of muddle and confusion.

One of the most remarkable circumstances in connection with pharmacy during the year, has been the formation of a Trade Defence Association with head quarters at Birmingham. An organization of this kind—one in which we should have confidence, and might look up to for guidance and advice—has been a long-felt want to most outside the charmed circle of the Pharmaceutical Council. I commend it to your favourable consideration and hope that by a large increase of members and subscriptions to the Defence Fund, it may become unto us as a parent society strong in attack and powerful in defence of trade rights and interests. And I think we can very well afford to treat with indifference the sneers of the Journal, the soreness of some members of the Council, and the comments made by some London chemists. These gentlemen no doubt fully understand the nature and business of a druggist's establishment in town, but are just as ignorant of the nature of those that are carried on in the provinces. And this is just the point where the Council has failed. I give them all the credit that is their due for the educational and scientific successes they have achieved, but with regard to trade matters they either cannot or will not perceive the difference between town and country experience in pharmacy.

And whilst commending the new Association to your consideration, let me not forget to remind you of the claims our own elder Association has upon your attention and support. Probably no one now present can call to mind any period within the last twenty-five years when a more pressing claim could have been put forth. We do not know for certain what is looming in the future, but we do know this, that we are threatened with troubles and trials in all directions. The Inland Revenue authorities have given us a hint that their officers are going to look sharp after us in the matter of quinine wine; they are harrassing us with regard to methylated preparations for outward use and liquid extract of meat in a most absurd manner. We are to be visited by the inspectors under the Food and Drug Adulteration Act, which after being so long a dead letter in the town is now to be enforced. The Medical Defence Association tells us plainly they will prosecute, when they can get hold of a case, for counter prescribing, under the Apothecaries' Act, which said Act specially contains a clause exempting chemists *from* prosecution. More still, barristers tell us that the poisons in the second schedule of the Pharmacy Act ought to be registered, which if enforced will prove a most serious affair to the trade. And to crown all and make our cup of misery full to overflowing, we are threatened with another Poison Bill next session. I say then, there never was a time when we should so call in our reserve forces and putting shoulder to shoulder, closing in our ranks, present a bold front on behalf of trade interests. For we must remember this, however conscientiously we may desire to do what is right and honest, we never know what is in store for us. And whether it be the decision of a superior or a county court judge, the vagaries of county or borough magistrates, or worse still, the remarks of coroners, and the absurdities and contradictions of analysts; nearly all seem ignorant or strongly biassed against our trade. Notice too with what eagerness a doctor, when he thinks he has a case against us either with regard to the sale of poison or counter-prescribing, rushes into print and thinks to crush us at once. And the press is in no way backward in following up the attack, and leaders soon appear, nearly always displaying any amount of prejudice and ignorance, and in some paltry cases exemplifying the couplet of the poet,

"The ocean into tempest tossed
To waft a feather, or to drown a fly."

The Annual Report, 1875–6.

The report for the seventh year of this society's life stated that the number of meetings during the year, including the annual dinner, had been eight, there having been two extraordinary meetings in the months of June and July. The average attendance had been 7·75. The number of members remained the same. Changes had however occurred. The year now closing had been an expensive one for the members, two calls having been made upon their voluntary liberality in aid of the finances of the Association, besides others from without and related to the business its members pursue. With ordinary care there was no likelihood of similar demands during the new year. The balance in hand twelve months ago had been spent in providing the annual dinner, to which the Association invited several medical gentlemen. The gathering of the members was good, and the kindly feeling between the guests and their entertainers was very agreeably manifest. Two matters had taken up much of the time of the monthly meetings. The first was the rise and establishment of a small but excellent scientific library. A handsome sum remained in hand after the disposal of the effects of the recent Halifax Chemists' Assistants and Apprentices' Association. These moneys the representatives of that association, Messrs. Illingworth and Rhodes, desired to spend in standard works on the sciences and arts immediately connected with the business and practice of pharmacy. They proposed to hand over such books to the care of the Halifax Chemists' Association to be held by them in trust for the use of its own members, and young men engaged by chemists in the town and district from time to time. This offer was received with much favour, and the list of books submitted was most carefully considered by a committee. Its suggestions were approved by the next meeting, and then passed on for the consideration of the young men's representatives. On receiving their reply, a smaller committee had an interview with them, and the arrangements were completed. The books had been for some time in the hands of the President, who had kindly acted as librarian *pro tem*. The works were the best treatises on the subjects in the English language, and more than sufficient as to number and variety to admit of ample preparation for the dreaded examinations being obtained by their study, without necessarily attending lectures or laboratory, or undergoing the degradation of being "coached." A small herbarium of medicinal plants and one of Messrs. Southall's materia medica cabinets were handed over with the books into the librarian's care. One of the members, Mr. B. Wood, had also kindly added a set of the *Pharmaceutical Journal*. The second principal subject of the year was the demand for and formation of a Trade Defence Association. As soon as the project was broached, the Association, considering such a body would meet a real and pressing want, expressed its approval and promised co-operation, and ultimately Messrs. Dyer and Jessop, Vice-Presidents, were selected as delegates to the preliminary conference, which met in Birmingham. Some ten guineas had been forwarded from members of the Halifax Association as subscriptions and donations in aid of the new body. In reference to closing hours and Sunday trade, it was to be regretted that in many cases the agreement to put shutters up at 7 p.m. had fallen through. Final closing at 8 p.m. was still general, and Sunday business was not only unsought, but undesired.

During the year the meetings had been very much meetings of the same faces. But few visitors from the less regularly attending members had shared the cares, or added to the interest. The average attendance had been as good, if not better than in some years, and good feeling had been preserved unimpaired.

Arrangements were afterwards made for the annual dinner, and guests were selected for invitation. The meeting passed this resolution unanimously:—"This Association recognizes the peculiar appropriateness and value of the gift of books, herbarium, and cabinet, constituting the scientific library, and tenders to Messrs. Illingworth and Rhodes, the representatives of the late Chemists' Assistants and Apprentices' Association, its hearty thanks for having disposed of the balance at their command in such a permanent and useful manner. The Association also hereby undertakes to exercise all needful care in respect of the circulation and keeping of the above-named property." The prospect for the coming session is stated to be clear and good.

HULL CHEMISTS' ASSOCIATION.

The annual meeting of the above Association was held on Thursday, October 26, at the Cross Keys Hotel, the President in the chair.

The ordinary business having been gone through, the Secretary read the report of the committee, from which we gather that the year just ended has not been quite so sensational as the preceding one; still matters of great importance have occurred affecting the interests of the trade generally. One of the most important was the conference held at Birmingham in July, when the Trade Defence Association was formed, which gives promise of being of very great advantage to the trade. Three gentlemen attended from this Association, and rendered practical service there. The treasurer's balance sheet showed a small balance in hand.

An alteration in one of the rules was proposed by the President, by which a solicitor is elected at the annual meeting.

A ballot was then taken for the office bearers for the ensuing year, when Mr. C. B. Bell was re-elected President; Mr. W. Staning, Vice-President; Mr. B. M. Stoakes, Secretary and Treasurer; Messrs. Myers, Earle, Oldham, and W. Hammond, the Committee; and Dr. A. K. Rollitt, Solicitor.

Votes of thanks were cordially passed to the past officers and the auditors for the services they had rendered.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The first meeting of the above Association for the present session was held at 17, Bloomsbury Square, on Thursday evening, October 26th, Professor Attfield, President, in the chair. There were present thirty members and four visitors.

The Secretary, Dr. Senier, read the minutes of the previous meeting, which included a report of the work of the last session. The number of members had been seventy-nine. There had been eighteen meetings, with an average attendance of eighteen members. Besides the President's address (already reported in the *Pharmaceutical Journal*, 3rd series, p. 279), twenty-five papers had been read and discussed as follows:—

"Life Germs," by Mr. Chas. J. Boorne; "Infusions," by Mr. H. G. Greenish; "Pharmaceutical Zoology, Pt. I." by Mr. Charles Shapley; "The Botanical Relationships of some Thalamifloral Orders and their Pharmaceutic and Economic Products," by Mr. Arthur Hunt; "John Dalton," by Mr. Thos. Slater, jun.; "Reminiscences of Session, 1871-2,' by Mr. R. W. Houghton; "Notes upon the Properties and Uses of Magnoliaceæ, Sarraceniaceæ and some other Allied Natural Orders," by Mr. Arthur Hunt; "Cortex Winteranus," by the late Daniel Hanbury, F.R.S.; "The Composition of Pilula Hydrargyri, B.P." by Mr. Harold Senier; "Notes upon some Branches of Physical Science," by Mr. Ernest Cardwell; "Notes upon Hydriodate of Quinia," by Mr. Arthur Hunt; "Albuminous Urine," by Mr. R. W. Houghton; "Ultimate Organic Analysis," by Mr. Sydney Plowman; "Vegetable Nutrition," by Mr. W. A. H. Naylor; "Pharmaceutical Zoology, Part II.," by Mr. Chas. Shapley; "Glycerine," by Mr. A. J. G. Lowe; "Spectrum Analysis," by Dr. Senier; "Ferns," by Mr. E. B. Walton; "Ext. Nucis Vomicæ a Cumulative," by Mr. R. W. Houghton; "Guarana," by Mr. W. A. H. Naylor; "Absorption Spectra," by Mr. Chas. J. Boorne; "Note on the Solar Spectrum," by Mr. Henry Campbell; "Voltaic Electricity," by Mr. Chas. H. Hutchinson; "The Production of Aniline and its Derivatives," by Mr. Edwin Richardson; "Polarization of Light," by Mr. Chas. H. Hutchinson.

The President then addressed the meeting. He read the objects of the Association from the prospectus, and reminded the members that the papers expected of them were not original memoirs, such as would be acceptable to the Chemical or Pharmaceutical Societies, but essays on the work of the older chemists, physicists and botanists, experimental confirmation of results published from time to time in the various journals of chemistry and pharmacy, and discussions on subjects and observations drawn from their past daily experience in the shop, the dispensing counter, and the reading-room. The papers of last session the titles of which they had just heard, had been very creditable to the authors, and to the management of the Association, and, he was informed would shortly be in a form in which they might be consulted by members. In order to perform the duties of an educated pharmacist it was necessary that something should be learned besides chemistry, botany, materia medica, and dispensing. Professor Attfield did not believe that any student came to the school of which he was a teacher, for the simple purpose of passing the examinations of the Pharmaceutical Society. If a teacher chose he could so rapidly prepare his students that they would be able to pass examinations in about half the time devoted to study in the Society's school. He need hardly say, however, that facts so hurriedly acquired were as quickly lost, and left behind them a weakened rather than an educated mind. He thought that the students of the Society's school knew all that, and came to their studies with a sincere desire for lasting knowledge. He trusted they would accomplish their desire, but further would endeavour to give their gems of knowledge the golden setting of a well-cultured mind. In doing this no aid was more valuable than the preparation—by each member—of papers and essays for the meetings of the Students' Association, and the intelligent comprehension and discussion of the communications of other members. The Professor then drew attention to the duties of an educated pharmacist to his calling and to the public, as well as to himself and his household, reminding his audience that in the time to come as now and in the past, Councillors, Educators, Examiners, and other leaders would be wanted and that those students who took the broadest, widest, and soundest view of their present position would best be able to guide pharmacy in the future. In conclusion he earnestly advised every student to avail himself of the advantages of this Association and to contribute as much as possible to its papers and discussions.

The election of officers being next in order the President appointed Mr. W. F. Gadd and Mr. S. Eliott a committee to examine the voting papers.

While this examination was being made Professor Attfield introduced the subject of the necessity now being felt for competent sanitary advisers who might be consulted in cases of defective ventilation and drainage. He thought that those pharmaceutical chemists who had passed the Major examinations were fully capable of acting as such advisers.

An interesting discussion followed in which Messrs. Plowman, Hutchison, Atkins, Elliot, and Naylor took part.

The report of the Committee on elections was then read and the following gentlemen declared to be the officers and committee for the session of 1876—77.

Vice-presidents; Mr. Harold Senier, Mr. Henry Campbell: Committee; Mr. Chas. H. Hutchinson, Mr. Jas. C. Shenstone, Mr. John F. Savory, Mr. Edwin Richardson: Secretary and Treasurer, Mr. J. Howden Hugill, 17, Bloomsbury Square, W.C.

A vote of thanks to the retiring officers was acknowledged by Mr. W. A. H. Naylor, after which the papers for its next meeting were announced and a vote of thanks to the President brought the meeting to a close.

Parliamentary and Law Proceedings.

Suicide of a Chemist and Druggist.

On Tuesday last Mr. Donaldson held an inquiry at Lower Clapton, respecting the death of Mr. William Lambert Kibble, aged 50 years, who had up to five years ago, carried on business as a chemist and druggist, at 34, Tavistock Place, Tavistock Square. From some unforeseen circumstances he failed, and shortly after Mr. Edwards, of Clans House, Seven Sisters Road, Tottenham, placed him in charge of his shop, 4, Portland Place North, Lower Clapton. In September last Mr. Edwards advertised for another assistant, whom he engaged. He then informed the deceased what he had done, which seemed to prey much upon his mind, An agreement was then arranged between the deceased and witness that the deceased should pay the person engaged a month's salary and witness would keep him on. He was then having £120 per annum.

Sarah Elizabeth Taylor, who attended upon the deceased daily with his meals, stated that at 5 o'clock on Friday last he said to her that he was going to the devil, as he had no money. On her arriving at the shop the following morning she could not gain admission, and, thinking something was wrong, sent to the police-station, when Inspector Taylor, accompanied by a constable, came and broke open the door. The deceased was found lying partly dressed in bed. He was dead, and on the dressing-table were a glass and a bottle labelled "Poison."

Dr. Aveling, on making a *post mortem* examination, found enough prussic acid of Scheele's strength to kill fifty people.

The jury returned a verdict of "Suicide while in a state of unsound mind."—*Times.*

Reviews.

The Dispenser's Chart (An Abstract from the "British Pharmacopœia" of 1867), showing at a glance the Formulæ of Preparations in constant use by the general practitioner,—quickly and readily made,—other Preparations requiring length of time or percolation, see the above work. London: H. K. Lewis, 136, Gower Street.

This double-crown sheet contains a jumble of formulæ composed principally of dog Latin of the worst kind and English, of which a specimen is given above, where certain preparations are given eyes to "see the above work." The Latin may be exemplified by the following:—"Tinctura Opii Ammoniata; ℞ Opium, 100 gr.; Croci., Ac. Benz., of each 180 gr.; Anisi Ol., ʒj.; Liq. Ammon. Fort., ℥iv.; Sp. Rect., ℥xvj. 1 in 96;" and "Tinctura Lobelia Œtherea; ℞ Lobelia, ℥iiss.; Sp. Œtheris, vj., 1 in 8." Some of the groups of preparations have special headings with notes on their general preparation, as under the head of Unguenta we have "Ointments to be made by the heat of a Water Bath." It is somewhat curious to note, that not one half the ointments mentioned are ordered to be heated at all in the British Pharmacopœia. The spirits are headed "Spirita." The sugar and water are directed to be boiled together in making simple syrup.

Many preparations are inserted which are never used, such as Conf. Terebinthinæ, and Tinct. Cocci, whilst others in constant use, such as Liquor Ammoniæ, are not to be found. We think that with the uncertainty of finding what we wanted in this chart, it would be a saving of time to refer to the Pharmacopœia at once, especially when we find that the compiler stated that "5 minims of either Liq. Soda Arsen., Liq. Arsenic., or Liq. Arsenic. Hydrochl. contain $\frac{1}{24}$ grain of arsenic." Tabulated formulæ such as are in the Pharmacopœia, are much more easily referred to than those running line into line as in this chart. To assist the memory, the compiler might have used a little more ingenuity, and have composed a few more rhymes of the formulæ like the following:—

"Asafœtida, Galbanum, Myrrh,
Treacle by weight, and give it a stir."

His work might then have possessed about as much merit as a Comic Sermon on the Mount, which it at present lacks.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Chemistry: General, Medical, and Pharmaceutical, including the Chemistry of the U.S. Pharmacopœia. By John Attfield, Ph.D., F.C.S., etc. Seventh edition. Philadelphia: Henry C. Lea. 1876. From the Publisher.

Water Analysis: A Practical Treatise on the Examination of Potable Water. By J. Alfred Wanklyn and Ernest Theophron Chapman. Fourth edition, rewritten by J. Alfred Wanklyn, M.R.C.S., etc. London: Trübner and Co. 1876. From the Publisher.

Notes and Queries.

[528]. CRIMSON MARKING INKS.—*O. K.* is desirous of obtaining a good recipe for Crimson Marking Ink.

[518]. COCKROACHES.—The following methods of destroying cockroaches are quoted from *The Garden*:—

Arsenic.—Mix some arsenic with honey, and lay it on scraps of paper about the floor for them to eat. If arsenic be mixed with boiled potatoes, and laid about in the same way, it will answer the same purpose.

Bracken.—Another remedy is said to be to procure some bracken, *Pteris aquilina*, or common fern, plentiful on commons, and put it down about the house at night. The black beetles will eat it ravenously and soon die, and their relatives will pick their bones. It is commonly used in the north of England.

Honey.—Mix some honey and water together. Two teaspoonfuls of honey will be ample for half a common basinful of water; put the basin on the floor at night, half filled with the mixture, and place three or four small sticks, about half-an-inch wide, to rest on the edge of the basin for the cockroaches to walk upon. They will fall into the liquid and get drowned. Some tumbler-glasses half filled with the mixture, and sunk to the rim in pits in the tan or soil, make excellent traps for them. Porter and brown sugar is said to be equally efficacious.

Oatmeal.—Bait them well with oatmeal for three or four successive nights, or until such time as they feed greedily on it; then mix some arsenic with the meal for one night, repeating the process from time to time if necessary. Mr. Wilson states that if a bowl be wrapped round with a wet cloth they will get into the bowl, from which they cannot escape.

Phosphorus.—A very simple and effectual remedy is given in the *Revue Horticole*, communicated by M. Loury, chief propagator at the Jardin Fleuriste, Paris. It is as follows:—Dissolve the heads of a couple of boxes of common phosphorus matches (not *Safety* matches) in a pint and a half of water; then mix with it about one lb. of flour, and add about half lb. of sugar, of which these insects are very fond. The mixture may then be distributed in various parts of the house overnight on pieces of board, slates, etc., and when examined in the morning, numbers of dead cockroaches will be found close to wherever the poison has been laid.

The remedies given for crickets are equally effective in the case of cockroaches.

Obituary.

Notice has been received of the Deaths of the following:—

On the 22nd of October, 1876, suddenly, at 37, George Street, Edinburgh, Mr. Evan Thomas, Chemist and Druggist, aged 37 years. Mr. Thomas had been upwards of twelve years principal assistant to Messrs. James Robertson and Co., Pharmaceutical Chemists, 35, George Street, Edinburgh.

On the 24th of October, 1876, Mr. Henry Robert Maynard, Pharmaceutical Chemist, Brandon, Suffolk. Aged 52 years. Mr. Maynard had been a Member of the Pharmaceutical Society since 1848.

On the 25th of October, 1876, Mr. Jonathan Briggs Fletcher, Chemist and Druggist, Hampstead. Aged 47 years.

On the 31st of October, 1876, Mr. John Lomas Pimlott, Chemist and Druggist, Leek, Staffordshire. Aged 35 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

The Norwich Chemists' Association.—De Mortuis Nil Nisi Bonum.

Sir,—To the mutual honour of teachers and students will you allow me to record that on my son leaving Norwich a few months since, the members of the chemical class of the above association presented to him, as their teacher for a portion of two sessions, twelve volumes of valuable scientific works?

W. Symons, F.C.S.

Barnstaple.

Dangerous Green Fire.

Sir,—In the Journal of the 14th October, there are some tables for coloured fires, by Kern. I have mixed a number of the different numbers of these tables, and I find the greens of the higher numbers to be dangerous. I mixed 5 oz. of the No. 6 green (having previously found that it suited us best), and I may say that we should have mixed much more if we had not been short of Pulv. Pot. Chlor. It was put in a bottle and then bunged up. About ten minutes after I heard a hissing sound, and found that it proceeded from between the bung and the neck of the bottle containing the No. 6 green fire. I seized the bottle and ran with it into the middle of the back-yard and laid it on the ground. I had no sooner done so than out flew the bung with a slight report, and a jet of visible vapour issued from the mouth of the bottle with such a velocity that the jet was almost a straight line for some feet; the bottle then broke from the heat generated, and the mixture now having a free access of air took fire. I may add that another person and I felt the effects of breathing the medley of gases which were generated (whilst we were opening the door to run out with the bottle) all the evening, nitric oxide and chlorine being preponderant.

Last year I added a small quantity of chlorate of potassium to some green fire containing nitrate of barium for the purpose of making it burn better, and I found that nitric oxide was copiously evolved after some days, but the mixture never took fire. I used dry Bar. Nit.

Wm. West.

Bradford.

Toughened Glass.

Sir,—A few days ago I supplied myself with some cylindrical two ounce toughened glass measures, with an idea that I should perhaps lessen my too many breakages.

This evening whilst using one simply for measuring cold water from my shop filter, it suddenly went to pieces, breaking into minute crystalline fragments, which were strewn about the floor in every direction.

My object in writing is to deter others from purchasing these measures, as, although this accident did no harm, it might have been otherwise, had it contained a corrosive acid or other strong preparation.

I find that one of the measures left is beginning to shed small pieces from the edges of the thickened bottoms.

I should also mention that the glasses had been standing on the shelf in my shop, the temperature of which at the time was 58° F., and that the filter had been filled up in the early part of the morning, so that there could not have been any very great lowering of the temperature of the glass.

Country Member.

W. W.—*Humulus lupulus.*

G. W. S. Highmoor.—(1) *Valeriana officinalis;* (2) *Veratrum album;* (3) *Helleborus niger.*

C. B.—(1) Page's 'Advanced Text-Book of Geology,' published by Blackwood. (2) See an article on 'Preparations of Coca,' by Shuttleworth, before, vol. v., 483. (3) Squire gives the following formula for Syrupus Ferri Hypophosphitis:—"Sulphate of Iron, 1; Carbonate of Soda, 1⅓; Hypophosphorous Acid, 6; Dilute Phosphoric Acid, 1; Sugar, 12; Distilled Water, a sufficiency. Dissolve the sulphate and carbonate in separate portions of water, mix the solutions, collect the precipitate, wash it, and dissolve it in the acids, and then add the sugar to form a syrup. Dose, 1 drachm.

W. W Leete is thanked for his communication. The liniment of chloral hydrate and camphor has, however, been already referred to on several occasions in this Journal, and a paper on the nature of the union that takes place will be found on p. 89 of the present volume.

"*Kappa.*"—Apply to the Secretary of the Royal College of Surgeons, Lincoln's Inn Fields.

E. J. Clark.—Candidates for the appointment of Dispenser in Her Majesty's Naval Hospitals, must "possess certificates of either the Major or the Minor qualifications of the Pharmaceutical Society of Great Britain," and must make a written application to the Director-General of the Medical Department of the Navy. Information respecting pay, etc., will be found in the Order in Council on the subject, printed in vol. iii. of the present series of this Journal, and in the Calendar of the Pharmaceutical Society.

"*Captene.*"—(1) For the pyrogallic acid hair dye, see *Pharm. Journ.* [3], vol. iv., p. 747. (2) For the hyposulphite of sodium and acetate of lead, etc., see vol. i., p. 78. (3) No. (4) The active principle is slowly decomposed by caustic fixed alkalies in the cold.

"*Inquirer.*"—A formula for Pepsine Wine was given on p. 20 of the present volume.

J. B. L.—See a paper on the composition of sea-water in various parts of the world, by G. Forchhammer, printed in the *Philosophical Transactions* for 1865. Answers to the other questions will be forwarded.

S. P.—See before, p. 314; also a letter in the preceding column.

Communications, Letters, etc., have been received from Mr. Watson, Mr. Wilkinson, Mr. Redford, Mr. Paul, R. H., S. P.

A GLYCEROLE OF NITRATE OF BISMUTH.

BY BALMANNO SQUIRE, M.B. LOND.,

Surgeon to the British Hospital for Diseases of the Skin.

A note I contributed to the *Pharmaceutical Journal* on glycerole of subacetate of lead, this summer, has been followed by the adoption of that preparation as a remedy, not only in skin diseases (particularly in chronic eczema, the purpose for which I had designed it), but also quite as much in uterine diseases. I am encouraged, therefore, to propose now a soluble preparation of nitrate of bismuth, if such a proposition is not too absurd to be listened to.

The value of bismuth as an application in a great variety of skin diseases is well known, but its use in this direction, and indeed as I may say for every purpose for which bismuth has yet been employed as a remedy, has always been much crippled by the difficulties that have always hitherto existed in the way of obtaining a solution of bismuth.

There is of course the liquor bismuthi et ammoniæ citratis of the Pharmacopœia, but it is a matter of doubt whether this double salt presents the properties, as a local application, of a simple salt of bismuth. It is of course merely as a local application that bismuth is employed in medicine, that is to say as a local application to the stomach in cases of painful digestion or of waterbrash and its use in skin affections, in gonorrhœa, and so forth, is equally of the character of a topical application.

The difficulty, or rather the impossibility, of making an aqueous solution of nitrate of bismuth, otherwise than in the presence of a large excess of nitric acid (an agent which renders that solution perfectly useless for any purpose for which bismuth is serviceable), arises from two causes, the one the feeble basic properties of teroxide of bismuth, and the other the basic properties of water,—the water robbing the nitrate of bismuth of the greater portion of its nitric acid, and so precipitating nearly all of the bismuth in the form of the so-called trisnitrate.

It occurred to me, accordingly, that by the employment of glycerine as a solvent in place of water, both of these drawbacks might be circumvented, if only it should prove that nitrate of bismuth should be capable of solution in glycerine. I find that it is freely soluble in glycerine and that it dissolves without decomposition. As I think there is likely to be a large demand for this solution I think it necessary to communicate this fact to the pharmaceutical body through their Journal. For example, I applied to one of the first pharmaceutical chemists of this city for a solution of nitrate of bismuth in glycerine and I was told, firstly, that the salt would certainly not dissolve in glycerine, so that he could not supply me with such a solution, and in the next place he told me that the nitrate was not kept by any chemist because there was no demand for it.

Now I think that henceforward the nitrate should be kept by every chemist in the kingdom. I will explain why I think so. In the first place its solution in glycerine will prove without doubt the most valuable means of applying the remedy to any external surface, and in the next place it will serve equally as a means of administering bismuth internally, or if it be desired that an aqueous solution should be so administered even that may be done. For on diluting freely the glycerole with water, the presence of glycerine, as I find, serves to delay the precipitation of the bismuth by water. So that for quite half an hour, at the least, no turbidity whatever takes place provided the water used be cold water. It seems to me, moreover, that the presence of glycerine absolutely prevents, even after the lapse of several hours, the precipitation of more than a small proportion of the contained nitrate; insomuch that I have reason to believe that a merely moderate dilution of the glycerole might leave a permanently clear solution, but I have not as yet made quantitative experiments on this head.

We accordingly have henceforward at our command a preparation which has for long been a desideratum, and one the contrivance of which has baffled the efforts of the compilers of our Pharmacopœia, and indeed the efforts of every one who has devoted attention to the point.

I was assured on all hands that if I ever should succeed in getting by any means a solution of nitrate of bismuth, I should find that I had before me a very irritating application instead of what I desired, that is to say, a bland astringent. But I have sucked my glycerole; I have even rubbed it into my tongue, and I find it to be merely what I had designed it to be, and that is a bland and mild astringent. It is obvious that a soluble preparation of a drug is a much more efficient and certain mode of employing it than an insoluble one, and that a simpler preparation of the article is likely to prove a more active and serviceable mode of administering it than any more complicated preparation of it. I accordingly lay the results of my investigation before the pharmaceutical body in the confidence that they will soon develop its capabilities in a very considerable degree.

As an application to the throat, the larynx, the vagina, the uterus and the urethra, as well as to the skin, and no less as an internal remedy, I believe the preparation of glycerole of nitrate of bismuth will be found to open out a new field of therapeutics.

Since writing the above, I find the glycerole of nitrate of bismuth to be a somewhat more stimulant application, in cases of eczema, than a glycerole of the subacetate of lead of corresponding strength.

On the other hand, I find by sucking the actual crystals of the nitrate of bismuth, that the salt is in no degree a caustic, and not more acid to the taste than crystals of citric acid.

COMPARATIVE EXAMINATION OF THE MORE IMPORTANT COMMERCIAL VARIETIES OF GALBANUM AND AMMONIACUM GUMS.

I. GALBANUM.

BY EDWARD HIRSCHSOHN.

(*Continued from page* 371.)

5. *Chemical Composition.*—The first examination of galbanum appears to have been made by Carthäuser,* and his results gave for its composition a resin, a gum-like substance and a volatile oil. In 1812, Pelletier† analysed a galbanum; the sort is not stated. Fiddechow‡ also analysed an un-

* Pelletier, in 'Bull. de Pharmacie,' vol. iv., p. 97.
† 'Bull. de Pharmacie,' vol. iv., p. 99.
‡ 'Berlin Jahrbuch f. d. Pharm.' (1816), p. 250.

described kind. In 1816, Caspar Neumann* examined a galbanum in massis; Meissner, in 1817, a galbanum in granis; and Vigier,† in 1869, another undescribed sort. The results of these examinations are set forth in the following table:—

	Undescribed Kinds.			In massis.	In granis.
	Pelletier.	Fiddechow.	Vigier.	Neumann.	Meissner.
Resin	66·86	67·3	65·80	59·4	65·8
Gum	19·28	23·6	21·50	18·7	22·6
Tragacanth substance	...	...	...	...	1·8
Volatile Oil	...	5·7	6·75	4·7	3·4
Volatile Oil and Loss	7·52	...	...	...	...
Malate of Lime	traces.	...	...	...	...
Malic Acid	...	...	0·20	...	...
Extractive	...	3·5	...	...	0·2
Residue	7·52	4·8	5·75	12·5	2·8
Moisture	...	...		...	2·0

The resin, according to the general description of the above authors, is of a dark yellow brown colour, transparent, friable, with a shining fracture, and tasteless. It is soluble in ether and alcohol, scarcely so in almond oil, and insoluble, according to Berzelius,‡ in turpentine oil even when hot. It is dissolved by alkaline solutions. The melting point of the resin Pelletier found to be 50° C., but Vigier 60° C. According to Mössmer§ the resin dissolves in milk of lime and can be precipitated from such solution by hydrochloric acid. The resin so precipitated, he states, dissolves completely in ordinary but not in absolute ether; alkalies dissolve it imperfectly and also carbon bisulphide. All attempts to crystallize it, or to prepare from it crystalline nitrated or brominated compounds failed. Mössmer found the composition of the resin, as stated by Johnston,‖ to correspond with the formula, $C_{26}H_{38}O_5$.

Pelletier made the observation that when galbanum is heated to 120—130° C. a blue oil distils over, and Fiddechow obtained thus 8·33 per cent. of blue oil.

Sommer¶ observed that by heating the gum resin, as well as the pure resin, besides the blue oil umbelliferone is formed, of which he obtained 0·8 per cent. He also obtained umbelliferone by treatment with concentrated sulphuric acid. According to Hlasiwetz and Grabousky** the stronger the heating the greater is the yield of umbelliferone.

By melting the resin with caustic potash Hlasiwetz and Barth†† obtained, besides oxalic acid and a small quantity of fat acids, about 6 per cent. of resorcin.

According to Schwanert,‡‡ when boiled with nitric acid galbanum yields camphresinic acid.

* Buchner's 'Repert. f. Pharm.' [2], vol. xxvii., p. 249.
† 'Gommes Resines des Ombellifères,' p. 60.
‡ 'Lehrbuch der Chemie' (1838), vol. vii., p. 277.
§ 'Annalen der Chemie und Pharm.,' vol. cxix., p. 260.
‖ 'Annalen der Chemie und der Pharm.,' vol. xliv., p. 337.
¶ Ibid., vol. cxv., p. 15.
** Ibid., vol. cxxxix., p. 99.
†† Ibid., cxxx., p. 354.
‡‡ Ibid., vol. cxxviii., p. 123.

The gum is described as being perfectly similar to gum arabic.

Mössmer obtained the volatile oil (about 7 per cent.) by distillation with the vapour of water;* it had a balsamic galbanum odour, and by another rectification with water was prepared perfectly colourless and fairly refractive. Rectified over calcium chloride, a platinum wire being placed in the retort, it showed a constant boiling point of 160° C., and distilled over almost without residue at that temperature. Analysis gave results corresponding with the formula $C_{10}H_{16}$. The specific gravity of the oil at 9° C. was 0·8842. It rotated the plane of polarized light to the right, the specific rotatory power being 0·1857. By treatment with dried hydrochloric acid gas it was coloured reddish to purple red, and eventually lost its transparency. After a time, in the cold, a hydrochloric acid compound separated out, which crystallized from alcohol; it had a strong cajuput-like smell and resembled the substances obtained from oil of turpentine and other isomerous hydrocarbons. By nitric acid the oil was darkened, but no crystals separated in three months. Vigier,† on the other hand, obtained microscopic crystals by treatment with nitric acid. Other observers agree pretty closely with Mössmer. Fiddechow‡ states that the oil has a specific gravity of 0·876 at 15° R.; according to Berzelius its specific gravity is 0·92 and its colour a faint yellow.

6. *Description of Samples Examined by the Author.*—Before proceeding to give the results of his comparative examination the author gives the following description of the various specimens he had at his disposal collected from various sources.

(*a*) Persian Galbanum.

(1) Galbanum persicum, obtained through Apothecary Osse, Astrachan. A homogeneous turpentine-like mass, with numerous stalk fragments and little fruit; it has a penetrating garlic-like odour of galbanum.

(2) Galbanum persicum, obtained through Apothecary Langel, Kasan. A soft turpentine-like mass, mixed with dark tears of varying sizes, having a waxy glossiness; also with fragments of stalk, fruits, and stones. Its smell recalls that of turpentine and galbanum.

(3) Galbanum persicum, about twenty years old, from the collection of the Dorpat Pharmaceutical Institute. Large hard lumps, varying from a light wax-yellow colour to a dark cherry red. Fracture tough. The galbanum is mixed with fragments of stalk and small stones. Smell similar to No. 2, but more pungent.

(4) Galbanum persicum. Old and badly preserved. Like No. 3, but darker in colour.

(*b*) Levant Galbanum.

(5) Galbanum in granis, from the collection of the Pharmaceutical Institute, Dorpat. Tears varying in size from linseed to that of a hazel nut, roundish, reddish, or brownish-yellow, transparent, with a yellowish fracture and waxy lustre, the tears softening between the fingers, and having a weak smell. Mixed with some small fragments of root, pieces of stalk and fruit.

(6) Galbanum in granis, from a Dorpat pharmacy,

* Ibid., vol. cxix., p. 259.
† 'Gommes Resines des Ombellifères,' p. 76.
‡ 'Berl. Jahr. d. Pharm.' (1816), p. 236.

at present in the collection of the Pharmaceutical Institute. Similar to No. 5, more symmetrically roundish, yellow, some tears softening and some not between the fingers, and having a very weak smell. Rubbing the tears between the fingers causes some of them to give off a decided odour of olibanum, while others emit an odour of sagapenum or of opoponax. It is a mixture of olibanum, sagapenum, opoponax and galbanum.

(7) Galbanum in granis, from the collection of the Pharmaceutical Institute, Dorpat. Similar to No. 5, the tears agglutinated together and shining. It contains fragments of stalk and fruit.

(8) Galbanum in granis, obtained from Hamburg in 1873. Tears varying from the size of a pea to that of a walnut, irregularly formed, white to amber yellow, opaque, with here and there semi-translucent pieces, white to yellowish at the fracture, readily softening between the figures, and having a strong smell of galbanum. Mixed with slices of root.

(9) Galbanum in granis (ordinary kind), obtained from Hamburg in 1873. Like No. 8, but darker coloured. No white tears, yellowish green. Mixed with fragments of roots and stones.

(10) Galbanum in massis, Hamburg, 1873. Irregular soft masses, formed of different sized bluish, greenish and yellowish translucent tears, large slices of root, and stones. Smells strongly of galbanum. Nos. 8, 9, and 10, have, since the opening of the Suez Canal, again come into commerce from India by this route.

(11) Galbanum in massis, from a Dorpat pharmacy. Irregular, hard, homogeneous, greenish brown coloured masses permeated by white veins (slices of root); fracture with a waxy lustre, greenish semi-translucent, soft, with yellow friable spots.

(12) Galbanum in massis, obtained from Nischni-Nowgorod through the Russian Drug Company (1873). Large adherent masses, formed of bluish and greenish almost translucent tears and numerous large slices of root. In the interior of the large pieces are masses having the consistence of turpentine and a strong smell.

(13) Galbanum in granis. Sent to St. Petersburg from Trieste as a sample (1873). Pieces 1½ inches in diameter, containing slices of root, which are agglutinated together by yellowish, internally milk-white, opaque or slightly transparent tears, mixed with a little black substance that softens between the fingers.

(14) Galbanum, sold in London in 1840, supplied by Mr. Hanbury. Like No. 11, but without white veins.

(15) Galbanum imported into London in 1850 and sent by Mr. Hanbury to the Dorpat Pharmaceutical Institute. Rather soft colophonium coloured dusty pieces, mixed with fruit and fragments of stalk. Similar to the Persian galbanum in smell, and probably, as shown by further investigation, wrongly named, and to be considered a Persian variety.

(16) Galbanum imported into London (1872) through Horner and Co., supplied by Mr. Hanbury. Irregularly formed pieces, formed of transparent greenish or opaque milk-white tears, which contain slices of root up to 1¼ inches in diameter.

(17) Galbanum, purchased in Paris by Mr. Hanbury (1849). Similar to No. 15, somewhat harder. Probably, as shown by further investigation, wrongly named, and to be considered a Persian variety.

(18) Galbanum in lacrymis. Reached Mr. Hanbury through Dr. Mohr of Coblentz (1851). Like No. 5.

(19) Galbanum from the Lens collection, obtained by Mr. Hanbury. Pieces of a red-brown myrrh colour, rather brittle, and with a weak smell; mixed with tolerably thick very porous stalk fragments.

(20) Galbanum in massis, from the Lucae collection, imported into London from Bombay. This and the next three numbers were supplied to the Dorpat Pharmaceutical Institute by the present possessor of the Lucae collection, Dr. Witte Rostock. Similar to No. 11, but more shining, permeated by root fragments.

(21) Galbanum (persicum ?), from the Lucae collection. Homogeneous, amber coloured, almost transparent pieces, having a weak smell and mixed with slices of root.

(22) Galbanum artificiale, from the Lucae collection. Homogeneous, amber yellow, non-transparent tears, the size of a nut, softening between the fingers, and then giving off a strong odour of olibanum.

(23) Galbanum in granis, from the Lucae collection. Non-transparent, reddish-yellow, dusty, tolerably symmetrical tears, not readily softening between the fingers, and having a weak smell of galbanum.

(*c*) Galbanum depuratum.

(24) Galbanum depuratum, 20 years old, from the collection in the Dorpat Pharmaceutical Institute; prepared from Persian galbanum. Dark, almost black, masses, internally still soft, and smelling of turpentine and galbanum.

THE DETECTION AND QUANTITATIVE DETERMINATION OF FREE SULPHURIC AND HYDROCHLORIC ACIDS IN VINEGAR, LIME AND LEMON JUICES, AND SIMILAR LIQUIDS.*

BY OTTO HEHNER.

Although a large number of methods for the detection and determination of free mineral acids in vinegar have been proposed, yet there is none, as far as I am aware, which could be considered to fulfil all the requirements expected from such a method. These requirements are, first, that a simple quantitative test should at once answer the question, whether a given sample of vinegar contains free mineral acids or not, so that, the result being negative, no quantitative determination need be resorted to; second, that the method for determining the amount of free mineral acid present should be exact within a few hundredths of a percentage; and third, that no substance or re-agent should be required which is not within reach of every chemist, and which is not to be found in the laboratory of any public analyst.

The older qualitative tests, as proposed by Normandy, Muspratt, and other chemists, were mostly based upon the charring action of sulphuric acid upon paper or other organic substances. Thus we read, "Sulphuric acid may be detected by writing with a quill upon white paper and drying it strongly before the fire, when the paper will become charred," but, fortunately, the author adds, "if the quantity of sulphuric acid exceeds two per cent." (Muspratt.) Another writer recommends that a drop of the suspected vinegar should be placed upon paper and dried before the fire, when a black stain will be produced, and a third, to heat a solution of cane sugar nearly to boiling, and then to add a small quantity of the liquid containing the sulphuric acid, when the charring of the sugar will at once point out the presence of mineral acid. These absurd and worse than useless methods

* From the *Analyst*.

seem to have been in general use, as they are to be found in most books dealing with the subject, which were written fifteen or twenty years ago.

But, besides the above methods, there are several worthy of attention. Thus it is directed to evaporate a measured quantity of the vinegar on the water-bath and to extract the syrupy liquid with spirits of wine, when the sulphates will be left in the residue on account of their insolubility in alcohol, while the sulphuric acid will be found in the alcoholic solution. But I have not unfrequently found an appreciable quantity of sulphate to pass into solution, even where no trace of free sulphuric acid could be present.

Another plan is to determine the total amount of sulphuric acid, both free and combined, gravometrically by means of chloride of barium, and to evaporate and incinerate another portion of the vinegar, thus driving off the free sulphuric acid, and to determine in the residue left the amount of the combined sulphuric acid, the difference between the two determinations being calculated as free sulphuric acid. This method, however, is quite incapable of giving accurate results, as free sulphuric acid so pertinaciously clings to the ash, that even with the acid of carbonate of ammonium it cannot be completely got rid of without some loss by volatilization of the sulphate of soda invariably present. In addition, it will be seen, this method requires two tedious gravimetrical estimations, in order to find out whether free sulphuric acid is present or not, and as even in the purest vinegar, which has never been contaminated with free mineral acid, the results before and after incineration are never exactly identical, it cannot be relied upon when small quantities of sulphuric acid are to be determined.

Mr. Thresh, in a late volume of the *Pharmaceutical Journal*, described a method similar in principle. He estimates the amount of chlorine before and after incineration of the vinegar, the difference being equivalent to the quantity of sulphuric acid added; but although this method is capable of giving more accurate results than the method just described, yet the same objection applies to it, namely, that two quantitative determinations are needed to obtain a qualitative result.

There have lately been published two other methods; one based upon the solubility of oxalate of lime in mineral acids, it being insoluble in acetic acid; and the other upon the change of colour which methylaniline violet undergoes, on the addition of mineral acids, it being unaffected by vegetable acids. Both these methods, however, are nearly useless; the former, because the solubility of the oxalate of lime depends upon a great variety of circumstances; and the latter because the quantity of mineral acid usually present in proportion to the acetic acid is by far too small to allow of a direct accurate determination. Both methods may however be useful, if the quantity of mineral acid present is very large.

As vinegar consists, except in the case of its being distilled, not merely of acetic acid and water, but always contains potash and soda salts of organic acids, as the tartrate or acetate, and chloride of sodium, it is obvious that sulphuric or hydrochloric acids, if added in small quantity, can no longer be considered to exist as such in vinegar, but that they decompose an equivalent quantity of acetate or tartrate. Whenever there is any undecomposed acetate or tartrate present in vinegar, no trace of any mineral acid can be present in the free state. As the organic salts of the alkalies are converted by incineration into the corresponding carbonates, it can safely be asserted that whenever the ash of a vinegar exhibits an alkaline re-action, free mineral acid cannot be present in the vinegar. Mineral acid may have been added, but it then has become neutralized by the decomposition of the acetates or tartrates. We have thus the simplest possible qualitative test for free mineral acids in vinegar.

But whenever the ash is neutral, free mineral acid is most likely present. The quantity of this may be ascertained with the utmost accuracy by following the same principle. If we add to a measured quantity of the suspected vinegar, a known and exactly measured volume of decinormal soda solution, somewhat more than would be necessary to neutralize the total amount of free mineral acid present, evaporate and incinerate, the alkalinity of the ash gives the measure of the quantity of the free sulphuric or hydrochloric acid. Supposing we add 20 c.c. of standard alkali to a vinegar, and find after incineration, by titration with standard acid, an alkalinity corresponding only to 5 c.c., then 15 c.c. of the soda solution have been neutralized by the mineral acid in the vinegar.

As the point of neutralization can be far easier ascertained, litmus being used as an indicator, by titrating from red to blue, than from blue to red, and as the latter plan offers several other advantages, it is advisable to operate as follows:—A measured quantity, say 50 c.c. of the vinegar to be examined, is mixed with 25 c.c. of decinormal soda solution (capable of neutralizing 0·200 per cent. of SO_3). The liquid is evaporated on the water-bath in a platinum basin, the residue is dried to prevent spirting in the air, or on the sand-bath at about 110°C, and is then carefully incinerated at the lowest possible temperature. The ash need not be burned white. 25 c.c. of a decinormal sulphuric acid solution, corresponding exactly to the soda solution, are now added to the ash, the liquid is heated to expel all carbonic acid, and is then filtered into a small beaker. The filter is washed with hot water, tincture of litmus is added to the filtrate, the acidity of which is ascertained by means of the decinormal soda solution. The volume of soda necessary for neutralization directly gives the proportion of free mineral acid present in the vinegar, 100 cc. of the standard solution, corresponding to 0·49 grammes of H_2SO_4.

It may happen, when more than 0·200 per cent. of free mineral acid is present, that the 25 c.c. of decinormal solution added to the vinegar are insufficient to neutralize all free mineral acid: in that case 25 c.c. of decinormal soda would be required to neutralize the filtrate. A fresh experiment, with the addition of a larger quantity of soda solution, say 35 or 40 c.c. to the vinegar, must then be made.

An error of 1 c.c. of decinormal soda solution, would cause with 50 c.c. of vinegar an error only in the amount of free mineral acid of 0·0098 per cent., calculated as H_2SO_4, but practically results of far greater accuracy can be obtained, as the following experiments show. I will remark, that they are taken without selection, but were made with scrupulous care.

A vinegar was prepared by diluting pure acetic acid, to a strength of 5·475 per cent. and by adding about one per cent. of cane-sugar. to represent the organic residue present in all non-distilled vinegar. To four portions of this liquid as much decinormal sulphuric acid was added, as corresponded to 0·2, 0·1, 0·05, and 0·025 per cent. respectively, and which I will call, I., II., III., IV. To 50 c.c. of I., I added 30; to 50 c.c. of II. III. and IV. each, 25 c.c. of decinormal soda solution. The liquids were evaporated in a platinum basin, and incinerated at the lowest possible temperature, the basin not being allowed to become heated to redness.

To the carbonaceous residue in I. 31 c.c. of deci. H_2SO_4 were added, the liquid was boiled and filtered; the filtrate needed 25·07 c.c. of deci. soda for neutralization, equal to 0·10028 gram SO_3 or 0·20056 per cent., instead of 0·2000 per cent. Error, + 0·00056 per cent.

To ash II., 25 cc. of deci. acid were added; the filtrate required 12·79 cc. of deci. soda, equal to 0·05116 gram SO_3, or 0·1022 per cent., instead of 0·100. Error, + 0·0022 per cent.

Ash III., was likewise treated with 25 cc. of deci. acid, the filtrate requiring for neutralization 6·30 c.c. of acid, corresponding to 0·0252 gram SO_3, or 0·0504 per cent. instead of 0·0500 per cent. Error, 0·0004 per cent.

To ash IV., 25 c.c. of deci. acid were added; 3·8 c.c. of deci. soda were required for neutralization, corresponding to 0·0152 gram. SO_3, or 0·0304 per cent., instead of 0·0250 per cent. Error, +0·0054 per cent.

It will be seen that in no case is the error greater than 0·054 per cent., and this only when the total quantity of free sulphuric acid present was as small as 0·025 per cent.

As vinegar mostly contains some chloride of sodium, which would be converted by the action of free sulphuric acid into free hydrochloric acid, and sulphate of soda, and as hydrochloric acid might be directly used as an adulterant, a similar series of experiments as that described above was undertaken, the vinegar being admixed with hydrochloric acid to the extent of 0·2, 0·1, 0·05, and 0·025 per cent. To 50 cc. of each of these adulterated vinegars, 25 cc. of decinormal soda solution was added, and the quantities determined as in the previous series. The following are the results:—

I. Used 24·14 cc. of deci. soda, equal to 0·08814 gram HCl, or 0·1763 per cent. instead of 0·200 per cent. Error, +0·0237 per cent.

II. Used 1403 cc. of deci. soda, equal to 0·0512 gram HCl, or 0·1040 per cent., instead of 0·100 per cent. Error, +0·0040 per cent.

III. Required 7·93 cc. of deci. soda equal to 0·02894 gram HCl, or 0·05789 per cent., instead of 0·050. Error, +0·0079 per cent.

IV. Used 5·63 cc. of deci. soda solution, corresponding to 0·0205 gram HCl, or 0·0410 per cent., instead of 0·025. Error, 0·016 per cent.

Thus it is shown, that although the error of estimation in the case of free hydrochloric acid is greater than with free sulphuric acid, the results are still highly favourable and accurate, the difference between theory and experiment not exceeding 0·02 per cent. The experiments quoted show that the amount of free mineral acids may be determined with far greater accuracy alkalimetrically than by any other method.

The same method may be applied to lime and lemon juices, wherein I have repeatedly come across large quantities of sulphuric acid.

With a view to establish the correctness of the conclusion that an alkaline reaction of the ash of the vinegar is the best proof of its freedom from uncombined mineral acid, the following experiments were undertaken. They may, perhaps, appear somewhat superfluous, but I quote them, as again demonstrating the extreme accuracy of the method.

A pure distilled vinegar was mixed with a solution of acetate of soda, and it was found that 100 c.c. were capable of saturating 0·1065 gram SO_3, corresponding to 26·62 c.c. of decinormal sulphuric acid.

To 50 c.c. of this artificial vinegar, 12·5 c.c. of decinormal sulphuric acid were added; the liquid was evaporated and the residue was charred at a low temperature. The ash was all but neutral, but slightly alkaline, showing the absence, as was expected, of free sulphuric acid in the vinegar. The alkalinity of the ash was found to be equivalent to 0·0085 gram of SO_3. Theoretically there ought to have been an alkalinity corresponding to 0·0065 gram of SO_3.

To 50 c.c. of the same vinegar 6·25 c.c. decinormal sulphuric acid were added. The alkalinity of the ash corresponded to 0·0643 per cent. of SO_3, instead of 0·0565 per cent.

To another 50 c.c. of the same solution, 3·13 c.c. of decinormal acid were added. The alkalinity of the ash corresponded to 0·0776 per cent. of SO_3, theoretically 0·081 per cent.

The final conclusion to be drawn from these results is obvious. The alkalinity of an ash is diminished in exact proportion to the amount of mineral acid added to the vinegar; alkaline reaction is the surest and safest criterion that free mineral acid is absent from the vinegar.

MEGARRHIZA CALIFORNICA, Torrey*.

BY JOHN P. HEANEY, PH.G., SAN FRANCISCO.

This plant, better known by the synonyms of the "big or giant root" and "manroot," is a herbaceous, climbing and succulent vine, growing abundantly throughout the State. It is closely allied to the echinocystis of the Eastern States, and also to a new species called *Marah muricatus*, or California balsam apple, which has been described by Dr. Kellogg in the proceedings of the California Academy of Natural Sciences (vol. i.). It is found both in dry sandy and rich soil. In the former it grows in bushy tufts about two feet high and four or more wide, being evidently somewhat stunted; but in rich soil, when well shaded, its annual stem climbs thirty to forty feet over trees and acquires its largest growth. It flowers in March and April.

The most remarkable feature of this plant is its gigantic root, which is perennial, tubero-fusiform, externally of a yellowish-grey colour, and rugose; within white, succulent and fleshy, of a nauseous odour, which is lost in a great measure by drying, and of a bitter, acrid and disagreeable taste, which leaves a feeling of acridity in the fauces. The Indians are said to use this root as a drastic purge in dropsy. It has also been used by domestic practitioners, in the form of decoction, both as a laxative and cathartic with good results. On drying, the root lost from 70 to 75 per cent. in weight. The dried root is externally of a yellowish-brown colour and longitudinally wrinkled; internally of a white colour, becoming somewhat darker by age, concentrically striated, light, brittle and readily pulverizable, yielding a whitish powder.

A preliminary examination made with the aqueous, alcoholic and ethereal extracts of the fresh root led to the following conclusions, namely: That the root contained a bitter principle soluble in water and alcohol, but more readily in the latter; also a resinous, fatty matter and an organic acid, probably of a fatty nature, which was soluble in and extracted both by alcohol and ether. The probable presence of gum and pectin was likewise indicated, as well as the absence of albumen, sugar and volatile oil.

Examination of the Dried Root.—A quantity of the powdered dried root was first treated with ether until thoroughly exhausted by this menstruum, in order to remove the fatty and resinous matter. The ethereal tincture had a lemon-yellow colour, and left, on evaporation, a yellowish-brown residue, which possessed the characteristic odour of the root, a slight bitter taste, was brittle, and had an acid reaction.

To determine the nature of the free acid, the residue was treated with a weak solution of sodic carbonate and filtered from the insoluble portion. To the filtrate a sufficient quantity of tartaric acid was added, when whitish oily globules were observed on the surface of the liquid. These had an acid reaction, possessed a disagreeable odour, and gave to paper a stain unaffected by heat; the author names it megarrhizic acid. The portion insoluble in sodic carbonate was treated with a solution of caustic potash in order to effect the saponification of the fatty matter, and the insoluble resinous substance was removed by a filter, washed, dried and reserved to be examined subsequently. To the solution of soap obtained was added a sufficient quantity of tartaric acid to decompose it. Ether was now added, and the mixture agitated. After a few hours the supernatant ethereal liquid was removed and allowed to evaporate spontaneously, when it was found to possess properties characteristic of fatty acid bodies. The insoluble resinous substance obtained before was first boiled with water, then thrown on a filter, well washed and dried. It was afterwards

* From the *American Journal of Pharmacy*. Abstract from an Inaugural Essay presented to the California College of Pharmacy.

dissolved in ether, and the solution decolorized by animal charcoal. The filtrate was evaporated, the residue, redissolved in alcohol and then allowed to evaporate spontaneously, when it left a deposit, exhibiting under the microscope a rhomboidal crystalline structure; it is evidently a resin. This *megarrhizitin* is soluble in alcohol and ether, and is unaffected by alkalies and solution of cupric sulphate.

The root previously exhausted by ether was next treated with alcohol (sp. gr. 0·835), until deprived of its bitter taste. The tincture was evaporated to a small bulk, then thrown into water to remove traces of fat or resin, and afterwards filtered. The liquid was heated to expel the spirit. To the resulting aqueous fluid was added a concentrated solution of tannic acid. A bulky gelatinous precipitate was obtained. This, being removed by a filter, was well washed and dried. It was now dissolved in alcohol (95 per cent.), the tannin thrown down by plumbic subacetate, the excess of lead removed by H_2S, and the liquid filtered and evaporated. The residue well washed with ether yielded the bitter principle pure. This process was adopted from that of Dr. Waltz, as mentioned in his analysis of colocynth.

To the principle thus obtained, the name of *megarrhizin* is given. It is of a brownish colour, somewhat transparent, brittle and friable, yielding a yellowish-brown powder. It is fusible below 100° C., inflammable, more soluble in alcohol than in water, both solutions being intensely bitter. It is insoluble in ether. The following reactions, with reagents, were obtained: H_2SO_4, dissolved it slowly with the production of first a bright red and afterwards a brown colour; HCl gave a faint violet colour; HNO_3, a yellow dull colour. An aqueous solution of it produced with ferric chloride a deep colour, but no precipitate; with plumbic acetate and subacetate, mercuric chloride, solution of iodine, potassa or its carbonate, or argentic nitrate, no change; with tannic acid, a bulky, gelatinous precipitate, and with bromine water, a white, insoluble precipitate. Boiled with baryta water, decomposition ensued; treated with dilute H_2SO_4 or HCl, no change was observed in the cold, but upon boiling, immediately decomposition took place, yielding glucose and an insoluble substance, which may be called *megarrhizioretin*.

This *megarrhizioretin* when washed and dried possesses a dark-brown colour, a resinous appearance, and is somewhat brittle. Alcohol dissolves it, but ether is only a partial solvent of it, leaving an insoluble portion behind. It is, therefore, a complex body.

The ashes showed, on analysis, the presence of magnesia, lime, iron, potassa, soda, chlorine, sulphuric and phosphoric acids, also a silicious residue.

It will be seen from the foregoing that megarrhizin belongs to that class of substances known as glucosides, to which belong also colocynthin and bryonin, and that it agrees with these two in many of their chemical and physical properties. But megarrhizin differs from colocynthin in the fact that colocynthein, the insoluble resinous substance obtained from the boiling of it with diluted acids, is soluble in ether, while megarrhizioretin is but partially soluble in that liquid, thereby agreeing with bryoretin. But it differs from bryonin principally in the behaviour to sulphuric acid, which dissolves megarrhizin, yielding a brown colour; while bryonin produces with it a blue colour. Therefore, it was concluded to be a distinct principle.

Physiological Investigation.—A sample of an extract prepared from an alcoholic tincture, and also some of the bitter principle, were sent to a physician in this city to be examined physiologically, and the following note received:—

"Your note, with samples of the alcoholic extract and bitter principle of *Megarrhiza Californica*, for the purpose of ascertaining their physiological action on the animal organism, has been received. I would state that the extract in large doses is a powerful irritant, causing gastro-enteritis and death. It produces griping pains in the stomach, nausea, vomiting and profuse diarrhœa, violent strangury, with other symptoms of renal and vesical irritation. Given in a quarter to half grain doses, the extract is a drastic hydragogue cathartic, causing nausea, sometimes vomiting, griping pains and copious watery stools. In smaller doses, frequently repeated, it is a diuretic and laxative. Notwithstanding its activity, I should deem it a safe and convenient purgative, and should consider it useful in all cases where it is desirable to produce an energetic influence on the bowels, to obtain large evacuations. Its hydragogue properties must prove beneficial in dropsies. It also augments the urinary discharges. In intestinal inflammations it should not be used. The above is the result of a series of experiments made upon myself and others. Its toxicological action on a dog was undertaken, but proved a failure in so far as it caused emesis. Five grain doses of the bitter principle were repeated every fifteen to thirty minutes, until thirty grains were administered. However, purging and frequent desire to urinate followed, but, otherwise, the animal showed no symptoms of disturbance. The following day, I again administered five grains of bitter principle, which was also ejected. Finding that nothing would be retained in the stomach (not even food), the animal was killed for examination, which was conducted immediately after its death. The chief morbid appearance observed was a patch of redness in the mucous membrane of the stomach near its cardiac orifice. The intestines were found to be slightly inflamed, as also the bladder, which was nearly empty. There was also a marked congestion of the kidneys."

THE MANUFACTURE OF MILK SUGAR IN SWITZERLAND.

BY A. SAUTER.

In a communication to the *Schweizerische Wochenschrift für Pharmacie* for the 20th of October, the author gives an account of a visit to Marbach, in the canton of Luzern, Switzerland, where a half-a-dozen refiners are said to make a handsome income from the manufacture of milk sugar.

The raw material used for the recrystallization comes from the neighbouring Alps, in the cantons of Luzern, Bern, Schwyz, etc.; a considerable quantity is supplied also by Gruyères. It is the so-called "Schottensand" or "Zuckersand," the French "déchet de lait," obtained by simple evaporation of the whey after cheese-making. Notwithstanding a continual rise in the price, consequent upon the demand and the increased cost of labour and fuel, the manufacture continually expands, and now amounts to 1800 to 2000 cwts. yearly, corresponding to a gross value of about 300,000 francs, certainly a handsome sum for a small mountain village with but few inhabitants.

The manufacture is only carried on in the higher mountains, because there the material can no longer be used profitably for the fattening of swine, which are found chiefly in the valleys, and the wood required for the evaporating process is cheaper in the highlands.

The crude material is sent to the manufacturer, or refiner, in sacks containing one to two hundredweights. It is washed in copper vessels, and dissolved to saturation at the boiling temperature over a fire, and the yellow brown liquor, after straining, is allowed to stand in copper-lined tubs or long troughs to crystallize. The sugar crystals form in clusters on immersed chips of wood, and these are the most pure and therefore of rather greater commercial value than the milk sugar in plates which is deposited on the sides of the vessels.

In ten to fourteen days the process of crystallization has ended, and the milk sugar has finished growing ("*ausgewachsen*"). The crystals are then washed with cold water, afterwards dried in a cauldron over a fire, and packed in casks holding four to five hundredweights.

As the "Schottensand" can only be obtained in the summer, the recrystallization is not carried on in the winter, hence a popular saying that the milk sugar does not "grow" in the winter. The entire manipulation is carried on in a very primitive manner, it being a matter of astonishment to find a specific gravity instrument in any place. The author is of opinion that with a more rational method of working a whiter and finer quality sugar could be produced.

SURFACE BIOLOGY.*

BY ALFRED RUSSEL WALLACE, F.R.G.S., F.L.S.

(*Concluded from page* 374.)

But the question of the mere "Antiquity of Man" almost sank into insignificance at a very early period of the inquiry, in comparison with the far more momentous and more exciting problem of the development of man from some lower animal form, which the theories of Mr. Darwin and of Mr. Herbert Spencer soon showed to be inseparably bound up with it. This has been, and to some extent still is, the subject of fierce conflict; but the controversy as to the fact of such development is now almost at an end, since one of the most talented representatives of Catholic theology, and an anatomist of high standing—Professor Mivart—fully adopts it as regards physical structure, reserving his opposition for those parts of the theory which would deduce man's whole intellectual and moral nature from the same source and by a similar mode of development.

Never, perhaps, in the whole history of science or philosophy has so great a revolution in thought and opinion been effected as in the twelve years from 1859 to 1871, the respective dates of publication of Mr. Darwin's 'Origin of Species' and 'Descent of Man.' Up to the commencement of this period the belief in the independent creation or origin of the species of animals and plants, and the very recent appearance of man upon the earth, were, practically, universal. Long before the end of it these two beliefs had utterly disappeared, not only in the scientific world, but almost equally so among the literary and educated classes generally. The belief in the independent origin of man held its ground somewhat longer; but the publication of Mr. Darwin's great work gave even that its death-blow, for hardly any one capable of judging of the evidence now doubts the derivative nature of man's bodily structure as a whole, although many believe that his mind, and even some of his physical characteristics, may be due to the action of other forces than have acted in the case of the lower animals.

We need hardly be surprised, under these circumstances, if there has been a tendency among men of science to pass from one extreme to the other, from a profession (so few years ago) of total ignorance as to the mode of origin of all living things, to a claim to almost complete knowledge of the whole progress of the universe, from the first speck of living protoplasm up to the highest development of the human intellect. Yet this is really what we have seen in the last sixteen years. Formerly difficulties were exaggerated, and it was asserted that we had not sufficient knowledge to venture on any generalizations on the subject. Now difficulties are set aside, and it is held that our theories are so well established and so far-reaching, that they explain and comprehend all nature. It is not long ago (as I have already reminded you) since *facts* were contemptuously ignored, because they favoured our now popular views; at the present day it seems to me that facts which oppose them hardly receive due consideration. And as opposition is the best incentive to progress, and it is not well even for the best theories to have it all their own way, I propose to direct your attention to a few such facts, and to the conclusions that seem fairly deducible from them.

It is a curious circumstance that notwithstanding the attention that has been directed to the subject in every part of the world, and the numerous excavations connected with railways and mines which have offered such facilities for geological discovery, no advance whatever has been made for a considerable number of years in detecting the time or mode of man's origin. The Palæolithic flint weapons first discovered in the north of France more than thirty years ago are still the oldest undisputed proofs of man's existence; and amid the countless relics of a former world that have been brought to light, no evidence of any one of the links that must have connected man with the lower animals has yet appeared.

It is, indeed, well known that negative evidence in geology is of very slender value; and this is, no doubt, generally the case. The circumstances here are, however, peculiar, for many converging lines of evidence show that, on the theory of development by the same laws which have determined the development of the lower animals, man must be immensely older than any traces of him yet discovered. As this is a point of great interest we must devote a few moments to its consideration.

1. The most important difference between man and such of the lower animals as most nearly approach him is undoubtedly in the bulk and development of his brain, as indicated by the form and capacity of the cranium. We should therefore anticipate that these earliest races, who were contemporary with the extinct animals and used rude stone weapons, would show a marked deficiency in this respect. Yet the oldest known crania (those of the Engis and Cro-Magnon caves) show no marks of degradation. The former does not present so low a type as that of most existing savages, but is (to use the words of Professor Huxley) "a fair average human skull, which might have belonged to a philosopher, or might have contained the thoughtless brains of a savage." The latter are still more remarkable, being unusually large and well formed. Dr. Pruner-Bey states that they surpass the average of modern European skulls in capacity, while their symmetrical form, without any trace of prognathism, compares favourably not only with those of the foremost savage races, but with many nations of modern times.

One or two other crania of much lower type, but of less antiquity than this, have been discovered; but they in no way invalidate the conclusion which so highly developed a form at so early a period implies, viz., that we have as yet made a hardly perceptible step towards the discovery of any earlier stage in the development of man.

2. This conclusion is supported and enforced by the nature of many of the works of art found even in the oldest cave-dwellings. The flints are of the old chipped type, but they are formed into a large variety of tools and weapons—such as scrapers, awls, hammers, saws, lances, etc., implying a variety of purposes for which these were used, and a corresponding degree of mental activity and civilization. Numerous articles of bone have also been found, including well-formed needles, implying that skins were sewn together, and perhaps even textile material woven into cloth. Still more important are the numerous carvings and drawings representing a variety of animals, including horses, reindeer, and even a mammoth, executed with considerable skill on bone, reindeer horns, and mammoth-tusks. These, taken together, indicate a state of civilization much higher than that of the lowest of our modern savages, while it is quite compatible with a considerable degree of mental advancement, and leads us to believe that the crania of Engis and Cro-Magnon are not exceptional, but fairly represent the characters of the race. If we further remember that these people lived in Europe under the unfavourable

* Presidental Address delivered to the Biological Section of the British Association, at Glasgow, on Sept. 6, 1876.

conditions of a sub-Artic climate, we shall be inclined to agree with Dr. Daniel Wilson, that it is far easier to produce evidences of deterioration than of progress in instituting a comparison between the contemporaries of the mammoth and later prehistoric races of Europe or savage nations of modern times.*

3. Yet another important line of evidence as to the extreme antiquity of the human type has been brought prominently forward by Professor Mivart.† He shows, by a careful comparison of all parts of the structure of the body, that man is related not to any one, but almost equally to many of the existing apes—to the orang, the chimpanzee, the gorilla, and even to the gibbons—in a variety of ways; and these relations and differences are so numerous and so diverse that, on the theory of evolution, the ancestral form which ultimately developed into man must have diverged from the common stock whence all these various forms and their extinct allies originated. But so far back as the Miocene deposits of Europe we find the remains of apes allied to these various forms, and especially to the gibbons; so that in all probability the special line of variation which led us to man branched off at a still earlier period. And these early forms, being the initation of a far higher type, and having to develop by natural selection into so specialized and altogether distinct a creature as man, must have risen at a very early period into the position of a dominant race, and spread in dense waves of population over all suitable portions of the great continent—for this, on Mr. Darwin's hypothesis, is essential to rapid developmental progress through the agency of natural selection.

Under these circumstances we might certainly expect to find some relics of these earlier forms of man along with those of animals which were presumably less abundant. Negative evidence of this kind is not very weighty, but still it has some value. It has been suggested that as apes are mostly tropical, and anthropoid apes are now confined almost exclusively to the vicinity of the equator, we should expect the ancestral forms also to have inhabited these same localities—West Africa and the Malay Islands. But this objection is hardly valid, because existing anthropoid apes are wholly dependent on a perennial supply of easily accessible fruits, which is only found near the equator, while not only had the south of Europe an almost tropical climate in Miocene times, but we must suppose even the earliest ancestors of man to have been terrestrial and omnivorous, since it must have taken ages of slow modification to have produced the perfectly erect form, the short arms, and the wholly non-prehensile foot, which so strongly differentiate man from the arboreal apes.

The conclusion which I think we must arrive at is that if man has been developed from a common ancestor with all existing apes, *and by no other agencies than such as have affected their development*, then he must have existed, in something approaching his present form, during the tertiary period—and not merely existed, but predominated in numbers, wherever suitable conditions prevailed. If then, continued researches in all parts of Europe and Asia fail to bring to light any proofs of his presence, it will be at least a presumption that he came into existence at a much later date, and by a much more rapid process of development. In that case it will be a fair argument, that, just as he is in his mental and moral nature, his capacities and aspirations, so infinitely raised above the brutes, so his origin is due, in part, to distinct and higher agencies than such as have affected their development.

There is yet another line of inquiry bearing upon this subject to which I wish to call your attention. It is a somewhat curious fact that, while all modern writers admit the great antiquity of man, most of them maintain the very recent development of his intellect, and will hardly contemplate the possibility of men equal in mental capacity to ourselves having existed in prehistoric times. This question is generally assumed to be settled by such relics as have been preserved of the manufactures of the older races showing a lower and lower state of the arts, by the successive disappearance in early times of iron, bronze, and pottery, and by the ruder forms of the older flint implements. The weakness of this argument has been well shown by Mr. Albert Mott in his very original but little known presidential address to the Literary and Philosophical Society of Liverpool in 1873. He maintains that "our most distant glimpses of the past are still of a world peopled as now with men both civilized and savage," and "that we have often entirely misread the past by supposing that the outward signs of civilization must always be the same, and must be such as are found among ourselves." In support of this view he adduces a variety of striking facts and ingenious arguments, a few of which I will briefly summarize.

On one of the most remote islands of the Pacific—Easter Island—2000 miles from South America, 2000 from the Marquesas, and more than 1000 from the Gambier Islands, are found hundreds of gigantic stone images, now mostly in ruins, often thirty or forty feet high, while some seem to have been much larger, the crowns on their heads cut out of a red stone being sometimes ten feet in diameter, while even the head and neck of one is said to have been twenty feet high.* These once stood erect on extensive stone platforms; yet the island has only an area of about thirty square miles, or considerably less than Jersey. Now as one of the smallest images eight feet high weighs four tons, the largest must weigh over a hundred tons, if not much more; and the existence of such vast works implies a large population, abundance of food, and an established government. Yet how could these coexist in a mere speck of land wholly cut off from the rest of the world? Mr. Mott maintains that this necessarily implies the power of regular communication with larger islands or a continent, the arts of navigation, and a civilization much higher than now exists in any part of the Pacific. Very similar remains in other islands scattered widely over the Pacific add weight to this argument.

The next example is that of the ancient mounds and earthworks of the North American continent, the bearing of which is even more significant. Over the greater part of the extensive Mississippi valley four well-marked classes of these earthworks occur. Some are camps, or works of defence, situated on bluffs, promontories, or isolated hills; others are vast enclosures in the plains and lowlands, often of geometric forms, and having attached to them roadways or avenues often miles in length; a third are mounds corresponding to our tumuli, often seventy to ninety feet high, and some of them covering acres of ground; while a fourth group consists of representations of various animals modelled in relief on a gigantic scale, and occurring chiefly in an area somewhat to the north-west of the other classes, in the plains of Wisconsin.

The first class—the camps or fortified enclosures—resemble in general features the ancient camps of our own islands, but far surpass them in extent. Fort Hill, in Ohio, is surrounded by a wall and ditch a mile and a half in length, part of the way cut through solid rock. Artificial reservoirs for water were made within it, while at one extremity, on a more elevated point, a keep is constructed with its separate defences and water-reservoirs. Another, called Clark's Work, in the Scioto valley, which seems to have been a fortified town, encloses an area of 127 acres, the embankments measuring three miles in length, and containing not less than three million cubic feet of earth. This area encloses numerous sacrificial mounds and symmetrical earthworks, in which many interesting relics and works of art have been found.

The second class—the sacred enclosures—may be com-

* 'Prehistoric Man,' 3rd ed., vol. i., p. 117.

† 'Man and Apes,' pp. 171–193.

* *Journ. of Roy. Geog. Soc.*, 1870, pp. 177, 178.

pared for extent and arrangement with Avebury or Carnack, but are in some respects even more remarkable. One of these at Newark, Ohio, covers an area of several miles with its connected groups of circles, octagons, squares, ellipses, and avenues on a grand scale, and formed by embankments from twenty to thirty feet in height. Other similar works occur in different parts of Ohio; and by accurate survey it is found not only that the circles are true, though some of them are one third of a mile in diameter, but that other figures are truly square, each side being over 1000 feet long, and, what is still more important, the dimensions of some of these geometrical figures, in different parts of the country and seventy miles apart, are identical. Now this proves the use, by the builders of these works, of some standard measures of length, while the accuracy of the squares, circles, and, in a less degree, of the octagonal figures shows a considerable knowledge of rudimentary geometry and some means of measuring angles. The difficulty of drawing such figures on a large scale is much greater than any one would imagine who has not tried it, and the accuracy of these is far beyond what is necessary to satisfy the eye. We must therefore impute to these people the wish to make these figures as accurate as possible; and this wish is a greater proof of habitual skill and intellectual advancement than even the ability to draw such figures. If, then, we take into account this ability and this love of geometric truth, and further consider the dense population and civil organization implied by the construction of such extensive systematic works, we must allow that these ancient people had reached the earlier stages of a civilization of which no traces existed among the savage tribes who alone occupied the country when first visited by Europeans.

The animal mounds are of comparatively less importance for our present purpose, as they imply a somewhat lower grade of advancement; but the sepulchral and sacrificial mounds exist in vast numbers, and their partial exploration has yielded a quantity of articles and works of art which throw some further light on the peculiarities of this mysterious people. Most of these mounds contain a large concave hearth or basin of burnt clay, of perfectly symmetrical form, on which are found deposited more or less abundant relics, all bearing traces of the action of fire. We are therefore only acquainted with such articles as are practically fire-proof, or have accidentally escaped combustion. These consist of bone and copper implements and ornaments, disks, and tubes—pearl, shell, and silver beads, more or less injured by the fire—ornaments cut in mica, ornamental pottery, and numbers of elaborate carvings in stone, mostly forming pipes for smoking. The metallic articles are all formed by hammering, but the execution is very good; plates of mica are found cut into scrolls and circles; the pottery, of which very few remains have been found, is far superior to that of any of the Indian tribes, since Dr. Wilson is of opinion that it must have been formed on a wheel, as it is often of uniform thickness throughout (sometimes not more than one sixth of an inch), polished, and ornamented with scrolls and figures of birds and flowers in delicate relief. But the most instructive objects are the sculptured stone pipes, representing not only various easily recognizable animals, but also human heads, so well executed that they appear to be portraits. Among the animals, not only are such native forms as the panther, bear, otter, wolf, beaver, raccoon, heron, crow, turtle, frog, rattlesnake, and many others well represented, but also the manatee, which perhaps then ascended the Mississippi as it now does the Amazon, and the toucan, which could hardly have been obtained nearer than Mexico. The sculptured heads are especially remarkable, because they present to us the features of an intellectual and civilized people. The nose in some is perfectly straight, and neither prominent nor dilated; the mouth is small, and the lips thin; the chin and upper lip are short, contrasting with the ponderous jaw of the modern Indian, while the cheek-bones present no marked prominence. Other examples have the nose somewhat projecting at the apex in a manner quite unlike the features of any American indigenes; and although there are some which show a much coarser face, it very difficult to see in any of them that close resemblance to the Indian type which these sculptures have been said to exhibit. The few authentic crania from the mounds present corresponding features, being far more symmetrical and better developed in the frontal region than those of any American tribes, although somewhat resembling them in the occipital outline;* while one was described by its discoverer (Mr. W. Marshall Anderson) as a "beautiful skull worthy of a Greek."

The antiquity of this remarkable race may perhaps not be very great as compared with the prehistoric man of Europe, although the opinion of some writers on the subject seems affected by that "parsimony of time" on which the late Sir Charles Lyell so often dilated. The mounds are all overgrown with dense forest, and one of the large trees was estimated to be eight hundred years old, while other observers consider the forest growth to indicate an age of at least 1000 years. But it is well known that it requires several generations of trees to pass away before the growth on a deserted clearing comes to correspond with that of the surrounding virgin forest, while this forest, once established, may go on growing for an unknown number of thousands of years. The 800 or 1000 years' estimate from the growth of existing vegetation is a minimum which has no bearing whatever on the actual age of these mounds; and we might almost as well attempt to determine the time of the glacial epoch from the age of the pines or oaks which now grow on the moraines.

The important thing for us, however, is that when North America was first settled by Europeans, the Indian tribes inhabiting it had no knowledge or tradition of any preceding race of higher civilization than themselves. Yet we find that such a race existed; that they must have been populous and have lived under some established government; while there are signs that they practised agriculture largely, as, indeed, they must have done to have supported a population capable of executing such gigantic works in such vast profusion; for it is stated that the mounds and earthworks of various kinds in the state of Ohio alone amount to between eleven and twelve thousand. In their habits, customs, religion, and arts they differed strikingly from all the Indian tribes; while their love of art and of geometic forms, and their capacity for executing the latter upon so gigantic a scale, render it probable that they were a really civilized people, although the form their civilization took may have been very different from that of later people subject to very different influences, and the inheritors of a longer series of ancestral civilizations. We have here, at all events, a striking example of the transition, over an extensive country, from comparative civilization to comparative barbarism, the former left to tradition and having hardly any trace of influence on the latter.

As Mr. Mott well remarks:—Nothing can be more striking than the fact that Easter Islands and North America both gave the same testimony as to the origin of the savage life found in them, although in all circumstances and surroundings the two cases are so different. If no stone monuments had been constructed in Easter Island, or mounds, containing a few relics saved from fire, in the United States, we might never have suspected the existence of these ancient peoples. He argues, therefore, that it is very easy for the records of an ancient nation's life entirely to perish or to be hidden from observation. Even the arts of Nineveh and Babylon were unknown only a generation ago, and we have only just discovered the facts about the mound-builders of North America.

But other parts of the American continent exhibit

* Wilson's 'Prehistoric Man,' 3rd ed., vol. ii., p. 123.

parallel phenomena. Recent investigations show that in Mexico, Central America, and Peru the existing race of Indians has been preceded by a distinct and more civilized race. This is proved by the sculptures of the ruined cities of Central America, by the more ancient terra-cottas and paintings of Mexico, and by the oldest portrait-pottery of Peru. All alike show markedly non-Indian features, while they often closely resemble modern European types. Ancient crania, too, have been found in all these countries, presenting very different characters from those of any of the modern indigenous races of America.*

There is one other striking example of a higher being succeeded by a lower degree of knowledge, which is in danger of being forgotten because it has been made the foundation of theories which seem wild and fantastic, and are probably in great part erroneous. I allude to the Great Pyramid of Egypt, whose form, dimensions, structure, and uses have recently been the subject of elaborate works by Professor Piazzi Smyth. Now the admitted facts about this pyramid are so interesting and so apposite to the subject we are considering, that I beg to recall them to your attention. Most of you are aware that this pyramid has been carefully explored and measured by successive Egyptologists, and that the dimensions have lately become capable of more accurate determination, owing to the discovery of some of the original casing-stones and the clearing away of the earth from the corners of the foundation showing the sockets in which the corner-stones fitted. Professor Smyth devoted many months of work with the best instruments in order to fix the dimensions and angles of all accessible parts of the structure; and he has carefully determined these by a comparison of his own and all previous measures, the best of which agree pretty closely with each other. The results arrived at are:—

1. That the pyramid is truly square, the sides being equal and the angles right angles.

2. That the four sockets on which the four first stones of the corners rested are truly on the same level.

3. That the direction of the sides are accurately to the four cardinal points.

4. That the vertical height of the pyramid bears the same proportion to its circumference at the base, as the radius of a circle does to its circumference.

Now all these measures, angles, and levels are accurate, not as an ordinary surveyor or builder could make them, but to such a degree as requires the very best modern instruments and all refinements of geodetical science to discover any error at all. In addition to this we have the wonderful perfection of the workmanship in the interior of the pyramid, the passages and chambers being lined with huge blocks of stones fitted with the utmost accuracy, while every part of the building exhibits the highest structural science.

In all these respects this largest pyramid surpasses every other in Egypt. Yet it is universally admitted to be the oldest, and also the oldest historical building in the world.

Now these admitted facts about the Great Pyramid are surely remarkable, and worthy of the deepest consideration. They are facts which, in the pregnant words of the late Sir John Herschel, "according to received theories ought not to happen," and which, he tell us, should therefore be kept ever present to our minds, since "they belong to the class of facts which serve as the clue to new discoveries." According to modern theories, the higher civilization is ever a growth and an outcome from a preceding lower state; and it is inferred that this progress is visible to us throughout all history and in all the material records of human intellect. But here we have a building which marks the very dawn of history, which is the oldest authentic monument of man's genius and skill, and which, instead of being far inferior, is very much superior to all which followed it. Great men are the products of their age and country, and the designers and constructors of this wonderful monument could never have arisen among an unintellectual and half-barbarous people. So perfect a work implies many preceding less perfect works which have disappeared. It marks the culminating point of an ancient civilization, of the early stages of which we have no record whatever.

* Wilson's 'Prehistoric Man,' 3rd ed., vol. ii., pp. 125, 144.

The three cases to which I have now adverted (and there are many others) seem to require for their satisfactory interpretation a somewhat different view of human progress from that which is now generally accepted. Taken in connection with the great intellectual power of the ancient Greeks—which Mr. Galton believes to have been far above that of the average of any modern nation—and the elevation, at once intellectual and moral, displayed in the writings of Confucius, Zoroaster, and the Vedas, they point to the conclusion that, while in material progress there has been a tolerably steady advance, man's intellectual and moral development reached almost its highest level in a very remote past. The lower, the more animal, but often the more energetic types have, however, always been far the more numerous; hence such established societies as have here and there arisen under the guidance of higher minds have always been liable to be swept away by the incursions of barbarians. Thus in almost every part of the globe there may have been a long succession of partial civilizations, each in turn succeeded by a period of barbarism; and this view seems supported by the occurrence of degraded types of skull along with such "as might have belonged to a philosopher," at a time when the mammoth and the reindeer inhabited southern France.

Nor need we fear that there is not time enough for the rise and decay of so many successive civilizations as this view would imply; for the opinion is now gaining ground among geologists that palæolithic man was really preglacial, and that the great gap (marked alike by a change of physical conditions and of animal life), which in Europe always separates him from his neolithic successor, was caused by the coming on and passing away of the great ice age.

If the views now advanced are correct, many, perhaps most, of our existing savages are the successors of higher races; and their arts, often showing a wonderful similarity in distant continents, may have been derived from a common source among more civilized peoples.

I must now conclude this very imperfect sketch of a few of the offshoots from the great tree of Biological study. It will, perhaps, be thought by some that my remarks have tended to the depreciation of our science, by hinting at imperfections in our knowledge and errors in our theories where more enthusiastic students see nothing but established truths. But I trust that I may have conveyed to many of my hearers a different impression. I have endeavoured to show that, even in what are usually considered the more trivial and superficial characters presented by natural objects, a whole field of new inquiry is opened up to us by the study of distribution and local conditions. And as regards man, I have endeavoured to fix your attention on a class of facts which indicate that the course of his development has been far less direct and simple than has hitherto been supposed; and that, instead of resembling a single tide with its advancing and receding ripples, it must rather be compared to the progress from neap to spring tides, both the rise and the depression being comparatively greater as the waters of true civilization slowly advance towards the highest level they can reach.

And if we are thus led to believe that our present knowledge of nature is somewhat less complete than we have been accustomed to consider it, this is only what we might expect; for however great may have been the intellectual triumphs of the nineteenth century, we can hardly think so highly of its achievements as to imagine that, in somewhat less than twenty years, we have passed from complete ignorance to almost perfect knowledge on two such vast and complex subjects as the origin of species and the antiquity of man.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 11, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE DECOMPOSITION OF SALICYLATE OF SODA.

SINCE the important announcement of Professor KOLBE respecting the antiseptic action of salicylic acid and its capability of preventing fermentation, which was published for the first time in England in these columns scarcely two years since, quite an extensive amount of literature has been devoted to the subject. Only comparatively a small fraction of it, however, has been published in this country; for the battle of its merits and demerits has been most stoutly fought out in Germany. But it soon became evident that much of the diversity of opinion possibly had its origin in the disregard of the fact observed by KOLBE, and confirmed by KNOPP, that the antiseptic action of free salicylic acid is not shared by its salts, and that it might, for instance, be greatly diminished or even stayed by being saturated with the ammonia resulting from the decomposition of albuminous substances. It was becoming generally acknowledged that in salicylic acid a valuable addition had been made to our list of antiseptics when, in the course of the year 1875, it was stated by Dr. BUTT, that it had, as well, an almost specific action in the reduction of the temperature of the body. In this direction, also, the acid has now attained considerable reputation as a remedy in typhoid and rheumatic fever, and it is increasingly prescribed by both British and foreign physicians; but what is also notable is that the sodium salt is for certain reasons preferred by some. Bearing in mind that the antiseptic action of the acid is diminished in proportion to its saturation, this seemed to require an explanation. The question had a specially pharmaceutical aspect too, since some of the substances suggested to be used to increase the solubility of the acid would probably enter more or less into combination with it.

Professor BINZ, of Bonn, has recently suggested in a communication to the Lower Rhine Medical Society, that the explanation is to be found in the continual liberation of carbonic acid in the animal tissue, to which is due in great measure the alkalinity of the blood. The gas, evolved in an absolutely pure state, has the property of setting free the salicylic acid from sodium salicylate. This proposition Professor BINZ illustrates by the following experiment.

A solution of the salt (1 per cent.), shaken up with ether, yields to it nothing that gives a ponderable residue after evaporation. But if the same solution be treated at the ordinary temperature and under the ordinary pressure with carbonic anhydride, it will afterwards give up to ether from one-seventh to one-tenth of the salicylic acid originally in combination in the salt, and upon each repetition of the operation successive portions of the acid are set free. The salt being much more soluble in water than in ether remains in the former; but the acid being more soluble in ether than water, the conditions are reversed, and when set free (presumably by the carbonic acid), it passes into the ether from which it can be obtained upon evaporation of the ether in fine crystals.

Further, when the solution of sodium salicylate is brought into closer relations with blood by the addition of a little sodium phosphate and carbonate, and the carbonic anhydride is afterwards introduced, the salicylic acid is similarly set free, but to a less extent. An evaporating dish was coated upon the evaporation of the ether with a strong crust of salicylic acid thus set free; whilst in a comparative experiment, when the ether was simply shaken with the solution of the three salts, no residue was obtained.

Putrescible mixtures, when sufficiently diluted with water, as for instance, urine with an equal quantity of water, putrefy much less readily under access of air after an addition of 1 per cent. of sodium salicylate and carbonic anhydride, than after an addition of either alone, and this difference extends over several weeks. This was confirmed by experiments made with a mixture to which no addition had been made, one which was only treated with carbonic anhydride, a third to which only sodium salicylate was added, and a fourth treated with both sodium salicylate and carbonic anhydride.

Here also Professor BINZ is of opinion, it may be inferred, that there is a liberation of the antiseptic agent, the influence of which is eventually overcome by the ammonia gradually formed in the meanwhile.

It is apparent, therefore, that it is not admissible to describe sodium salicylate as a salt without chemical action in the organism. As Professor BINZ forcibly remarks, it cannot *à priori* be affirmed of a salt which is decomposed by carbonic anhydride that it will pass unaltered through an organism where a continual evolution of nascent carbonic anhydride is taking place.

Professor BINZ concluded his interesting communication by pointing out that in some respects salicylic acid has the greatest similarity with quinine. Like quinine it cuts short the symptoms of malarial poisoning, though somewhat less surely and lastingly, and it acts as a powerful antizymotic that can be introduced into the system in large doses. It remains for a considerable time in the system, and passes out again, at least partially, unaltered. Of course the correspondence between the two substances, as might be expected from the difference in their constitution, is not complete in all respects.

THE REPETITION OF PRESCRIPTIONS IN SAXONY.

A DECREE has recently been issued by the Minister of the Interior for Saxony, abolishing former regulations as to the repetition of physicians' prescriptions in that country, and replacing them by more inclusive rules.

With respect to medicines for internal administration, pharmacists are now forbidden to repeat, without a special order from the original prescriber or another qualified physician or surgeon, any prescription, ordering, in any dose whatever, any of the substances included in Table B (*medicamenta cautissima asservanda*) of the German Pharmacopœa. This table includes arsenic and its preparations, mercurial compounds, phosphorus, strychnine, atropine, coniine, veratrine, and to these are also now added digitalin and chloroform (whether for inhalation or internal administration). The same rule applies to the articles in Table C (*medicamenta caute servanda*) if the dose ordered exceed by one-fifth the official maximum dose. Chloral hydrate is not to be repeated when the maximum dose of 4·0 grains is exceeded; or secale cornute if the dose exceed 6 grains, or extractum secalis if the dose exceed 0·3 grains. Neither are the prescriptions of homœopathic physicians up to and inclusive of the third dilution to be repeated.

As to medicines for external use dispensers are prohibited from repeating prescriptions containing any dose whatever of an article in Table B, before referred to, with the exception of red oxide of mercury, white precipitate and veratrine; or a prescription for subcutaneous injection of a solution of a substance in Table B or Table C.

LAC AND LAC DYE.

A RECENT report on Indian trade gives a fresh illustration of the far-reaching influence that has been exercised by the wonderful discoveries of artificial dyeing materials that have been made during the past few years. The manufacture of lac-dye has been always combined with that of shellac, the dye being the colouring matter contained in the body of the insect whose resinous excretion is converted into the shellac of commerce. In the manufacture of shellac it becomes necessary to eliminate the dye, and the liquid dye is then allowed to solidify into cakes. Formerly the dye was more valuable than the shellac, but owing to the competition of aniline dyes and cochineal its price has now so declined that its manufacture is only continued because it is bound up with the preparation of shellac, the demand for which is constantly increasing. The Government therefore decided in 1874 on the remission of the duty on lac-dye, but it is thought that it is doubtful whether the trade will ever revive. The quantity exported last year was 8379 cwt. against 9902 cwt. the previous year.

On the other hand the value of the shellac exported has risen from £184,149 in 1874 to £189,564 in 1875. In Burmah and the Central Provinces measures are being taken to increase the production of lac, the only obstacle to a still further development of the trade in shellac being the scarcity of the raw material.

A CHEMISTS AND DRUGGISTS' ASSOCIATION FOR IRELAND.

MR. J. T. HOLMES, who it will be remembered took an active part in the negotiations preceding the passing of the Irish Pharmacy Act, appears now to be stirring up his brother pharmaceutical chemists in Ireland to united action to prevent any infringement of their "rights." Mr. HOLMES has issued a circular stating that as he believes that he is in a position to say that the majority of the Council of the Irish Pharmaceutical Society is averse to that Society becoming a prosecuting body he feels there is a necessity for the formation of a Pharmaceutical Defence Association. To promote this object a meeting is to be held on Monday evening next, in Molesworth Hall, Dublin.

INJURED INNOCENCE.

A NEW YORK contemporary, bearing the name of *The Druggists' Advertiser*, exhibits in its last issue a little uneditorial bashfulness at the appreciation shown by other papers in appropriating its "good things" without acknowledgment. Our contemporary, although engrossed in "labouring for the advancement of pharmaceutical knowledge," and not desiring more credit than is its due for its humble efforts, expresses a relish for a little honesty now and then, if even from an editor. As the immediate boundaries on two sides of the paragraph containing the editorial wish consist of paragraphs taken from this Journal without any acknowledgment, we are ready to admit that our contemporary in its cravings shows a keen appreciation of one of its failings at least.

M. CHARLES SAINTE-CLAIRE DEVILLE.

WE are obligingly reminded by our esteemed *confrère*, Dr. MEHU, of Paris, that M. CHARLES SAINTE-CLAIRE DEVILLE, whose death we recorded recently, was a brother of the eminent chemist who discovered anhydrous nitric acid, and who is famous for his researches on sodium and platinum. The deceased *savant* was rather a mineralogist and geologist, though he was the first to discover the amorphous form of sulphur, which he announced in 1852 in a memoir entitled "Recherches sur le Dimorphisme et les Transformations du Soufre." He was a Member of the French Academy of Sciences and Professor of Geology in the College of France.

WE learn that Messrs. T. and H. SMITH and Co., of Edinburgh, have been awarded three medals for their exhibits at the Philadelphia Exhibition of (1) Chemicals; (2) Essence of Coffee, Essence of Coffee with Chicory, and Culinary Essences; and (3) Aërated Waters.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

April 11th, 1876.

Present.—Messrs. Ainslie, Borland, Buchanan, Gilmour, Kemp, Kinninmont, and Young.

MINOR EXAMINATION.

Fourteen candidates were examined. *Six* failed. The following *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Brumwell, William Preston......Newcastle-on-Tyne.
Edwards, William Herbert......Kidderminster.
Glegg, John ....Edinburgh.
Greenwell, William ....Gateshead.
Gregson, James Kenyon ....Blackburn.
Irving, Peter........................Dumfries.
Lawson, William ....Glasgow.
Maddison, Thomas Harwood ...March.

MODIFIED EXAMINATION.

Four candidates were examined. *All* failed.

NOTE.—The above should have been published in the Journal in April last.

Provincial Transactions.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

REPORT OF THE FIRST MEETING OF EXECUTIVE COMMITTEE.

A meeting of the Executive Committee was held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, on Friday, October 20, 1876, at 1 p.m. Mr. S. U. Jones (Leamington), President, in the chair; Mr. Thomas Barclay (Birmingham), Vice-President.

Present—Messrs. Andrews (London), Arblaster (Birmingham), Brevitt (Wolverhampton), Churchill (Birmingham), Cross (Shrewsbury), Earle (Hull), Fairlie (Glasgow, N.B.), Greaves (Chesterfield), Greenish (London), Hampson (London), Holdsworth (Birmingham), Jervis (Sheffield), Johnson (Manchester), Laird (Dundee, N.B.), Mackenzie (Edinburgh, N.B.), Shaw (Liverpool), G. Walker (Coventry), R. Walker (Birmingham), and the Solicitor of the Association.

The minutes of the meeting of the General Committee held at Glasgow were read and confirmed.

Several letters were read by the Secretary respecting the threatened prosecution of chemists at Nottingham for counter prescribing by a local branch of the Medical Defence Association.

The Secretary reported that on the 27th of September he proceeded to Nottingham and thoroughly investigated these cases of threatened prosecution. The results were laid before the meeting.

Mr. Hampson thought if one general resolution in respect to this matter was passed it would not necessarily apply to the Nottingham cases only, but to cases in general. If they passed a cautious and wise resolution it would be of infinite service to the trade.

Mr. Churchill said they were nearly all agreed that they could not go in for wholesale prescribing, but most of them, he thought, were determined to uphold the right of prescribing in simple cases.

Mr. Mackenzie explained at considerable length the condition of chemists in Edinburgh, and stated that a great many medical men were annually sent out from the Edinburgh Universities, and they found that every Edinburgh man carried with him an inherent antipathy to dispensing his own medicines.

Mr. Fairlie said he did not think there was a town in England or Scotland so situated at Edinburgh, there were very few surgeons in the whole city who kept open shop.

Mr. Jervis said this was a subject upon which they in Sheffield felt very deeply, and it was a question on which they must protect themselves or their objects in supporting the Association would never be carried out.

Mr. Laird said he understood that chemists had a right to prescribe by usage.

Mr. Andrews said they were not there to discuss the desirability of prescribing, the broad question was really the legality or the illegality of the act.

Mr. Barclay proposed the following resolution, and thought it would recommend itself to them all because they could not carry out literally the desire of some members of the medical profession. It was a very small section of the profession who wished to carry out the view that chemists should not prescribe in any way. Of course there were some medical men who were determined to confine them to the simple compounding of medicines, but they would have the sympathy of the medical men generally if they took up such cases as ought to be defended.

Mr. Earle said he found that their branch of the Medical Defence Association was not supported by the leading medical men in the town.

It was then moved by Mr. Barclay, seconded by Mr. G. Walker, and unanimously resolved—

> "That a sub-committee, consisting of Messrs. Earle, Fairlie, Hampson, and Reynolds, together with the officers of the Association, be appointed for the purpose of considering and taking such action as they think desirable in any case submitted by its members for legal proceedings."

Moved by Mr. Barclay, seconded by Mr. Fairlie, and unanimously resolved—

> "That in any case in which a chemist and druggist is threatened with legal proceedings for recommending simple remedies when required to do so in his own shop, if he be a member and the case is such as the sub-committee appointed for this purpose approves, this Association undertakes to defend him, but at the same time disapproves of the practice of other indiscriminate prescribing."

A letter was then read by the Secretary from the Council of the Pharmaceutical Society of Great Britain referring to the resolution passed at the Chemists and Druggists' Conference held in Birmingham on July 11th last, urging upon the Pharmaceutical Society the necessity of testing the legality of co-operative traders selling and dispensing poisons. The letter contained an invitation to the Chemists and Druggists' Trade Association to appoint a deputation to meet the Law and Parliamentary Committee of the Council of the Society in order that the whole case might be fairly explained.

Mr. Hampson said he felt considerable interest in this matter, as they knew, and he was extremely anxious that this Association should do all that lay in its power to bring it to a good issue, and he maintained that they must be resolute, they should take it up as a great and important question, and he did hope they would not be content to allow this question to lie idle.

It was then moved by Mr. Fairlie, seconded by Mr. Jervis and unanimously resolved—

> "That in response to the resolution passed by the Council of the Pharmaceutical Society inviting a deputation from this Association to meet the members of the Law and Parliamentary Committee of that Council, this Committee appoints the following gentlemen to consult with them on the subject of co-operative trading in poisons:—The London Members of the Executive Committee, who are not members of the Pharmaceutical Council, together

with Messrs. Barclay, Howden, Jones, Reynolds, and the Solicitor of the Association, with powers to add to their number."

The Secretary was instructed to forward a copy of this resolution to the Secretary of the Pharmaceutical Society, and to inform him that the deputation would meet the Law and Parliamentary Committee of the Council on the day and at the hour named in his letter of invitation.

Mr. Andrews said it was a most important matter to them in London; they felt it most in large towns at present, but he believed it would be felt universally throughout the country.

Mr. Barclay strongly urged the necessity of testing in a court of law the question of the legality of co-operative trading in poisons.

The Scotch memorial and a letter containing a resolution passed at a meeting of Aberdeen chemists supporting the same were read by the Secretary.

Mr. Mackenzie said as one who had canvassed in Edinburgh he could say that it was the unanimous opinion that they should have a Scotch Board, or Executive; because of the difference in the laws of the two countries, it would save much trouble and would simplify matters.

Mr. Fairlie explained their position from a Scotch point of view. With regard to having a Scotch executive the North British Branch of the Pharmaceutical Society had no powers except those relegated to them by the Society in London and he did not ask that the Association should give the Scotch branch any larger powers. He thought the Scotch Board should have a Scotch solicitor as gentlemen there naturally knew more of Scotch law than English solicitors.

Mr. Glaisyer (the solicitor of the Association) said he was prepared to advocate the employment of a Scotch solicitor on the ground that there are gentlemen there who had a higher interest and more practice in these matters than the agent of an English solicitor.

Mr. Hampson thought it was extremely desirable that some arrangement should be made and that the request of the Scotch Memorial should be agreed to. Dealing with the Glasgow Memorial first, he moved—

"That this Committee generally approves of the proposal contained in the Memorial presented to the Association by chemists resident in Scotland at the Trade Meeting at Glasgow, asking for a separate branch of the Association for Scotland and appoints a Sub-Committee consisting of Messrs. Davison (Glasgow), Fairlie (Glasgow), Kinninmont (Glasgow), Laird (Dundee), Mackenzie (Edinburgh), Macnaught (Grenock), and Strachan (Aberdeen), to draw up a scheme which shall be submitted to the Executive Committee of this Association for approval."

This motion was seconded by Mr. Greaves and unanimously agreed to.

In reference to the Aberdeen letter it was moved by Mr. Holdsworth, seconded by Mr. Fairlie, and unanimously resolved—

"That in answer to the letter from Aberdeen the Secretary be instructed to send to Mr. Strachan a copy of the resolution adopted in reference to the Glasgow Memorial."

A correspondence was read by the Secretary respecting a case of illegal trading under the Pharmacy Act.

A full and earnest discussion took place on the matter, and on the best means of proceeding against parties who were infringing the Act.

It was then moved by Mr. Churchill, seconded by Mr. R. Walker, and unanimously resolved—

"That the deputation already appointed for the purpose of conferring with the Law and Parliamentary Committee of the Council of the Pharmaceutical Society on the question of co-operative trading, be requested to bring the question of illegal trading under the Pharmacy Act generally before it."

The Secretary explained to the Committee the scheme for organization which had been adopted at the Glasgow meetings, and it was suggested that alterations may be made in the boundaries of a district if thought desirable.

Mr. Barclay explained the system on which canvassing and the work of organization generally should proceed under the scheme.

It was moved by Mr. Earle, seconded by Mr. Cross, and unanimously resolved—

"That the President and Honorary Secretary be requested to act as a sub-committee to arrange with the Secretary as to the time and manner of canvassing the districts."

Mr. Andrews said he thought it would be advisable that a sub-committee of London members of the Committee should be formed to arrange a system for dividing the city into districts and canvassing.

It was then moved by Mr. Fairlie, seconded by Mr. Laird, and unanimously resolved—

"That Mr. Andrews and Mr. Matthews be requested to prepare a scheme for canvassing the City of London and submit it to the Executive Committee for approval."

A letter was read from a firm of chemists in Ireland, inquiring if it is intended to confine the operations of the Association to England and Scotland.

It was, after discussion, moved by Mr. Andrews, seconded by Mr. Barclay, and unanimously resolved—

"That this Association earnestly desires to co-operate with the chemists and druggists of Ireland, and should it be shown to the Executive Committee that a feeling favourable to that object prevails they will carefully consider the subject."

The following resolution was moved by Mr. Andrews, seconded by Mr. Greenish, and unanimously resolved—

"That Messrs. Barclay, Churchill, Holdsworth and Southall form a finance committee."

A vote of thanks to the President for presiding terminated the proceedings.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Thursday the 2nd inst. the members of the above association assembled to listen to a lecture on "The Starches," by Mr. J. J. Edwards.

In the absence, owing to illness, of the President and Vice-President, the chair was occupied by Mr. Thirlby. After a few preliminary observations, the chairman called upon Mr. Edwards to discuss the subject for the evening.

In complying, the lecturer, fully yet tersely, explained the chemical composition of starch; the uses it subserved in nature's economy, both in plant and in animal life, and the dependence placed upon it, in one or other of its varied forms, as a food stuff, by millions of human beings. The behaviour of starch on the microscope stage when acted upon by various reagents, including calcic chloride, chromic acid, bile, saliva, pepsin, chloral hydrate, heat, etc., was next explained and illustrated. The various theories that have been promulgated relative to the formation of starch were next described, their comparative value being carefully enunciated by the lecturer. Attention was at this stage directed to the physical portion of the subject, special value being placed upon this branch as affording to an experienced operator means of detecting foreign bodies when present in the starches used as food. The mode of determining the kind of starch under examination by noting the size of the granules, the position of the hilum, the mode of lamination, and the behaviour under polarized light. was carefully explained and illustrated by reference to slides containing specimens of starches from the yam, acorn, maize, rice, tous le mois, potato, Bermuda, St. Vincent, and Natal arrowroots. The mode of mounting starches for microscopic use was next described, particular attention being directed to the fact that for successful use with the polarizing prisms the specimens must not only be mounted in powerfully refractive media, such as canada balsam, benzol, essential oils, and the like, but must also be viewed with high powers. Finally the importance of the subject, as evinced by the operation of the Adulteration Act, and the necessity always existing in starch analysis for a careful, cautious exercise of the judgment, were imperatively insisted upon. A hearty vote of thanks to Mr. Edwards for his clear and exhaustive lectnre terminated the evening's proceedings.

Proceedings of Scientific Societies.

PARIS SOCIÉTE DE PHARMACIE.

A meeting of this Society was held on Wednesday, October 4, when the chairman, M. Coulier, announced the death of M. Gobley, one of the most eminent members, and M. Blondeau recapitulated the address he had delivered at the grave in the name of the Society.

Adulteration of Quinine Sulphate.—A note from Dr. Jaillard, Algiers, was read, describing an adulteration of quinine sulphate that had been met with in that colony, consisting of an admixture of 70 per cent. of potassium nitrate. A sample was exhibited, that had been received in Algiers. It had on it a seal and label, and was wrapped in a prospectus, all bearing the name of a respectable French house. The mixture consists of acicular interlaced silky looking crystals, resembling closely those of pure quinine sulphate. The presence of the nitre could be demonstrated by the deflagration which took place, leaving a white ash, upon placing some of the substance on the end of a knife in the flame of a lamp. The meeting requested the chairman to send the adulterated specimens to the Procureur de la République.

Xanthium spinosum.—M. Yoon described to the Society some experiments that had been made in the school at Alfort, by MM. Trasbot and Nocard, respecting the alleged prophylactic action of *Xanthium spinosum* against hydrophobia. The results had been entirely negative.

CHEMICAL SOCIETY.

November 2, 1876. Professor Abel, F.R.S., President, in the chair. After the minutes of the previous meeting had been read and the other ordinary business completed, the President announced that the Goldsmiths' Company had contributed £1000 to the recently established research fund of the Society. Mr. Lupton then read a paper on "The Oxides of Potassium," after which communications were read "On Certain Bismuth Compounds, Part III.," by M. M. P. Muir; "On Phospho- and Arseno-Cyanogen," by W. R. Hodgkinson; "A Secondary Oxidized Product formed during the Reduction of Stannic Ethide to Stannous Ethide," by W. R. Hodgkinson and G. C. Matthews; and a preliminary notice on "Pigmentum Nigrum, the Black Colouring Matter contained in Hair and Feathers," by W. R. Hodgkinson and H. C. Sorby. This black colouring matter is left on digesting the cleansed hair or feathers with dilute sulphuric acid, but is present only in very small quantity. The meeting was finally adjourned until Thursday, November 16, when papers will be read "On Barwood," by the late Dr. Anderson; "On Potassium Triiodide," by G. S. Johnson; "On the Coal Gas of the Metropolis," by J. S. D. Humpidge; and "On Calcium Sulphate," by J. B. Hannay.

Parliamentary and Law Proceedings.

POISONING BY EATING OPIUM PILLS.

On Thursday, November 2, Mr. F. Price, district coroner, held an inquest at Worsley, on the body of Martha Alice Thornley, aged one year and eight months, daughter of Thomas Thornley, stone-quarryman.

The child's mother stated that she had been in the habit of giving pills to all her children to "sleep" them. She purchased the pills from Edward Crompton, a shoemaker and farmer, who lived at the Hollins, Worsley, but did not know what were their ingredients. Crompton had never told her to be cautious in the use of the pills. On Saturday last she purchased a box of the pills from him, and, having given one to deceased and one to her twin brother, left the box, in which were 22 pills, on a chest of drawers. About one o'clock on Sunday afternoon her daughter Ellen called her attention to the fact that deceased had got the pills by standing on a chair. She saw deceased with a paper containing eleven of the pills in her hand, and another pill was lying near her on the floor. Being asked where were the pills, the child put her finger into its mouth. Witness found the pill-box empty on the drawers. Deceased afterwards had some broth, and then became very sleepy. She was taken to the surgery of Dr. Martin, at Walkden, where she died.

William Young Martin, physician and surgeon, said he found the deceased child perfectly comatose when brought to his house. The pupils of her eyes were contracted, and her skin congested—the chief symptoms of poisoning by a narcotic. He applied the usual means to restore her, but failed to give relief. The child's mother had informed him that half of one of the pills would "give the children a good night's rest," and assuming the deceased had taken ten of the pills he was decidedly of opinion that that number would be dangerous. A pharmaceutical chemist had analysed one of the pills which witness had received from Mrs. Thornley, and had stated that it contained opium. Witness considered that the sale of opium by persons ignorant of its effects to persons equally ignorant, without proper caution being given, was highly dangerous. He had doubt whatever that deceased had died from narcotic poisoning.

The jury returned a verdict that the deceased, being a child under the years of discretion, had died from the effects of poison inadvertently administered by herself. The jury recommended that the police be requested to call upon the man Crompton to inform him that they highly disapproved of his indiscriminate sale of the pills, and that they suggested he should discontinue the practice and destroy all the pills in his possession.—*Manchester Courier.*

POISONING BY CYANIDE OF POTASSIUM.

On Wednesday an inquest was held by Dr. Hardwicke, in the Farringdon Road, touching the death of Sarah Langley and her infant daughter. From the evidence it appeared that the deceased woman had herself swallowed some solution of cyanide of potassium and given some to her child, being unable to meet her husband after pawning some property without his knowledge. The husband is a silver polisher, and kept the poison in the house for the purposes of his business.

The Coroner, in summing up, observed that it was very careless to leave such dangerous poisons about, as they were great temptations to persons to make away with themselves, especially if under the influence of drink. The jury returned a verdict that Sarah Langley committed suicide while of unsound mind by taking cyanide of potassium; and that the child met her death by poison, administered by her mother, whilst of unsound mind.

Charge of Attempted Murder.

At the Hampstead Police Court on Monday Eugene Cousté, 41, mechanician, was brought before Messrs. Marshall, Faulconer, and Smith, charged on suspicion of attempting to murder his two children, Maria Cousté, aged three years, and Victor Cousté, aged two years and one month, by causing poison to be administered to them. Mr. Marshall asked prisoner, who is a Frenchman, if he understood the charge, to which he assented.—The evidence embraced the narration of circumstances attending the recent death of the children's mother.

Margaret Askew, wife of a police-constable, deposed that she lived at Hampstead, and knew the accused. He came to lodge with her in September, 1875, and was accompanied by a female who passed as his wife, and two children. The woman and the children were in perfect health when they went to witness's house. In July of this year the woman was taken ill with purging, and complained to witness very much at times of the diarrhœa. A little while afterwards she complained of sickness, and that she could not keep anything on her stomach, and of a loss of appetite. The woman also retched blood, about a pint of it a day. She suffered from the purging for about a month before the retching of blood came on. The purging was continuous, and witness sent for Dr. Prance but she did not remain long under his care. Neither prisoner nor the woman seemed quite to approve of his coming. Witness thought Dr. Prance saw the woman three times altogether. He came once before the retching, and then they sent for him when the retching of blood came. The illness continued, and the woman did not take any further steps for some time; then some one advised her to go to the hospital, and she went to the French Hospital, Lisle Street, Leicester Square. She had a card for the hospital on the 22nd of July. Witness thought she remained in the hospital the first time about a fortnight. Witness visited her during that time. Prisoner did not accompany her on the first occasion, but he did afterwards on one occasion. He had very little conversation with the woman in witness's presence—only asked her if she wished for anything. He always took a bottle of wine—a bottle of claret—with him. He did so on the occasion he accompanied witness. He spoke to the woman in French, which witness knew sufficiently to understand their conversation. He said, "I have brought you a little wine." When he gave her the bottle the cork had been taken out; he did not take the cork out in the hospital. Witness did not notice all that he used to say to his wife. Witness used to go away from the bed. He told the woman to hide the wine or put it away. She said she was allowed wine there, and prisoner said it would not be so good as what he brought her. The woman used to hide it with her clothes in a little stool by the side of the bed, and prisoner told her to mind it was not seen. They used to hide the empty bottles which they brought away. The woman left the hospital in August. After her return to witness's house she got worse, and remained an out-patient of the hospital for a fortnight. About the end of August she again became an in-patient of the hospital, and witness visited her there every week. She died on the 6th of September. The accused accompanied witness to the hospital on, she thought, three of her visits, and took wine with him on each occasion, the bottles being handed to the woman with the corks drawn as before. She appeared to witness to be getting worse and worse. Prisoner used to lean over the bed and they used to whisper. She only heard him ask her if she wished for anything. He appeared to be very kind to her. Witness felt sure that the medical people at the hospital did not know anything about this wine. Prisoner continued to reside in her house with the children. On the 2nd of October he went away, and gave her a bottle of medicine before going. Previous to that, on the 14th of September, he had given her one, which he told her was the remainder of what "Madame" had been taking before she went to the hospital. Prisoner told witness she was to give this medicine to the children to give them an appetite, and to strengthen their chests. He wished the children to have it half an hour before eating, twice a day. The children where not in good health up to that time—they were sickly. Witness said she did not think the children wanted the medicine, and prisoner said that if she did not like to give it them he would. When "Madame" went away they began to get this purging, the same as Madame had, and the little boy was taken quite off his feet. She told prisoner that she thought they had had too much, and he replied, "Excuse me, madame; but I know better than you. You have had no children. You don't understand minding them." She promised to give them some, and she did so on Sunday morning the 17th. Prisoner asked her if she had forgotten to give them the medicine, and she took the bottle into the room and gave them some. That was the only time. It was in prisoner's presence. Cousté said, "That's right; never forget to give it them." The children afterwards were purged and very fretful and did not sleep through the night. This came on in the evening when she was putting them to bed. They had not eaten much dinner, which consisted of roast beef, potatoes, and apple pudding. The next morning they were worse. She did not give them any more after that. She had seen "Madame" give it them, and they always suffered from diarrhœa afterwards. That made her reluctant to give it to the children. On the Friday morning after the Sunday witness herself was not well, and she thought as this medicine was for strengthening she would take some fasting, which she did. Again on Saturday she took some, and she was so bad during the day she could not stand up afterwards. She had seen prisoner put Peruvian bark into the bottle, but he always took it away to put the wine in. In the course of much further evidence the witness described the effects produced upon her husband by drinking half a tumblerful of what he thought was claret, which prisoner had left for her to add to the children's medicine, and which brought on violent purging in her husband. She led prisoner to believe that she continued to give the medicine to the children, which she did not during his absence from home for several days, and on his finding that the children were well he seemed surprised. At last he took them away in great haste, saying he was going with them to Paris; but she subsequently saw him and the children, the latter much altered for the worse, both bodily and mentally, in Clerkenwell. Some bottles left in her house were handed over to the police.

Superintendent O'Loghlen said that Professor Redwood, who would attend on a future occasion, had informed him that the fluid in one of these bottles contained poison.—Detective Sargeant deposed that on apprehending prisoner that morning he said the charge was a false one.—The prisoner was remanded till next week.—*Standard.*

Review.

The Quinology of the East Indian Plantations By John Eliot Howard, F.R.S., etc. Parts II. and III. London: L. Reeve and Co. 1876.

To say that the author is better qualified than any one else in this country to make authoritative statements upon all points connected with the subject of quinology, to which he has so long and ably directed his attention, is simply to express a fact that has long been recognized. The magnificent style in which the present work is got up, regardless of expense, renders it quite a work of art, while the importance of the information contained in it should lead to its finding a place in every scientific institution in the British Empire.

The present volume is a continuation of the one issued in 1869, and the pages and plates are numbered accordingly. It is divided into three sections. The first consists of information respecting the present state of the plantations in India, and is evidently intended as a completion of the volume previously issued. The second section, distinguished as Part II., contains botanical observations. Part III., which forms the third section of the present volume, comprises microscopical observations upon the bark of *Cinchona Ledgeriana*, and five Appendices presenting in detail the latest intelligence from India and Java.

From its arrangement the work must evidently be regarded rather as a complete history of the East Indian plantations since the year 1869, than as a condensed summary of the present state of our knowledge upon the subject.

The expensive character of the work renders it probable that many of our readers may be precluded from seeing much of the valuable information contained in it; we propose, therefore, to extract rather freely from its pages.

In the introduction the author points out that the "only commercially profitable investment of capital must be connected with the production of a superior description of bark, such as will continue to command a relatively high price in the market." In consequence of the quantity of inferior bark, which is yet suitable for the extraction of quinine, still imported from South America, the price obtainable for the lower qualities of East Indian bark is very low (from 5*d.* to 1*s.* 4*d.* per lb.), and does not repay the cultivator. Although the percentage of mixed alkaloids in red bark is often large, yet the quinine frequently forms but a small proportion of the whole and, there being but little demand for the other alkaloids, the bark is not one that is likely to prove a valuable speculation.

It was thought that, such being the case, it would be a saving to the Government if the mixed alkaloids were prepared in India on the plantations; but Mr. Howard states that the mixed alkaloids can be supplied by European manufacturers at half the sum which it costs to produce them in India. He then proceeds to recommend that the Indian Government should make more extended trial of cinchonidine and cinchonine (the alkaloids most abundant in red bark), which he considers have been proved, by the statistics he quotes, to be as valuable febrifuges as quinine, if given in somewhat larger doses.

The author gives *in extenso* a long and interesting letter from Mr. Charles Ledger, narrating the difficulties, dangers, and the loss of a considerable amount of money and several lives, attendant upon procuring the more valuable kinds of cinchona seed from South America. Mr. Howard emphasizes by italics, and rightly we think, the following sentence: "Surely after the success attending the seed sent by me in 1865, the government of India and that of the Netherlands should award me a sum of money commensurate with the importance and value of the service rendered." The only comment necessary upon this sentence is to state that the bark from the tree grown from Mr. Ledger's seed is now readily bought at Amsterdam by manufacturers of quinine at from seven to nine shillings a pound.

From the various chapters relating to the cultivation of the cinchona in Java we learn that the Dutch are likely to take the lead in the market for several years to come in the production of the finest and most valuable cinchona barks. This is owing partly to the fact that the climate is more favourable to the growth of the best barks, particularly of *Cinchona Ledgeriana*, and partly to the promptitude with which the resolution to grow only the best varieties was carried out, immediately the value of Ledger's seeds was discovered. At the present time there are in cultivation at Java the following kinds; *Cinchona Calisaya*, vars. *Anglica*, *Javanica*, *Hasskarliana* and *Ledgeriana* (the last variety yields from 5 to 10 per cent. of quinine and the *Anglica* from 2 to 5 per cent.); *Cinchona Pahudiana; Cinchona officinalis*, var. *angustifolia*, yielding five per cent. of quinine; *Cinchona lancifolia*; [*Cinchona caloptera; C. micrantha*, yielding a large percentage of cinchonine; and *C. succirubra*. Of these the *C. Ledgeriana* and *C. officinalis*, var. *angustifolia*, are by far the most valuable varieties. In the Java plantations the inferior varieties are being replaced by these two kinds as fast as commercial interests permit.

With regard to the species cultivated in the Indian plantations, the information supplied is very meagre when compared with that from Java; it may be gathered, however, from the body of the work, that *C. succirubra* and *C. officinalis*, with its varieties, *crispa*, *angustifolia*, *Uritusinga*, *Bonplandiana-lutea* and *Bonplandiana-colorata*, are the species chiefly under cultivation; while *C. Calisaya* (probably var. *Boliviana*) forms a smaller portion of the plantations, and *C. micrantha*, *C. Peruviana* and *C. nitida*, are cultivated only to a small extent. In fact the first importation of Calisaya bark from India, noticed by Mr. Howard, was offered for sale in London, on May 9, in the present year, and consisted of only 1000 lbs., while that of red bark, original and mossed, exported from India at the same time, was 45,000 lbs., and that of pale bark 20,000 lbs. These figures will give some idea of the relative proportion of the species at present cultivated in India.

Judging from the herbarium specimens received by Mr. Howard from Ootacamund, it would appear that the Calisaya does not thrive so well in the Indian plantations as in Java. Mr. Howard points out that the species most deserving the attention of cultivators are the following: *C. Calisaya*, var. *Ledgeriana*, of which the true plant does not appear to be cultivated, at present, in India; *C. Calisaya*, *β microcarpa*; *C. officinalis* and its varieties mentioned above; *C. Pitayensis*; *C. lancifolia*, *δ Calisaya*, Wedd. (the Calisaya of Santa Fé). The latter appears to be valuable from the fact that every shoot from a felled tree will quickly form bark of good quinine-producing quality, and hence promises a quicker return for the outlay of planting than any other species. He suggests that the Indian Government should employ the well-known collector, Mr. Cross, to procure seeds from South America.

Mr. Howard considers that *C. Pahudiana*, *C. Calisaya*, vars. *Hasskarliana*, *Javanica*, *Anglica*, and *C. caloptera* are likely to cause disappointment to cultivators.

In Ceylon the young plants of *C. officinalis* are planted so close together (4 by 4 feet) that the direct rays of the sun are excluded and the planter is enabled to dispense with the expensive process of mossing.

One chapter is devoted to the relative merits of coppicing and mossing trees, and from the statements made it appears that coppicing, which consists in cutting down the young trees about six inches from the ground, and leaving the shoots at the root, is not nearly so advantageous as mossing, many of the trees dying from excessive bleeding and the shoots not yielding marketable bark for about ten years. By the mossing process increasingly valuable bark is obtained every year. It appears from Mr. Mac Ivor's account that this operation is performed in the following manner:—The labourer proceeds to a tree eight years old (the bark separates best at this age) and makes a horizontal incision, usually about one and a half inch wide, as high up on the tree as he can reach, and then makes two vertical incisions down to the base of the tree, and seizing hold of the top of the strip thus marked out, taking care not to injure the cambium, he then pulls it off down to the root of the tree, where he cuts it off. The process is then repeated all round the trunk, leaving a space between each incision, rather broader than the strips which he has removed. He then at once proceeds to surround the trunk with moss, which is fastened round the tree with some fibre. The moss being kept constantly moist, in about three days the wound is covered over with a layer of new tissue. Each red bark tree of the above age is found to yield on the average 1¾ lb. of dried bark. In from six to twelve months the process is repeated, and the strips which were left at the first operation are now removed, so that at the end of the second operation the whole of the original bark has been removed, and future harvests must consist of "renewed" bark. The process is repeated every year, apparently without permanent detriment to the tree. It is a remarkable fact that the bark produced when the old bark has been removed is not only thicker in proportion, one year's growth being equal in thickness to two or three years' growth of the original bark, but contains a larger percentage of quinine, which increases after each operation; so that "renewed" barks fetch a much better price in the market than the original bark. The whole amount of the alkaloid is not increased, the tables showing that in proportion as the quinine is increased the cinchonidine, and in a less degree the cinchonine, are decreased in quantity, so that the total yield of alkaloid remains about the same.

With respect to these processes, Mr. Howard remarks that commercial experience has shown that mossing is the best treatment for *C. succirubra*, and that for *C. officinalis*, which grows more slowly, although mossing improves the quality of the bark, planting thick and thinning out in four or five years, may in some situations be the most feasible if not the most profitable arrangement. The bark obtained from coppiced trees abounds in colouring matter, and the bark from the smaller branches, as supplied by this plan, is comparatively barren in quinine. Indeed the only species for which coppicing appears to be suited is the Calisaya of Santa Fé.

The *C. Ledgeriana*, as being by far the richest quinine-producing bark known, deserves a few special remarks. It appears that the original seeds purchased from Mr. Ledger did not all yield the same valuable variety, and hence the Dutch chemist at Java concludes that they may have been the result of cross-fertilization. It has been found by experiment that hybrids thus formed partake in nearly equal proportions of the chemical characters of their parents, so that it has been possible to judge from the alkaloids found in the bark of what two species the plant was the offspring. It has also been shown that there is a tendency in such hybrids to revert to the type of one or other of the parent plants. Hence he concludes that if the Ledger seeds are hybrids, that it may be possible in two or three generations for this valuable form, *C. Ledgeriana*, to revert to an original type containing even 20 per cent. of quinine. For present purposes it is necessary to propagate extensively the best trees by cuttings. Singularly enough it has been found that the *C. Ledgeriana*, unlike *C. succirubra*, cannot be propagated from cuttings from the branches, but that if a tree is felled the shoots which spring from the stumps will strike readily.

It will naturally be supposed that in this bark, containing one-tenth to one-sixth of its weight of quinine the alkaloids must be visible to the eye, and such is the case. Under a lens the bark is seen to be speckled with white dots, particularly in the cellular portion just outside the liber. That these can be seen in the form of crystalline nodules in a microscopical section, and that the crystals exist in the bark and are not formed by the liquor potassæ in which the sections are soaked for a minute to remove colouring matter, is strongly insisted by the author, contrary to the opinions of Berg, and the authors of 'Pharmacographia.' He is supported in his opinion by Mr. Broughton, who says that the crystals in red bark are unmistakably those of cinchonidine.

Another fact worthy of remark is that the *C. Ledgeriana* is a trimorphic plant, having three forms, in one of which (macho form) the stamens are prominent in the throat of the corolla, the pistil being situated entirely below the anthers; in the second (hembra form) the stigmas are prominent in the throat of the corolla, the anthers being below the stigma, and in the third form the pistils and anthers are on the same level. In the first the leaves are purplish underneath, in the second, green, and in the third, green with red veins. These features are well shown in the magnificent coloured lithographs, by Fitch, at the end of the work. The masculine or feminine element does not appear to have any influence upon the production of alkaloids.

The crown barks, derived from varieties of *C. officinalis*, come next in value to the *C. Ledgeriana*, the varieties *Bonplandiana, lutea*, and *angustifolia* appearing to be the richest in quinine. All of them yield an increasing amount of quinine in the renewed bark, but the trees have the disadvantage of growing rather slowly. Altitude appears to have some influence upon their yield of quinine, the amount of alkaloids becoming less below 6500 feet, and instead of quinine, cinchonidine and quinidine are produced, as well as resin, which hinders the crystallization of the alkaloids. In *Cinchona Peruviana*, also, Mr. Broughton found that, although at 6000 feet it yielded no crystallizable quininine, at 7800, feet it yielded much beautifully crystallized sulphate of quinine almost as readily as the *C. officinalis*.

Mr. Howard evidently does not hold the theory of evolution, or at all events does not apply it to the cinchona genus. He accepts instead the views of Mr. Jordan, that every so-called species in those districts where it may be said to have its home, or in other words, is found most abundantly and luxuriantly, exists in several forms, diverging as it were from a common centre, the forms belonging to one centre being connected by intermediate links with those of another centre. He looks upon all these forms as possessing equal permanency and as indefinitely producing their like. These forms he distinguishes from accidental hybrids by their chemical characteristics, hybrids giving alkaloids representing in tolerably equal proportions both the parents, while the forms give only the alkaloid of the group to which they belong. He considers that in this very natural but difficult genus "permanence, rather than insensible variation and the gradual transformation of species, is that which meets our view." In proof of this he mentions the fact that *C. officinalis* yields bark which is not only identical in the fourth generation with that which he received from Uritusinga in 1859, "extending to the minutest characteristics of a bark which can be distinguished at sight from the other form of *C. officinalis*, but is also the same with that gathered by Pavon 100 years before." Its yield of quinine has, however, been improved by mossing.

Facts seem to show that, as in human beings, the grandson or great-grandson will strongly resemble the grandfather or great grandfather, rather than the immediate parents, so in these trees there will occasionally occur, without any apparent reason, variations in different generations marked by a subsequent return in the descendants to the original type.

It yet remains to be proved whether the method of propagating the best forms by cuttings may not lead ultimately, as it has done in the case of the potato, to diminished vitality, and consequent disease. Further experiments are also needed to show whether the bark will be indefinitely enriched in quinine by mossing, or whether there is a limit in the age of the trees beyond which it will begin to diminish.

Several interesting facts, in a botanical point of view, have been discovered in the course of experiments in the cinchona plantations. Mr. Van Gorkom, of Java, grafted two Calisayas upon two Pahudianas, and the grafts succeeded well. Upon examination of the bark it was found that the *C. Pahudianas* as well as the Calisayas, kept their alkaloids as if they had grown separately.

When bark has been stripped off the tree, the wound if exposed to the air forms new bark from the edges, if covered with moss, however, new bark is produced simultaneously from the whole of the wounded surface. In either case, the original bark surrounding the wound does not yield a diminished quantity of alkaloid. From these and other experiments taken in connection with the fact that the alkaloids have been found to be more abundant in the living cellular tissues of the bark than in the liber, Mr. Howard draws the inference that the alkaloids are formed in the cells in which they are found, and that they are probably formed at the expense of the cinchotannic acid. This opinion appears to be borne out by the fact that the leaves contain only a very small proportion of the alkaloids.

Another fact which has a bearing upon the variation from so-called types in this difficult genus is the alteration of a plant during different stages of its development; thus a tree which for six months has had the habit of *C. Uritusinga*, will suddenly begin to have shorter leaf stalks and leathery leaves and begin to look like *C. crispa*.

The latest intelligence from Java states that there are 50 to 60 trees averaging 10·91 per cent of sulphate of quinine in the bark, all blossoming and seed-bearing trees, and that the Ledgeriana trees began to blossom freely last December, so that by this time there must be a plentiful supply of excellent seed.

The latest news from India informs us that some plantations of red bark at Darjeeling are to be rooted up and tea cultivated instead. The Calisaya imported this year from India was little more than half as rich as the Ledgeriana and is probably, Mr. Howard believes, the produce of a fine sort of Bolivian Calisaya.

It is evident from the valuable information contained in this volume that the wisest policy of Indian cultivators is to follow as speedily as possible the example of the Dutch in Java, *i.e.*, to cultivate only the cinchonas yielding a large percentage of quinine and which are suitable to the climate. Those who yet cherish the hope of making quinine artificially will find a mine of valuable hints, drawn from the laboratory of nature, in this work. The only point that we regret is that the absence of a good index and the want of grouping the information makes it very difficult to find out any particular point in which the reader may be interested. The splendid plates at the end of the work will enable the cultivator to recognize without any difficulty the true *C. Ledgeriana* in its different forms as well as the other more valuable kinds of cinchona which Mr. Howard recommends to the notice of the East Indian Government.

BOOKS, PAMPHLETS, ETC., RECEIVED.

CHEMISTRY: GENERAL, MEDICAL, AND PHARMACEUTICAL, INCLUDING THE CHEMISTRY OF THE U.S. PHARMACOPŒIA. By JOHN ATTFIELD, Ph.D., F.C.S., etc. Seventh edition. Philadelphia: Henry C. Lea. 1876. From the Publisher.

WATER ANALYSIS: A PRACTICAL TREATISE ON THE EXAMINATION OF POTABLE WATER. By J. ALFRED WANKLYN AND ERNEST THEOPHRON CHAPMAN. Fourth edition, rewritten by J. ALFRED WANKLYN, M.R.C.S., etc. London: Trübner and Co. 1876. From the Publisher.

PROCÉDÉS PRATIQUES POUR L'ANALYSE DES URINES, DES DÉPOTS, ET DES CALCULS URINAIRES. Par E. DELEFOSSE. Deuxième Edition. Paris: J. B. Baillière et fils. 1876. From the Publishers.

MANIPULATIONS DE PHYSIQUE. Cours de Travaux pratiques professé à l'Ecole de Pharmacie de Paris. Par HENRI BUIGNET. Paris: J. B. Baillière et fils. 1876. From the Publishers.

HISTOLOGICAL DEMONSTRATIONS; A Guide to the MICROSCOPICAL EXAMINATION OF THE ANIMAL TISSUES IN HEALTH AND DISEASE; being the Substance of Lectures delivered by GEORGE HARLEY, M.D., F.R.S., etc. Edited by GEORGE T. BROWN, M.R.C.V.S., etc. Second Edition. London: Longmans, Green and Co. 1876. From the Publishers.

LONDON HOSPITAL.—THE REPORTS OF THE MEDICAL AND SURGICAL REGISTRARS FOR 1875.

Notes and Queries.

BRILLIANT COLOURS FOR SHOW BOTTLES.—A correspondent of the *Druggists' Circular* recommends the following:—

Red Colour.

Cudbear	2 ounces.
Sulphuric Acid	2 „
Water	2 gallons.

Macerate the cudbear and the acid six or eight hours, add the water, and filter.

Purple Colour.

Cudbear	2 ounces.
Ammonia	8 „
Water	2 gallons.

SALICYLIC ACID AS INDICATOR IN ACIDIMETRY.—According to H. Weiske, a convenient quantity of salicylic acid is dissolved in distilled water, the solution filtered, and a few drops of solution of ferric chloride are added. To the intensely coloured solution a very dilute soda-solution is carefully added, until the exact point of neutralization is reached, when the liquid assumes a reddish-yellow colour. In titrating an acid, if a few cub. centim. of this solution be added, the liquid remains in the beginning colourless; but in proportion as the acid becomes gradually more and more neutralized by standard alkali solution, the violet tint increases, until just before neutralization it assumes the greatest intensity, while all colour suddenly disappears at the slightest excess of alkali. According to the author, this method permits a much more delicate titration than any other, principally because the transition from intense coloration to colourlessness is so rapid and decisive, without intermediate tints.—*New Remedies, from Zeitsch. f. anal. Chem.*

[529]. OL. VIRIDE.—Will any reader favour me with a ready formula for Ol. Viride—not the one made from the green herbs, etc.? I believe there is a way of making it for veterinary use by mixing Ol. Lini and Verdigris. It is such a one that I want.—J. S. W.

[530]. INDIA RUBBER CEMENT.—"Bicyclist" is desirous of obtaining a recipe for an India Rubber Cement suitable for fastening the india-rubber tyres on bicycle wheels.

[531]. PHOSPHORIZED COD LIVER OIL.—Can anyone oblige me with a formula for Phosphorized Cod Liver Oil?—F—x.

[*** The following appeared in the *Lancet* for June 3rd last.—ED PHARM. JOURN.]

"Take of pure unoxidized phosphorus, two grains; almond oil, two ounces. Put into a bottle, stopper it, and immerse the same in a water-bath; apply heat until the temperature of the oil is about 180°, as directed by the British Pharmacopœia in the preparation of oleum phosphoratum; shake up occasionally, and put the bottle again into the water if necessary until a perfect solution is obtained; then add about ten ounces of cod-liver oil, and again immerse in the water-bath; finally make up the measure with cod-liver oil to twenty-five ounces. One drachm so prepared will contain over one-hundredth of a grain of pure phosphorus."

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

THE SESSIONAL PRIZES.

Sir,—At the meeting of the Council last week a discussion took place on the advisability of altering the existing conditions of competition for the sessional prizes in the Society's school.

Being a student in the school and feeling an interest in the subject, I should like to make a few remarks thereon.

In the first place, I would ask, why alter the present regulations? No reason, as yet, has been given for altering a custom that hitherto, apparently, has worked well.

The question has been raised that it is unfair to allow a second year's man to compete with a first year's man for these prizes. I fail to see the injustice. I believe these prizes are awarded for proficiency in the various subjects taught in the school, therefore if those students who have attended the longest were ineligible to compete, it is obvious that the most efficient man may be prevented from obtaining a prize. It may with as much justice be said that a man who studied six hours daily competed unfairly against a man who worked two hours only.

There are various points that ought to be considered before an alteration is attempted. I would especially mention the relative position of the students as regards their period of studying.

Some have the whole day to work at the subjects which the students require to know; others, and by far the majority, have but two or three hours daily. It is simply natural that a person in the latter position would require a longer period of study than the former would require. In short, what the former would accomplish in ten months, the latter would only accomplish in twenty months or more.

Mr. Hanbury mentioned the fact that at medical schools second year's men were not allowed to compete against first year's man. This is so; but I fail to see the connection between the two cases; in the one, attendance is compulsory, in the other, purely voluntary. I believe even in medical schools fifth or sixth year's men are not prevented from competing with a second or third year's man.

Two or three years since, Dr. Attfield deplored the fact that students did not work in the laboratory long enough to be able to devote their time to original research. Is this not owing in some measure to the regulation prohibiting second year's students from competing for the laboratory prizes?

If there is an injustice in the present conditions, it is in the competition for the lecture bronze medals; in this case a student obtains a higher prize for an easier examination.

I would ask the opinion of the professors on this subject. I may say from experience that very few students would either take perpetual tickets, or enter for a second session if the only inducement for them to do so were taken away.

Should the Council think it advisable that a change should be made, surely some other prizes ought to be instituted to act as levers to urge on students to attain that high degree of education which the Council so much desire.

AN INTENDED SECOND YEAR'S STUDENT AT THE SQUARE.

London, Nov. 7, 1876.

DANGEROUS GREEN FIRE.

Sir,—Mr. West has done well in mentioning his experience with the formulæ he has alluded to, and his letter may be the means of averting many serious accidents, especially amongst the young and inexperienced in the trade. The percentage of sulphur, in my opinion, being most dangerous, rendering even the incorporation of the ingredients (if done in a mortar without extreme caution) not free from peril.

I have for some time made this subject a study, and now prepare colours for every purpose in which they can possibly be employed, and in most instances, excepting where the proportion of sulphur is reduced to an infinitesimally small quantity, or in others where cheapness is an object, I dispense with its use altogether. It is impossible to obtain a good green without the use of potassæ chlorat. and the preparations of baryta, but sulphur, the source of mischief, is not an absolutely necessary ingredient in producing this colour.

I shall be happy to supply (free of cost) your correspondent with a recipe that I think will please him.

J. R. P.

Newnham.

Mr. West writes again in relation to this subject that from what he has experienced in the making of coloured fires he has come to the conclusion that if fires containing a nitrate and a chlorate are placed in closed vessels in a fair quantity, they are very liable to self-combustibility (especially if in the slightest degree damp?), but if left quite open as in paper bags, etc., are comparatively safe.

THE DISPENSING OF COPAIBA RESIN.

Sir,—To dispense elegantly the mixture of copaiba resin, mentioned by Mr. Greenish in his paper of the 1st inst., the addition of sugar of milk and more spirit is, I think, unnecessary.

The following method of mixing I find satisfactory:—

Powder the resin of copaiba with about 1½ drachm of powdered gum arabic. Add the spirit and triturate till quite smooth. Add now the remainder of the powdered gum, 3½ drachms, so as to form a thick paste. Continue the trituration, and add gradually the water.

LEONARD J. READE.

3, Lower Parade, Leamington.

TOUGHENED GLASS MEASURES.

Sir,—The experience of your correspondent "A Country Member" quite coincides with my own. Reading the advertisement of "Toughened Glass," and delighted above measure at the prospect of fewer breakages, I ordered a quarter of a dozen in order to test their value; but alas! only to be "disappointed still and still deceived." Exclaiming, like the man of old, "Eureka!" I let one fall on a well carpeted board floor about two feet, to see it dashed to atoms, not merely broken but as if crushed to tiny fragments. Clearly I think Toughened Glass may be a profitable novelty for the glass manufacturer but is not yet a boon to the poor chemists.

ANOTHER (DISAPPOINTED) COUNTRY CHEMIST.

Kidderminster,
November 6, 1876.

M. P. S. (who is referred to the rule respecting anonymous communications).—We cannot advise you upon the subject.

"*Syrupus, P.B.*"—We are not aware that any site has been definitely fixed upon.

L. E. Bore.—(1) *Carex vulgaris;* (2) Not perfect enough to determine; (3) *Festuca ovina* (vivaparous); (4) *Psamma arenaria;* (5) *Carex vesicaria.*

"*Compositæ.*"—*Erigeron acris.*

G. A. Redford.—Coralline is a preparation of rosolic acid, obtained by the oxidation of carbolic acid.

W. E. Paul.—"Gasaline" is one of the numerous names for petroleum spirit.

E. J. H. Thring.—We are afraid that nothing can be done to restore the colour. Why not try the plan you mention?

R. H.—Griffin's 'Chemical Testing of Wines and Spirits'; Bolley and Paul's 'Manual of Technical Analysis.'

Réa.—If made carefully in a water-bath it scarcely becomes coloured at all but retains its whiteness.

H. Clift.—Probably the brown colour was due to the liberation of bromine by some free benzoic acid present in the lard.

Mr. Wilkinson (Manchester) is thanked for his communication.

COMMUNICATIONS, LETTERS, ETC., have been received from Mr. Thresh, Mr. West, Apprentice, Viator.

"CHICLE" GUM AND MONESIA BARK.

BY JOHN R. JACKSON, A.L.S., CURATOR OF THE MUSEUMS, KEW.

So long ago as 1839 an article was published in the Paris Medical Gazette on a vegetable substance from South America, known as Monesia. This article was reprinted in the *Pharmaceutical Journal*, vol. iii. (1843–44), p. 292. It pointed out that *Monesia*, as then known, was in the form of hard thick cakes, covered with yellow paper, each weighing about 500 grammes; and in this form it was, at the date given above, a recent introduction into France. The substance consisted of an extract prepared from the bark of the tree, the botanical source of which was at that time unknown, though it was supposed to be a species of *Chrysophyllum*. It was known, however, to travellers as *goharem* or *buranhem*. The bark was described as smooth and greyish, in appearance like that of the plane tree but much thicker, showing an imbricated fracture and having a sweet taste. The extract was in colour deep brown, very friable, and when broken having the appearance of a well roasted cocoa nut, entirely soluble in water, at first sweetish to the taste, like liquorice, but afterwards becoming astringent, leaving a well marked and lasting acid taste in the mouth, which is particularly felt in the tonsils. The uses to which Monesia was put were diarrhœa, leucorrhœa, uterine hæmorrhage, inflammation of the mucous membrane, etc. Such is a brief *résumé* of what has already been published on Monesia, which will be found in detail at the reference given above as well as at pp. 125 and 187, vol. iv. (1844–45) of the *Pharmaceutical Journal*, the latter being a quotation from the 'Systema Materiæ Medicæ Vegetabilis Braziliensis.' In this the plant is referred to as the *Chrysophyllum Buranhem* of Riedel.

Quite recently the plant has been brought to notice again as the probable source of a gum or gum-resin, known as "Chicle" in New York, whence it is imported from Mexico for manufacturing purposes such as mixing with rubber for insulating telegraph cables. Some experiments have also been made with it with a view of manufacturing a paint for the bottoms of vessels, besides which an essential oil adapted for perfumery purposes can, it is said, be extracted from it. A specimen of this Chicle Gum has recently been received at the Kew Museum. In appearance it is somewhat like crude gutta percha but more friable or brittle. It is easily made plastic in warm water, but from experiments made in this country it does not seem suitable for mixing with india rubber for telegraphic purposes as it makes the rubber itself more birttle. Besides the name of Chicle the substance seems to be known in the New York Market as "Mexican Gum" and "Rubber Juice." The identification of this gum with the plant yielding Monesia is founded as yet only on the fact that the plant yielding the former is known as Zapota or Zapote and is described as a sapotaceous tree, and further that it yields a medicinal product known as Monesia. Specimens of the plant itself have not yet been received, therefore though all the circumstances indicate them to be one and the same thing it cannot be decided as a certainty until the reception of actual specimens yielding Chicle Gum.

With regard to the Buranhem or Guaranhem of Brazil, which is also known as the Imiracem, Mohica, and Cusca doce (sweet bark), it is conclusive that the plant furnishing them is the *Chrysophyllum glycyphlœum*, Cazar. (*C. Buranhem*, Riedel). It is one of the commonest trees in Brazil, and is met with even in the environs of Rio de Janeiro, where Cazareth studied it (on the Corcavado), as well as Velloso and Peckholt in Cantagallo. Both in the provinces of the north as well as in the Antilles, it is well known and employed in medicine and in veterinary practice. The bark is carried to market in fragments of from two to three millimetres thick and five to twenty centimetres in length. It is of a red or brownish colour, according to the season in which it is gathered and according to the age of the plant. When recently collected the bark is abundantly milky and has a strong astringent and sweetish taste.

Monesia, as now met with, presents under the form of transparent plates of a yellowish white colour a substance easily pulverized. When reduced to powder it has a white colour. It is soluble in alcohol and in water, but barely so in sulphuric acid. When put into water and shaken it produces a froth like soap-suds. In Brazil the preparations of the bark of this plant are used both internally and externally. It is considered an excellent astringent, applied in the same cases as the ratanhia. In Bahia, Leigipe and sundry other provinces it is the usual medicine for cases where an energetic astringent action is required. The preparations employed are—the decoction for baths and clysters; the extract for pills and to put on cataplasms, and the syrup or wine. The disorders in which this medicine is most efficacious are diarrhœa, intermittent fevers, dysentery, hæmorrhage, ulcerations of the mucosus gastro-intestinal canal, quinsy, etc.

With regard to the physiological action of Monesia, it is said that, notwithstanding its sweetish taste, it belongs strictly to the astringents and tonics. Its astringency becomes less sensible by the presence of the saccharine principle contained in the bark. On ulcers it produces a sensation of pain accompanied with great heat which lasts for hours and sometimes even for days afterwards, accompanied with a rapid formation of numerous fleshy pimples. On the fibres of the uterus it acts with the same effect as ergot of rye.

Monesine, the acrid principle, is applied in doses of 1 to 3 decigrams. The syrup has a great reputation against hæmoptisis, the extract in ulcerations of the mouth and the mucosus gastro-intestinal canal, as has already been said. Externally the extract, either with glycerine or pure, is considered very efficacious for wounded breasts, lips and arms; the powder is also used for similar purposes. With regard to the industrial applications of the bark of *Lucuma glycyphlœum* it is, on account of its astringency, used both for tanning leather and for dyeing purposes; further than this, it is said to contain a quantity of saponaceous matter which might be employed for cleaning, but which does not seem capable of development to any extent so as to make it commercially profitable.

The foregoing remarks on the products of *Lucuma glycyphlœum*, or Monesia, are abstracted from a report recently drawn up for the Brazilian Government by some of the best authorities on the subject. Although Monesia is not now used in Brazil so much as formerly it still has a reputation.

PHARMACY IN MALTA.

BY ROBERT WATSON.

Having returned from a stay of six months on the island, I thought a few words regarding the course of study required before a dispensary can be opened there would interest some of the readers of the Journal.

The course of study extends over a period of five years; the studies are conducted at the University.

First year.—Botany and Mathematics.

Second year.—Inorganic Chemistry, Zoology, and Natural Philosophy.

Third Year.—Natural Philosophy continued (an examination is held of the above studies, including English and Latin languages and Geometry).

If the student be successful he enters on the fourth year, which is devoted to Organic Chemistry.

Fifth year.—Materia Medica, and Medical Botany.

If the examination is passed at the end of the term he receives his licence to practise as an apothecary.

Any person holding the Minor or Major diploma who wished to open a dispensary in Malta would be obliged to write to the Chief Secretary of the Government to call a Medical Board, at which he would be examined in chemistry, pharmacy, and prescriptions, and would have to produce his Certificate of Registration by the Pharmaceutical Society. The fee for the licence is £1, payable at the Chief Secretary's office.

The dispensaries are owned by Maltese, except one, which is kept by Mr. Kingston, he being the only English chemist on the island. The shops have no windows, the door giving both light and entrance; it is built in the form of an arch. The fittings are very nice, principally French. There is only one counter, which is placed at the end of the shop, not touching on either side; shelves are placed all round, and to an Englishman the absence of glass cases, fancy articles, etc., is very striking, the English dispensary, which is fitted quite in home style, being the only exception. The prescriptions written by the Maltese doctors are in Italian principally; some are novel to the English dispenser. I give one, a favourite purgative—

℞ Ol. Ricini . . . . ℥j.
Ol. Amygdal. dulc. . ℥ss.
Syrup. Anthem. . . ℥ij. M. ft. Haust.

The hours of business are from 7 A.M. until 9 or 10 P.M. In the heat of the day the shops are closed for one or two hours. The prices for patents, perfumes, etc., are the same as in England. As for mixtures, etc., the Maltese cut them very fine. All the drugs are obtained from France and Sicily.

As regards the drug products, orange flower water is made in small quantities; also oil of neroli, which is very thick and dark. Almond oil is pressed, but in so small a quantity as not to be worthy of notice. Rose water is obtained from Tripoli.

THE BEHAVIOUR OF SOLUTIONS OF SOME SUBSTANCES TO POLARIZED LIGHT.*

(*Continued from p.* 192.)

BY O. HESSE.

Milk Sugar.

For milk sugar a double rotatory power has been observed. The fresh solution prepared cold, according to Dubrunfaut,† rotates $\frac{5}{3}$ times stronger to the right than one that has stood a longer time at a moderate temperature, or has been boiled. If the latter solution be left to evaporate, it does not deposit crystals, according to Dubrunfaut, before it acquires a specific gravity of 1·063. The solution then contains 21·64 per cent. of sugar, which consequently must exist in a modified form, as 85·45 parts of water at 10° C. only dissolves 14·55 parts of sugar. The modified sugar, therefore, distinguished as β, dissolves $\frac{3}{2}$ times as easily as the crystallized or α milk sugar. According to E. O. Erdmann‡ for the β modification $\alpha j = +56{\cdot}4°$.

Milk sugar deposits from its solution in water as well as from alcohol always in combination with one molecule of water; it may probably be assumed, therefore, that it exists in the respective solutions in similar combinations. The water of crystallization is not given off in the exsiccator at a temperature below 130° C. Analysis gave the following result:—

	Calculated for $C_{12}H_{22}O_{11} + H_2O$	Found I.	Found II.
H_2O ...	5·00	4·96	4·86

For the optical examination the sugar was finely powdered, dissolved in water, without heat, and the solution at once examined. It then gave:—

Ia. $p=2, l=220, \alpha=+3{\cdot}55°$, consequently $\alpha j=+80{\cdot}68°$.

IIa. $p=3, l=220, \alpha=+5{\cdot}26°$, consequently $\alpha j=79{\cdot}70°$.

After standing 52 hours—

Ib. In the same proportion as Ia., $\alpha=+2{\cdot}36°$, consequently $\alpha j=+53{\cdot}63°$.

IIb. $p=3, l=200, \alpha=+3{\cdot}19°$, consequently $\alpha j=+53{\cdot}16°$.

Solutions prepared at 60° C, and kept 5 hours at that temperature gave—

III. $p=5, l=200, \alpha=+5{\cdot}82°$, or $\alpha j=+52{\cdot}90°$.

IV. $p=12, l=200, \alpha=+12{\cdot}64°$, or $\alpha j=+52{\cdot}67°$.

The latter four solutions contained the sugar in the β modification. It is apparent that the rotatory powers of the two modifications do not stand to one another as 8:5 but 3:2; consequently in inverse proportion to the solubility of the two forms. This the author explains as follows. A freshly prepared solution of milk sugar saturated at 10° C. contains in 100 parts, 14·55 parts of sugar. In these proportions the molecules of sugar fill the given space so perfectly that any further molecules of sugar added to the solution find no more room to dissolve. By boiling, as well as by standing, there results a contraction in the building up of the molecules, so that the volume of each molecule is reduced to two-thirds of its original expansion. The solution is then only two-thirds full, so that a further one-third part of substance in the same condition may find place in it. A light ray which passes through the volume of the first form must travel a path one half longer than when it passes through the β form, and correspondingly in the first case it is more strongly affected by one-half than in the other.

According to this view the volume of the molecule would have an influence upon the rotatory power.

Within the limits of $0p$ and $12p$ the rotatory power of

* Abstract of a paper in the *Annalen der Chemie*, vol. clxxvi., p. 95.

† *Chem. Centralblatt*, 1856, 233.

‡ *Jahresbericht f. Chemie*, 1855, 671.

the β-form of milk sugar in aqueous solution at 15° C. can be calculated according to the following formula:—

$$\alpha j + 54{\cdot}54 - 0{\cdot}557\, p + 0{\cdot}05475\, p^2 - 0{\cdot}001774 p^3.$$

The α form through its instability presents difficulties to an estimation of its rotatory power. The greater p is, the greater is the lapse of time before it is all dissolved, and a trustworthy result is excluded. How much time influences the result is shown by the following:—A solution containing $p=2$ was made in the cold, but was not examined until after the lapse of half an hour, when $\alpha j = +75{\cdot}63°$ was found. With $p=3$, under the same conditions, $\alpha j = +73{\cdot}74°$ was found. Finally, a solution containing 2 p examined after two hours gave $\alpha j = +65°$.

To ascertain whether the sugar rendered anhydrous at 130° behaved in this manner, a quantity of it was taken corresponding with 3 p of hydrated sugar. Upon pouring cold water upon the sugar it caked together somewhat, evidently through the absorption of water. After standing two hours the solution gave, with $l=220$ a deviation of $+4{\cdot}18$, or $\alpha j = +63{\cdot}34$. So that it was clear that the anhydrous sugar was by contact with water restored to its former molecule, and now existed in solution like ordinary sugar.

The alkalies depress the rotatory power of milk sugar. A solution of p 3 in water containing one molecule of Na_2O gave $\alpha j = +45{\cdot}45°$, and after 24 hours, $\alpha j = +12{\cdot}57°$. Solutions of both the α and the β forms behaved similarly in this respect, so that the author concludes that only the most soluble modification of milk sugar can be contained in alkaline solution. This sugar is met with in milk in the same form.

Glucose.

Under the name glucose is understood, as is known, the crystallized grape sugar. It has been thought that the sugar actually occurring in the ripe grape, as well as the sugar which is obtained by decomposition of several organic substances, and has the same composition as crystallized grape sugar, are also identical with it. Biot has, however, stated* that the substances which are usually called glucose, or grape sugar, in respect to their optical behaviour do not quite agree with one another. The author, therefore, examined glucose of varying origin.

As a characteristic of the hitherto examined substances it is remarked that they have the composition represented by the formula $C_6H_{12}O_6 + H_2O$, and can exist in two modifications, namely, an amorphous or easily soluble form, which possesses a definitely lower rotatory power, and in a crystalline, or difficultly soluble form, in which the rotatory power is double as great as in the amorphous form. Consequently conditions are met with here similar to those occurring in milk sugar.

a. Honey Sugar.—Bees separate this sugar only in the soluble modification, according to Dubrunfaut, mixed with fruit sugar, cane sugar, and other substances. Not till after some time is this sugar converted into the other modification, the honey becoming gradually hard or crystalline. Naturally only the older crystallized honey is suited to the preparation of this kind of sugar. This was spread out between blotting paper, in order to separate the liquid portion as much as possible; then the nearly hard mass was dissolved in alcohol, the solution treated at a boiling temperature with hydrochloric acid to remove any cane sugar present, the alcohol, and at the same time the greater part of the hydrochloric acid, driven off by exposure in a flat-dish to a gentle heat, and the syrupy but still acid residue stood in a cool place to crystallize, which it did in a short time. The crystalline mass was washed with alcohol, and again spread out between blotting paper. The hard mass was then triturated with alcohol to remove yet adhering hydrochloric acid, the fine paste drained upon a filter, and treated from time to time with some stronger alcohol. After a subsequent recrystallization of the sugar from water it was perfectly free from hydrochloric acid. But as the sugar had still a slightly yellowish colour it was dissolved at a moderate temperature in a little water, and the syrupy solution treated with animal charcoal, after which the sugar separated quickly from the perfectly colourless solution in dazzling white aggregated crystals. After washing with alcohol the crystalline mass was first dried in the air between blotting paper and afterwards in the exsiccator.

Honey sugar prepared from old honey without using hydrochloric acid possessed exactly similar properties as that prepared as described. The inference drawn by the author is that the honey used contained no noticeable quantity of cane sugar, and that probably cane sugar is present in honey only under abnormal conditions.

The honey sugar thus obtained is dazzling white and forms hard warty clusters of crystals, consisting apparently of short prisms.

In the exsiccator this sugar lost no water at the ordinary temperature. But when the temperature rose to 70° C. the water of crystallization was given off except a small quantity, which finally separated at 95° C. At this temperature the sugar did not melt. The amount of water separated amounted to 9·1 per cent., the quantity required for one molecule being 9·04 per cent. At 100° and even at 110° C. the dried sugar showed no further loss. But if honey sugar be very rapidly heated it melts, and then only an unsatisfactory result is obtained relative to the amount of water of crystallization. Melted in a fine tube the author's specimen melted at 82° C. (uncorrected); Smith gives the melting point as 86° C. (corrected).

Optical experiments were made with the crystalline form (α), and the amorphous modification (β). In the former case the solution was examined immediately upon being prepared, and in the latter after twenty-four hours. If the solution were warmed it could be examined for the β-form at once. The α-form showed a rotatory power extending from $\alpha j = +91{\cdot}81°$ to $\alpha j = +91{\cdot}75°$; the β-form varied between $\alpha j = +50{\cdot}00°$ for $p=1$ and $l=220°$, to $\alpha j = +46{\cdot}34°$ for $p=12$ and $l=100$. Here also the rotatory power decreased with the increasing concentration.

The α-form is very unstable in aqueous solution showing a greater rotation at the commencement of the experiment than even at the end of the few minutes during which it lasts.

A comparative experiment was made with an acid solution, $p=3$, water containing equal to six molecules of HCl being used as a solvent. When examined directly it gave $\alpha j = +68{\cdot}50°$; after twenty-four hours $\alpha j = +47{\cdot}17°$, this latter being almost the same result as obtained with the aqueous solution.

An alcoholic solution, in which $p=3$, and the alcohol amounted to 73 per cent. gave, when examined immediately, $\alpha j = +93{\cdot}93°$; after twenty-four hours αj had sunk to $= +52{\cdot}88°$; after another twenty-four hours to $\alpha j = +49{\cdot}69°$; after this there was but a slight further decrease. Alcohol of medium strength would therefore appear to retard the change of the α-form of honey sugar into the β-modification. But if very strong alcohol is used the α-form goes into solution without altering to the β-form, whilst water separates and the sugar becomes anhydrous. The best way is to treat the sugar first with 60° to 70° alcohol, and afterwards with boiling absolute alcohol, when it forms four-sided, apparently right-angled prisms, which show no loss when heated to 110° C.; at 135° C. the crystals soften, and in a fine tube melt at 144°. When dissolved in water these crystals pass at once into the ordinary hydrated state, and after a time crystallize in that form. These crystals at 100° C. lose equal to one molecule of water. When this material was used for the optical test, for the α-form $\alpha j = +101°$; for β-modification $\alpha j = +51{\cdot}70$; being higher results than those previously mentioned.

* *Comptes Rendus*, vol. xlii., p. 351.

b. Grape Sugar.—The ripe grapes contain this sugar only in the β-modification, mixed with a larger quantity of fruit sugar, for which reason grape juice rotates a beam of polarized light to the left. But if dried and preserved for some time a portion of the fruit sugar disappears, and a deposition of the grape sugar goes on, so that not unfrequently the dried grapes become covered with a white coating of crystallized sugar. The author used only grape sugar prepared from dried grapes. These were soaked in lukewarm water, and after swelling were crushed, and the fluid portion concentrated. The syrupy residue was boiled with strong alcohol, the alcohol removed from the separated clear solution, and any tartaric acid still present removed with chalk. Upon then sufficiently concentrating the faintly acid filtrate the grape sugar very soon separated out, and was spread out between filter paper to remove adherent viscous matter. It was then twice recrystallized from water, the second solution being treated with animal charcoal, when it was obtained in beautiful aggregated crystals, resembling in external appearance honey sugar. The air-dried substance heated to 105° C. lost altogether 8·95 per cent. of H_2O (1 mol. $H_2O = 9{\cdot}04$ per cent.). The sugar melted in a fine tube at 82° C. It was rendered nearly anhydrous by 70 per cent. alcohol, and if then dissolved in boiling 97 per cent. alcohol, the anhydrous sugar crystallized out on cooling; it resembled externally the anhydrous honey sugar, and also melted at 144° C. Optically examined the hydrated sugar gave for the α-modification $aj = +94{\cdot}5°$; for the β-modification $aj = +47{\cdot}87°$; for the β-modification when the anhydride was used, $aj = +51{\cdot}78°$. The author concludes that these results show grape sugar to be identical with honey sugar.

(*To be continued.*)

THE DRUG WAREHOUSES OF THE EAST AND WEST INDIA DOCK COMPANY.

A very interesting article in the *British Trade Journal* for November is devoted to the description of the warehouse accommodation provided in London by the East and West India Dock Company, for the convenience of the merchants, brokers and buyers concerned in the foreign produce imported by the vessels using the docks. We extract from it the following paragraphs relating to the drug stores:—

"The warehouse in Billiter Street is set apart for the storage of the most valuable articles of importation, such as the finer drugs, ivory, feathers, china ware, etc. In the drug department one sees such costly articles as musk, vanilla, ambergris, and the various kinds of essential oils undergoing manipulation. Each package of musk is carefully sorted, and every individual pod subjected to close scrutiny, for Ah Sing has a peculiar knack of deftly introducing different foreign substances into the pods and closing them up again. Some mysterious compound known as 'Chinaman's Earth' is a favourite adulterant of this highly-priced natural perfume. Ambergris, a peculiar secretion of the sperm whale and the base of many scents, was not a great number of years ago accounted worthless, but as much as five guineas an ounce has since been paid for it. Essential oils occupy an important place in the drug warehouse. We noticed a large vat for the reception of cassia oil, capable of holding 206 gallons. This oil has to be turned out of its original packages and "bulked," or mixed together, buyers being chary of investing in an article which exhibits very unequal quality. . .

"In Fenchurch Street is the greatest drug store, perhaps, in the world, and here also are worked and warehoused such leading import staples as silk, tea, cigars, etc. . . . While, as already mentioned, the finer sorts of drugs find their way to Billiter Street, it is to this place that the great staples are diverted. The stowage capacity is immense. Rooms upon rooms, and cellars of vast extent, are crammed to overflowing with the medicinal produce of many climes, and the money value of the drugs here accumulated is little short of fabulous. Articles like jalap, ipecacuanha, and aloes, are stored in separate rooms, fitted with tiers of racks for the reception of the packages. Of ipecacuanha root alone the stock is valued at 6000*l.*, and it not unfrequently reaches 15,000*l.* China rhubarb is stored in a small building apart from the general drug block, as from its peculiarly penetrating and slightly nauseous smell its proximity to other drugs is not desirable. The present stock is about 850 cases, and their average value may be set down at 16*l.* a case. Every package that is received in the drug department requires "working," that is, it has to be classified, sorted, sampled, etc. The responsibility of this work falls on the experienced foreman, under whom is a staff of thirty assistants. The practice of years has made him a consummate judge, and at a glance he is almost able to appraise a parcel at its true value. In few trades are greater judgment, discrimination, and experience necessary than in the drug trade. The warehouse system is an immense advantage to the brokers in this line, for they can depend on these qualities being exercised on their behalf. The parcels entrusted to them for sale undergo manipulation in this warehouse. They are supplied from the same source with descriptive particulars for their catalogues, and practically all they have to do is to knock down the lots on the day of auction.

"The wholesale druggists muster strongly in the drug show-room at Fenchurch Street prior to the public sales, which occur every fortnight. Here they see the bulk of goods down for disposal, and at such times every nook and corner of the place is occupied with drugs. Attached to the show-room is a most complete museum, containing specimens of nearly every article in the Pharmacopœia. One could well spend a day in this department alone without exhausting all that is to be seen."

NOXIOUS VAPOURS FROM ALKALI WORKS.*

BY EDWARD DAVIES, F.C.S.

Any one who has had occasion to visit St. Helen's, Widnes, or any other centre of alkali manufacture, or who has even passed near these places in travelling, will have a lively recollection of certain odours, varying in character and intensity, but all bad, and of dense vapours which, in damp weather especially, rolled along the ground in clouds. He will also recall the features of the landscape, if we may give that name to fields without a green leaf in the hedges, trees with no more life than a clothes prop, and in the immediate vicinity of these towns, vegetation all but extinct. And as these smells and sights offend the nose and eye, the traveller will certainly feel disposed to invoke the interposition of a benevolent legislature to clear the atmosphere and restore the fair face of nature; that is, if he be in no way interested in the manufacture in question. The landed proprietors in the neighbourhood, who, perhaps, have no beneficial interest in the works, and who see trees which have graced their domains for ages struck down whilst still strong and sound at heart, whose flower gardens can no longer be a source of pride or pleasure, and who cannot at once or without a pang sever their connection with spots which their forefathers for generations have inherited, and with which historical ties have bound their name and reputation, are sure to resent the intrusion of these upstart outcomes of modern science, and to call upon them to depart or cease to be a nuisance.

* Read at a Meeting of the Liverpool Chemists' Association.

No one who has not had a practical connection with an alkali works can take a general and fair view of the subject, and if, like myself, he has ceased to have intimate relations with such works, he will form as impartial a witness as the circumstances of the case will allow.

In view of, no doubt, impending legislation on the subject we cannot, as a chemical association in the close vicinity of such works, do better than strive to attain correct views on this subject, and with this view I have brought the question on for discussion this evening.

I propose to treat it in the following manner :—

1. To describe the various vapours, noxious to animal or vegetable life, which escape from alkali works, with their effects.

2. To show how these vapours get into the atmosphere, by causes preventible and non-preventible.

3. The methods for diminishing or preventing such escape.

4. The probable effects of stringent legislation and the possibility of enforcing it.

The first part of my subject will probably be old to many here, and I must beg their indulgence whilst I speak to those who are less acquainted with substances which to others are as household words.

Sulphurous Acid Gas.—This gas, familiar to all who have burnt a sulphur match, which (by the way) is now almost a thing of the past, arises almost exclusively from the burning of sulphur, either free or combined with iron or copper. In the manufacture of sulphuric acid vast quantities of iron pyrites, FeS_2, are annually burnt, and by combination with the oxygen of the air converted into peroxide of iron and sulphur dioxide or sulphurous acid gas. In the burning of coals also, the sulphide of iron contained in all coal, and especially in the inferior qualities used in the alkali manufacture as fuel, is decomposed in like manner, yielding the same gas.

Sulphurous acid gas is a dense gas thirty-two times heavier than hydrogen and two and a quarter times heavier than air. It has a pungent smell, and when in large proportion in air produces coughing. It does not appear to be injurious to health when inhaled in small quantities and has been found useful in affections of the throat, for which, *a priori*, we should have supposed it most unsuitable. It is also a powerful disinfectant and one of the oldest known.

On vegetable life it exercises a most baneful influence, due, no doubt in part, to its direct action, but more to the formation of sulphuric acid by its oxidation in presence of moisture.

I cannot find any information with regard to the rapidity with which this oxidation takes place, but I believe that it is more rapid than is usually supposed.

Hydrochloric Acid, arising in the first process of alkali manufacture from the decomposition of salt with sulphuric acid, is a gas not so dense as SO_2, but, from its forming clouds of visible vapour by combining with the moisture in the air, is more visible. To this gas the public attribute the injury resulting from vapours from alkali works almost entirely, no doubt from the fact that before the Alkali Act manufacturers who did not make bleaching powder had no compunction about sending the gas into the atmosphere in appalling quantities, and also that the Act deals only with this gas.

This gas has no doubt a very irritating action upon the lungs, especially when concentrated, but my own experience in a works does not tend to show much injury from it.

A few months before going to an alkali works I had a severe attack of bronchitis, and I entered upon my duties in December. During a large portion of the time which I spent there (four years) I had to walk three miles to and from the works over very exposed roads, and in one or two very severe winters.

The works (it was before the Alkali Act) were rather out of repair, and such volumes of hydrochloric acid gas used to come down at times that I was driven out of the laboratory and had to take refuge on the canal bank. Yet I had no return of the disease, nor was I, from any cause due to ill health, absent one day during the four years.

The manager, a young Scotchman, who, when he came, appeared to be a certain victim to consumption, suffering from continuous cough and night sweats, gradually recovered strength and lived there for about eight years. He, when absent from the works, got thoroughly wet, caught cold, and died in a few weeks, but when I left the works his own opinion was that their influence had been beneficial. In the works I made careful inquiries as to the general health of the men, and, although I have no statistics, I found that rheumatic affections arising from exposure in the long walks to the works and alternations from heat to cold were the prevailing complaints. As to its action on plants there is no doubt that it is most destructive when in a concentrated state, but as I cannot meet with any researches on the comparative action of SO_2 and HCl I am unable to say which is the most destructive. *A priori*, I should think SO_2, not so much on account of its own specific action as on account of the H_2SO_4 which it generates. Water containing HCl on leaves as it volatilizes will take the acid with it, but H_2SO_4 concentrates as the water evaporates and is left behind.

Nitrous Fumes.—These must amount to a very considerable amount as almost all the nitrogen of the nitrate of soda (except that retained by the sulphuric acid sold away from the works) will ultimately find its way to the atmosphere in this form. These fumes consisting of $N_2O_3+N_2O_4$ are by moisture converted into nitric acid, which is well known to have a peculiar corrosive action, and also acts chemically on organic matter in a manner different to the acids named above. These gases are decidedly injurious to health, and when inhaled in quantity have been known to act as a specific poison and not merely by the local injury which they produce. As to their action on vegetable life we have no specific details, but no doubt it is injurious; against which may, perhaps, be set the manurial value of nitrates when the nitric acid is washed into the ground by rain.

Sulphuretted Hydrogen.—This gas, emanating from the vast heaps of waste which accumulate so fast as a bye-product in making soda ash, is one which calls attention to itself by its strong and offensive smell. In the concentrated state it is speedily poisonous to animal life, but in a dilute state those who have the misfortune to work much in a laboratory must hope that its poisonous action is slow. Certainly it does appear to cause headache sometimes; but except as it may gradually sap the foundation of health and imperceptibly bring on disease or a susceptibility to disease, it does not otherwise cause alarm.

To plants it does not appear injurious to anything like the extent of the gases previously named.

Chlorine.—In the manufacture of bleaching powder the production of this gas is yearly increasing. It is a heavy greenish gas and perhaps the most injurious which escapes from the works.

Its influence on man is well known to any one who has had practical experience in an alkali works, as resulting in violent irritation of the air passages, causing coughing, together with a directly poisonous action manifested by diminished action of the heart, exhaustion, and pallor of face and extremities. Alcoholic stimulants are apparently necessary for the treatment of this unpleasant affection, at least I remember having to supply large quantities when I was at a works.

On vegetable life it is no doubt equally potent as it, like nitric acid, has a chemical action on organic matter.

The only thing to be said in its favour is that it is a disinfectant and that it and H_2S, if they get mixed, neutralize one another with production of $HCl+S$.

Ammonia is the only remaining emanation from alkali works, being produced in the manufacture of caustic soda; but it cannot be considered as a noxious vapour as it neutralizes any acid with which it may mix. It sometimes intensifies the dense appearance of vapours by the formation of ammonia salts.

The second head may perhaps be best treated by taking these vapours in the same order as before.

Sulphurous Acid Gas.—I give the pre-eminence to this gas, as in the atmosphere of our alkali districts it far exceeds the hydrochloric acid. Dr. R. A. Smith, in 'Air and Rain,' gives the following figures.

	HCl	H_2SO_4
St. Helen's	1	3·48
Glasgow	1	7·82

This gas escapes from the works when it arises from the combustion of pyrites almost entirely from preventible causes. I have seen it blowing out from the kilns in consequence of insufficient draught, and in a gale an old leaden chamber will give it off from every crevice, and they are sometimes many.

The renovation of an old chamber is an expensive affair and there is a strong temptation to patch it up as long as it will hold together. Then, under the united influence of heat and acid, tunnels and pipes will leak every now and then and intermittent loss is inevitable; but its amount should be small, and as it represents money value good management will repay itself. But as regards any valuable effect to result from the checking this source of evil I fear that it will be imperceptible; for whilst we stop the leaking tap the gas from another source is escaping as by the bunghole. I allude to the SO_2 from the pyrites in the coal and slack used as fuel. In Widnes I am informed that 1,000,000 tons of coal are used in a year. These contain about 2 per cent of sulphur, but suppose, allowing for waste, etc., that 1½ per cent is converted into SO_2, this will equal 15,000 tons of sulphur or 30,000 tons of SO_2, equal to about 46,000 tons of sulphuric acid annually set free in the atmosphere. Here, in my opinion, is the true source of mischief, everything else being subordinate; and this at present is non-preventible. We may completely burn our smoke and thus prevent carbon escaping, but this has not the slightest effect in mitigating the mischief; and at present no means are known which will remove this gas from the products of combustion. To some extent lofty chimneys may afford the means of diluting the gas by sending it into the upper strata of the atmosphere, but the problem of absorbing the SO_2 without injuring the draught of the chimney is unsolved.

Another source entirely preventible is the production of SO_2 from burning waste heaps, and where this is permitted the gas, being evolved at the level of the ground, does immense mischief.

Hydrochloric acid is so completely under control from the conditions under which it is produced that, with the exception of accidental break downs, but little need escape. The condensation in most cases is within the government limit of 5 per cent., and as the inspectors have given their undivided attention to this gas, we may suppose that almost as good results are at present attained as are practicably possible. In drawing the charges there is an escape, which however is not an amount of more than a small fraction of the gas produced. Here again the difficulty of preventing leakage in the pipes which convey either the gaseous or liquid acid is great, owing to the action of heat and acid. By alternate cooling and heating, contraction and expansion loosen the joints and crack the earthenware tubes, whilst the cement does not appear to have been found which will stand the continuous action of hot acid.

The adoption of Hargreave's process appears to do away with much of the escape of hydrochloric acid vapours. No loss from broken pots can be experienced; and, so far as I have seen, the charges when drawn do not evolve any perceptible amount of gas. Here the only point of danger is the condensers, and as these are easily surveyed any escape can soon be detected.

Nitrous Gas.—In the style of working adopted when I was in an alkali works, the amount of nitrous fumes that escaped by the chimney was considerable, as Glover towers were not invented, and Gay-Lussac towers were rather out of repute. By the improved methods now in use the amount of nitre is diminished by two-thirds, and consequently so much less remains to escape. Possibly still more perfect means may be adopted so as to make the sulphuric acid process as perfect in practice as it is in theory; but in any case the proportion of this gas to others is small.

By Hargreave's process again all nitrous fumes are done away. What does escape at present is generally sent up the tallest chimney of the works.

Sulphuretted Hydrogen.—This arises from the waste heaps, either by action of the CO_2 of the air intensified by the acid fumes contained in it, or from acid liquors finding their way upon solid waste or the liquid running from the heaps. The action of the air upon the heaps may be prevented by covering the waste as soon as possible with soil, and making the sides as smooth and compact as possible, but the liquid highly charged with sulphide of calcium, which drains from the heaps, is more difficult to dispose of, especially as acid liquids are almost sure to get into the drains which carry it off. The amount of the liquid naturally draining away is rather small to be worked to a profit, but I think that it might be decomposed and nuisance prevented at no great cost.

Chlorine.—This most deleterious gas should, from economical reasons, be narrowly watched. Under the present system of bleaching powder making, no doubt a good deal escapes, both from the pipes which convey the gas, and also in packing the chambers. The former difficulty will continue to be felt until some material for pipes is discovered unacted on by chlorine, non-fragile, and capable of being made in long lengths. The second evil may be greatly diminished by syphoning off the surplus chlorine from the finished powder, and perhaps may be some day removed by some kind of mechanical packing.

As to my third head, namely, the prevention of the escape of these vapours, I think that the previous remarks will have shown that with the exception of SO_2 from coal, they result from leakage or imperfection of apparatus. Any one who knows the difference between perfectly new works and old ones, will at once see that this is the case. Again, with the exception of H_2S, all these gases represent a value in money, and at first it would appear that self interest was all that need be invoked to cause them to be arrested. On the other hand, it must be remembered that to save a shilling at the cost of eighteenpence does not leave a profit, and in many cases it pays much better to patch and have a little loss than to repair thoroughly and have none. Accidents again will unavoidably happen as long as earthenware pipes and lead constantly acted on from the inside are the most prominent materials in the construction of apparatus, and as this is at present unavoidable in many of the processes, these accidents must be taken as part of the system.

In my opinion much injury has arisen from the concentration of works in a small area, and to check the natural tendency in this direction, however hard it may be, is I think of paramount importance. When the vapours of one works mix with those of another, and then of another, a process of concentration goes on, and vapours in themselves almost harmless, when increased in density in arithmetical proportion appear to do mischief in geometrical proportion. In works grouped together it is most difficult to apportion the measure of blame, and each hopes to escape under cover of the rest. As the escape of vapours to so large an extent depends on imperfections of apparatus attendant on wear and tear, if the government take this matter in hand, as they seem paternally disposed to do, the first requisite will be an army of inspectors furnished with fullest powers. Literally despotic sway will have to be given, with authority to order the removal of this, and the renewal of that. Attendance of the inspector almost as constant as that of a Customs officer in a bonded warehouse will be needed, so that the perversity of the British workman may be in some measure checked.

It is to be hoped that in this way whatever expense the manufacturer may be put to he will not, as in the past, be left in the lurch after all, and compelled to pay any damages an enlightened British jury may assess, although he has done all he was called upon to do. He may fairly, I think, demand that he be furnished with a certificate of immunity, and with governmental supervision and management of his works he will feel inclined to ask them to kindly take the whole thing into their own hands and allow him a small pension to look on.

I am utterly opposed to this paternal government and meddling interference in minute details. If crowding of works is permitted, then let the damage inflicted by a given area be paid by that area, and thus a direct impetus be given to each to look keenly after both himself and his neighbours. Let damage be assessed by independent men who will give some consideration to broader views than damage to an isolated field, and will take into account the advantages which accrued to the neighbourhood as a set off to some extent.

Fourthly.—If stringent legislation does follow, what effect will it have? In my opinion not much that will be perceptible in the vegetation around a group of alkali works. Where several works unite their vapours in one dense cloud, trees will still be objects of pity for a couple of miles around, and occasionally a delicate nose will detect an acid whiff at perhaps three miles. All that unavoidable accidents and coal smoke can do will still be done, and it will be hard for the closest inspection to keep pace with the ever increasing area of the works. If works are still allowed to crowd together, I suppose a certain area must be given up to them, as in the black country, and the landowners indirectly recompensed by increased value of land and produce in their neighbourhood. If stringent regulations and continual inspection are to be the order, then increased price must be the result of increased expense, independently of the cost of the inspectors and their reports, and English manufacturers will be weighted in their competition with other nations. I do not say that they will therefore be defeated, but I do think that they should not be more hardly dealt with than the iron manufacturer, and the salt boiler, who in much the same way create a desert around them. Minute regulations as to the manner of carrying on the business, infraction of which would incur penalty and responsibility, would tend to discourage improvements, and act on the alkali trade as old excise rules did on the manufacture of glass. When we consider that the tendency of modern improvements in this branch is all towards the doing away with vapours, Hargreave's process diminishing $HCl+SO_2$, and doing away with nitrous fumes altogether, the ammonia process almost removing all the vapours and making no waste, and Mond's process utilizing the waste in the present process, I think that we may trust competition and small profits to put down waste, and the march of modern science to attack and destroy the evils which remain, without binding the hands of the manufacturer with endless governmental red tape, or smothering his responsibility by setting up a standard beyond which he will have no inducement to go.

MILK GLOBULES, AND A NEW THEORY OF CHURNING.

BY F. SOXHLET.

It is generally supposed that the fat-globules of milk are contained within a thin membrane, which it is necessary to destroy, before the fat itself can be separated and extracted from the liquid in which the globules are suspended. The destruction of this membrane can be accomplished, it is said, in two ways; either mechanically by the operation of churning, or chemically, by the solvent action of some reagent, such as potash or acetic acid. Now if it be true, that, as in the latter case, the action of acetic acid upon milk is really due to a solution of this globule-membrane, then it is clear that more acetic acid must be used than would be required for the mere coagulation of the milk. Experiments, however, show that this is not the case. Again, if some milk be mixed with just enough very dilute acetic acid to convert nearly the whole of its sodium phosphate into acid phosphate, but not sufficient to cause the separation of the casein, and a current of carbonic acid gas be passed through the liquid, perfect coagulation ensues, and the fat may then be extracted by shaking with ether.

These experiments seem, on the one hand, to indicate that the action of the acetic acid is to rob the milk of its emulsive condition, but, on the other hand, to refute the idea that it accomplishes this by the destruction of an enveloping membrane. In the precipitation of the casein by carbonic acid, the membrane theory is inadmissible, because carbonic acid will not dissolve any single albuminous body.

The fact that the milk-globule, in its natural state, cannot be dissolved by ether, may be explained upon the assumption of a peculiar property of adhesion possessed by it, and this view is supported by the following experiment:—if milk be dried in a vacuum over sulphuric acid the fat can be easily extracted from the residue by ether; but if the residue be dissolved in water, the solution resists the action of the ether, just as milk does in its natural state.

Raspail (*Schmidt's Jahrb.*, vol. 24) cites, in proof of the existence of a pellicle investing each globule, that the globules do not flow together. This may be answered by the parallel case of an emulsion of sugar-syrup and oil, in which the oil-drops no more tend to coalesce than the fat-globules in milk; and, similarly, by the case of the oil-drops in the *emulsio oleosa* of the German pharmacopœia, which differ from the fat-drops of milk only in being more transparent.

If quicksilver be shaken up with water, it separates into single globules, which cannot without trouble be reunited, the adhesion of the water to the surface of the globules preventing their flowing together.

It has frequently been asserted that a globule-membrane can be detected by the microscope, and Henle (*Froriep's Notizen*, 1839, 223) stated that a casein-membrane was visible after treatment with dilute acetic acid. The author, however, believes these opinions to be quite erroneous, and asserts that no membrane can be observed by the microscope, even with the aid of the highest powers.

There is another argument which has been advanced in proof of the existence of globule-membranes. Brücke (*Müller's Archiv.*, 1847, 409) first called attention to the remarkable difference in specific gravity between butter-fat and the liquid in which it is suspended—a difference which, he observed, is sufficient to cause the fat to rise to the surface much more rapidly than it actually does. Brücke explained this difficulty by supposing each fat-globule to be enclosed within an envelope specifically heavier than the liquid, a deduction reasonable enough if milk-liquid could be compared to a solution of salt of the same specific gravity; but he had overlooked the fact that, like all albumin solutions, it is slightly gelatinous, a circumstance extremely likely to interfere with the rising of the globules to the surface.

The power of a gelatinous liquid to retain in suspension finely divided substances of a greater specific gravity than itself, was proved very clearly by Scheibler (Zeitschr. d. Vereins f. *Rübenzucker-Industrie in der osterr.-ungar. Monarchie*, xi. Jahrg., p. 435) who [precip]itated the baryta from a solution of barium arabate by sulphuric acid, and found that, after standing for four years, the fluid had remained just as milk-white as it was on the day on which the barium sulphate was thrown down.

From such considerations as these, the author believes the membrane theory to stand in direct opposition to our present chemical and physical knowledge, and he therefore abandons it. With regard to the condition in which the fat-globules exist, he believes that in new milk they are undoubtedly fluid drops, because, at the animal heat, the milk is at a higher temperature than the melting point of butter (34°—37°), and this view seems to be supported by their appearance when viewed under the microscope.

But if milk be frozen at a temperature of three or four degrees below zero, the globules lose their fluidity, and become solid, and remain also in this state after the milk has been thawed. It was found that milk which had been thus treated could be churned into butter in two minutes, whereas to produce the same result with milk in its natural state required eleven minutes, showing that the low temperature had produced the same effect as seven—eight minutes' churning.

The author concludes from this, that in the operation of churning, the liquid fat-globules are brought into the solid condition, but that this change can also be effected by subjecting the milk to a temperature of — 3° or —4°.*

QUICKSILVER.†

BY SAMUEL PURNELL.

At many points in the coast range of California are found deposits of cinnabar of greater or lesser extent. It has, however, been mined successfully in but few places. The reasons are that the metal is seldom found sufficiently concentrated in the rocks to make mining possible; while in the remaining cases the extracted ores are of such low grade that they cannot be profitably smelted. Occasionally small deposits are found that yield very rich ores—60 to 70 per cent.—but it is well known that those deposits which are large and easily mined, are almost invariably composed of ores so poor—1 to 3 per cent.—that they can barely be operated with profit when quicksilver is at a less price than 2*s.* per pound. The price at present being some 1*s.* 8*d.* only, we accordingly see the greater part of our cinnabar mines closed, the furnaces cold, and large concerns—that alone remain at work—making little or no money. Perhaps not more than four or five important mines are now in operation in Calfornia; and, though the public constantly hears of new and great deposits of cinnabar, they are, as yet, practically undeveloped and valueless, and cannot affect the market price of mercury.

That quicksilver will soon rise in value does not seem probable, unless one should look for the still more improbable occurrence of a combination to limit production; and, consequently, the writer thinks that mercury will still farther decline in price, till only those works which can make a profit when it sells below 1*s.* 2½*d.* per pound can afford to remain in operation.

It would appear to be the rule that quicksilver mines grow constantly poorer from the surface down.

Taking the New Almaden, the largest and foremost mine on the Pacific coast, as an example, we find that in 1850 the ores worked yielded, on the average, 36 per cent.; in 1862, 19 per cent.; in 1865, 11 per cent.; in 1870, 5·23 per cent.; in 1873, 4·87 per cent.—constantly growing poorer, while, at this date, the yield is said to be not over three and a-half per cent., and which is considered as low a percentage yield as can be made profitable with the present apparatus, and with quicksilver below 2*s.* per pound. The same is substantially true of the balance of the prominent mines of the coast, and the effect of the anticipated decline will be disastrous to their interests. Then only the small deposits of rich ores could be worked, which would not half supply the home demand, and quicksilver would have to be imported from Europe. In short, the quicksilver interests of the Pacific coast, so far as the developed and well-known mines are concerned, to the ordinary observer appear to be not only on the decline, but in process of extinction.

The celebrated mines of the world are Almaden, in Spain; Idria, in Austria; and New Almaden, New Idria and Redington, in California. The Almaden has been worked more or less since the time of the ancient Romans, and is, without doubt, the most extensive deposit of cinnabar in the world. The mine is now under lease to the Rothschilds of Europe. In 1872, the workings were over 1200 feet deep, and the mine was reported to be in such bad condition that it was thought it could not much increase its then production. The ores are poor—about 5 per cent.—but their abundance and the cheap labour of the country for their extraction and smelting enables the Almaden quicksilver to control the Eastern trade.

The Idria mine has been worked over 400 years. In 1872 its deepest workings were 750 feet. For many years it has been in charge of the Austrian Government, and all the operations of mining and smelting are carried on with the best talent available and the best known apparatus. Hence, the operations at Idria have long been considered as models of completeness, and works elsewhere have imitated their process. The ores average about 3 per cent.

The New Almaden mine, in California, has been worked, more or less, since May, 1846, to date. From tables furnished by Mr. J. B. Randol, the general manager, we learn that the production from 1850 to close of 1875 was 595,882 flasks, obtained from ores yielding from 36 per cent. in 1850 to 3·35 per cent. in 1875. The average of about four tons of ore is raised from the mine to each ton smelted, which are hand sorted.

Statistics of the New Idria and Redington mines are not at hand; but in general it may be said that the ores of the leading mines of California are so poor that they do not now yield, on the average, over 1 or 2 per cent. as they come from the mine. The concentration that is done by hand must necessarily be expensive.

CRESOTIC ACID AND SODIUM CRESOTATE.*

Both of these substances have been experimented with by Dr. C. F. Buss, assistant at the Medical Clinic of the University of Basle, as to their antipyretic action. Cresotic acid being homologous to salicylic acid, led to the presumption that their therapeutic action must likewise be similar. The observed results, especially in cases of fever, leave no doubt that cresotic acid is a most effective antipyretic remedy, corresponding in its actions to quina or to salicylic acid. Sodium cresotate was administered in doses of 6 to 8 gms. (about 1½—2 ʒ). After its administration the patients sometimes complained of a bad taste, but never of disagreeable sensations; sometimes it produced humming in the ears, but very rarely hardness of hearing after a few hours.

Cresotic or carbocresylic acid, $C_8H_8O_3$, is derived from cresol or cresyl-alcohol (C_7H_8O) in the same way as salicylic acid ($C_7H_6O_3$) is from phenol or phenyl-alcohol (C_6H_6O), by passing carbonic acid gas into cresol (or phenol) containing metallic sodium. The cresotic acid crystallizes from its hot watery solution in colourless prisms. It is sparingly soluble in cold water, readily in ether, alcohol, and alkaline solutions. Ferric chloride produces the same violet coloration as with salicylic acid. Comparative experiments will have to be made to determine which of these two acids has stronger antipyretic powers.

* From the *Journal of the Chemical Society. Landw. Versuchs. Stat.*, xix., 118—155.

† Reprinted from *Iron*, Nov. 4.

* *New Remedies*, from *Pharm. Centralb.*, 1876, 273.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 18, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE EXPLOSIVES ACT AND CHEMISTS AND DRUGGISTS.

As at this time of the year it is possible that the experience with respect to the mixing and keeping of coloured fires described by MR. SLIPPER, on p. 428, may become, with a disagreeable variation, that of many other chemists and druggists, we think it may be doing good service to again remind our readers in these pages of the law on this subject which was enacted last session of Parliament in the Explosives Act, 38 Vict. cap. 17. It will be remembered that this Act was based upon the report of a Select Committee, and was passed under the gentle stimulus of the Regent's Canal explosion. It might appear that the regulations therein enacted with respect to the manufacture, transit, and sale of gunpowder in various forms had but little to do with the chemist and druggist. But with certain modifications these regulations apply to all other "explosives," and by section 3 it is enacted that the term "explosive" includes, besides gunpowder, dynamite, and other blasting agents, all *coloured fires*, and every other substance used or manufactured with a view to produce an explosive or *pyrotechnic effect*, and every adaptation or preparation of an explosive as above defined. Therefore, bearing in mind the inclusive character of the business of the chemist and druggist in many localities, it is evident that there is a danger that some may be infringing the Act without knowing it.

The details of the regulations under which explosives may be made, kept and sold are too voluminous to repeat here. A full *résumé* of the Bill was given, whilst it was before Parliament, in the *Pharmaceutical Journal* for March 27th last; an abstract of the principal provisions will be found also in the Calendar of the Pharmaceutical Society. Further, the entire Act may be obtained from the the Queen's printers for a small sum. It will be sufficient now to state that every building in which an "explosive" is manufactured, stored, or sold must be registered; that there are stringent provisions as to the maximum amount to be kept in the registered premises, and the manner of keeping it; also that when sold the package must be labelled with the name of the substance, followed by the word "explosive," and that it must not be sold to a child apparently under thirteen years of age. It will be seen also by Mr. SLIPPER'S letter that a person mixing "coloured fires" will be held to be a manufacturer of explosives under the Act, and require to have his premises registered and constructed accordingly, or be liable to a penalty of one hundred pounds.

It is worthy of note that, although the subject has been brought forward in this Journal on more than one occasion, and a special warning was given in our Summary for the year 1875, we have reason to believe that amongst those to whom it is sent our correspondent is by no means singular in being unaware of the risk run in making up and selling so-called "coloured fires." This is only one of many instances giving evidence of the fact that the bearing of information supplied to members of the trade at considerable trouble and expense is overlooked or ignored until it can no longer do the service it might have done.

A CORRECTION FOR THE BENEFIT OF A MEDICAL CONTEMPORARY.

OUR young contemporary, the *Medical Examiner*, has been moved by a tender regard for the welfare of the pharmaceutical body to devote upwards of three columns of its latest issue to a sermon on the subject of "Counter Prescribing." Of course against this we should have nothing to say had the *Medical Times* not also erroneously attributed its text to this Journal. It says that on the 7th instant we reported that the Council of the Pharmaceutical Society had passed a resolution that it would undertake the legal defence "of any chemist or druggist who is threatened with prosecution for prescribing according to long usage." We will not stay to dispute the distorted construction our contemporary puts upon these words, but simply remark that we made no such statement. The resolution which we reported was that which was passed on the subject, and was as follows:—

> "That this Council is prepared to consider the case of any chemist and druggist who is threatened with vexatious proceedings for alleged infringement of the Apothecaries Act, and if the circumstances warrant, to defend the same."

May we expect our contemporary to set us right with its readers?

THE NORTH BRITISH BRANCH.

WE are glad to be in a position to state, concerning the winter arrangements for classes for pharmaceutical students in connection with the North British Branch, to which we referred in a recent editorial note, that the evening courses of lectures on Botany and Materia Medica, delivered in the rooms of the Society at 119A, George Street, and got up merely as an experiment, have been as successful as could be wished. The introductory lecture on Materia Medica was delivered on Monday, November 6th, at 8·30, p.m., by Dr. WILLIAM CRAIG, F.R.S.E., Lecturer on

Materia Medica, Edinburgh School of Medicine. The opening lecture on Botany was delivered by Mr. JOHN SADLER, Royal Botanic Gardens, on Tuesday November 7th, at 8·30 p.m. A brief abstract of Dr. CRAIG'S first lecture will be found in the next column.

SPURIOUS TEA.

IN compliance with an application made at the Mansion House, on Tuesday last, by the Solicitor to the City Commissioners of Sewers, Sir ROBERT CARDEN made an order for a large quantity of bonded "tea," estimated to amount to 40,000 lbs., to be destroyed by fire. The evidence showed that it had been in bond for about nine years, and Dr. SAUNDERS, the Food Analyst for the City of London, certified as to its unfitness for food, some of it being putrid, some partially exhausted, some mixed with sand, and some with 20 per cent. of dried olive leaves. The worthy magistrate expressed his regret that he could not have some Chinese brought before him charged with the offence, but surely it was not necessary to go to China either for olive leaves or sand.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of the above Association will be held at 17, Bloomsbury Square, on Thursday evening, November 23rd., at eight o'clock, when the following papers will be read:—"Carnot's Test for Potassium," by Dr. A. SENIER and Mr. HENRY CAMPBELL, and "Questions on Dispensing," by Mr. CAMPBELL.

THE CANTOR LECTURES.

IT is announced by the Council of the Society of Arts that the courses of CANTOR Lectures for the forthcoming session will be on (1) "The History of the Art of Coach Building," by Mr. GEORGE A. THRUPP, commencing on Monday evening next; (2) "The Chemistry of the Gas Manufacture," by Mr. A. VERNON HARCOURT, and, (3) "The Connection of Greek and Roman Art with the Teaching of the Classics," by Mr. SIDNEY COLVIN.

THE ROYAL SOCIETY MEDALS.

THE "COPLEY Medal" of the Royal Society has been this year awarded by the Council to Professor CLAUDE BERNARD, for his contributions to the science of physiology. The "RUMFORD Medal" has been awarded to M. JANSSEN, for his researches respecting the radiation and absorption of light, chiefly carried on by means of the spectroscope. Also a "Royal Medal" has been awarded to Sir C. WYVILLE THOMSON, for his successful direction of the scientific investigations carried on in connection with the cruise of the *Challenger*. The medals will be presented at the Annual Meeting of the Royal Society on the 30th inst.

MUNICIPAL HONOURS.

WE have great pleasure in stating that Mr. S. M. WEBSTER, Pharmaceutical Chemist, has been unanimously elected to the office of Mayor of Warrington for a second term. Although himself a Conservative his re-election, was proposed by members of both parties.

Provincial Transactions.

NORTH BRITISH BRANCH—EDINBURGH.

On Monday evening, the 6th instant, the introductory lecture of a course on Materia Medica by Dr. William Craig was delivered in the rooms of the North British Branch of the Pharmaceutical Society, and on Tuesday the 7th instant the introductory lecture of a course on Botany was delivered by Mr. Sadler.

The following is an abstract of Dr. Craig's lecture:—Some years ago the Pharmaceutical Society recommended pharmaceutical students to prosecute three important branches of the medical curriculum—Botany, Chemistry and Materia Medica—because it was deemed advisable that they should be possessed of a knowledge of these three important branches of science. There could be no doubt that this advice was given for wise and good reasons, for no one could hold a foremost place as a pharmacist who was not well acquainted with botany, chemistry, and materia medica. The more thoroughly a pharmacist was acquainted with these subjects, the better he would be able to perform all his business duties aright. The time had not yet come, but the lecturer believed it would soon come, when not only a knowledge of these sciences will be demanded of all pharmaceutical students, but also attendance on systematic courses of lectures on those subjects before they were admitted to the professional examinations. The tendency of the present day was to insist more and more on the value, not only of knowledge, but of academic training as a requisite for the learned professions. He was glad to see that in this respect the Pharmaceutical Society was endeavouring to raise the status of its members and licentiates. Although attendance on a course of lectures on these subjects was not at present compulsory on pharmaceutical students, yet attendance on courses of lectures on botany, chemistry, and materia medica would do much to help them to pass the examinations which were unavoidable before becoming chemists and druggists. Ever since the Pharmaceutical Society recommended students to prosecute these various branches of science, opportunities had been granted in Edinburgh by teachers for pharmaceutical students to attend their lectures at a reduced fee. As these lectures, however, were either in the morning or during the day, many students could not find time to attend. To meet the wants of such students, and also to oblige pharmaceutical students generally, it had been resolved that this session evening courses of lectures on botany and materia medica should be given. The lectures on botany would be given by Mr. Sadler, of the Royal Botanic Gardens, whilst he (Dr. Craig) would give the course on materia medica. Both courses were to a certain extent under the patronage of the North British Branch of the Pharmaceutical Society of Great Britain, at least in so far as granting the use of the Society's rooms, and also of their ordinary specimens of materia medica.

Turning to the more immediate subject of his lecture, Dr. Craig said materia medica, as distinguished from therapeutics, might be described as comprehending a description of all the substances which are available for the cure of disease or the alleviation of human suffering. It included a description of their source in nature, their physical properties, their chemical composition, and the various forms in which they might be administered, together with their doses and mode of administration. Materia medica was intimately related on the one hand to chemistry, botany, zoology, and mineralogy, whilst on the other it was clearly associated with physiology and the practice of medicine. With no department of science is materia medica more intimately connected than with chemistry. By a knowledge of the chemistry of medicines, it became possible not only to understand their actions and uses, but also to prescribe antidotes when too much of any had been administered. Botany was another branch of study intimately associated with materia medica, most of the substances used in medicine being obtained from the vegetable kingdom. There were about 800 official preparations of medicines in the British Pharmacopœia, and of these nearly 600 were derived in whole or in part from the vegetable kingdom; or in other words, about 75 per cent. of the preparations were more or less connected with vegetable productions; and as it was incumbent on the physician to make himself acquainted with those plants which are deleterious to man, it certainly was of the utmost consequence for the chemist and druggist to be able to recognize those plants which contain poisonous ingredients. He therefore hailed it as a step in the right direction that pharmacists are now encouraging their students in the prosecution of this most interesting and delightful of studies. Zoology also was associated with the study of materia medica, certain articles of medicine being derived exclusively from the animal kingdom. Mineralogy was more important to the student of materia medica than zoology, very many important substances used in medicine being got from minerals, as the salts of silver, lead, bismuth, antimony and mercury. Most of the metals and their salts had important actions on the human frame, and therefore a knowledge of them was necessary to the student of materia medica. It would thus appear that a knowledge of chemistry and botany was indispensable to the proper study of materia medica, whilst those who added to these subjects a knowledge of natural history would find it of considerable advantage in prosecuting the study of this department of science. These three subjects formed the basis on which materia medica rests. It might be said to begin with chemistry, botany, and zoology, and to end in physiology and the practice of medicine.

Dr. Craig then gave a short history of materia medica from the earliest to the present time, and after alluding to the importance of the science to the members of the medical profession, said it followed by a natural process of reasoning that it was of the utmost importance that chemists and druggists should also be well acquainted with the actions and uses of remedies, because the important results for which medicines were prescribed could never be attained unless the physicians' prescriptions were accurately dispensed. Materia medica was the grand connecting link between the pharmacist and the physician. It was, so to speak, common ground to both. It was the duty of the pharmacist not only to dispense accurately the prescriptions of physicians, but also to investigate for them the best modes of administering medicines. It was his duty also, by his knowledge of chemistry, to find out the various constituents of medicines, and if possible their active principles, to investigate the properties of new remedies, and prepare suitable preparations for administration; and these things could never be performed without an enlarged knowledge of the actions and uses of medicines.

In conclusion Dr. Craig said: "Let me urge on you all, as an argument for your studying carefully this subject, that not only physicians, but also the general public, may place implicit confidence in the honesty and accuracy of the chemists dispensing their prescriptions."

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

Opening Meeting.

The first meeting of the session of this Association was held in Anderson's University, on the 8th inst., Mr. Daniel Frazer, President, in the chair.

The minutes of the last meeting having been read and adopted, the Secretary intimated the receipt of the *Pharmaceutical Journal*, also the ten guinea present of books from the Bell and Hills Fund of the British Pharmaceutical Conference, together with the portraits of Dr. Pereira, Jacob Bell, and the London and Edinburgh Boards of Examiners, which had been framed and hung up in the library, and moved that the best thanks of the Association be given to the several donors.

The Treasurer intimated the receipt of £1 from Mr. Borland, of Kilmarnock, as a donation to the library fund, to whom special thanks were also voted. It was also intimated that one of the members of Council, Mr. James MacDonald, late of the Glasgow Apothecaries' Company, had died since the annual meeting, in May last. The Council greatly regretted, the loss the Association and the trade generally had sustained in this the early demise of one who had been so much esteemed.

It was agreed that Mr. John Fennick, of Strathbungo, be elected to fill the vacent seat in the Council till the end of the year.

The President then delivered the following—

Inaugural Address.

Gentlemen,—The difficulty experienced by most men who sit down to write an "Inaugural Address" will, I suspect be that of the little man who was asked to hang his hat upon one of the empty pegs he saw stuck along the wall. There were plenty of these, but, alas for him, they were all placed just a "peg" too high for his little arm to reach to. This was my difficulty in choosing a subject for to-night's address. There are plenty of subjects open for discussion by pharmacists, but, alas for me, most of these are beyond my reach; and, were they to have full justice done to them in their treatment, all that are within my reach call for a much ampler leisure for their discussion and elucidation than it has been possible for me to bestow on them at this time. In these circumstances I must throw myself on your kind indulgence while I attempt to give you some sketches of a few of the subjects with which the pharmaceutical world has recently been much exercised. In doing this from my point of view, some corns will have to be trodden upon, but I hope to tread upon them with as gentle a pressure as may be consistent with the giving of a clear and explicit statement of what my own views of the topics under discussion are.

Before entering upon this discussion, I am sure that all present will agree in thinking that our first remarks should be made in regard to the recent meeting of the Pharmaceutical Conference held in our city. That event so overshadows in bulk, as it outweighs in importance all other items of our local history as pharmacists, that I feel confident no apology need be offered for my giving to it the place of honour in my address to night.

The meeting of the Pharmaceutical Conference in Glasgow, and all that that event involved, constitutes an era in the history of our Society—that Society at whose most cordial invitation it assembled here. With all our heart we sent out that invitation—with all our heart we welcomed the members of the Conference who accepted it, and who honoured us with their presence in our midst, and, now that they are gone, and that they and we have returned to their and our wonted occupations, and have all settled down in our own dwelling-places at home, I am quite sure that in expressing my views I am also reflecting yours when I say that with all my heart I look back upon the fifth, sixth, and seventh days of September last as the red-letter days of our calendar, and that no similar event is likely to arise that can displace them from that pre-eminence in our memories.

Our expectations were large, but the reality greatly exceeded them. When we nominated such active and energetic men as Messrs. Kinninmont, Davison, Fairlie, and Stanford, to take charge of the arrangements needed for the reception and entertainment of our expected guests, we little knew the strain to which their powers of organization and entertainment were to be put. Happily for us, however, great though the strain put on their energies was, they proved themselves equal to the occasion, and their efforts, aided by willing and able landlords and an able and gracious captain, were crowned with success alike on land, river, loch, and sea.

We had anticipated a possible meeting of 120 or 140, whereas 175 gentlemen entered their names in the visitors' book at the entrance door of the hall of the Royal Hotel—the meeting place of this year. We thought it possible that 150 or 160 might gather on board of the "Eagle" steamer for the trip down the Clyde. We found the number to be nearer 300.

Not only did the numbers attending the Conference exceed our most sanguine anticipations, the weight was in proportion to the bulk. Not only did the London Council send—with the much regretted exceptions of Messrs. Sandford, Hills, and Bottle—its best known men, including its President and Vice-President, and its most valued and energetic Secretary, but for the first time since the Pharmaceutical Society was instituted, did it, in deference to the meeting of the Conference here, omit one of its stated monthly meetings. When, in addition to so many members of the present Council as favoured us with their presence, men of the mark of Professors Redwood and Attfield, such ex-Councillors as Messrs. Stoddart, Groves, Reynolds, and Sutton, were along with us, along with such other noted pharmacists and men of science as Messrs. Proctor, Brady, Ekin, Benger, and Tilden, and literary men such as the editors of the *Pharmaceutical Journal* and of the *Chemist and Druggist*, no wonder that a meeting with such men gathered under one roof in this northern region, was warmly welcomed by us and that it should have proved, as the saying is, "a complete success." No wonder that some of us, in order to do but bare justice to such visitors, curtailed our night's rest by an hour or two, whilst they were amongst us. That the meeting was appreciated by our friends from south of the Tweed was amply evidenced by the addresses of not a few of them in person when here, and by the editors of the *Pharmaceutical Journal* and of the *Chemist and Druggist*, in their respective Journals; but further, I could occupy not a little of your time by reciting the congratulatory terms in which very many friends have since written to myself. Time will not allow of giving more than one of these, and I give it as the first that reached me, and as a fair specimen of the others—

"We are laid," says the writer of this letter, "under much obligation to all who generously contributed both in money and able and diligent arrangements for our comfort, and so promoting the objects of the meeting,—the advancement of pharmaceutical science, the recognition of the unity of our interests, and the promotion and establishment of mutual goodwill." The writer then concludes thus, "Your noble city, spacious hotels, commodious meeting room, swift steamer, beautiful lochs, lofty hills, band and highlanders, have left impressions not to be soon forgotten."

Here let me say how intensely I myself enjoyed the presence amongst us of very many kind friends whom I meet with so frequently south of the Tweed, and who there so strive to emulate the man "who killed his neighbour by kindness," that sometimes I fear they may succeed, and so spoil what has not already been spoiled in me. The atmosphere in which I moved during the sitting of the Conference here was to me so akin to that of Bloomsbury Square, that had my imagination been only a little less dull than it is, I could almost have believed myself transported to that classic ground.

One more sentence before I leave this part of my address. It is to urge as many of my brother pharmacists of Scotland as may find it possible to cross the Tweed on the 14th of August next, and again—though under a different roof—sit at the feet of Professor Redwood, to listen to his words of kindly advice, of wisdom, and of a knowledge that appears to well from him as from a fountain, ever flowing, ever full.

No doubt the journey from this to Plymouth is a long one, but the journey may be broken. The routes to it are various, and the places of rest on them are numerous. We can look in at Edinburgh or Newcastle, York or London, Bath, Bristol, or Exeter. Around Plymouth, and within an easy distance, will be found scenery that will, in itself, well repay the journey, even to us Scotchmen, who think so much of our hills and our lochs. To name no others, the river Dart with its overhanging woods; the ancient and picturesque town of Dartmouth, and that of the too notorious one of Totnes, with their tortuous and narrow streets, and overhanging houses, have only to be seen to be admired by all who have a love for the antique and the picturesque. I only hope that it may be possible for me to be there myself, and that if so, I may see not a few of you beside me.

Though other matters of a more scientific and of a less political character than the Trade Defence Association might be named as worthy of a place in our opening address, still I think that in the special circumstances under which we meet, it is natural that it should come next in our remarks. It was in our midst that it held its second meeting, and that only two months ago, and it is a society in which not a few here and elsewhere, are deeply interested; and so I feel sure that no one will quarrel with my dealing with the subject, though they may be quite at issue with me in my estimate of the work of the Association itself.

I have not attended any of the meetings of the Trade Association, mainly, though other things also hindered my attendance, because I failed to see an adequate call for its existence. I have a strong fear also that its existence, alongside of the present Pharmaceutical Society, may at some time, more or less near, give rise to still further complications and confusion in a trade already more than sufficiently perplexed and troubled about many things very difficult to adjudicate upon.

Of course I am aware that the origin of the Society is due to the existence of these very troubles, troubles that so sorely afflict the body-pharmaceutic; and I give unbounded credit for singleness of eye to the promoters of the Association. It is my happiness to have the personal acquaintance—I think they will even allow me to say the friendship—of at least two of its earliest, warmest, and most able and judicious supporters, I mean Mr. Reynolds of Leeds and Mr. Jones of Leamington, and I will yield to no one in my admiration of both gentlemen at once for their high personal character, their ability, and their purity of motive.

To what then, it may most fairly be asked, in the Society itself, whilst holding this opinion of its supporters, do you object.

First then, I think that in this case, as in many others, the remedy is worse than the disease it is intended to alleviate, if not to cure. It appears to me, to be not overstating the case to say it is equivalent to the swinging of a huge sledge-hammer by a brawny blacksmith to exterminate a fly that had settled upon the brow of a fellow-workman. No doubt the fly would be exterminated, but what of the unhappy victim of his affection?

Plainly stated the case as it appears to me stands thus: A few—few in relation to the number of pharmacists in our country—cases of actual hardship to some of our number have arisen in the application of recent Acts of Parliament by an unpaid and irresponsible magistracy. The sufferers cried out so lustily, "Police, police!" that the whole pharmaceutic world has been roused from its slumbers. What then are the grievances to which we had been subjected? Here it is that the sale of a "morning tonic" by an unlicensed man is declared to be illegal; there it is the selling of a mixture of lime and sulphur as the very purest of sulphur; and now it is the selling of an effervescing compound under an erroneous name that brings us "poor apothecaries" within the meshes of British law.

Well, I do not say that these are matters of trifling moment. I do say that every such case deserves to be looked into. But, living as we do, not in a lawless country where might overrules the right, but in a land where the law reigns paramount, and where it is administered in the highest possible purity, I do say that the remedy for each case of misapplied law, and so of real hardship, lies within every reach, and that where an aggrieved individual may not himself be able to employ the machinery needed to get justice done to him, there are always, as in the Greenock citrate of magnesia case, brother pharmacists all around who are both willing and able to help; and where the ordinary magistrate or the justice of peace has inflicted an unjust sentence the process to have the erroneous decision reversed is a very easy and cheap one. So far, then, for cases of misapplied law. My friend, Mr. Reynolds, in arguing for the promotion of the Trade Association as a means of getting justice done to the aggrieved parties in such cases, used this illustration:—"A person seized with a sudden illness was not generally the most capable of judging of what was the best remedy in such an emergency. The advice of a friend might often be of extreme value in such a case—and so in this instance." This case was that of the summons issued by the excise against a number of us for selling Liebig's so-called Extract of Beef, without our possessing a wine licence, and the pleading guilty by one of our number to the same. Go to a doctor. The only thing then between us is, what doctor? My friend says go to the Trade Association for advice. I say go to a good lawyer, or to Dr. Elias Bremridge. Instead of going to Drs. Reynolds or Barclay, or Jones, much as I respect them all, I say go to Drs. Adam, Paterson, Anderson, Kirkwood, or Roberton, and be quite sure that if the law has been kept by you, and the decision of the justice or magistrate has been contrary to law, you will speedily have the wrong decision reversed. If you do not go direct to the lawyer, be quite sure that in the long run you will have to land at his door. This was the course taken by those of us who were summoned for selling Liebig's Liquid Extract without a wine licence. How could any society have done better for us? We had, through ignorance, infringed the law, and, though there were circumstances connected with the mode of raising the prosecution by the authorities of which we had much cause to complain, we had no right to complain of its application to our case, and so we did not appeal against the decision given in it. The result was the exaction of a merely nominal fine—fifty shillings—by the authorities.

So far, then, as to hardships inflicted on the pharmacist either through a misapplication of the law by the authorities, or through its application in an unexpected quarter—as in this case of Liebig's so-called Extract of Beef. It will next be asked, how are you to remedy the other class of grievances inflicted within the law itself? The Association is disposed to go to Parliament, and have the Act of 1868 amended, so as to meet both classes of cases. These are not the exact words employed by the Society in its official document, but I am quite sure I have only given a fair statement of the case as put by some of its chief promoters in their published speeches. Let us now look at some of the hardships so much complained of.

The retailing of articles contained in the two poison schedules by co-operative stores is one of these. Well, if that case be proved to be an infringement of the law, and therefore punishable at law, I, for one at least, will go in to-morrow for trying the case. But that is just the difficulty. It is not certain at all that they are infringing the law. In such circumstances, I have no right, in my capacity as a councillor of the Pharmaceutical Society, and so representing a public body, to enter the law courts without first counting the costs and seeing how I am to come out of them. I would not do it in my private capacity, and I do not think my action should be different in my public one.

It is also a subject of complaint that patent medicines and drugs generally are sold by grocers and others. Many argue for their sale being restricted to druggists. I maintain this cannot be. No parliament will venture to enact a law to create such a monopoly in our behalf. Nor, I hold, should it be asked to do so. In my young days the two chief places for procuring patent medicines in Glasgow were an Italian warehouse in Candleriggs and a surgeon's shop in the Irongate. It is also quite well known that in many districts in England booksellers did and still do a large portion of the trade in them. But granting, for the sake of argument, that we might secure a monopoly in the sale of patents and drugs by going to parliament, I say the law of fair play even is against us. If we seek to restrict others from selling drugs and patents, we must, in all fairness, begin by ourselves giving up the sale of a thousand and one articles other than drugs now sold by druggists all over the kingdom. This, I suspect, will be giving two very rich Rolands for one very poor Oliver.

The very last thing I have noticed in the direction of seeking to restrict a trade to those already in it by legislative interference was that of certain mineral water makers, so many of whom are, like myself, also druggists. They met in London only the other week, and this motion was gravely put to the meeting:—

"*Items of business to be discussed.*—1. Whether it would afford better protection to the respectable members of the trade in securing for them higher prices for goods and the safety of their bottles, by having a tax imposed on each manufacturer, thereby decreasing the present existing opportunities for men of no capital or character entering the trade and depreciating it by opening up a reckless and unfair competition, and who also carry on their business with other persons' bottles and cases that are dishonestly obtained?"

The mover of this motion thought that a tax of "from £10 to £50 on each soda water manufacturer would exclude many persons from entering the business," etc., etc. This was not, however, carried, and I only quote it as a mode of letting us see ourselves as others would see us were we, as druggists, to go to parliament to seek for a monopoly in the articles we are supposed chiefly to deal in.

If these soda water makers knew that the troubles of druggists only begun when we got tied, neck and heel, by the Act of 1868, they would hesitate long before seeking to add to their present troubles those entailed by the iron shackles of the law. No, the selfish policy that prompted the calling of a meeting to carry such a motion is a shortsighted one, and would not help the interests even of those who thus sought to interfere with the liberty of others.

The next subject I wish to refer to is the keeping of "open shop" by medical men and surgeons. This, even when lawfully done, is what so many in Glasgow consider to be their special grievance. Well, this is not a new offence under the sun. Sir Walter Scott, in his novel of 'Rob Roy,' refers to an ancient offender in this very thing. Francis Osbaldiston, after the encounter with his cousin Rashleigh, is made by Sir Walter to say—

"On my way to Mr. Jarvie's, whose dinner hour was approaching, I stopped at a small unpretending shop, the sign of which intimated the indweller to be Christopher Nielson, surgeon and apothecary. I requested a little boy, who was pounding some stuff in a mortar, that he would procure me an audience of this learned pharmacopolist. He opened the door of the back shop, where I found a lively elderly man who shook his head incredulously at some idle account I gave him of being wounded accidentally by the button breaking off my antagonist's foil while engaged in a fencing match. When he had applied some lint and somewhat else he thought proper to the trifling wound I had received, he observed, 'There never was a button on the foil that made this hurt. Ah! young blood! young blood! But we surgeons are a secret generation. If it werna for hot blood and ill blood, what would become of the two learned faculties?'" Vol. ii., pp. 116—7.

To let you know how I look upon some aspects of this question, I will here quote a letter written by myself in December, 1868, at the suggestion of Robert Dalglish, Esq., then one of the M.P.s. for Glasgow, and to whom a number of our leading medical men had complained of the Pharmacy Act of 1868, as it then stood.

"*The New Pharmacy Act.*

"To the Editor of the *Glasgow Herald.*

"Sir,—We are by no means surprised at the tone adopted by 'Chirurgicus' when writing in your paper of to-day, in regard to the operation of the Pharmacy Act passed in the late session of Parliament.

"The evil he so justly complains of calls for immediate rectification, and it will doubtless receive it. So far as known to us—and we believe our information on the subject to be substantially correct—there was nothing further from the wish of the chief promoters of the Act—the Pharmaceutical Society of Great Britain—than to hamper the action of the very large body of medical practitioners throughout the country who are also dealers in drugs. As originally framed, and as sent to the House of Lords, by the House of Commons, there was no such restrictory clause as the one prohibiting all parties in Scotland but pharmaceutical chemists, or such chemists and druggists as may now register themselves under it, from dealing in drugs and poisons. On the face of it, such a restriction would be a manifest absurdity. One of the main objects in carrying this Act was to secure the better education of the dispenser of medicine throughout the country; but it never was imagined that a higher standard of education was to be insisted upon in the case of the dispenser than in that of the prescriber."

"The evil complained of arose, we believe, by hurriedly transposing one word for another during the last stages of the bill, and it is quite understood amongst the pharmaceutical chemists themselves, that they, in their corporate capacity shall, on the opening of Parliament, make applications for the amendment of the restrictory clause in question.

"To us it is quite clear that, in thinly populated districts of the country, the public must either get their drugs from the necessarily educated medical practitioner or from the not necessarily educated grocer or general dealer, as such districts are incapable of supporting purely drug businesses. It surely admits of no debate which of these should have the preference?

"We are, etc.

"FRAZER and GREENE.

"*9th December*, 1868."

Regarding the matters referred to in this letter, I ask, if medical men at that time—*before* the shoe began to pinch—had sufficient influence with the government to not only get the Pharmacy Act of 1868 amended in their favour, but to get it held in abeyance by the authority of the Lord Advocate, as they did, till the obnoxious clause was repealed, what possible hope can any one have of Parliament, at our instance, or at that of the Trade Association, again re-enacting such a clause? Here again I say, even if we could succeed in getting it we ought not to ask for such a monopoly. How stands the case? Do we not find, all the country over, in small towns as well as in the largest ones, members of the Pharmaceutical Society itself exhibiting on one side of their shop the much honoured diploma of the Society, while on the other side of it are displayed all the garish paraphernalia of the wine merchant. Only the other day I saw, in a large Scottish town, the lower half of a large window wholly covered with the ordinary olive colour oil paint—so usual in spirit-dealers' premises—and in huge gilt letter the words "Agent for W. and A. Gilbey, Wine Importers and Distillers," and in small letters the name of the agent—we shall say "John Blank, Pharmaceutical Chemist," printed at the bottom of the pane.

I am far from complaining of this. This is a land of liberty. Teas, wines, cigars, stationery, photographs, etc., are regularly dealt in by some of the most respectable members of the trade, as a means of eking out a livelihood that otherwise might be of the scantiest proportions. In short, if the druggist cannot earn a sufficient income in a country village or town without supplementing it by dealing in such articles as I have named, and in a hundred others equally remote from any connection with drugs, even should the articles be, as I but lately saw in the premises of an old fellow-councillor in the South of England, terra cotta vases, statuary, etc., then by all means continue to deal in them. But I say do to others in this thing as you do by yourselves. As you cannot live by merely dealing in drugs, pure and simple, no more can the country surgeon live by merely feeling pulses, and prescribing. They, like ourselves, have to live, and as the supply of them, as of us, is generally above the demand, to make both ends meet they naturally enough add the selling of the medicines prescribed to the prescribing itself. Let then, the surgeon, when he has it, invest his money in an array of bottles, not quite empty, till he can dispense with them as a means of supplementing his income. Indeed, as in many villages and towns, a surgeon-pure, or a druggist-pure, cannot be maintained, I hold that it is for the advantage of the public that the surgeon should keep "open shop." The doctor can do the whole work of the druggist, but the druggist cannot do the whole work of the doctor.

But, while I say so much on the one side, I go as far as anyone here in condemning, as unwarranted, a wholesale rush into our business by medical men in towns such as our own, where there is ample scope for the display of their energies in their own proper field, and where there is certainly no lack of efficient druggists. They ought to aim at taking a higher social position than is compatable with their continuing to keep "open shop." I need not say how utterly I condemn those medical men who lend their names, as it is believed not a few do, to needy outcasts of the Pharmaceutical Society—her rejected candidates—that, under such a covering, they may carry on a business in every true sense illegitimate. This is a scandal of the deepest character, and cannot be too strongly condemned, or too soon put down, could the arm of the Pharmaceutical Society only find a means of reaching them.

Two more grievances of us poor pharmacists, much discussed of late, have to be named, each in a sentence or two.

Exemption of chemists and druggists from serving on juries. Well there is no such exemption that I know of in Scotland. Nor do I see any strong reason for our being so exempt. Certain I am that the evil is not so crying a one as to call for its being made one of the proximate causes for getting up a great society all over the land.

Counter prescribing. Much was being made of threatened proceedings in this matter in Nottingham, but happily these have collapsed. On this subject I simply repeat what I said at the conference in September. No law in the world can prohibit John Brown from prescribing to John Smith on the street or in the exchange. So we need not fear the enforcement of an old, or the enactment of a new law, to interfere with the just privileges of the druggist who does not traverse the well recognized use and wont boundary line that lies between his special work and that of the medical man. I have seen the rough soiled hand of an Irish labourer engaged in the delicate operation of extracting a mote from underneath the eyelid of his fellow-labourer, planted up against the wall of their common shed. Would any surgeon in the world venture to bring the kindly operator "to book" for such an interference with his vested rights? This is a subject that I hold should not cause one hour's uneasiness to any one of us who honestly seeks to attend to his own business, and to leave to others the core of theirs.

Having at such great length spoken of the grievances to protect us from which is the main purport of the Trade Association, it is more than time to grapple, as best I may, with the grounds on which its leading promoters vindicate their support of it.

In brief and in plain terms these are substantially, that the Pharmaceutical Society, either from a defective constitution, or from an ineffective administration of the constitution it at present enjoys, has not in the past been able, and is not in the future expectant to be able, to afford that protection in the prosecution of their trade by chemists and druggists that the exigencies of the case require. A main reason given for this inability or unwillingness on the part of the Pharmaceutical Society to prevent or to remedy the evils I have already enumerated is, that "it only reaches the fringe of the trade," and therefore it is "important to have an organization representing the whole body" (Mr. Barclay, at Glasgow Meeting).

Be it so. But whose fault is it that it is so? Where is the remedy? I maintain that it is to be found in making the Pharmaceutical Society not only representative of the trade, but to embrace the trade in its entire length and breadth. Let all the present outsiders who are really legitimate chemists and druggists join the Society. It is, however, said that many of them cannot afford to pay a guinea a year to enable them to do so. I fear this may be true of too many of our brethren, but surely it is not so of the vast majority of them.

Then, when you have joined the Society, take a deeper interest in the proceedings of its Council, and of its annual meeting, than you have been wont to do, and, if the Council does not represent your views make it do so. You have the whole matter in your own hands. A more popularly elected body never sat. You can change the face of the Council once every year by turning out fourteen of the old and by voting fourteen new men in, if you but so will it. The law is at your back here, if it won't help you in all the directions some would seek its aid in.

Then, too, will the Pharmaceutical Society, when embracing the whole, or the vast bulk of the trade, be able to go to Parliament as it is proposed by the Trade Association by and bye to do, to seek an amendment of the Act of 1868, with some prospect of being listened to. I, too, like the Association, would like to see the said Act considerably amended, though, I fear, in a manner very much in an opposite direction from what I suspect it wants.

But, be that as it may, sure I am of this, that if the Act is to be amended it ought to be done at the instance of the existing legally constituted Society. But I also add this, that if either society, or both together, seek to advance our trade interests at the expense of those of the general public ours will go the wall and those of the public will be preserved, and that by any government that may be approached on the subject. This is a subject in which, in these days, whatever it may have been at one time, "Whig and Tory a' agree."

There is, however, a still wider, deeper objection remaining to be urged against the Trade Association, and that is to the very constitution of the Association itself. I object to it as a step in that reactionary policy that has been manifested of late in too many directions. I mean,—a recurrence to the seeking and enacting of protective laws, laws intended to benefit class rather than national interests. In this is involved a departure from that freedom of trade that I hold to be not only sound in principle, but to be, in the long run at least, by much the wisest course to pursue, even by those seeking no higher aims than their own aggrandisement. This is, I hold, the shortest, surest road to that "success in business" at which all, and so properly, aim.

But some may say, what has this to do with the Trade Association? Very directly it has to do with it. The outstanding, ostensible aim of the Association is not only to protect members of the trade that may be exposed to vexatious and unjust prosecutions in the carrying on of their business, but to extend that protection by prohibiting, by legal enactment, the grocer, the co-operative store, and others, from dealing in patent medicines, etc. What is this but seeking an extension of the monopoly already granted to us for the sale of the scheduled poisons?

This is just what the farmers and the landowners of this country fought so hard for in seeking to maintain the old corn laws as against the farmers of America and of the Continent, who, unlike us in this narrow island of ours, grew more corn than their own countrymen could consume. I need hardly tell even the youngest here how the folly of this opposition has now been demonstrated by the greatly increased prosperity of the British farmer, and the quite enormously enhanced value of land, so that tenant and landlord have alike benefited by the abolition of the old protection laws, while you and I get the benefit in a greatly cheapened loaf. So much, I hold, for having the grand principles of equity, as between man and man, and between nation and nation, as a basis on which to rest our legislation.

Having exhausted all I have to say in regard to the principles on which the Trade Association is based, let me in closing acknowledge the kindly feeling exhibited by its leaders to the Pharmaceutical Society. I do not need to single out names. Suffice it to say that without exception their cordiality and friendship towards it have left nothing in that direction to be desired. Manifestly, and beyond all doubt, they wish nothing but good to it.

Several of the Association's more prominent supporters have said that if they thought it was to be antagonistic, or other than helpful to the Pharmaceutical Society, they would retire from its membership. That they are thoroughly sincere in this expression of friendship there can be no possible doubt.

But if the Association is to go on and to maintain a separate existence, as doubtless it is, how long will it be possible to maintain this cordiality and warmth of friendship throughout its borders?

Who would be so cruel as to hint to that happy bright young couple, on the eve of their marriage, that before many years, it may be before many months, their present hours of bliss will be exchanged for hours of the bitterest possible grief, and possibly of separation?

As I have somewhere read, little harm can come of the protrusion of the jagged pikes of the wheel circling in mid-air, but let the minutest tooth of an interlocked bit of machinery, be it of a watch, or of a locomotive, get out of place, then there is a wrench and a dislocation that throws the whole machinery out of gear. So is it with the two societies of which we have been treating. They have too many things in common, are much too nearly allied in their *personnel* and in their objects, long to walk together without a jar. Questions are most certain to arise of which different views will be taken by the representatives of each, and then comes the question, Who is to yield?

No,—let the two really become one. Let them enter into the marriage relation now, and becoming one, and with one governing and a truly representative head, the whole body, fitly joined together, will move on sweetly and without a jar.

Now it only remains that I apologize for the great length and unfinished character of this address, and to thank you most heartily, as I very sincerely do, for the patience with which you have listened to remarks with which I am well aware many here do not sympathize. But as I always insist on having full liberty of thought to myself, I not only do not grudge it to others, but my whole desire is that every one, not only here in this little world of ours, but in the larger world of politics outside of us, should be "left to the freedom of his own will," without landlord, master, or would-be representative, daring by word or deed, by bribe or threat, to interfere with his holding and expressing his opinion on any and every question before the country.

At the close of the address, which was frequently applauded in course of the delivery, Mr. Fairlie (Hon. Sec.), proposed a hearty vote of thanks to the President for his racy, interesting, and humorous address. He said that he could not agree with Mr. Frazer on very many of the points touched upon, and had time permitted he would have been disposed to criticize, perhaps pretty severely, some of the conclusions Mr. Frazer had come to. He could not help admiring, however, the ability of the paper, and was grateful to the President for having uttered his views on the all important subject of the Trade Association, because it was just by interchange of thought and opinion that a proper understanding was often come to. He therefore, with the greatest cordiality, proposed that the members award the President their best thanks for his address.

Mr. Kinninmont, in supporting the motion, said he had not much fear of any antagonism arising between the Trade Association and the Pharmaceutical Society, otherwise he would not have joined it. He knew from personal experience that there was work for both, and his only regret was that the great bulk of the trade seemed to hold aloof from all associations.

The vote of thanks was then given with acclamation.

It was afterwards arranged that the Council should consider the propriety of having either a conversazione or a supper in place of the annual festival.

It was announced that 26 members had joined the tutorial class, and 15 had come forward to the chemistry class, and that both classes were now in full operation.

This was all the business of importance.

LIVERPOOL CHEMISTS' ASSOCIATION.

The second general meeting, twenty-eighth session, was held at the Royal Institution, October 26, 1876. The President, Mr. A. H. Mason, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed. Donations of current numbers of the *Pharmaceutical Journal* from the Society, and *Canadian Pharmaceutical Journal* from the editor, were announced to the library, and thanks accorded to the donors.

Messrs. G. H. Damsell and T. A. Wood were unanimously elected members, and Mr. J. E. Tipper was unanimously elected associate.

Mr. Thos. Williams, F.C.S., exhibited piece of a stone which is found in Bolivia, and produced the results of experiments which he had performed on the same, along with its analysis. It is composed chiefly of silicious matter and water of combination, and contains 10·45 per cent. of common salt, some oxide of iron and phosphates. It is easily broken with the hand, impalpably fine, meagre to the touch, does not adhere to the tongue, light drab colour, and burns into a much darker colour. It floats for a length of time on water, and in sinking gives a notable amount of effervescence with a loud hissing noise. Mr. Williams stated that it is found inland, and asked if any member could give it a name, or explain its natural history; and not having had time to examine it further himself, he suggested it might be of microscopical interest, as he held the opinion that it consisted of the remains of marine infusoria (animalcules).

Mr. Edward Davies, F.C.S., considered that this deposit was made up of marine diatoms which had lived in lagoons having connection with the sea; a subsequent upheaval of the land, which is known to have taken place, caused the gradual drying up of these, and in that rainless district it was easy to understand how the common salt was not washed away. He would be glad to receive a little for the microscopical examination.

Mr. Thos. Garside, F.C.S., stated that he had noticed a black residue in dissolving aluminium in alkali, and found out that it consisted of platinum black. He had not determined accurately the amount, but found about ½ per cent.

Mr. James T. Armstrong, F.C.S., had been consulted about certain boilers fed with water from a canal, which showed a much larger consumption of fuel than a similar boiler fed with other water. The cause was incrustation of great thickness, which he exhibited, and gave analysis of two kinds of water that had been employed.

Mr. Garside said that he had seen a deposit produced by water of a canal in which the water only contained four grains of solids per gallon.

Mr. Arthur Haddock had seen a decided beneficial effect by the use of chloride of ammonium on water containing sulphate of lime.

The President exhibited a large sample of artificial vanillin and small packets of sugar containing ½ per cent. as used in Paris for flavouring. He stated that vanilla had fallen 40 per cent. in price in consequence of the discovery. He also exhibited Mr. Stoddart's test for the colouring matter of saffron with hydrochloric acid and sugar.

Mr. E. Forbes Morton exhibited a specimen of millerite (sulphide of nickel), covered with crystals of sulphate of nickel, which had formed upon it in his cabinet.

Mr. Davies stated it would be very interesting to investigate the manner of formation of such crystals.

The third general meeting was held at the Royal Institution, November 9th, 1876. The President, Mr. A. H. Mason, F.C.S., in the chair.

The minutes of the previous meeting were read and signed.

The following gentlemen were unanimously elected members:—Dr. Egerton F. Hall, M.D., Messrs. Joseph Walker and Thos. Hall.

Mr. Edward Davies, F.C.S., etc., read a paper on 'Noxious Vapours from Alkali Works,' which is printed at p. 412.

A lengthy discussion followed the reading of the paper, in which the President, Drs. W. Carter, E. F. Hall and C. Symes, Messrs. T. Garside, F.C.S., J. T. Armstrong, F.C.S., Jas. Simpson, and others took part. A cordial vote of thanks to Mr. Davies, which was given with acclamation, brought the meeting to a close.

CHEMISTS AND DRUGGISTS' ASSOCIATION OF IRELAND.

The annual meeting of this Association was held at the Society's rooms, 172, Great Brunswick Street, Dublin, on Monday evening, October 31. Mr. E. M. Hodgson, President, in the chair. It was decided to continue the classes in connection with the society for the purpose of qualifying for the pharmaceutical examinations. The following are the classes:—Pharmaceutical and General Chemistry, Professor Tichborne; Materia Medica and Botany, Dr. Auchinleck; Classics, etc., Mr. T. Lyons, C.E., T.C.D. The following officers were elected for the year:—President, Mr. E. M. Hodgson; Vice-President, Professor Tichborne; Hon. Secretary, Mr. W. Hayes, Treasurer, Mr. Stanley Oldham; Assistant Secretary, Mr. J. O'Brien; Committee, Messrs. S. Boyd, P. T. Bermingham, F. Froedman, J. Goodwin, G. Grindley, J. T. Holmes, J. Greenfield, R. Simpson; Auditors, Messrs. R. Simpson, C. Johnston. The Society is stated to be in a very prosperous condition.

MEETING OF PHARMACEUTICAL CHEMISTS (IRELAND) IN DUBLIN.

A meeting of pharmaceutical chemists was held at the Molesworth Hall, Molesworth Street, on Monday evening, Mr. C. Mannin in the chair, to take preliminary steps for the formation of a Pharmaceutical Defence Association. Mr. Holmes acted as secretary, *pro tem.*, and read a large number of letters expressing sympathy with the objects of the meeting.

After much discussion it was decided to wait on the Council of the Pharmaceutical Society (Ireland) at its next meeting to urge the necessity of protecting the interests of its licentiates.

Messrs. Mannin, Bennett, Keatley, Ferguson and Keogh, were appointed a deputation for that purpose.

Mr. Grindley, in proposing a vote of thanks to the Chairman, said that all pharmaceutical chemists were very much indebted to Mr. Holmes for the energetic manner in which he had taken the matter up. The meeting was largely attended.

WOLVERHAMPTON CHEMISTS AND DRUGGISTS' ASSOCIATION.

On Tuesday evening, November 7, the first meeting of the present session of the above-named Association was held in the Committee Room of the Agricultural Hall, Wolverhampton. There was but a small attendance. Mr. Fleeming (the President), in opening the proceedings, said he hoped the present session would be as successful as the last. It started under very favourable circumstances, with one exception, viz., the loss of one of the Association's secretaries, Mr. F. Barrett, who had left the town.

The Hon. Secretary (Mr. W. Y. Brevitt) then read the report for the past year.

It commenced by expressing regret for the loss of the valued secretary, Mr. Barrett. The Association had been indebted to Mr. Barrett for nearly all the success it had achieved; had it not been for him it would not have the valuable library it possessed, as with the exception of one or two books they had all been presented by the respective authors, and given at the solicitation of Mr. Barrett. Since the last meeting several students had passed the examinations at Bloomsbury Square, one of them, Mr. Severs, having succeeded in passing the highest examination—viz., the Major. He also succeeded in obtaining a certificate of honour in the Practical Chemistry Class, conducted by Professor Attfield. The Preliminary examination has also been passed by two. The next subject was the classes. Mr. Brevitt said he thought it should be the object of the Association to get as many as possible to join the various classes in chemistry and botany that are constantly being carried on by the Free Library Committee, and at various other places. He felt convinced much good might be derived therefrom, without the anxiety of the financial aspect of the question. Independently of this, he intended to try to have a pharmacopœia class, conducted by himself in Darlington Street. Early in the new year he hoped there would be a popular Christmas Lecture, made as attractive as possible, by a valued friend of the Association. He need scarcely tell the apprentices of the present day that they had their work to do, and it was only by diligent application that they would succeed. There was no doubt that the examinations are more severe than formerly, and he questioned very much the propriety of that step; he thought when more candidates were rejected than passed, it was a sign that there was too much severity exercised. In the selection of examiners he would much prefer men of the stamp of Jacob Bell, Peter Squire, John Garle, and Henry Deane, than those that were selected principally because they have distinguished themselves as students, and have taken the chief prizes. He might be wrong, but he thought they rather expected others to be as clever as themselves. However, when young men saw that some of their fellow-students passed it showed it may be done, and they must then be determined it shall be done.

The Chairman, before distributing the prizes gained by the successful students during the last session, expressed the pleasure it gave him to distribute those prizes. He agreed with the remarks of the Secretary in the report about the stringency of the examinations, which was telling very much against the trade of the chemists in the country. The examinations were so severe that they were driving young men away from the trade, and this would eventually tell fearfully against it. He then distributed the prizes as follows:—

Latin and Preliminary examination prizes—1st, Pereira's Materia Medica' (abridged edition), Mr. Gaskin; 2nd, Squire's 'Companion to the British Pharmacopœia,' Mr. Whiston. Pharmaceutical Chemistry and Pharmacy—1st, Bryant's 'Practice of Surgery,' 2 vols., Mr. Aston; 2nd, Chemical Apparatus, Mr. J. H. Jones; 3rd, Chemical Apparatus, Mr. W. B. Cooley. Botany and Materia Medica—1st, Parrish's 'Pharmacy,' Mr. W. B. Cooley; and 2nd, Dr. Phillip's 'Manual of Materia Medica,' Mr. Watts.

Mr. W. F. Haydon, of Birmingham, the secretary to the recently formed Chemists and Druggists' Trade Association, then read a paper on the objects of that Association. These included the amendments of the Pharmacy Act, and also to deal with the defence of its members from vexatious and unjust prosecutions under the Adulteration and Medical Acts. The Association had urged upon the Pharmaceutical Society the necessity of testing the legality of co-operative traders selling and dispensing poisons.

The paper, which was listened to with the greatest attention, included topics most important to the interest of the trade in general, and after a very interesting discussion, a resolution was passed:—"That the meeting thoroughly approved of the aims and objects of the Chemists and Druggists' Trade Association as described by Mr. Haydon, and pledged themselves to support the same by every means in their power."

After a vote of thanks to Mr. Haydon for his paper, and to the Chairman, the meeting separated.

DOVER CHEMISTS' ASSOCIATION.

A meeting of the members of the trade in Dover was held at the Apollonian Hall, on November 8, when it was decided to form an Association, holding quarterly meetings, and to which the annual subscription should be five shillings.

Mr. W. H. Cotterell was appointed President, and Mr. J. F. Brown Secretary and Treasurer, for the ensuing year.

It was resolved that the President for the time being should represent Dover and the surrounding district on the General Committee of the Chemists and Druggists' Trade Association, the consent thereto of the members residing in the district having been already obtained.

A general opinion was expressed that the Chemists and Druggists' Trade Association should act in concert with the Pharmaceutical Society, through whom either legislative or legal action could be most effectually taken.

The compilation of a dispensing and retail price list for the whole of England was also suggested as a subject deserving its attention at the earliest opportunity.

Although the Dover Association is only now formally constituted several previous meetings had been held, at one of which a dispensing and retail price list, on the basis of the Liverpool list, was agreed upon.

Parliamentary and Law Proceedings.

CHARGE OF SELLING POISON WITHOUT A LABEL.

Mr. A. J. Appleton, druggist, Bolsover, was on Saturday, November 4, summoned by Superintendent Carline, to the Chesterfield County Police Court, for an offence against the Pharmacy Act on the 13th ult.

A woman, named Mary Crowder, deposed that on the day named she went to the defendant's shop for two ounces of cordial or soothing syrup, which she was in the habit of giving her children. She took a bottle with her, and there was no label on it. The defendant's sister served her, and on receiving the bottle back it was labelled, "Soothing Syrup." On taking it home she was about to give some of the contents of the bottle to one of her children, when it refused to have it. Thinking there must be some mistake she smelt the mixture, and found it was laudanum. On the advice of a neighbour, she took the bottle to the police station.

An assistant at Mr. Booth's, druggist, Chesterfield, stated that the bottle produced contained laudanum, and bore a label, "Soothing Syrup." If the contents had been taken in the quantities specified, it would have been sufficient to cause death.

The person who supplied the mixture was called, but was unable to recollect serving Mrs. Crowder. She admitted, however, that the label on the bottle was such as she would have put upon a bottle containing cordial for children, and bore the defendant's name and address.

The defendant said there had evidently been a conspiracy to injure him, or the woman would have taken the bottle back to the shop, and pointed out the mistake, if there had been one, instead of handing it to the police. He contended, however, that a label stating that the bottle contained laudanum might have been put over a cordial label already on the bottle, and that Mrs. Crowder had taken it off as soon as she left the shop.

The Bench declined to believe that version of the case, and fined the defendant £1 and costs, remarking that he might consider himself fortunate that he was not there on a more serious charge.—*Sheffield and Rotherham Advertiser.*

Death through Incautious Subcutaneous Injection of Morphia.

At Southsea, on Saturday, November 4, the Coroner (W. H. Garrington, Esq.) held an inquest upon the body of Annette Ray Frampton, wife of a lieutenant and adjutant in the Royal Marine Light Infantry.

Deceased's husband deposed that his wife was 25 years old, and that whilst at Walmer, in 1871, previous to giving birth to a child, she suffered greatly from sickness. Dr. Woodman, to alleviate this, used morphia by the hypodermic method, always injecting the solution himself. On leaving Walmer the deceased went to London until three months ago, and during a portion of that time continued the subcutaneous injection under medical sanction. After her removal to Southsea, deceased assured him she had entirely given up the use of morphia. On the previous Monday he left home for London and returned the following Thursday, when he found the deceased suffering from convulsions. She grew worse and died the following morning. Since her death several bottles had been found in her wardrobe tied up in a parcel and secreted, together with five or six small cases each containing a hypodermic syringe. He was certain his wife did not know the risk she ran while using the morphia.

A domestic servant in the employ of previous witness deposed to having been sent frequently by her late mistress to Mr. Cruse, chemist, Palmerston Road, for the medicine referred to. On Wednesday the deceased sent her to Mr. Burford Norman, to ask him to re-visit her, as she thought she had symptoms of lock-jaw. He came and gave her a draught. On Thursday morning, between two and three, she got worse, and shortly after the doctor had left the second time she was seized with frequent convulsions, during which the head was drawn forcibly back, and the back was curved. Whenever she took the solution of morphia to her mistress she was told to take it up quietly and put it in the drawer.

Mr. Thomas Harris Cruse, registered pharmaceutical chemist, Palmerston Road, said that at first he refused to serve the solution, but on reference to his junior assistant he was informed that he had been in the service of Mr. Horncastle, and knew that Mrs. Frampton had been frequently supplied with the solution. In August, September, and October, he supplied nine bottles each month, the last being on the 30th ult.

Dr. Norman deposed that when he asked deceased if she had latterly taken morphia, she said she had not except on a very few occasions. He described the state he found deceased in, and stated that when Mr. Henry Burford Norman and Dr. Jackson were called in they discovered on the upper part of both arms, a large number of old scars, which they were informed were the result of hypodermic injections five years ago. There were no recent marks about the arms, but upon both thighs there were a large number of similar marks, and also several marks of recent punctures. Around some of these latter there was a redness of the skin in different stages, and one particularly had the appearance of having been made within twenty-four hours. He was of opinion that Mrs. Frampton died from tetanus, caused by the punctures made in the thighs for the purpose of injecting solution of morphia. He had been shown three syringes, all of which were in a dirty condition, apparently not having been wiped dry after using. The steel needles were in a very rusty state, which would be likely to set up inflammation.

The jury returned a verdict to the effect, "That the deceased died from tetanus, or lock-jaw, caused by inflammation arising from punctures made by the deceased herself, for the purpose of subcutaneous injection of solution of morphia."—*Portsmouth Times.*

Alleged Death through Administration of Laudanum.—Verdict of Manslaughter against a Chemist's Assistant.

An adjourned inquest was held at Grangetown on Saturday last, by Mr. E. B. Reece, the coroner, touching the death of Archibald William Henry Hayward, aged seven months, who died under suspicious circumstances on the previous Monday.

At the first sitting of the inquest the jury, not being satisfied with the evidence adduced, decided that a *post-mortem* examination of the deceased's body should be made, and adjourned the inquest in consequence.

According to the deposition of Matilda Hayward, the mother of the child, it appeared that the child, which seemed healthy when born, became subject to fits when three months old, and had never since been well. She had been in the habit of taking him to the infirmary at Cardiff, and also to medical men. She had been also in the habit of giving deceased continually, soon after his birth, syrup of poppies, in which was always some laudanum, she having been recommended to give that to one of her children when living at Southampton. Mr. Williams, an assistant in Mr. Yorath's shop at Lower Grangetown, had always sold her the syrup of poppies, and she had gone to no other chemist's shop. She had told Mr. Williams that laudanum had been put into the syrup of poppies at Southampton, and he had always put some drops in the medicine she had bought of him, which was always a pennyworth at a time.

The depositions of George Whitfield Williams, living at 44, Stuart Street, Cardiff, chemist's assistant, were then read, after which,

Edward Hayward, father of deceased, was called, and deposed to going on different occasions to Mr. Yorath's shop and being served by Mr. Williams on each occasion with a pennyworth of syrup of poppies, in which laudanum was always put. Mr. Williams used at first to put three drops of laudanum in the medicine, but it having no effect upon deceased witness used to tell him so, whereupon Mr. Williams would always put a larger quantity of laudanum in the syrup of poppies. Last week the amount of laudanum placed by Mr. Williams in the pennyworth was fifty drops. Deceased was always given a half teaspoonful of the mixture as directed.

Dr. D. E. Jones was next examined as to the result of his *post-mortem* examination. He stated that he found the body in a very emaciated condition. Deceased only weighed 6 lb. 11 oz., the average weight for a child of that age being 20 lbs. He found that both lungs were inflamed, and certain portions of the body in a congested state. The stomach was very small and contracted, and would only hold one ounce of food, or two tablespoonsful of anything at a time. In his opinion death was accelerated by taking opium or laudanum, together with the diseased state of the child's body. He was of opinion that if proper medical treatment and necessary care had been taken, and opium had not been administered to him, deceased would have lived.

The Coroner having summed up and pointed out the most important points of the evidence,

The jury, after consulting for over half an hour, could not agree, and the inquest was again adjourned.

On Monday the adjourned inquest was resumed, and Matilda Hayward, the mother of the deceased child, was recalled. In answer to questions from the coroner, she said she did not begin to give the child poppy syrup when it had fits before Dr. Jones saw it. She could not say for certain when she began to administer this medicine. She weaned the child on the Thursday before it died, and then gave it food in a bottle. At this time the quantity of food the child would take was very small.

Edward Hayward, the father, was also recalled, and said the child was in the habit of vomiting food after it had taken it.

Dr. D. E. Jones, in reply to the coroner, said the practice of taking opium for a long time would produce great derangement of the stomach, and in the case of a child would be likely to result in the rejection of food. He thought it possible the child was offered food frequently enough, but, from the condition its stomach was in from the laudanum, was unable to take the food. This state of things might have existed for some weeks past.

This was all the evidence, and the Coroner then summed up the leading points of it to the jury. He pointed out that there could be no doubt the cause of the child's death was starvation, and that from the fact of taking the laudanum its stomach got into such a condition that it could not take any food. The evidence of the father and mother, however, showed that food had been offered to the child frequently enough, and the question for the jury was whether blame attached to anyone for administering the laudanum. If they thought the father and mother were aware of the hurtful nature of the opium they were no doubt guilty of great negligence, but, as many people in their position were ignorant of its fatal effects, there was reason to doubt whether they were well informed on this point. The question also arose whether any culpability attached to Mr. Williams, the chemist's assistant who supplied the medicine containing laudanum; and if the jury were of opinion that he was to blame, it would be their duty to return a verdict of manslaughter against him. They would also have to consider whether the father and mother were aware of the dangerous properties of opium, and if they believed they were it would also be the duty of the jury to include the parents in the verdict of manslaughter.

A girl named Comer was called to confirm the statements of the mother as to frequently offering the child food. She mostly saw the mother offer food to the child both in the morning and the evening, but could not say how frequently food was given to it during the day.

After deliberating about half an hour the jury returned a verdict of manslaughfer against Edward Hayward and Matilda Hayward, the parents of the deceased, and George Whitfield Williams, the chemist's assistant who supplied the laudanum.

The Coroner then committed the accused for trial at the winter assizes, but accepted bail for their appearance, the parents in two sureties of £50 each, and Williams in two of £100 each.—*Western Mail.*

POISONING BY CARBOLIC ACID IN A HOSPITAL.

An adjourned inquest on the body of Christina Fraser, a child who was poisoned in the Wirrall Hospital for Sick Children, Birkenhead, on the previous Friday, was held on Thursday, Nov. 9, before Mr. Churton, coroner, at the Richmond Hotel, Birkenhead.

Mr. Billson, solicitor, watched the proceedings on behalf of the managers of the institution.

Mr. Alfred C. E. Harris, M.B., hon. surgeon, said the deceased was admitted in February last, suffering from dislocation of the spine, and had since been under the care of Dr. Braidwood. On Saturday morning, between seven and eight o'clock, he was called to the child, which he found dead on his arrival. Witness made a *post-mortem* examination of the body on Monday, and found that death had resulted from the effects of carbolic acid. The medical officer did not dispense medicine to the patients. There was a dispenser, who attended daily, and when not in use the dispensary was locked, the matron having charge of the key. Carbolic acid was used in the hospital for surgical dressings, and the quantity on the premises varied. As it was required it was obtained from the dispenser. At this time none of witness's cases required any.

Charlotte Crockett, the night nurse, who administered the poison, said that at half-past ten o'clock on Friday night she gave deceased a supper of bread and milk, and afterwards a small quantity of port wine from a 3oz. bottle which she always found on a tray on the top of the cupboard. The child had to take three ounces of wine every twenty-four hours. Deceased seemed very restless, and at midnight she gave her a small quantity of wine, and again when she asked for something to drink witness gave her some milk. About seven o'clock next morning the child seemed exhausted, and asked if breakfast was ready. Witness, finding there was not sufficient wine in the bottle from which she had obtained the first supply, took down another bottle, thinking it contained the child's wine, and gave deceased some of it. The bottle was not labelled, and resembled the bottles in which wine for the patients was put. It had formerly been one of the wine bottles. (The bottle was produced, and was found to contain carbolic acid.) Witness was not told by anyone that there was carbolic acid in the room. She did not smell anything on pouring the acid out. It was daylight when she poured it out.

Mr. Billson: Did you think you were doing right in making use of another patient's wine?

The Coroner: I think she did quite right, considering the child's exhausted condition; and she thought the bottle contained port wine.

Witness: The bottles of wine are always labelled. I took it for granted that all the bottles in the tray contained wine. I am not a certificated nurse.

Elizabeth Sheard, under-nurse, said that in cleaning out a cupboard in the hospital on Friday night, she thought the bottle produced contained port wine, and she placed it on the tray near the deceased. In answer to the coroner, witness said she was seventeen years of age, and could neither read nor write.

Ann M'Cann, head-nurse, said she only used carbolic acid under the direction and personal superintendence of one of the doctors. No carbolic acid had been used since last June. The bottle produced had remained in the cupboard till brought out by the last witness. It was formerly a wine bottle, but witness had forgot to label it

The Coroner remarked that the case was an extraordinary one, and suggested that the committee of the institution should endeavour to obtain the services of women of greater experience and intelligence than were possessed by the under-nurse, and that such people should both read and write.

The jury returned a verdict of "Death from misadventure." They added the following presentment:—"Great carelessness has been exercised on the part of the officers of the institution in the use of poisons; and we suggest that the committee should in future order that all the bottles containing poison should be labelled as such, and when done with should be returned to the surgery. We also think it incumbent that in such an institution the servants ought to be able to read and write."—*Liverpool Daily Post.*

Poisoning of an Infant by Laudanum.

A case which no doubt was intended by the Crown authorities to act as a warning to nurses in the treatment of infants, was tried before the Sheriff at Selkirk on Saturday last. The accused, Mrs. Scott, acted as nurse on the occasion of the confinement of the mother of a fine strong and vigorous infant. About twenty-four hours after its birth, as the child cried considerably, the nurse gave it three drops of laudanum, telling the mother what she was about to do, and saying that she had done it before, and it would do the child no harm. In a few hours, the child became very ill, and it died fourteen hours after taking the laudanum. The Sheriff, in passing sentence, remarked that there was no reason whatever for thinking that the accused had acted otherwise than with a desire to benefit the child, which, indeed, was the line of defence; but, having in view that there was a good deal of administering of poison by nurses in ignorance of its effects, he passed a sentance of six weeks' imprisonment.—*British Medical Journal.*

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

Coloured Fires and The Explosives Act.

Sir,—Seeing some correspondence in the Journal about coloured fires, I think it right for the information of chemists, to let them know that the legal advisers of the Metropolitan Board of Works consider that all makers of coloured fires come under the regulations of the "Explosive Substances Act of 1875." Consequently, that mixing a coloured fire, though not explosive, must be carried on in a properly constructed building, precisely such as is used for fireworks, rockets, etc. If I mix a coloured fire composed of nitre, sulphur, and antimony, which by the bye might be a very useful horse medicine, I am liable to be summoned before a magistrate and fined £100. A customer ordered of me 20 lbs. of coloured fire. I mixed it and sent it to him. The inspector from Spring Gardens, in the execution of his duty called on him, took some of the fire, and waited on me shortly afterwards to see what stock I had on my premises, but I had none ready. I went at once to headquarters, saw Mr. Spencer, who very courteously and pleasantly told me, that as these fires were according to the wording of the above Act used in producing a "pyrotechnic effect," the maker or mixer was subject to the same regulations as all manufacturers of "explosive substances." I might register my place of business and buy and sell, but directly I mixed them I became a manufacturer. I did not feel disposed to contest the matter, however harmless and innocuous might be the fires I made, though this interference with what I believe to be the legitimate business of a chemist does at once stop what has been for the last three or four years a very useful and paying part of my business. Because rockets, stars, Roman candles, and many other explosive fireworks, together with coloured fires, have been stored and sold in a careless and negligent manner by licensed retail dealers, therefore, chemists are prevented from mixing and selling coloured fires, which are neither explosive nor dangerous. I suppose we ought to be thankful for the care taken of us by such legislative Acts, but I am free to confess that I am "considerably riled" at such mistaken kindness, as I feel quite capable of conducting my business without dangerous risks.

James Slipper.

November 11, 187c.

Toughened Glass.

Sir,—Some of your correspondents appear to have been very unfortunate with their toughened glass experiences. My experience is quite different, having had a set of tumblers of toughened glass in daily use for the last two months, and without any breakage. Only last week my servant, in taking them out of the glass closet in the kitchen, let one fall without harm on the brick-floor, a height of four feet; it simply rebounded, and rolled away to her astonishment.

Tenbury. J. S.

The Sessional Prizes.

Sir,—"An Intended Second Year's Student" sees no reason for altering a custom that hitherto apparently has worked well. Has it worked well? Were not the silver medals for the lectures last session carried off by a second year's man, causing much dissatisfaction among the first year's men?

He also fails to see the injustice of allowing second year's men to compete with the first year's men. If this is to be allowed, what is to stimulate the first year's man to earnest study? It is few that can afford the luxury of more than one session at the Square; and are they "to be turned empty away," while the silver medals are taken by some gentleman with plenty of time and money to make up for other deficiencies?

That the altered system works well and gives satisfaction among the students in the laboratories is well known. Then why not extend it to the lectures?

A Last Year's Student at the Square.

"*Aquam.*"—The Aq. Sambuci quoted at 8*d.*, is, we believe, that made of the strength of the British Pharmacopœia (one pound flowers to one pound of distillate), and is termed "duplex." That at 4*d.* per pound is half this strength; while that quoted as "triplex" is either imported from South France or made in the proportion of one and a-half pound flowers to one pound of distillate.

M. P. S.—The more volatile portion of petroleum spirit has been used for the purpose mentioned, but the name "gasaline" is by no means restricted to that portion.

J. Edwards.—We shall be happy to publish your recipe, and thus put it in the possession of all our readers without expense to you or them.

P. W.—Probably some substances in each of the classes mentioned.

T. C.—*Brilliantine.*—Recipes for this preparation have been already given in this Journal. The following is one of them:—

Honey	℥j.
Glycerine	℥ss.
Eau-de-Cologne	℥ss.
Rectified Spirit of Wine	℥ij.

E. Bevan.—The preparation you mention is a proprietary one. Beasley gives the following for a Syrupus Hypophosphiticus:—Hypophosphites of lime, potash, and soda, one part each, dissolved with heat in 100 parts of syrup. See also *Pharm. Journ.* [3], vol. v., p. 425.

R. S.—We believe the preparation is made by Messrs. Corbyn.

A. P. S.—A new edition of the *Homœopathic Pharmacopœia* has just been issued, and copies may, we believe, be obtained at the Society's establishment, Great Ormond Street.

"*Apprentice.*"—See the prescriber; the precipitated quinine had probably been strained out before.

"*Pil Garlic.*"—Syr. Ferri, B.P.

Messrs. T. and H. Smith.—Your communication has been forwarded to the publishers.

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly over the Editorial columns will prevent delay, and the consequent annoyance.

Communications, Letters, etc., have been received from Mr. Graves, Mr. Davis, Mr. Abraham, Dr. Tilden, Mr. Thresh, Mr. Edwards, Mr. Bevan.

SOLVENTS OF SALICYLIC ACID.

BY J. C. THRESH, PHARMACEUTICAL CHEMIST.

To increase the facility with which salicylic acid may be administered, various substances have been proposed, which increase in a remarkable manner the solvent action of water upon it. The salts usually employed for this purpose are, borax, phosphate of soda, and citrate of ammonia, and my experiments were undertaken to ascertain whether or not this increased solubility was due to some chemical decomposition between the acid and the salts employed, and if the solutions thus formed possessed the antiseptic and antifermentative properties of the free acid.

Borax.—This salt is remarkable for its solvent action upon a large number of organic compounds, the nature of which action is not, in most cases, yet ascertained. If borax and salicylic acid be mixed in a mortar, the result is a damp almost pasty mass. The taste at first is simply that of the acid and borax, but in a very short time it begins to acquire a bitter taste, and after a few hours it will be found to be intensely bitter. If a little of the freshly prepared mixture be carefully fused the resulting mass at once becomes exceedingly bitter, and if the proportions employed were one of borax to two of acid, the mass is soluble in about twice its weight of water. A dilute solution of five gr. each of acid and borax, in one oz. of water is devoid of bitterness, and remains so even after keeping a length of time, but stronger solutions soon become bitter. I have failed as yet to ascertain the nature of this reaction, or to isolate the bitter product, unless a crystalline deposit, which is slowly forming in a solution of 2·5 borax, 4 acid, and 50 water, which is evaporating spontaneously, proves to be the substance in question.

Phosphate of Soda.—This salt has not a solvent effect equal to that of either borax or ammonium citrate. One part of salicylic acid requires—

2 parts of phosphate to form a solution with				50	parts water.
2·25	"	"	"	25	"
2·5*	"	"	"	12·5	"

Solutions 1 and 2, are colourless, but the strongest solution has a slight pink tint (characteristic of salicylic salts). Diluted with water, ferric chloride added in excess gives a purple red solution, which also indicates the existence of a salicylic salt, since whilst free salicylic acid strikes a purple colour with ferric chloride, its salts give a deep red coloration with this reagent. No phosphoric acid, however, is liberated, for a single drop of the dilute acid, added to the solution, causes a precipitation of salicylic acid.

Ammonium Citrate.—I first ascertained by experiment that this citrate, whilst increasing the solubility of salicylic acid in water to a much greater extent than sodium citrate, yet possesses no advantages over potassium citrate, and as this latter was more convenient for my purpose, I have employed it in preference.

Table of solubility of salicylic acid in potassium citrate solution—

Sal. Acid	1	Citrate	·75	Water	100
"	1	"	1·0	"	50
"	1	"	1·15	"	25
"	1	"	1·25	"	20
"	1	"	1·4	"	12·5
"	1	"	1·5	"	7·5

A stronger solution than the last solidifies upon cooling, but the nature of the mass I have not yet ascertained. It gives reactions indicative of free and combined salicylic acid, and of combined citric acid, but not of free citric acid. An alcoholic solution of potassium salicylate, mixed with a similar solution of citric acid, gives a precipitate of potassium citrate, which readily dissolves on the addition of a little water, and the solution thus formed is miscible with water, without precipitation of salicylic acid. 1 dr. Acid. Salicylic, 3½drs. Sp. Vin. Rect., 1 dr. Pot. Cit., and 3½ drs. Water, form a solution miscible with water in all proportions, and 2 drams of which contain 15 grs. of the acid. In this solution diluted acetic acid gives no precipitate, citric acid causes a precipitate to form slowly, mineral acids throw down the salicylic acid instantly. Ferric chloride colours the fluid purple red.

To ascertain the antiseptic value of the solutions formed by aid of these salts I added them to a number of infusions (malt, quassia, calumba, etc.), to grape juice, and flour paste, and so far as I can tell after a lapse of two months, with the exception of flour paste and grape juice, the solutions are equally as fresh as those prepared with free salicylic acid.

To test their antifermentative powers I prepared over thirty mixtures of flour (1oz) and water (½oz), with 20 grains of German yeast in each and added thereto various proportions of free salicylic acid, of potassium salicylate acidified with acetic acid, and of salicylic acid dissolved by aid of borax, phosphate of soda, and citrate of potash, and in the cases where no fermentation ensued I confirmed the result by repetitions of the experiments.

The smallest quantity of free salicylic acid which uniformly prevented the rising of the dough was 1 grain. The acidified salicylate of potash had not the slightest effect unless added in large proportions. 1 gr. of acid in borax solution was equally as powerful as the free acid. A similar quantity dissolved by aid of ammonia citrate or sodium phosphate only retarded for a variable time the fermentation, but in both cases 1¼ gr. was found effectually to arrest it.

It is therefore evident that some reaction as yet undetermined does take place between the salicylic acid and the salts employed as its solvents, yet that in whatever state the salicylic acid exists in the above named solutions, it is capable of exhibiting in a high degree all those properties which have conferred upon it such notoriety.

Buxton, Nov. 6, 1876.

* Three drams would contain a full dose (fifteen grains nearly) of salicylic acid.

COMPARATIVE EXAMINATION OF THE MORE IMPORTANT COMMERCIAL VARIETIES OF GALBANUM AND AMMONIACUM GUMS.*

I. GALBANUM.

BY EDWARD HIRSCHSOHN.

(*Continued from page* 391.)

7. *Behaviour towards Reagents*—Among the qualitative reactions to which galbanum was submitted by the author, those with alcohol and sulphuric, hydrochloric and nitric acids, merit

* From a memoir for which the gold "Suworow" medal has been awarded by the Medical Faculty of the University of Dorpat. (*Pharmaceutische Zeitschrift für Russland,* April 15, 1875, p. 225.)

attention, because not only do they enable galbanum to be distinguished from ammoniacum, but also from other resins and gum resins; also, chloride of lime, although it produces no special appearance with galbanum, may be used in this respect to distinguish galbanum from ammoniacum.

Upon moistening small pieces of the gum resin with a few drops of alcohol, and treating them with concentrated sulphuric acid, there resulted in every case a chestnut-brown solution which was carmine-red at the edges, whilst the gum resin was more or less coloured dark green to greenish blue, with the exceptions of Nos. 1, 2, 3, 4, 15, 17, and 24,* which showed a brown-black colour. An addition of water caused the separation of a dirty violet coloured body. Upon treating this solution of the resin in sulphuric acid with three to four times its volume of 95 per cent. alcohol, there was formed with the Persian sorts, Nos. 1, 2, 3, 4, 15, 17, and 24, a clear yellow brown solution, whilst the Levant sorts, Nos. 5, 6, 7, 11 and 12, gave a more or less intense blue violet, and Nos. 8, 9, 10, 13, 14, 15, 16, 18, 20, and 21, a red violet solution.

When moistened with alcohol, and treated with hydrochloric acid (sp. gr. 1·12), Nos. 5 to 9, 12, 13, and 16, showed a faint rose colour, which after half an hour in Nos. 5 to 9, 13 and 16, passed into red violet, and in No. 12 to light blue. Nos. 11, 14, and 18 to 21, showed a violet colour, which in No. 19 passed in half an hour to light blue, the others changing into blue violet. In Nos. 1 to 4, 15, 17, and 24, the colour was yellowish brown, becoming more or less red after half an hour. No. 10 at first showed no change, but after half an hour showed a faint violet tint. Nos. 22 and 23 formed slightly yellow coloured solutions, No. 22 afterwards acquiring a very faint rose colour, but No. 23 undergoing no further change. Small pieces of resin treated with a saturated solution of chloride of lime underwent no change. When equal volumes of tincture of galbanum (1 part of gum resin in 5 parts of 95 per cent. alcohol) and pure hydrochloric acid (sp. gr. 1·12), or nitric acid, were mixed, there resulted a turbidity and coloration of the mixture, as shown in the following table:—

No.	Description.	Hydrochloric Acid.	Nitric Acid.
1	Per. Astrachan	Light red brown.	At first scarcely any colour, gradually rose, and finally red violet.
2	„ Kasan	Same.	At once rose, passing gradually to red violet.
3	„ Institut	Same.	Same.
5	Lev. Institut	Blue violet.	Yellow red, soon blue violet.
8	„ Hamburg	Violet.	Blue violet.
10	„ Hamburg	Almost colourless.	No change.
11	„ Dorpat	Blue violet.	Like No. 8.
12	„ Nisch.	Violet.	Like No. 8.

Other gums and gum resins were examined by the author with the same reagents, but with the exception of sagapenum none behaved similarly to galbanum.

8. *Amount of Mineral Constituents and Water.*—For the estimation of the ash a quantity of the resin was mixed as thoroughly as possible, and then 2 to 10 grams taken, according to the purity. The combustions were rather troublesome, the last portion of carbon being difficult to remove.

In each case the ash consisted of small quantities of alkaline chlorides, sulphates and phosphates, rather much calcium carbonate, a little ferric oxide, and more or less ferruginous sand. The least sand was contained in Nos. 1, 2, 5, 8, 11, 14 and 16; Nos. 3, 4, 7, 9, 10, and 13, contained more; and No. 12 the most. These data show that all sorts are not collected with equal care, and that sand is introduced into many through carelessness or adulteration.

The estimation of the moisture was very difficult, several methods were tried without arriving at perfectly satisfactory results. An estimation in the ordinary way, by heating the substance to 110° C., was hindered by the presence of the volatile oil. To remove this obstacle as much as possible, a small quantity was weighed and mixed with sand, and treated with petroleum ether in a small displacement apparatus, until nothing more was taken up; the residue was then heated (in the displacement apparatus) at 110° C. until it no longer lost weight. The loss of weight then represented the moisture plus the volatile oil, and from this the amount of oil, obtained by a separate operation, was deducted.

An attempt to remove the moisture by exposing a weighed portion mixed with sand in a watch-glass over sulphuric acid until the weight remained constant, was unsatisfactory. The figures obtained were not reliable in all cases, as, especially in the Persian, a small quantity of volatile oil was lost.

Finally, the moisture was estimated from the loss after a weighed quantity mixed with sand had been treated with petroleum spirit, ether, alcohol, and water, and the residue dried at 110° C. The figures obtained in this way gave the most satisfactory results, and agreed very well with those obtained by the first method. The results obtained by these two methods, and the percentage of ash are shown in the following table:—

No.	Description of Galbanum.	Ash.	Moisture 1st method.	Moisture 2nd method.
1	Persian, from Astrachan . . .	2·24	3·12	3·58
2	„ „ Kasan	3·83	3·70	3·66
3	„ „ Pharm. Inst. . .	7·93	2·34	2·61
4	„ „ „ „ . .	6·29	4·00	3·83
5	In granis, „ „ „ . .	3·26	—	2·09
6	„ „ Dorpat Pharmacy	—	—	1·21
7	„ „ Pharm. Inst. . .	6·46	—	2·44
8	„ „ Hamburg, 1873 .	4·53	2·30	2·91
9	„ „ „ „ .	9·12	—	2·01
10	In massis, „ „ „ .	8·74	—	4·35
11	„ „ Trieste	6·51	3·67	2·85
12	„ „ Dorpat Pharmacy	10·26	3·20	3·89
13	„ „ Nisch. Nowgorod	7·19	3·11	3·94
14	London, 1840	5·37	3·12	3·46
15	„ 1850	—	—	4·12
16	„ 1872	6·51	—	4·41
17	Paris, 1849	—	—	3·91
18	Coblentz, 1851	—	—	3·80
19	Sens	—	—	3·27
20	Lucae Collection	—	—	3·32
21	Lucae „	—	—	4·00
22	Artificiale, Lucae	—	—	2·48
23	In granis, Lucae	—	—	2·14
24	Depuratum	—	5·30	5·17

9· *Distillation with Water.*—These experiments

* See before, p. 390.

were only carried out with those sorts of which a certain quantity was available. The distillation was effected with the vapour of water from a glass retort placed in a sodium chloride bath. The steam was introduced by means of a tube bent twice at right angles, the longer end of which passing through the tubulure reached almost to the bottom of the retort, whilst the shorter end was connected with a flask containing boiling water. The water passing over with the volatile oil was poured back into the retort as long as any oil drops passed over.

The following sorts were used—

No.	Description of Galbanum.	Quantity used.	Amount of Oil.	Per ct. of Oil.
		Grams.	Grams.	
1	Persian, from Astrachan . .	50	6·89	17·38
2	„ „ Kasan . . .	100	14·74	14·74
8	In granis, „ Hamburg, 1873	50	2·59	5·18
11	In massis, „ Dorp. Pharm. .	100	4·06	4·06
12	„ „ Nowgorod . .	50	3·12	6·24

The oil from Nos. 1 and 2 passed over with the water vapour very easily, No. 1 in the proportion of one part of oil to 2·8 parts of water; that from the other sorts much more slowly.

All the volatile oils were neutral to litmus paper. With the exception of No. 11, which had a faint yellow colour, they were perfectly colourless; they refracted light rather strongly, and had a strong smell of galbanum, which in Nos. 1 and 2 appeared to be mixed with that of rosemary and turpentine. The sp. gr. at 17° C. of Nos. 1 and 2 was 0·8673; Nos. 8 and 12, 0·8890; and No. 11, 0·9004.

Examined in a Wild's polaristrobometer, with a 50 mm. column, No. 1, gave with the sodium light a deviation of a beam of polarized light 8·3 to the right, showing a specific rotatory power of 19·116°; No. 2 gave 7·1, or a specific rotatory power of 16·373°.

Concentrated sulphuric acid coloured the oils Nos. 1 and 2 citron yellow; Nos. 8, 11 and 12 orange red, which after 24 hours became blood red. Shaken with nitric acid (sp. gr. 1·2) the oils were coloured yellow, and after longer standing formed a yellow resinous mass, which, after washing off the acid, dissolved partly in water, imparting to it an intensely bitter taste. A portion of this resinous substance, heated to dryness and then boiled with water gave no reaction of umbelliferon.

Iodine was dissolved by the oils with a red brown colour, which colour, if only a small quantity of iodine had been added disappeared upon heating.

Upon dissolving one drop of oil in twenty drops of alcohol saturated with hydrochloric acid gas, Nos. 1 and 2 took a rose colour which gradually passed into violet; whilst Nos. 8, 11 and 12 were coloured light brown and gradually became darker. Also, one drop of oil dissolved in twenty drops of 95 per cent. of alcohol with five or six drops of concentrated sulphuric acid added gave with No. 1 and 2 no colour, but a milky turbidity; with Nos. 8, 11 and 12 a red violet colour and turbidity.

Some drops of the oils exposed on a glass plate to bromine vapour were coloured yellow. Frohde's reagent produced a similar colour.

Chloral mixed with chloral hydrate dissolved the oils from Nos. 1, 2, 11 and 12 with a faint yellow red colour, passing into olive green; the oil from No. 8 remained yellow red after standing.

An oil from Persian galbanum, about twenty years old, from the collection of the Pharmaceutical Institute, was of a dark yellow colour, and had a galbanum-like odour recalling at the same time that of turpentine. It specific gravity at 15°C. was 0·9500 and it rotated the polarized beam in a 50 mm. column 5·55° to the right. Petroleum spirit dissolved this oil only partially; a largish quantity of yellowish white flocks separating. Strong sulphuric acid dissolved it with an orange red colour, which at the edges changed gradually into red violet, and finally into blue, the liquid itself becoming blood red. A solution of bromine, ether or chloroform added, produced a beautiful red violet colour in the solution, which gradually changed into a beautiful blue. Drops of the oil exposed to bromine vapour were coloured a magnificent violet, which after standing exposed to the air passed to blue and eventually to green. A portion of this oil being submitted to distillation the first drops passed over at 165° C., and had a strongly acid smell and reaction. The thermometer gradually rose to 180° when the greater portion distilled over, and at 200° the first yellow drops were noticed. At 260° the retort was suddenly filled with blue vapour, and some drops of blue oil appeared. The residue, which was a thick dark yellow oil, when boiled with water and filtered hot, gave a strongly fluorescent liquid, the fluorescence being intensified by the addition of potash solution (umbelliferon).

Another sample of this oil was distilled with steam, and passed over in the proportion of 1 part of water to 1·13 part of oil. The oil thus distilled was colourless and neutral, had a sp. gr. of 0·8800 at 15° C., and a specific rotatory power of 22·045° to the right. The accompanying water had a faintly acid reaction, and gave no reaction with hydrochloric acid. The examination for formic and acetic acid, with sulphuric acid and alcohol, gave negative results. The aqueous liquid remaining in the retort reacted strongly acid, and upon the addition of concentrated hydrochloric acid gave a red colour, passing through violet into blue. The resinous residue in the retort, separated from the liquor and heated to 200° C., gave crystals of umbelliferon, and a blue oil. As the freshly distilled oil is free from umbelliferon, these crystals must be considered a decomposition (oxidation) product of galbanum oil.

Another sample of oil, in the collection of the Dorpat Pharmaceutical Institute, from Zeise of Altona, and prepared from Levant galbanum, behaved similarly towards reagents, and in distillation. Its sp. gr. at 15° C. was 0·9545, and its specific rotatory power was 10·058 to the right.

(*To be continued.*)

THE DISPENSING OF COPAIBA RESIN.

BY ALFRED BALKWILL.

The following form of exhibiting copaiba resin we have found give satisfaction to the prescriber and his patient.

It is no trouble to make, and the mixture in elegance of appearance, permanence, and therapeutic action, is preferable to that of any form that we have met with.

℞ Resinæ Copaibæ . . . . . . ʒiss.
Ol. Amygdal. Dulc. . . . . ʒiv.
Mucil. Acaciæ . . . . ʒiss.
Liq. Potassæ . . . . ʒss.
Ol. Cinnamomi . . . . guttæ vi.
Aquam . . . . ad ℥vi.

A sixth part three times a day.

Dissolve the resin in the almond oil with gentle heat, then add the liq. potassæ, and form an emulsion.

SYRUP OF COFFEE.*

BY ROBERT H. BERNHARDT, PH.G.

The preparation of this elegant syrup has long been within the province of the pharmaceutist; yet, with all the various formulæ for its production, contributed from time to time, it has not yet attained any appreciable degree of perfection. Its liability to fermentation has continually been a barrier to its more general adoption.

Syrup of coffee, like some other officinal syrups, is possessed of little or no medicinal value. Its importance as a pharmaceutical preparation lies exclusively in its remarkable power of disguising the taste of nauseous medicines, and the delicate flavour it imparts as an adjunct or diluent.

The following formula, in which is used the process known as "cold percolation," I have found after many experiments the most appropriate:—

Take of

Roasted Coffee	2 troy ounces.
Crushed Sugar	28 „ „
Distilled Water	a sufficient quantity.

Moisten the coffee, previously reduced to a moderately fine powder, with half a fluid ounce of distilled water; introduce it into a conical glass percolator, and gradually pour distilled water upon it until sixteen fluid ounces of infusion have passed. Add this to the sugar contained in a glass percolator, in the orifice of which a piece of soft sponge has been introduced; and in order to prevent the immediate escape of the liquid, a cork is to be tightly fitted in the tube of the percolator at the bottom. The whole is then to be closely covered and set aside for about two hours, or until the sugar has dissolved down to half its former bulk. Then the cork can be removed, and the liquid allowed to drop. If the liquid has all passed and there still remains a quantity of undissolved sugar in the percolator, pour it again upon the sugar until the desired result is effected. This last proceeding is, however, entirely unnecessary and only occupies time; an essential precaution, and on this simple mechanical contrivance depends the success of the entire process, is to carefully insert the sponge in the orifice—not too tightly, but also not too loosely—*just sufficiently close to allow the syrup to pass drop by drop.*

It is also requisite to the immediate transparency of the preparation that the infusion obtained by percolation should be perfectly clear; to accomplish this in the quickest and most convenient manner it is only necessary to close the orifice of the percolator with a wad of dry, well compressed cotton, tightly inserted.

It will be noticed that there is not the slightest degree of heat used in preparing this delicious syrup—further than in the parching of the coffee—and the transparency, reliability and beauty of the product cannot be surpassed by any generally known formula.

The strength of this preparation can be made as individual fancy or desire may dictate. The above affords a very handsome dark-brown coloured liquid, pretty well impregnated with the odour of coffee, and for ordinary purposes serves exceedingly well. For disguising the bitter taste of alkaloids, etc., I would, however, recommend a preparation double the strength of the above; this is easily obtained by simply substituting twice the amount (four troy ounces) of coffee and treating as directed in the general formula.

* From *The Druggists' Circular and Chemical Gazette*, September, 1876.

PIGMENTUM NIGRUM, THE BLACK COLOURING MATTER CONTAINED IN HAIR AND FEATHERS.

At a recent meeting of the Chemical Society, a communication was made on the above subject by Messrs. W. R. Hodgkinson and H. C. Sorby, of which the following is an abstract:—*

When perfectly white hair or feathers are heated gently with dilute sulphuric acid for some time they completely dissolve, but if black or brown feathers or hair are thus treated an amorphous black residue is obtained. This substance, which exists only in very small quantity in the blackest feathers, may be conveniently prepared from rook's feathers (which yield about one per cent.) which have been separated from the central rib, and thoroughly cleaned from waxy and fatty matter by treatment with alcoholic ammonia. On digesting them with successive quantities of dilute sulphuric acid for several days, until the acid ceases to be coloured by red or brown soluble colouring matters, a black residue is obtained, which, after being thoroughly washed with dilute hydrochloric acid at 80° C., and then with water, is dried, and the last trace of fatty matter finally removed by treatment with boiling alcohol and ether. On analysis it gives numbers agreeing very well with the formula $C_{18}H_{16}N_2O_8$. It is not acted on by dilute acids or alkalies, but nitric acid slowly oxidises it. It forms new compounds by the action of bromine, one of which is soluble in water, and gives a characteristic absorption spectrum.

In reply to a question from the president, Mr. Sorby said he had regarded the subject of the colouring-matter of hair and feathers more from a biological than from a chemical point of view. Having found that a black residue was left on heating feathers with the dilute acid, Mr. Hodgkinson had undertaken to investigate chemically the nature of the substance. The black pigment was found in black, brown, and dark red hair, but in the latter it was associated with a brown pigment soluble in dilute sulphuric acid. In very bright red hair he had also found a pink colouring-matter. The feathers of birds were of two kinds, namely, those which contained the *pigmentum nigrum*—including the iridescent feathers, such as those of the peacock, which are really black—and another class of feathers, like those in the crest of the crowned crane, which are not iridescent, but contain various coloured pigments. He considered it very important, from a physiological point of view, that this matter should be more fully investigated. With regard to the pigment of the negro's skin, he had not examined it, but had no doubt that it would prove to be identical with that found in the hair.

Mr. Sorby exhibited a specimen of *pigmentum nigrum*, and also specimens illustrating the colours obtained with this pigment and others soluble in the dilute acid.

Professor Church said his attention had been entirely directed to the feathers in twelve species of turacoa, in which the red parts of the feathers were coloured by turacin. This differs in an important point from the *pigmentum nigrum*, in that its ash consists wholly of oxide of copper. The amount of copper present in turacin is considerably larger than he had formerly stated: this was owing to the fact that when turacin is distilled a red coloured substance passes over which contains copper. This, unlike turacin, is insoluble in ammonia, but soluble in ether.

THE SEEDS OF RICINUS COMMUNIS.†

BY EMIL LOUIS BOERNER, PH.G.

The acrid principle of *Ricinus* seeds is but in a slight degree extracted in the expression of the oil, and the residual marc, as left by the manufacturer of castor oil, would, therefore, contain the greater portion of it, and was the material operated upon.

The coarse particles, which were liable to interfere with

* *Chemical News*, Nov. 10, p. 203.

† From the *American Journal of Pharmacy*, November 1876.

percolation, being rejected, four different portions, of 1000 grains each, were treated respectively with gasolin, bisulphide of carbon, ether, and alcohol, until exhausted; the various menstrua evaporated, and the residues weighed, yielding from gasolin 6·9 per cent.; bisulphide of carbon, 11·77 per cent.; ether, 14 per cent., and alcohol, 21·2 per cent. The first three appeared to be pure oil, and were of a light yellow colour, while the alcohol residue was much darker, and contained considerable colouring matter, which was deposited upon standing.

The marc which had been exhausted with gasolin was further treated with bisulphide of carbon, resulting in an additional 5·37 per cent. of oily residue from which, after a few days' standing, acicular crystals separated, that were insoluble in gasolin, partly soluble in ether, and in alcohol. A second attempt to obtain the crystals was unsuccessful. That portion of marc which had been treated with bisulphide of carbon yielded nothing to gasolin upon subsequent treatment with this menstruum.

A portion of exhausted marc was macerated with water until decomposed, requiring for the process about fourteen days. It was then strained, to separate coarser particles, and distilled; the distillate, having an acid reaction and an odour resembling that of decayed cheese, was treated with carbonate of zinc and filtered; upon concentration of the filtrate, crystals of butyrate of zinc separated. Both crystals and mother-liquor, when shaken with sulphuric acid and alcohol, immediately developed, in a marked degree, the odour of butyric ether. A portion of this ethereal liquid, neutralized with ammonia was unaffected by the addition of ferric chloride, thus indicating the absence of an acetate.

An experiment was made similar to the one of Professor Tuson, in which he found a crystallizable substance supposed to be an alkaloid.

A portion of the marc was boiled with successive portions of water, the several liquids strained through muslin, and the resulting decoction evaporated to the consistence of a soft extract, which was exhausted with boiling alcohol. Upon standing, a substance of a resinous appearance, but soluble in water, separated from the filtrate, and was removed by a second filtration. The filtrate was concentrated, and, as no crystals separated, magnesia was added, the mixture evaporated to dryness, again exhausted with boiling alcohol, and filtered, when, upon concentration and a few days' standing, colourless crystals, having the form of rectangular prisms and tables, separated, answering to the appearance of those obtained by Professor Tuson. These crystals where slowly soluble in hot water. In an acidulated solution of the crystals, phosphomolybdic acid, tannic acid and iodohydrargyrate of potassium produced neither a precipitate nor a coloration; while in the mother-liquor precipitates were at once formed by the two first-named reagents, but by the last one only after some hours, and in amount about one-eighth that formed by phosphomolybdic acid. The mother-liquor, when heated with solid hydrate of potassium, developed the odour of ammonia. From these results the writer concludes that the crystalline substance in question is not an alkaloid.

A substance resembling emulsin was obtained by forming an emulsion of the marc with water, adding an equal bulk of ether, and agitating repeatedly during twenty-four hours, when, upon standing, the liquid separated into two layers; the supernatant liquid being removed, alcohol was added to the other, which precipitated the emulsin. This emulsin, with amygdalin, in the presence of water, developed the odour of hydrocyanic acid after several days' standing. The result of Mr. H. Bower (*American Journal of Pharmacy*, 1854, p. 208) is confirmed by this experiment.

The residue obtained from the alcoholic percolate having deposited a semi-solid portion, largely composed of colouring matter, was agitated with ether, which took up the oil. The part left undissolved by the ether was treated with successive portions of alcohol until but a few grains were left; this, containing a number of minute crystals, and having a very sweet taste, was dissolved in water. The application of Trommer's test proved the presence of sugar. A drop of the aqueous solution, placed on a microscope slide, and evaporated, plainly revealed the presence of cane sugar.

As the best authorities agree in placing the amount of fixed oil obtained from the kernals of the seeds at less than 50 per cent., it would seem that, as more than 11 per cent. is obtainable from the marc as rejected by the manufacturer by treatment with bisulphide of carbon, the latter oil could be produced at a less cost than an inferior quality of the expressed article, and answer the same purpose for use in the arts.

The writer intends making further experiments to determine the amount of butyric acid obtainable from the marc, by a process similar to the one above described.

IPECACUANHA AND VANILLA CULTIVATION IN INDIA.

The following notes on the cultivation of vanilla and ipecacuanha in India we gather from Dr. King's recently received report on the Calcutta Botanic Gardens. With reference to the former, Dr. King says, "some very sanguine forecasts having been made of the future of vanilla cultivation in Bengal, a number of plants were two years ago put out in the Calcutta Garden under sheds similar to those in which the pepper vine is grown. The growth of these plants has not been satisfactory, probably from over-shading, many have, therefore, been recently put under the shade of mango trees. The finest old vanilla plants in the garden grow against a north wall. One of these was this year laden with pods, but an unusually high temperature for a day or two caused them to drop prematurely. Recent as well as former experience leads me to think that vanilla will never become a staple product of Bengal." With regard to ipecacuanha, quantities of plants, it seems "have been sent to Ceylon, to the Neilgherries (for trial at Barliar, a garden in a hot, low valley below Coonoor), and to Burmah. It is to be hoped that a locality may soon be found where this invaluable specific for one of the worst of tropical diseases can be profitably grown as a crop. I fear it cannot be thus grown so far north as Bengal. The secret of successful propagation being now perfectly understood, any number of plants can be sent out. During the year I supplied a quantity of the drug itself (the dried root) to the surgeon-general for trial in hospital practice. This was carefully administered in cases of dysentery by Dr. Crombie, late officiating physician to the Medical College Hospital, and was pronounced by him to be quite as efficient as the best South American drug."

SIUM LATIFOLIUM.*

BY NATHAN ROGERS, PH.G.

Attention having been recently directed to this plant (see *American Journal of Pharmacy*, 1873, p. 371), the writer concluded from its stated marked poisonous properties to subject the plant to a chemical examination.

The water parsnip is an aquatic plant very common in the swamps and along the water courses of the valleys of the Pacific slope. Its root is creeping,† stem erect, angular, leaves pinnate, leaflets ovate, lanceolate, sessile

* From the *American Journal of Pharmacy*, November, 1876.

† This statement does not agree with the brief description given by Mr. A. R. Porter on page 174 of this volume. The root examined by the latter had been sent by Dr. C. B. White, U.S.A., to Mr. F. B. Power.

smooth, serrate, sometimes pinnatifid; flowers white' large rayed, involucres many-leaved, umbels terminal. The leaves of the plant, when found growing in water, are generally bipinnatifid. In appearance, growth, odour, and taste it is closely allied to its innocent congener, the *Pastinaca sativa* On account of this resemblance, it has frequently been productive of dangerous results, when eaten through mistake for the harmless and nutritious tuber of that edible species.

The root being considered the most active part of the plant, it was deemed proper to subject that part to a chemical examination.

A portion of the root, cut up fine, was introduced into boiling water, contained in a retort, and a volatile oil obtained, which had a light straw-colour, neutral reaction and possessed a pungent odour, resembling somewhat the peculiar odour of carrots. A cold infusion of the fresh root, acidulated with hydrochloric acid, and filtered, to separate a precipitate, failed to give a precipitate with iodohydrargyrate of potassium; but when distilled with an excess of potassa solution, a perfectly clear and colourless distillate was obtained, possessing a strong alkaline reaction and peculiar mouse-like odour, somewhat similar to that of conium; after neutralization with hydrochloric acid, however, not the slightest precipitate was occasioned by phosphomolybdic acid, iodohydrargyrate of potassium or potassium cadmic iodide.

The neutralized distillate was next concentrated on a water-bath, and then allowed to evaporate spontaneously over sulphuric acid, which resulted in the deposition of long, slender, colourless needle-shaped crystals. On the addition of milk of lime a peculiar alkaline volatile principle was instantly liberated from its combination, and distinctly recognized by its disagreeable mouse-like odour, and the property of restoring the blue colour to reddened litmus.

Following Wittstein's process for preparing pastinacina, the alkaline distillate was freed from the volatile oil, neutralized with sulphuric acid, evaporated and treated with etherized alcohol to remove ammonium sulphate, the filtrate evaporated to a syrupy consistency and distilled with solution of potassa, gave a distillate which possessed an alkaline reaction, a urinous odour and a pungent taste. After neutralizing with sulphuric acid, needle-shaped crystals were obtained. This *alkaloid* appears to be analogous to pastinacina.*

A spirituous tincture of the root was mixed with water, and the alcohol and volatile oil distilled off; the dark reddish-brown resin removed from the aqueous liquid was soluble in ether and alcohol, and produced in the throat an unpleasant, burning sensation. Weak ammonia dissolved from this *two acid resins*, which were precipitated, the one by acetate, the other by subacetate of lead. The portion insoluble in ammonia consisted in part of *an indifferent resin*. It was dissolved in alcohol, precipitated by a spirituous solution of lead acetate, the precipitate decomposed by sulphuretted hydrogen, and the sulphide of lead treated with boiling alcohol, from which, on cooling, shining colourless needles of a neutral principle separated, which were insoluble in pure and acidulated water, but soluble in ether, and from platinum foil volatilizable without charring. The aqueous filtrate from the resin obtained above was evaporated, and the residue incinerated; the ashes contained salts of *potassium*, *sodium*, *calcium*, and *magnesium*.

On examining a section of the root under the microscope, *starch granules* were found to be quite plentiful around the medullary sheath and near the cortical portion. They polarized but feebly, were oblong, different in size and quite small. *Sugar*, *albumen* and *gum* were found in the cold infusion by appropriate tests.

* Wittstein's pastinacina has an insignificant (unbedeutend) and scarcely somewhat acrid (scharf) taste. See 'Buchn. Repertorium,' vol. 68, p. 18.—ED. A. J. P.

Medicinal Effects.—From experiments made upon dogs, the volatile alkali and the neutral crystallizable principle were both found to be perfectly inert, while the resinous mass, in ten grain doses, was found to lessen the frequency and the force of the heart's beat, producing also dizziness, vomiting and purging, with slight convulsive movements. These poisonous symptoms having gradually disappeared, the animals were left in a prostrate, weakened condition, from which they slowly recovered.

PHARMACY ACT, 1868.

RECTIFICATION OF THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS.

We are requested by the Registrar to publish the following List of persons whose names will be erased from the Register unless they communicate with him on or before 30th December next.

Those marked (*) are Pharmaceutical Chemists.

Abbott, Joseph Ortzen	24, Alfreton Road, Nottingham
Addis, Philip	4, Sussex Villas, Warner Road, Camberwell, Surrey.
Aldridge, Joseph	105, North Street, Leeds.
Allcock, Samuel	Toton, Notts.
Allen, John	145, Moseley Street, Moseley Road, Birmingham.
Ancell, Theodore Robert	13, Berners Street, Oxford Street, London, W.
Anderson, John Watson	Chester.
Andrews, Richard	High Street, Rainham, Kent.
Arnall, Thomas	Franchise Street, Wednesbury, Staffs.
Aston, Edward	Ton-y-Pandy, near Pontypridd.
Armstrong, John	Maryport.
Atkinson, Richard	Skipton, Yorks.
Attwater, Thomas Chipping	Church Street, Liskeard.
Attwell, Arthur	28, Nassau Place, Commercial Road, London, E.
Baines, Wililam Duckle	4, Museum Square, Wisbeach.
Balfré, Juan Morday	13, Handcroft Road, West Croydon, Surrey.
Bannister, Benjamin Newnham	20, Delancey Street, Camden Town, London, N.W.
Barker, Frederick Griffiths	242, Oxford Street, Stepney, London, E.
*Barkley, William	3, Langham Place, London, W.
Barlow, Thomas	Nottingham.
Barns, Joseph	79, Old Street, Ashton-under-Lyne.
Barr, Thomas James	40, Dublin Street, Edinburgh, N.B.
Bartleet, John	55, King Henrys' Walk, Mildmay Park, London, N.
Beale, Benjamin Sturge	70, Bridport Place, Hoxton, London, N.
Beale, Joseph Foley	70, Bridport Place, Hoxton, London, N.
Bell, James Alexander	Nelson-in-Marsden.
Bell, John Armour	5, Salisbury Street, Edinburgh, N.B.
Blagg, George Denby	165, Lorrimore Road, Walworth, Surrey.
Bland, William Henry	37, Clifford Street, Oxford Road, Manchester.
Blandford, William Johnston	3, Moat Street, Stockton-on-Tees.
Bordass, William	Sibsey, Lincolnshire.
Bothamley, William Parkinson	Nottingham.
Bowen, William Milne	7, Deacon Street, Walworth, Surrey.
Bowles, Edward Henry	26, Gerrard Street, Islington, London, N.
Brierley, George Henry	16, Foregate Street, Chester.
Brierley, John	Field Head Road, Highfield, Sheffield.
Briggs, William	173, Long Lane, Bermondsey, Surrey.
Bristow, Robert Anthony	136, Grundy Street, Bromley, Middlesex.
Brooke, Charles	Penkridge, Staffordshire.
Brooker, John Bedford	89, Lake Road, Landport, Hants.
Broome, Robert	Ditton, near Farnworth, Lancs.
Brunton, Edward	624, Old Kent Road, Surrey.

Buckton, Thomas	Wortley, near Leeds.
Burgin, Nathan Rhodes	22, Bull Green, Halifax, Yorks.
Bywater, George	Cauldwell Street, Bedford.
*Cable, George Hughes	23, Northumberland Street, London, W.C.
Calder, William	Craigatin, Pitlochry, Perthshire.
Carns, Thomas	12, Elliston Street, Lower Broughton, Manchester.
Cary, Oswald R.	145, Great Alfred Street South, Nottingham.
Catton, Joseph Thurston	60, Pembroke Road, Kensington, London, W.
Chapman, William	Ruddington, Notts.
Chapman, William Travis	14, Clumber Street, Nottingham.
Church, William Robert	High Street, Wootton Bassett, Wilts.
Clark, Alexander	197, South Wellington Street, Glasgow, N.B.
Clark, Shadrach	Millbrook, Cornwall.
Clempson, Joseph	78, High Street, Brierley Hill, Staffs.
Clingan, William Morison	5, Queensferry Street, Edinburgh, N.B.
Clutterbuck, Samuel Richard	39, Ledbury Road, London, W.
Coate, Thomas Acraman	4, Devon Terrace, Albion Road, Hackney, London, E.
*Coleman, Abraham	Edinburgh, N.B.
Cooper, John Thornhill	70, Higher Bridge Street, Bolton, Lancs.
Copland, Thomas	13, Bath Street, Waterloo, near Liverpool.
Costerton, Horace Arthur	Alma Cottage, Vernon Road, Sutton, Surrey.
Cowdery, Frederic	19, Woodhouse Lane, Leeds.
Cregreen, James Henry	10, Shrewsbury Road, St. Stephen's Square, Bayswater, London, W.
Crew, William Thomas	217, Stockport Road, Manchester.
Crocker, George	68, Broad Street, Worcester.
Davies, George	149, Friar Street, Reading.
Davies, Hopkin Jones	The General Infirmary, Northampton.
Davison, Anthony	Darlington, Durham.
Day, Charles	10, Blackland Terrace, King's Road, Chelsea, London. S.W.
Day, William John	76, Upper Parliament Street, Nottingham.
Dickinson, Joshua Steel	67, High Street West, Gateshead.
Dixon, Henry Benjamin	Bedale.
Dobson, John	Wilmslow, Cheshire.
Dodwell, John, jun.	422, High Street, Cheltenham.
Dolman, Edward	56, White Horse Street, Stepney, London, E.
Donald, Peter Gellatly	12, North Road, New Cross, Kent.
Duncombe, William Pauncefort	Acre Lane, Brixton, Surrey.
Durham, Frederick William	Norbiton, Kingston-on-Thames.
Earnshaw, George	33, Portland Street, Ashton-under-Lyne.
Edwards, James Joseph	George Street, Pontypool, Mon.
Edwards, William Joseph	30, Chapel Road, Southampton.
Edwards, William Read	13, Forest Lane, Stratford, Essex.
Evans, Daniel William	231, Great College Street, London, N.W.
Evans, David Powell	Frogmore Street, Tring, Herts.
Farmer, Arthur Coningsby	1, West Hill, Wandsworth, Surrey.
*Farmer, Charles Adolphe	146, Holborn, London, E.C.
*Field, George	168, Edgware Road, London, W.
Flint, George	36, Pevensey Road, Eastbourne.
Forrester, Richard Hammersley	Hope Street, Sandbach, Cheshire.
Fowler, Charles March	1, Weymouth Street, London, W.
Francis, Thomas	Stowmarket.
Frith, Edwin John	138, Princes Road, Kennington, Surrey.
Gardam, Mary	Upper Union Street, Hull.
Gardner, Francis	Doncaster.
Garthwaite, William Humble	8, Pembroke Place, Liverpool.
Gavin, John	101, Broughton Street, Edinburgh, N.B.
Gawith, James Jackson	47, Lime Street, Liverpool.
Gawith, Tom Harrison	47, Lime Street, Liverpool.
Goldsmith, Joseph Lawder	17, Paradise Row, Chester.
*Gooch, William Philip	22, Hamilton Terrace East, Highbury Park, London, N.
Gordon, George	32, Bristo Street, Edinburgh, N.B.
Goulden, Henry William	3, Agar Street, London, W.C.
Gowans, James	Edinburgh, N.B.
Grant, Walter Henry	Newmarket Road, Norwich.
Graydon, John	Royal Arsenal, Woolwich, Kent.
Greaves, Edwin Tracy	55, James Street, Bute Docks, Cardiff.
Green, Edward Thomas	4, Arden Street, Battersea, Surrey.
Greeves, John Williams	52, Church Street, Edgware Road, London, W.
Gresham, Robert	231½, Gray's Inn Road, London, W.C.
Guthrie, Peter	111a, Sauchiehall Street, Glasgow, N.B.
Haas, Louis	Houndsditch, London, E.
Haigh, Daniel	Knottingley, Yorks.
Hampson, Peter	46, Newport Street, Bolton, Lancs.
*Hanson, Thomas	26, Above Bar, Southampton.
Hardin, Henry	Towcester, Northamptonshire.
Harlow, Robert	Byron's Street, Macclesfield.
Harold, Arthur	Cley-next-the Sea, Norfolk.
Harrison, John William	151, Commercial Road, Landport, Hants.
Harvey, James Steen	34, Ashton Street, Birmingham.
Haynes, John	High Street, Upper Sydenham, Kent.
Hayman, Henry Daniel	5, Aspland Terrace, Amherst Road East, Hackney, London, E.
Hayward, Robert	112, Hill Street, Peckham, Surrey.
Henderson, Robert Hood	41, Kingsley Road, Maidstone.
Hicks, William King	227, Walton Road, Liverpool.
Hill, James	120, High Street, Ramsgate.
Hine, Alfred Leonard	9, Albion Place, Hyde Park Square, London, W.
Hirst, George	Roewood Cottage, Sheffield
Hiscocks, Edwin Hillier	Fairfield, Manchester.
Hollis, William	London Road, Stoke-on-Trent.
Holmes, John William	15, Turner's Road, Limehouse, London, E.
Holt, Thomas	55, Narrow Marsh, Nottingham.
Homer, Frederick George	46, Hampton Street, Birmingham.
Hope, George Edward	Little London, Willenhall, Staffordshire.
Hopkinson, Stephen	15, Gloucester Street, Queen Square, London, W.C.
Howell, John	Pontypridd, Glamorganshire.
Hughes, John Griffith	Thornbury, Gloucestershire.
Hunt, Thomas Jones	Knightsbridge, London, S.W.
Inglis, James	181, New City Road, Glasgow N.B.
Jameson, William	Sheringham, Norfolk.
Jeffcoat, James	34, High Street, Putney, Surrey.
Jennings, William Henry	30, Lisle Street, Leicester Square, London, W.C.
Johnson, Henry John	251, Balls Pond Road, London, N.
Jones, David	90, Snow's Fields, Bermondsey, Surrey.
*Jones, David	Mount Pleasant, Lower Norwood, Surrey.
Jones, John	Victoria Road, Aldershot.
Jones, John	4, Aigburth Road, Grassendale, Lancs.
Jones, Joseph	38, Walbrook, London, E.C.
Jones, Samuel	Tredegar, Monmouthshire.
Jordan, James Alfred	372, Vauxhall Road, Liverpool.
Jukes, Edward Boswell	38, Balaam Street, Plaistow, Essex.
Kay, John Broomhead	231a, Gray's Inn Road, London, W.C.
Keeling, Thomas George	Wisbeach, Cambridgeshire.
Kent, Edward George	Sleaford, Lincolnshire.
Kerr, David Brown	4, Regent Park Terrace, Strathbungo, near Glasgow, N.B.
Kerry, Thomas	Knottingley, Yorkshire.
Kershaw, Charles Edward	2, Church Street, Wrexham.
King, Robert	Chandos Street, Strand, London, W.C.
Knowles, Thomas, jun.	7, Frederick Place, Caledonian Road, London, N.
Lavers, Henry Richard	Nettlestead, near Wateringbury, Kent.
Lawrance, Alexander	22, Commercial Place, Aberdare.
Lawrence, Christopher	38, Wilton Place, Belgrave Square, London, S.W.
Lear, William	61, North Street, Wandsworth, Surrey.
Leaver, William Henry	152, Sandringham Road, Dalston, London, E.
Lees, Henry	Spring Bank Cottages, Asht under-Lyne.

Linay, Thomas William	116, Fitzroy Street, Cambridge.
Lindley, William Walker	6, Rosendale Road, West Dulwich, Surrey.
Lloyd, Edward	538, Oldham Road, Manchester.
Lloyd, James	9, Sheldon Street, Paddington, London, W.
*Long, George	8, High Street, Penge, Surrey.
McDonald, William	Hide Hill, Berwick-on-Tweed.
McMillan, Mary	23, Anderston Quay, Glasgow, N.B.
*Marshall, Eli	8, High Street, Aldgate, London, E.
Melton, Frederick	Farsborne Villa, Park, Tottenham, Middlesex.
Micklem, Austen	Reading.
Middleton, John William	Prebend Row, Darlington.
Millar, Archibald James	93, High Street, Homerton, London, E.
Millard, Thomas	57, Westgate Street, Gloucester.
Miller, Charles	New Hincksey, Berkshire.
Milligan, John	Edenfield, Bury, Lancashire.
Molyneux, Henry	Templeman Terrace, Barton, near Patricroft, Lancashire.
Morgan, Augustus Kinsey	High Street, Newport, Monmouthshire.
Morris, Edward Straton	Winchcombe Street, Cheltenham.
Morris, John	Longton, Staffordshire.
Morse, Charles Bath	Enfield, Middlesex.
Morton, Henry	4, Cemetery Road, Nunhead, Kent.
Murray, George Balfour	10, New Cavendish Street, London, W.
Nash, William	Grosvenor Square, Lower Broughton, Manchester.
Nicholson, Frederick	18, White Abbey Road, Bradford, Yorkshire.
*Norrish, James	5, Altenburgh Terrace, New Wandsworth, Surrey.
Norton, Charles	Plymouth.
Nutt, John	Fanshawe Street, Southampton.
Page, William Henry	445, Strand, London, W.C.
Paris, Daniel George	66, Breckfield Road North, Liverpool.
*Parker, John	Reading.
Parnell, James B.	Wiveliscombe.
Pay, William	4, Salisbury Street, Lisson Grove, London, N.W.
Phillips, Joseph	41, Edward Street, Dorset Square, London, N.W.
Place, John	56, Wenlock Street, New North Road, London, N.
Poole, William	Lane End Street, Market Street, Blackpool.
Powell, Charles John Cadogan	Llanwrtyd Wells, Brecknockshire.
Pritchard, George Frederick	Knightsbridge, London, S.W.
Prys, Robert John	27, High Street, Wrexham.
Rawlinson, Ralph	Lords' Mill, High Wycombe, Bucks.
Redfern, James Howard	23, Upper Jackson Street, Hulme, Manchester.
Redford, John Gorton	Ducie Grove, Oxford Road, Manchester.
Rees, John	Ystalyfera, near Swansea.
Reynolds, Reuben	Grantham, Lincolnshire.
Reynolds, William Harris	123, New Oxford Street, Stepney, London, E.
Richards, John	9, Douglas Terrace, Cubitt Town, Poplar, London, E.
Richardson, Solomon	Pleasley, near Mansfield, Nottinghamshire.
Riches, William James	59, High Street, Lowestoft.
Ritchie, Andrew Wemyes	71, St. Vincent Street, Glasgow, N.B.
Roberts, Thomas Edwards	20, Pepper Street, Chester.
Robinson, Alfred	Walton Street, Wold Carr, Hull.
Robinson, Christopher William	Birmingham.
*Romano, Fredk. Wm. Richard	61, Virginia Terrace, Great Dover Street, Surrey.
Rose, Robert	Haverhill, Suffolk.
Ross, Richard	77a, Whitechapel Road, London, E.
Row, George Commins	14, Thorne Road, South Lambeth, Surrey.
Rowe, Joseph	High Street, Wednesfield, Staffordshire.
Rutter, Thomas Dixon	141, Regent's Park Road, London, N.W.
Sanders, William Edwin	Brighton Street, Egremont, Cheshire.
Scaife, Henry	10, Archer Street, Darlington, Durham.
Sewell, Joseph Dixon	40, Napier Street, Shieldfield, Northumberland.
Simons, David	27, Paradise Street, Liverpool.
Skinner, James Charlton	4, Quadrant, Lime Street, Liverpool.
Smith, Henry	Trinity Street, Cambridge.
Smith, Jeremiah	34, Church Street, Bradford, Manchester.
Smith, Joe	Wath-upon-Dearne, Yorkshire.
Smith, John Frederick	81, Athol Street, Liverpool.
*Smith, Richard	42, Banner Street, London, E.C.
Sowray, Robert Duck	11, Lendal, York.
Spalding, George Sydney	Stansted, Essex.
Staniland, Joseph	Commerce Street, Nottingham.
Stewart, Charles	203, Bute Street, Cardiff.
Stirling, John Richard	37, Church Street, Bethnal Green, London, E.
Stokes, Thomas	11, Gosta Green, Birmingham.
Tassell, Thomas	33, Church Street, Deptford, Kent.
Tatham, Leonard Francis	Byron Street, Patricroft, Manchester.
Tessier, William Henry	Biddenden, Kent.
Thomas, Archibald	311, Hackney Road, London, E.
Thomas, Henry	109, Old Town, Croydon, Surrey.
Thomas, Thomas Henry	Pentre Ystrad, Rhondda Valley, Glamorganshire.
Thomas, William Griffith	High Street, Llanerchymedd, Anglesea.
Thompson, Robert	Middlesborough-on-Tees.
Tomsett, George Thomas	47, Borough High Street, Southwark, Surrey.
Totherick, Edwin	Berwick-on-Tweed.
Totherick, Robert	Berwick-on-Tweed.
Troughton, James	6, Queen's Road, Everton, Liverpool.
Tucker, Benjamin Barkham	Myrtle Cottage, Whitwell, Isle of Wight.
Tucker, Charles Henry	11, St. George's Place, Cheltenham.
Tucker, Horatio H. N.	18, Market Place, Wednesbury, Staffordshire.
Turnbull, Edmund Hobson	3, Munder's Terrace, Hammersmith, London, W.
Turner, George Thomas	Chapel House, Redruth.
Walker, John	43, Great Homer Street, Liverpool.
Walker, Samuel Smith	Lichfield Road, Aston, Birmingham.
Walker, William Warren Tyler	271, High Street, Camden Town, London, N.W.
Wall, Alfred	Ravensbourne Villas, St. Mary Cray, Kent.
Warburton, James	10, Market Street, Over Darwen, Lancs.
Ward, William Edwin	45, Willoughby Street, New Lenton, Notts.
Waterworth, William	North Street, Scarborough.
Welch, George Edwin Andrew	25, Nechells Park Road, Birmingham.
Wells, Joshua Holroyd	115, North Street, Leeds.
Wharton, Frederick	41, Sloane Square, London, S.W.
*Wheeler, Francis	Norwich.
Willan, James Henry Burton	18, Conduit Street, London, W.
Williams, David	Syston, Leicestershire.
Williams, Edward	Wellington, Salop.
Wilson, Ebenezer Walden	44, Peploe Street, Bishopsfield, Chester.
Wilson, John	4, Middle Pavement, Nottingham.
Windle, John Richard	9, Drayton Terrace, Camp Hill, Birmingham.
Wolstenholme, John	50, Aston Street, Gosta Green, Birmingham.
Woodstock, Charles	Woburn, Beds.
Woodward, Charles	Bicester.
*Woolldridge, George	1, Belle Vue Place, Great Malvern.
Woolley, George John B.	48, Arkwright Street, Nottingham.
Wright, Edwin Butler	18, Wray Terrace, Bethnal Green Road, London, E.
Wright, Frederick William	329, Kennington Road, Surrey.
Wright, James	24, Stockwell Street, Greenwich, Kent.
Wright, William Henshaw	Keelings Lane, Hanley, Staffordshire.
Young, Dewar	Cricklade, Wilts.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 25, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE EXAMINATIONS.

WITH the close of the present year, the time will have arrived when an important alteration, provided for in the revision of the Bye-laws effected by the Special Meeting of the Pharmaceutical Society, held in May, 1873, will take place in the conditions under which candidates can present themselves for the Major and Minor examinations. Up to the present time it has been sufficient for a candidate to answer, to the satisfaction of the examiners, any questions that may be put to him in the examination room to entitle him to have his name included in the pass list. But after the 31st of December next, in compliance with clause 16, section X. of the Bye-laws, no person will be allowed to pass the Major or Minor examination unless he shall also satisfy the examiners that for three years he has been registered and employed as an Apprentice or Student, or has otherwise for three years been practically engaged in the translation and dispensing of prescriptions.

As the discussion upon this subject was brought to an end by the vote passed three and a half years ago,—that being the interval allowed to prevent any cases of hardship arising from a too sudden alteration,—it would be improper to refer here to the points of controversy in respect to this change. But a hope may be expressed that the obtaining of this additional guarantee of the practical nature of the examinee's knowledge will prove acceptable to the pharmaceutical body generally. In fact, as has been pointed out, the same test in a more or less modified form is almost always used by a pharmacist engaging an assistant, who asks, "Where have you been employed, and how long?"

It may be useful to state here that in order to carry out the provisions of the bye-law a declaration to the above effect will have to be made by every candidate previous to entering his name for an examination. A form of declaration will be prepared and copies of it may then be obtained upon application to the Secretary, at 17, Bloomsbury Square.

Another alteration in connection with the examinations, that will come into operation with the new year, is one that will interest mainly incompetent candidates. It has been generally admitted by those best acquainted with the details of the examination room, that of the candidates who fail to pass the examinations many come up in a very unprepared state, and it has even been suggested that some have made a kind of preliminary visit as an experiment. As it has hitherto been the practice to return to a candidate failing to pass either of the examinations the fee, less one guinea, and as the retained guinea does not cover the bare average cost per candidate in the Major or Minor examination, it is a fact that a large part of the expense of these premature experiments has fallen upon the Pharmaceutical Society. In defence of this nothing could be fairly urged even in the interests of the unsuccessful candidates themselves. In February last, the Council therefore, after a full discussion, and on the motion of its then Treasurer, resolved that on and after the 1st of January, 1877, should a candidate fail to pass an examination for which he presents himself, the fee shall not be returned, but he shall be permitted to present himself for examination at a subsequent meeting of the Board on payment of two guineas for the Major or Minor examination, or one guinea for the Preliminary or Modified examination, provided he presents himself within one year from the date of his failure.

The effect of this resolution, as is evident, will be to ensure a greater probability that all candidates will come up with a *bonâ fide* and reasonable expectation of passing, at any rate within a moderate time; and also, in the event of a second examination being necessary, that the expense should fall upon the person through whose want of proper preparation it has been incurred.

It should further be observed that although an unsuccessful candidate is permitted to present himself again for examination upon payment of the smaller fee, he must do so within the period of one year from the first failure, or the full fee will again become payable.

THE RECTIFICATION OF THE REGISTER.

THE long list of names published on the preceding pages shows that after an interval of two years the Registrar under the Pharmacy Act finds it necessary to exercise the power entrusted to him with a view to the correct keeping of the Registers of Pharmaceutical Chemists and Chemists and Druggists. The list includes the names of nearly three hundred persons, from whom two registered letters sent to their addresses as at present recorded in the Register have failed to obtain any response. Formal notice is therefore now given by the Registrar that, unless these persons communicate with him before the 31st of December next, he will proceed to erase their names from the respective Registers. As on former occasions we would ask our readers to scan the published list, and if they are able to give information respecting any of the persons mentioned therein, to forward it to the Registrar.

It may be noted that the number of names now published is almost identical with that of those published two years since, after a similar interval of two years, so that probably this represents what may be expected to be the average expenditure of money and time thrown upon the Pharmaceutical Society in carrying out the provisions of the Pharmacy Act in this direction. As, however, there is always a large proportion of these defaulters—on the last occasion one-third of the whole number—who at last send the needful corrections, and thus save their names from being erased, we again express our regret that at present there is no provision for making such persons repay the expense to which the Society has been put by their negligence.

THE SALE OF METHYLATED SPIRIT.

THE report, on p. 445, of the prosecution in Glasgow for the improper sale of methylated spirit presents more than one point of novelty and interest. No one can read the evidence so plainly pointing to the springing up of a most degrading and disgusting custom without sympathizing in any attempt to bring the strong arm of the law down upon those who would so pander to the weakness of their fellow creatures. But it is necessary to be just as well as generous, and without offering the shadow of an excuse for a colourable sale, we must at once protest that to throw upon the seller of methylated spirit, as the Glasgow magistrate's remarks as reported would imply, the onus of ensuring that the spirit sold should not be applied to improper purposes would be a burden that the law does not and ought not, in our opinion, to impose. Section 6 of the Act 24 and 25 Vict. cap. 91, makes it penal to sell spirit that has been once methylated "for use as a beverage, or for mixing with a beverage. But this is very different from making the seller responsible for the acts of his customer after the sale has been effected, unless there be evidence that he had prior knowledge of his probable intention.

AN OLD REMEDY WITH A NEW APPLICATION.

THE *Lancet* quotes a description by Dr. GEORGES DAREMBERG of a visit to a famous but irregular practitioner of Algiers. Dr. DAREMBERG must have been satisfied with the amount of respect shown to him, as immediately he entered, the master of the house and his whole family prostrated themselves on the ground before the supposed patient. He seems to have belonged to the same school as the Nottingham detective who has recently won a temporary fame; for not being troubled with an ailment he invented one for the occasion. Having satisfied himself that the medicine man's knowledge was *nil* he told him that he had an ailment of the stomach. A vast number of vials and flint stones seemed to constitute the visible stock in trade, but the prescriber had other resources also. Telling his patient to apply a piece of meat to his chest, he explained to him the situation thus: "You have a dog which gnaws your system; give him a good bit of meat, and he will gnaw that instead of your stomach." Dr. DAREMBERG appears to enjoy a fling at *la perfide Albion*, since he says that this Algerian practitioner is much resorted to by European, and *especially* English, residents.

A PROPOSED LEGAL ALCOHOMETER FOR FRANCE.

THE subject of the inconveniences resulting from the absence of any authoritative regulations respecting the construction and verification of instruments used in testing the alcoholic strength of liquids has recently been brought before the French Chamber of Deputies. One illustration quoted is, that although exporters of eau-de-vie are compelled by law to declare its strength within a margin of 1 per cent. under a penalty of from 500 to 5000 francs, it is not rare to see two instruments applied successively to the same eau-de-vie give indications differing by as much as five per cent. To remedy this state of things a *projet de loi* has been drawn up, and has been reported upon favourably. It provides that in all transactions, either public or private, after the 1st of January, 1877, Gay-Lussac's centesimal alcohometer shall be used, and that these instruments shall be first officially verified as being correct. There is also appended to the bill an official table indicating the variations according to the degrees of temperature.

GERMAN PHARMACEUTICAL STATISTICS.

THE *Pharmaceutische Zeitung* of the 18th inst. reports that, according to the official statements, 233 pharmaceutical candidates have proved their claims to the title of "*Apotheker*" in the German Empire during the examination year 1875–76. Of this number 114 passed in Prussia, 49 in Bavaria, 22 in Saxony, 11 in Wurtemburg, 9 in Baden, 5 in Hesse, 5 in Mecklenburg, 3 in the duchy of Saxony, 6 in Brunswick, and 9 in Alsace-Lorraine. During the same year 653 medical men, 8 dentists, and 82 veterinary doctors passed. The number of Apothekers is much smaller than in the three next previous years, the figures for those years being 347, 453, and 413; whilst on the other hand the number of medical students who have passed shows no falling off. Our contemporary appears to think the falling off in the pharmacists is due to the fact that under the present concession system, by which the number of pharmacies in Germany is strictly limited, it is not possible for so large a number as 400 annually to obtain an independent position. With only about 4000 concessions in the whole empire this would require that on the average every pharmacy should change hands once in ten years. Judging from the fact that the gaps in the ranks of about 12,000 medical men are filled by 650 recruits yearly, it is thought that an addition of from 200 to 250 young pharmacists yearly should suffice for the wants of one third of the number of pharmacies.

THE SCIENTIFIC RESEARCH FUND OF THE CHEMICAL SOCIETY.

WITH respect to a rumour to which we recently referred in connection with the above fund, we are informed that the Grocers' Company having been satisfied that the Chemical Society had already in hand the sum of £2000 subscribed for the purpose of fostering scientific research has now increased it by a donation of £1000.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The second general meeting of this Association during the present session was held on Wednesday evening, November the 15th, in the Library of the Association; the President, Mr. Yewdall, occupying the chair. After the usual preliminary business, and the election of Mr. Chadwick as a member and Mr. Highmoor as an associate, "A Biological Essay" was read by Mr. Jas. Abbott, of which the following is a short abstract:—

The study of biology includes both animals and plants. The chemist, geologist, mineralogist, and physicist deal with *dead* matter; the biologist with living. Dead matter, such as crystals, increase by additions to their exterior, consist of homogeneous parts which have no definite and fixed relation to each other, and are bounded by straight lines and plain surfaces; they are *formed*—do not grow. Organic bodies, on the other hand, consist of organs which go to make an individual—as a horse, or a tree. They grow, assimilate, and proceed from parents like themselves. Every living body possesses the power of taking into its interior certain materials foreign to those composing its own substance, and of converting them into materials of which its body is built up. The actions of living beings are accompanied by a corresponding destruction of the matter by which these actions are modified. Dead matter is completely passive. Types of life may be illustrated and explained by torula, bacteria, protococcus, and amœba. All living beings require oxygen, and if a fluid contains sugar, torula can decompose it, taking its oxygen from it, liberating carbonic acid, and forming alcohol, etc. Bacteria bear the same relation to nitrogenous substances that torula do to saccharine. Protococcus having chlorophyll in addition, can decompose carbonic acid, assimilating the carbon and giving off oxygen, and can also flourish in rain water containing tartrate of ammonia and earthy salts. Amœba are dependent on manufactured material, take in solid particles of food, which plants never do, and are distinguished as animals by never becoming enclosed in a cellular sac; neither can they manufacture protoplasm from inorganic materials. The life history of these and other forms were then briefly sketched.

A cordial vote of thanks was given to Mr. Abbott for his very able essay, on the motion of Mr. Knowles, seconded by Mr. Hallowell.

HULL CHEMISTS' ASSOCIATION.

The first meeting of this Association was held at the Cross Keys Hotel, on the 16th inst., Mr. C. B. Bell, President, in the chair. Mr. J. F. Smith was elected Vice-President, in the place of Mr. W. Staning, who had declined the honour conferred upon him at the Annual Meeting.

The President then delivered the following inaugural address:—

Gentlemen,—It is usual for a newly-elected president to say a few words to his constituents on the first meeting after election. I therefore take this opportunity of expressing to the members of the Hull Chemists' Association my heartfelt thanks for the very great compliment they have conferred on myself by placing me in the presidential chair for the second year. By your placing me there a second time I feel that my labours during the past year on your behalf have met with your approval, and I trust that at the expiration of my year of office I shall have done nothing to forfeit the confidence you have placed in me, and I ask with confidence the kind assistance and co-operation of my colleagues on the executive in all matters affecting the interests of our trade, and in promoting goodwill and brotherly love with every chemist in the town.

I may make this promise, that I shall endeavour to preside over our meetings impartially, allowing all a fair expression of opinion, and in return asking that the chair shall be supported.

To me, gentlemen, there is a matter of very deep regret, and I am sure you will all coincide with that regret, and that is, our educational classes are not supported by the assistants and apprentices in the liberal manner which they ought to be. I wish they could see the great advantages that would accrue to them by devoting more time to study than at present they appear to do, leaving the education of the mind until they go to the metropolis. I can assure you, brethren, that as one of the founders, and I believe I may take some credit to myself as one of the pioneers of the educational movement in this town, it is with deep anxiety I notice this seeming apathy.

In the annual report read before the members in the year 1869, the following passage occurs, written by your then secretary: "And during the forthcoming year your committee earnestly hope that arrangements will be made for the better education and advancement of apprentices and assistants; since the passing of the Pharmacy Act this is more important and very much to be desired." I have read you the paragraph so that you may see I am not encroaching on anyone else; but I must bear my testimony to the spirit and energy with which the then incoming president (Mr. Baynes) took the subject up, and how he laboured to bring the classes to a success. To your present and immediate past executive, it is a matter of the very deepest regret, that the young men of the present day do not make use of the facilities offered them, especially when we contrast the excellent and modern fitted laboratory which Mr. Baynes, Jun., has placed at the service of the students. I would therefore ask principals who may have youths attending the class, to impress upon them the advisability of taking every advantage they can of Mr. Baynes' kindness, knowing that it will amply repay them for the time they may devote to their studies. I can only place it to apathy on the part of the junior members of the trade, when I reflect that prizes of greater value have been given by this association than by any other similar one, and for smaller results. I trust that a brighter educational era is before us, and that Hull will send to Bloomsbury Square more than one or two, who will return with pharmaceutical honours of the highest grade.

Turning to matters more especially affecting ourselves, I will first allude to the establishing of the Trade Defence Association, and I must congratulate the promoters upon the great success which has attended their efforts, in the number of subscribers, and the amount of money that has been given in donations. I would advise every chemist in Hull and the district to join it. If any illustration is requisite to point out the advantages for joining it, need I point to anything more than the action taken in the Nottingham case? As that case may not be known to all I will give the particulars. A short time ago summonses were applied for at the Nottingham Police Court against three chemists in that town for prescribing; in each case a bottle of medicine and a gargle were obtained. As soon as it was ascertained that they were likely to be proceeded against, the chemists immediately reported what had occurred to the Executive Committee at Birmingham; the Secretary went to Nottingham and thoroughly investigated the cases of threatened prosecution, and it must be a matter of congratulation to the Executive Committee to find that their first efforts were the means of the summonses being withdrawn.

As most of you are aware, a Medical Defence Association has been established in this town, and no one will deny but that it can do much good if it is wisely directed, for it is well known that in all large towns there are some who use titles they are not entitled to use, and that the ignorant and uneducated are too frequently victimized by these sharks on the medical profession. It has been rumoured that this Medical Association is about to prosecute some of our trade for prescribing over the counter. After carefully considering the Apothecaries' Act of 1815, I am unable to find anything in it to cause us much anxiety on that score—of course I mean for prescribing simple remedies over the counter. If a chemist visits, gives certificates or papers stating cause of death, then he does render himself liable and places himself under the tender mercies of the Medical Association. If the trade carry on their business in the legitimate way they will have no cause for fear in the future.

The next subject I wish to allude to is one that of recent years has frequently been to the fore, I refer to the sale of patent medicines by grocers, and as this matter was considered by your past committee, and nothing could be done to prevent anyone selling at cost price, it is highly desirable that the trade should maintain its independence in this instance and continue to sell at the legitimate price. I regret much to learn that one chemist is disposed to lower the prices so as to compete with grocers, for a chemist cannot fairly compete with them; their articles are in everyday demand whilst his are required occasionally, and the sale is very limited. A person may be tempted to buy 4 or 6 lbs. of sugar to save a ½*d*. per lb., he will require sugar every day, but who will purchase three bottles of medicine to save 3*d*. or 6*d*.?

At the present time our trade is in a very unsatisfactory condition; most of the articles of our trade have increased in price; rents, rates, and taxes are higher, coals and gas are dearer, assistants' salaries and errand boys' wages are larger, and living expenses generally have considerably increased during the last few years, and to meet this increased expenditure, competition, and in some cases unnecessary competition, has of necessity reduced the legitimate profits. The trade being now a more educated body, and the expense of learning the business having increased, it is much to be deplored that our future prospects are not of that healthy nature that could be desired.

I regret that my remarks on the future have been of so dismal a character, and I hope I may be wrong in some of my impressions, and this, to a great extent, may be brought about by the sinking of petty animosities, narrowness of views, jealousy, etc., of fellow traders, by the expansion of more liberal minds, by working shoulder to shoulder, for union is strength, and the determination of upholding the dignity, the honour, and the respectability of a trade which is just passing away into an heterogeneous mixture of trades.

At the close of the address, Mr. Myers proposed a vote of thanks to the President for his excellent address. Messrs. Walton and Myers supported the same, and it was agreed to unanimously.

It was afterwards decided that the Committee should make arrangements for the annual banquet, and that they should also meet to discuss the patent medicine question, and this concluded the business for the evening.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, 16th November, 1876. Professor Abel, F.R.S., President in the chair. After the names of the visitors had been announced, and the minutes of the previous meeting read and confirmed, the names of Messrs. Edward Horatio Walker Sweete, and Channell Law were read for the third time; they were then balloted for and duly elected.

The first paper "On Barwood," by the late Professor Anderson, was then read by the secretary. On extracting barwood successively with ether and with alcohol, and evaporating the solution, a crystalline compound *baphnin*, $C_{24}H_{20}O_8$, is obtained, together with amorphous substances of a red colour. When baphnin in alcoholic solution is treated with lead acetate, a white precipitate of lead baphate is obtained, together with *baphinitin*, $C_{24}H_{24}O_6$, which remains in solution; a similar decomposition takes place on submitting baphnin to the action of a solution of potassic hydrate. *Baphic acid*, $C_{24}H_{22}O_{10}$, may be obtained from the lead precipitate by decomposing it with sulphuretted hydrogen. The author also obtained another compound, *baphinitone*, $C_{24}H_{26}O_6$, which by the action of bromine yielded a tribromous derivative $C_{24}H_{23}Br_3O_6$.

The President having thanked Dr. E. J. Mills for communicating this paper to the society, Dr. C. R. A. Wright gave a short abstract of Part I. of his memoir on "The Alkaloids of the Aconites: On the Crystallizable Alkaloids contained in *Aconitum Napellus*." After referring to his preliminary notice on the subject containing an account of *pseudaconitine*, $C_{36}H_{49}NO_{11}$, the uncrystallizable alkaloid of *A. ferox*, which however yields well defined crystallizable salts, he stated that very different results were obtained with *A. Napellus*. In one batch of one cwt. of roots which was worked up, two alkaloids were found, one of which, existing in comparatively small quantity, readily crystallized from ether, whilst the other did not; the latter, however, yielded crystalline salts which have a bitter taste, but do not produce the peculiar prickling of the tongue so characteristic of aconite roots. This base which is comparatively inert, may be called picraconitine, $C_{31}H_{45}NO_{10}$. The crystalline base *aconitine*, $C_{33}H_{43}NO_{12}$, which possesses high physiological activity, can only be obtained pure after repeated crystallization, first in the free state and then as a salt, finally liberating the base by ammonia or an alkaline carbonate. In a second quantity of two cwts. of the roots worked up to a condensed extract by Messrs. Hopkins and Williams, according to Duquesnel's process, only one crystallizable alkaloid, aconitine, was found. The hydrocloride, hydrobromide, and gold salt of this base, all of which are crystalline, were prepared and carefully examined.

The President thanked the author for this communication on a subject so important, both from a chemical and medical point of view, and hoped he would soon be able to lay before them the results of his experiments on the change produced on the alkaloid by various reagents.

Mr. David Howard remarked that it was a point of peculiar interest to ascertain how far the difference in the alkaloids was due either to diversity of species or to diversity of growth, occasioned by difference of climate or soil.

Mr. W. N. Hartley, Mr. C. E. Groves, and Mr. W. H. Perkins, called the attention of the members to marked differences produced in plants from circumstances of climate, soil, season of collecting, etc., which had come within their own personal experience.

Mr. J. Williams said he had every reason to believe that the different batches of aconite roots employed had grown wild in Switzerland, and were even from the same bale. He was of opinion that the different results obtained were due to altertions produced during the process. In the first extraction a stronger acid was used, it was heated for a longer time, and having been made much more dilute, had to be concentrated more; it was not improbable that the picraconitine was really an alteration product of the aconitine.

Dr. Wright replied that he had at first been inclined to believe that picraconitine was an alteration product formed by the action of hydrochloric acid on the aconitine, but Mr. Groves, of Weymouth, on extracting different samples of the roots by the same process, had in one instance obtained picraconitine, whilst in others it was not found. It would be interesting to ascertain if any alkaloid could be obtained from the marc, it was possible that the aconite existed in the extract in the form of a compound similar to a glucoside.

The next paper was by Mr. G. S. Johnson "On Potassium Triiodide." This was obtained by dissolving iodine to saturation in an aqueous or alcoholic saturated solution of potassium iodide, and evaporating slowly over sulphuric acid. At first, potassium iodide was deposited in cubes coloured by free iodine, but these after some days were succeeded by lustrous prismatic crystals of the triiodide KI_3 resembling iodine in appearance. It is very deliquescent, and is decomposed by water with liberation of iodine, but may be crystallized from alcohol. Two fine specimens of the crystals were exhibited.

The last communication was "On the Coal Gas of the Metropolis," by Mr. T. S. D. Humpidge. The gases examined were those of the Imperial, five of the Chartered collected at different stations, and the Cannel gas supplied to the Houses of Parliament, all during the month of May, 1876. The illuminating power was taken, and the gas carefully analysed, determinations being made of the carbonic anhydride, oxygen, nitrogen, marsh gas, carbonic oxide and the hydrocarbons absorbed by sulphuric anhydride. From a comparison of the results with those obtained by Dr. Frankland in 1851, twenty-five years ago, the author is of opinion that the gas now delivered in London is no better than it was then, and that the increase in illuminating power announced from the various testing stations, is to be attributed to improvements in the test burner. A comparison of the present referees' test burner with that used prior to 1860 showing a difference of more than three candles.

Dr. Frankland remarked that it seemed rather a melancholy fact, that although Parliament had spent much time and trouble on the matter, and had raised the standard from 14 to 16 candles, yet the gas was substantially the same as in 1851, and we were actually no better off now than we were then.

Mr. W. Valentin said most of the photometric observations had been made in the morning or in the afternoon, when the gas was perhaps not so good as it was in the evening, the time when the Act of Parliament provides that it should come up to the standard of 16 candles. Some, at all events, of the percentage of hydrocarbons was due to napthalene, and not to olefines or benzene; this was a source of great inconvenience by causing obstructions in the service pipes, etc.

In reply to a question by Mr. Vernon Harcourt, Dr. Frankland said, in his experiments he had found that for a given quantity of hydrocarbon vapour, diluted with a mixture of marsh gas and hydrogen, the illuminating power was sensibly the same whether the diluent contained 60, 25, or only 15 per cent. of marsh gas, from which he concluded that marsh gas was as much without illuminating power as hydrogen. There could be no doubt that benzene gave a very much higher illuminating power than hydrocarbons of the C_nH_{2n} or C_nH_{2n+2} series; but he could not understand Berthelot's statement that coal gas owed its illuminating power chiefly to benzene. Although this might be true of the Paris gas, it certainly was not of the London gas. He might state that all the gases mentioned in his report in 1851 were collected in the day time, and the photometric power determined in the day; on reference to Mr. Humpidge's results, it would be seen that one of his determinations made at 9.30 a.m. came fully up to the standard, as it was 16·3. He thought the most important point in the paper was that it showed that the apparent increase in illuminating power was really due to the improvement of the test burner, which with the same gas gave a light of 16 candles instead of 13 as the old one did.

Mr. Wills said his experience did not bear out the statement that the gas was no better now than it was 25 years ago. He was in the habit of examining the gas made by several of the large companies; they now supplied a gas up to the standard of 16 candles instead of 12 candles as in 1851; of this increase only two candles was due to improvement in the burner, and not three as stated by Mr. Humpidge, leaving a clear gain of two candles.

The President, after some remarks on the gas manufactured at Woolwich by the Government, adjourned the meeting until Thursday, 7th December, when the following papers will be read:—1. "Analysis of a species of Erythrophyll," by Professor Church. 2. "On Phenylene-diamine," by Dr. Otto Witt. 3. "On Calcium Sulphate," by Mr. Hannay.

PHILADELPHIA COLLEGE OF PHARMACY.

The first meeting of the session was held on the 17th of October, Professor Remington in the chair.

Syrup of Liquorice Root.—In the course of the meeting a paper was read, by Mr. A. P. Brown, on a method of preparing syrup of liquorice root and "brown mixture." The author having had occasion to make some ammoniacal glycyrrhizin, it occurred to him that the use of ammonia in preparing syrup of liquorice root would be an advantage, he therefore devised the following formula:—

Take of

Liqourice Root	4 troy ounces.
Cold Water.	q. s.
Water of Ammonia . . .	1 fluid ounce.
Granulated Sugar. . . .	13 troy ounces.

Grind the root in a mill, and place it in a wide-mouth bottle, with a tightly-fitting stopper, pour upon it one pint of water, mixed with the water of ammonia, macerate for forty-eight hours, then transfer it to a funnel, and allow the liquid to drain from it, and add sufficient water, until two pints of liquid has passed; allow it to stand until the particles have subsided, then decant and evaporate to eight fluid ounces, filter, and having added the sugar, dissolve it with the aid of heat.

Experiments were made with the ordinary liquorice root and the Russian peeled root, and of the two the syrup made from the Russian root was decidedly the finest. The cortical portion of liquorice root is acrid, without possessing the peculiar virtues of the root; the Russian root, being deprived of the epidermis, will therefore make the best preparation.

The syrup thus prepared is of a dark-brown colour, and contains all the sweet principles of the root without the starch and other inert matter.

Sulphate of magnesium, iodide and bromide of potassium lose most of their taste when mixed with this syrup.

The author said he had also made and used ammoniacal glycyrrhizin to mask the bitter taste of quinia; two drachms of the glycyrrhizin are dissolved in one pint of syrup, then to each fluid drachm is added one grain of quinia sulphate. In making ammoniacal glycyrrhizin care must be observed to use chemically pure sulphuric acid in the precipitation, and in the preparation of the compound mixture of liquorice, by the process suggested, an excess of ammonia must be avoided. In answer to an inquiry as to what is sweet syrup of quinia as used in Baltimore, the chairman suggested that it might be a mixture of syrup and tannate of quinia, the objections to which he stated, or one of undissolved sulphate of quinia in very thick syrup.

The author has also prepared a brown mixture from liquorice root and ammonia by the following process:—

Take of

Liqourice Root	4 troy ounces.
Water of Ammonia	1 fluid ounce.
Water	q. s.

Proceed in the same manner as for syrup of liquorice root, but instead of evaporating to eight fluid ounces, evaporate to twelve fluid ounces, and mix this with the gum arabic, sugar, and other ingredients. Lastly, add water of ammonia until a clear solution is obtained, taking care not to add an excess. Brown mixture, prepared by the above process, is of a brownish-yellow colour, and almost entirely free from sediment.

ROYAL SOCIETY.

Chemical Work done on Board H.M.S. 'Challenger.'

BY J. Y. BUCHANAN.*

Observations on the Specific Gravity of Sea-Water.

As the value of these results depends to a great extent on the nature of the means taken to collect the water, and on the delicacy of the instrument used for determining its specific gravity, I shall shortly describe them both.

The samples of water are collected either in an ordinary canvas bucket, or in one of two kinds of metal "water-bottle," according as it is to be taken from the surface or from depths below it. The use of the ordinary hand-bucket needs no explanation. When water is to be obtained from the bottom, the "slip" water-bottle is used. This instrument is a Swedish invention, improved by Dr. Meyer, of Kiel, who without doubt has described it, and by Messrs. Milne, of Edinburgh, who furnished those on board the 'Challenger.'

Water from intermediate depths is obtained in a much lighter instrument, which, with a drawing and the method of using it is fully described in a paper presented to the Royal Society in the early part of 1875, of which an abstract has been published in the 'Proceedings,' No. 160. It consists of a metal cylinder furnished with stopcocks at both ends. The levers by which these stopcocks are turned are connected by a straight rod, so that they are simultaneously either open or shut, or at least at the same phase of being open or shut. When water is to be collected by its means, the stopcocks are opened and the instrument sunk to the required depth, having been previously securely fastened to a sounding-line. The operation of sinking must be carried on without a check, owing to the peculiarity of the closing apparatus. When the required depth has been reached, the line is checked, hauled in a few fathoms, let go again, and finally brought to the surface by means of a donkey-engine. The rod connecting the stopcocks is furnished with a metal plate, which, during the descent, is retained in a vertical position by the passage of the water on both sides of it. When, however, the direction of motion is reversed, the plate falls down into a horizontal position, when, by its passage through the water, it exercises such a downward pressure on the rod that the stopcocks are closed. Arrived at the surface, it contains the water which it had enclosed at the depth in question. A small safety-valve allows of the escape of the surplus water, which, owing to the greater density of the water below the surface, it has enclosed in excess of what it can hold at atmospheric temperature and pressure. The apertures of the stopcocks being necessarily smaller than the diameter of the cylinder, the efficiency of the instrument in really changing the water as it descends was tested before leaving England in a freshwater lake, the water with which it was filled at the surface containing some yellow prussiate of potash. It was found that the water fetched, under these circumstances, from depths over $1\frac{1}{2}$ fathom was unacted upon by solution of perchloride of iron. The rate, therefore, of change of water is satisfactory, as we can be certain of obtaining an average sample of the last two fathoms passed through by the instrument.

Representing the specific gravity of distilled water at 4° C. by 100,000, I found that of ocean water at 15°·56 C. to vary between the extremes of 102780 and 102400; so that, to be of any value at all, the possible error in the results must not exceed 10. The hydrometer used for these observations is fully described in the paper above referred to. Its description is briefly as follows:—

The stem, which carries a millimetre-scale 10 centimetres long, has an outside diameter of about 3 millimetres, the external volume of the divided portion being 0·8607 cubic centimetre; the mean volume of the body is 160·15 cubic centimetres, and the weight of the glass instrument is 160·0405 grammes. With this volume and weight it floats in distilled water of 16° C., at about the lowest division (100) of the scale. In order to make it serviceable for heavier waters, a small brass table is made to rest on the top of the stem, of such a weight that it depresses the instrument in distilled water of 16° C. to about the topmost division (0) of the scale. By means of a series of six weights, multiples by 1, 2, 3, 4, 5, and 6 of the weight of the table, specific gravities between 1·00000 and 1·03400 can be observed. It is not necessary that these weights should be accurate multiples of the weight of the table; it is sufficient if they approach it within a centigramme, and their actual weight be known with accuracy. The weights of the table and weights in actual use are:—

Weight of table		0·8360	gramme.
Weight of weight No.	I.	0·8560	„
„ „	II.	1·6010	„
„ „	III.	2·4225	grammes.
„ „	IV.	3·1245	„
„ „	V.	4·0710	„
„ „	VI.	4·8245	„

For oceanic waters the hydrometer is always used with the table and either No. IV. or No. V. weight.

When the mechanical part of the construction of the instrument was finished, with the exception of the closing of the top of the stem (which instead was widened into a funnel-shape large enough to receive the ordinary decigramme weights), the calibration of the stem was effected by loading the stem with successive weights, and observing the consequent depressions in distilled water of known temperature. This done, the top was sealed up and the instrument carefully weighed. The expansion of the body with temperature was determined in a similar manner by reading the instrument in distilled water of various temperatures. The coefficient of expansion of the glass was then found to be 0·000029 per degree Centigrade.

For using this instrument at sea about 900 cub. centimetres of sea-water are taken, and the containing cylinder placed on a swinging table in a position as near the centre of the ship as possible. The observation with the hydrometer, loaded with the necessary table and weight, is then effected in the ordinary way, the accuracy of the readings being but little affected by rolling; pitching, however, is found to have a distinctly disturbing effect; and when it is in any way violent, it is advisable to store the specimen of water till the weather improves.

The temperature of the water at the time of observation is determined by one of Geissler's "normal" or standard thermometers, graduated into tenths of a degree Centigrade; and it is essential for the accuracy of the results that the water, during the observation of the hydrometer, should be sensibly at the same temperature as the atmosphere, otherwise the changing temperature of the water makes the readings of both the hydrometer and the thermometer uncertain. At low temperatures (below 10° or 12° C.) a tenth of a degree makes no sensible difference in the resulting specific gravity; but at the high temperatures always found at the surface of tropical seas, rising sometimes to 30° C., the same difference of temperature may make a difference of 3 to 4 in the resulting specific gravity.

Having obtained the specific gravity of the water in question at a temperature which depends upon that of the air at the time, it is necessary, in order that the results may be comparable, to reduce them to their values at one common temperature. For this purpose a knowledge of the law of expansion of sea-water with temperature is necessary. This had been determined with sufficient accuracy for low temperatures by Despretz and others; but as the temperatures at which specific-gravity observations are usually made are comparatively high, their results were of but little use, directed as they were chiefly to the determination of the freezing and maximum-density points. When the late Captain Maury was developing his theory of oceanic

* From the 'Proceedings of the Royal Society.'

circulation, owing to difference of density of the water in its different parts, he found the want of information on this important subject. At his request the late Professor Hubbard, of the National Observatory, U.S., instituted a series of experiments, from which he was enabled to lay down a curve of the volumes of sea-water at all temperatures from considerably below the freezing-point to much above what obtains even in the hottest seas. The results are published in Maury's 'Sailing Directions,' 1858, vol. 1, p. 237, and have evidently been carried out with great care. The composition of different oceanic waters varies, even in extreme cases, within such close limits, that the law of thermal expansion is sensibly the same for all of them; of this Hubbard's experiments afford satisfactory proof. In the table which gives the results of all his experiments he takes the volume of water at 60° F. as his unit. In order to avoid much useless calculation, I have been in the habit of reducing my results to the same temperature (15°·56 C.), while, for a like reason, I have retained the specific gravity of distilled water at 4° C. at the unit. The choice of a common temperature to which the results should be reduced, and of a unit of specific gravities, is a purely conventional matter; and in choosing the above-mentioned ones, in the first instance, I was moved solely by a desire to save calculation. For every water, however, there is one temperature to which it would be natural to reduce its specific gravity, namely, the temperature which the water had when in its place in the ocean; and in this sense all my results during the cruise have been reduced. Hubbard's table of the change of volume of a mass of sea-water with change of temperature enables us very easily to reduce any observed specific gravity from the temperature of observation to any other temperature, say 15°·56 C. In the paper it is transcribed from the 'Sailing Directions.'

In the following table the volumes for every centigrade degree from —1° C. to +30° C. are given :—

Temp. ° C.	Volume.	Temp. ° C.	Volume.	Temp. ° C.	Volume.	Temp. ° C.	Volume.
−1	0·99792	+7	0·99853	+15	0·99987	+23	1·00194
0	795	8	866	16	1·00010	24	224
+1	799	9	878	17	034	25	256
2	804	10	893	13	059	26	288
3	812	11	910	19	086	27	320
4	820	12	927	20	111	28	352
5	830	13	947	21	137	29	385
6	840	14	967	22	164	30	420

By means of the results given in this Table a chart of isothermals was constructed, giving by inspection, as soon as the specific gravity at any one temperature is known, its reduced values at any other. In this way the specific gravity of every water has been reduced to its value at 15°·56 C. and at the temperature which it possessed when in its place in the sea.

The results obtained since leaving Teneriffe on 15th February, 1873, are given in a series of Tables, in which those relating to surface-water are collected together and grouped in sections, as Teneriffe to St. Thomas's, St. Thomas's *viâ* Halifax to Bermuda, and so on. Those relating to bottom-water are collected in larger groups—the first containing all those observed in the Atlantic, the second those in the Southern, the third those on the western side of the Pacific Ocean, and the fourth those observed between Japan and Valparaiso. Where series of observations on waters from intermediate depths have been obtained, each series is given by itself. By far the greater number of the observations relate to surface-water, the specific gravity of which was, as a rule, taken once a day when at sea, the temperature of the water being at the same time observed with the standard thermometer above mentioned.

With a single exception, off the coast of Brazil, the densest water which we have met with in the ocean was found on the section from Teneriffe to St. Thomas's in the heart of the north-east trade-wind territory, where, from the strength and dryness of the wind, the amount of evaporation must be very large. Round about the Canary Islands the mean specific gravity was found to be 1·02730; to the westward it rises steadily until in longitude 28° W. it has reached 1·02762. Between longitude 28° W. and 54° W. the mean specific gravity is 1·02773, the maximum being 1·02781. On approaching the West Indies it rapidly falls off to an average of 1·02719 in the neighbourhood of St. Thomas's; and if we take into account all the observations made on the western side of the Atlantic, from St. Thomas's northward to the edge of the cold water which separates the Gulf-stream from the coast of America, we obtain the same average, 1·02719. Between Bermuda and the Azores an almost perfectly uniform specific gravity was observed, the mean being 1·02713, and the extremes 1·02694 and 1·02727. As Madeira is approached the specific gravity rises until it reaches 1·02746 close to the island itself. The mean specific gravity on the eastern side of the North Atlantic, between the latitude of St. Thomas's and that of the Azores, is 1·02727, or slightly higher than that of the water on the western side.

After leaving the Cape Verd Islands, the ship's course lay almost parallel to the African coast, and at an average distance of about 200 miles from it. Proceeding thus in a south-easterly direction, the specific gravity fell rapidly from 1·02692 off St. Iago on the 10th August, to 1·02632 on the 12th, after which it retained the low mean specific gravity of 1·02627 until the 21st August, when the course was changed to a westerly one along the equator. The specific gravity of the water on this day was the lowest hitherto registered for a surface-water; it was 1·02601, in lat. 3° 8′ N., and on the boundary line between the equatorial and Guinea currents. The same low specific gravity was observed in following the equatorial current as far as St. Paul's rocks, after which it quickly rose as the Brazilian coast was approached; and the maximum of 1·02786 was obtained on the 26th September, when off the entrance to Bahia, in latitude 13° 4′ S.

The observations in the South Atlantic were limited to a line down the western side as far as the Abrolhos Bank, and thence across to the Cape of Good Hope. In the region of the south-east trade-wind, therefore, we have only a few observations close to the coast; and as we have seen in the North Atlantic, on the voyage from Teneriffe to St. Thomas's, the specific gravity is higher in mid-ocean than either on the east or the west side, so in the South Atlantic it is possible that the same may hold good. From the Abrolhos Bank to Tristan d'Acunha the specific gravity sinks steadily from 1·02785 to 1·02606, and from Tristan to the Cape of Good Hope, along a course lying between the 35th and the 37th parallels of south latitude, the mean specific gravity was 1·02624. Between the same parallels of north latitude the mean specific gravity was 1·02713.

It must be remembered that the results obtained can only be held good for the season of the year in which they were observed, and that the observations in different latitudes were made in different seasons, and, further, that all the observations north of the line as far as 20° N. were obtained on the eastern side, and those to the southward of it as far as 30° S. were obtained on the western side of the ocean; so that it would be unwise to attempt to draw any general conclusions from such imperfect data. Considering, however, our four parallel sections, we have at least this positive result—that in the month of June and mean latitude 36° N. the surface-water in mid-ocean has a mean specific gravity of 1·02713, that in the months of February and March and mean latitude 22° N. the mean surface specific gravity is 1·02773, that in the month of August and mean latitude 2° N. it is 1·02624, and that in the month of October in mean latitude 36° S. it is 1·02621.

On the way to and from Halifax in the month of May some observations were obtained in the cold water with which the north-eastern coast of America is surrounded, the mean specific gravity being 1·02463. On the 1st May in the Gulf-stream the specific gravity of the water was 1·02675, and the temperature 23°·9 C.; and the next day it was 1·02538, and the temperature 13°·3 C. If the results be reduced to their values at the respective temperatures of the different waters, we have for the specific gravity of the Gulf-stream water 1·02445, and of Labrador-current water 1·02584; so that the fall of temperature very much more than counterbalances the want of salt in the water. In the same way we find the mean specific gravity of the water referred to the temperature which it has in the ocean to be—in latitude 36° N. and month of June 1·02548, in 22° N. and months of February and March 1·02592, in 2° N. and month of August 1·02335, and in 36° S. and month of October 1·02659.

Leaving Simon's Bay on the 17th December, 1873, the ship proceeded in the direction of the Marion Islands. Immediately outside the Cape the warm water of the Agulhas current was met with, which possessed a comparatively high specific gravity, averaging on the 18th, 19th, and 20th December 1·02657 at 15°·56 C., and 1·02477 at the average temperature (21°·9 C.) of the water. As we advanced in a southerly direction, the specific gravity as well as the temperature sank rapidly; and on the 26th, when off the misty and snow-capped islands of Marion and Prince Edward, the surface was 5°·3 C. and the specific gravity 1·02518. After leaving these islands, and until on the way northward to Australia we had passed the 50th parallel of south latitude, the specific gravity of the surface remained remarkably uniform. Between the Marion Islands and Kerguelen's Land the average specific gravity was 1·02512, between Kerguelen's and the edge of the pack-ice it was 1·02506, along the verge of the pack ice it was 1·02476, and between the pack-ice and the 50th parallel it was 1·02514; thence to the Australian coast it rose daily, reaching 1·02638 off Cape Otway. Except when amongst loose ice, there was hardly any variation at all in the specific gravity all the way between Marion Island and the 50th parallel; when amongst the ice the specific gravity was liable to sudden and considerable fluctuations, going down on the 14th February to 1·02419, and on the 18th to 1·02418, the ship being on both occasions surrounded by broken pack-ice. During the same trip the specific gravity at the temperature of the water was also very uniform, the mean being 1·02690.

Leaving Sydney a loop-like course was made, by way of New Zealand, Tongatabu, and the Fiji Islands, back to the Australian coast at its northernmost point, Cape York. The mean specific gravity of the western part of the sea between Australia and New Zealand was 1·02647, and that of the eastern part 1·02622, while in Cook's Strait itself it was only 1·02593. Between New Zealand and the Kermadecs the average specific gravity was 1·02630, and between the Kermadec Islands and Tongatabu it was 1·02651; round the Fijis it was 1·02[illegible]61; and between the Fijis and Cape York a very uniform specific gravity was maintained, the mean being 1·02643. We thus see that in the western part of the Southern Pacific the specific gravity of the surface-water is very uniform, varying but little with latitude, showing a very marked difference from the Atlantic Ocean, a difference which was observed to obtain in all parts of the Pacific.

From Cape York to Hong Kong the course lay through the remarkable series of so-called enclosed seas. The mean surface specific gravities in these seas were as follows:—In and around Torres Straits, 1·02655; in the Arafura Sea, 1·02549; in the Banda Sea, 1·02603; in the Molucca Passage, 1·02517; in the Celebes Sea, 1·02562; in the Sulu Sea, 1·02496; in the sea enclosed by the Philippine Islands, 1·02532; and in the China Sea, 1·02518. On the way to Hong Kong we traversed the Sulu and China seas just at the time when the south-west monsoon had ceased and the north-east one began to blow. When we returned by the same route as far as the south point of Mindanao, the north-east monsoon had already persisted for more than two months; and the effect of the comparative dryness of this wind is very evident in the surface specific gravities. The following average values were found:—In the China Sea, 1·02534; in the Philippine Sea, 1·02532; and in the Sulu Sea, 1·02570. On the other hand, the few observations made in the northern part of the Celebes Sea showed a diminution of specific gravity, the average being 1·02496. Outside the south point of Mindanao a strong and steady north-easterly wind was met with, and for the next ten degrees in longitude the mean specific gravity was 1·02596. On nearing the coast of New Guinea the specific gravity went down rapidly, averaging for a few days before our arrival at Humboldt Bay 1·02519. That a very large river must here empty itself into the sea was evident from the amount of drift-wood with which the sea was covered, and from the superficial distribution of the light water. The specific gravity of water at 50 fathoms below the surface was almost perfectly uniform, varying from 1·02611 to 1·02636 during the whole cruise from Mindanao to Admiralty Island. When about twenty miles off Humboldt Bay the specific gravity of the water fell as low as 1·02420. Between Humboldt Bay and the Admiralty Island the surface specific gravity was very uniform, varying from 1·02583 to 1·02600, except in one position (latitude 2° 30′ S., longitude 144° 7′ E.), where it fell to 1·02554; but a series of observations on waters taken from different depths at this position showed at once the superficial nature of the variation; the water at 10 fathoms from the surface had a specific gravity of 1·02580. Although there was here no drift-wood to be seen, I have little doubt that we had to do with warm water, although the nearest point of New Guinea was at least 80 miles distant; and indeed Captain Scoresby, who sailed along this coast much closer in shore, observed in this part large quantities of drift-wood, and inferred the existence of a large river in the neighbourhood.

North of Admiralty Island the specific gravity is somewhat higher; between the equator and 3° north latitude the mean is 1·02648; thence all the way north to Japan it remains very uniform, the mean being about 1·02600.

Leaving Japan in the month of June, the course lay entirely between the parallels of 34° and 40° N. as far as the meridian of 155° W. The specific gravity was slightly greater on the western side of the ocean than on the eastern. The following mean specific gravities were observed for every ten degrees of longitude:—

140° to 150° E.	1·02586.
150 to 160	1·02574.
160 to 170	1·02585.
170 to 180	1·02568.
180 to 170 W.	1·02569.
170 to 160	1·02544.
160 to 155	1·02532.

Arrived at 155° W. longitude, a southerly course was pursued by way of the Sandwich Islands and Tahiti, when the following mean specific gravities were observed:—

35° to 25° N.	1·02618.
25 to 15	1·02593.
15 to 5	1·02574.
5N. to 5 S.	1·02649.
5S. to 15	1·02658.
15 to 25	1·02699.
25 to 35	1·02620.

Whence it will be seen that the minimum value is reached between 15° and 5° N. latitude, the lowest value actually observed having been 1·02488 in latitude 7° 26′ N. The maximum to the south between 15° and 25° is very much more pronounced than that to the north of it; in fact round about Tahiti is the only spot in the Pacific where I have observed the specific gravity reaching 1·02700; the actually highest observed value was 1·02728 on the 3rd October, when the ship was being swung a few miles off Papeete Harbour.

The easterly course to Valparaiso was made principally between the parallels of 35° and 40° S. latitude. From 125° W. longitude to Valparaiso the mean specific gravity was 1·02534, the maximum being 1·02552 and the minimum 1·02513.

A large number of observations on the specific gravity of the waters at the bottom and intermediate depths have been made. In a preliminary report like the present it would be out of place to enter upon the discussion of so extensive a subject, even did the time at my disposal admit of my attempting it. I therefore content myself with giving the numerical results. It is to be hoped that in the homeward cruise through the Atlantic a more complete series of observations in this direction may be obtained, as those obtained on the way out were only sufficient to show that this ocean, and especially its northern part, differs greatly from the rest of the world-sea in density, as it does in temperature and in many other particulars. As a general rule, in both oceans between the parallels of 40° N. and 40° S. the specific gravity (reduced to 15°·56 C.) is greatest at or near the surface, and decreases more or less regularly until a minimum is reached, generally about 400 fathoms from the surface, when there is a slow rise, the bottom-water being rather heavier. This general law obtains in the Pacific and in the South Atlantic; but from the few observations obtained in the North Atlantic, there are indications of a departure from it. Although in the case of surface-water the variations of specific gravity with latitude are very considerable, more especially in the Atlantic, the water below 200 fathoms presents great constancy, the variations being comparable with those of the temperature at the same depths. In intertropical regions, and generally where there exists alternating wet and dry seasons, there are usually more than one maximum and minimum in the series between the surface and the bottom. How long it takes in quiet seas for fresh water to diffuse downwards in the sea, will be seen by inspection of the results obtained on the 22nd February, 1875, above referred to, when about 80 miles off the mouth of one of the large rivers of New Guinea, and the sea covered with drift-wood. The specific gravity was at the surface 1·02537; at 10 fathoms, 1·02578; at 20 fathoms, 1·22584; at 40 fathoms, 1·02594; at 50 fathoms, 1·02636; and at 100 fathoms, 1·02658, where it obtained its maximum, the temperature being sensibly the same down to 50 fathoms, namely from 28° C. to 28°·4 C.

Parliamentary and Law Proceedings.

The Sale of Methylated Spirit.

At a Justice of Peace Court held in Glasgow, on Monday last, Robert Fulton, oil and colour merchant, London Street, was charged with a contravention of the Excise regulations, in selling on one occasion a greater quantity of methylated spirits than was permissible under his license, which only warranted the sale of not more than one gallon; and also on two separate occasions having supplied four gills of methylated spirits to two men for drinking purposes, and as a beverage. For the offence of selling a greater quantity than was allowable the penalty was stated at £50; and for the "beverage" contravention the penalties were put at £200—in all, £250. In reply to the Bench,

Mr. Fulton said he sold the spirit regularly as methylated spirit. He was not much in the shop himself, but there was a girl there who sold the spirit daily. He understood that he could not sell more than one gallon at a time, and he believed that his girl followed that rule. He was not aware that any person ever got two gallons at a time, from any of his employés. As to the matter of the spirit being sold as a beverage, they sold them to a number of persons who came for them. These persons were polishers and hatters, and they were very much annoyed with them. He had turned away as many as eight and ten at a time. He never suspected that the people were drinking the spirit. His conscience would not have allowed him to supply them had he suspected that they did do so. He told his employés not to supply the spirit to people who did not appear to be dealing honestly, and they frequently required to call in the aid of the police to put some of these persons out. He was not guilty of trafficking in the spirit as a beverage, and he was not aware that it was illegal to sell the spirit in small quantities to all and sundry.

The Fiscal: There has been a regular trade in it.

Bench: Did you know you were breaking the law?

Defendant: No.

The Fiscal: The statute is quite clear on the point.

Defendant: How could I know that the people who got the spirit were going to use it as a beverage? They came in and asked for methylated spirit, and that fact did not convey the impression that it was to be used as a beverage. He would have insulted, he thought, any man had he asked him if he was going to drink the spirit.

James Aitken, private detective, spoke to the fact of having in September last received information that a number of people were regularly to be seen drinking some kind of spirit in the Green and the closes adjoining London Street entrance. He was told also that the drink was methylated spirit, which cost 3*d.* a half-mutchkin. He made inquiries, and learned that the spirit was obtained from the defendant's shop. The persons who were drinking the stuff were of the lowest class, and generally hailed from High Street and the Saltmarket. He asked the people whom he found drinking the spirit where they got it, and they told him it was in Fulton's. He went there, asked for a gill, and got it from a young woman, being asked no questions. He also sent in other persons for spirit, and they got it. He asked only for spirit, not methylated spirit. He communicated with the Excise, and was present when witnesses to be called were sent into Fulton's shop for and obtained small quantities of methylated spirit.

Four ordinary half-mutchkin bottles, a large black quart bottle, and a two-gallon jar—all containing methylated spirit—were produced, and the witness identified the half-mutchkin bottles as those used on the occasions to which he had referred.

John Leggatt, assistant private detective, in the employment of Aitken, said he knew defender's shop, and went there on the 9th October last with a common half-mutchkin bottle (produced), and bought a half-mutchkin of spirit, for which he paid 3*d.* He was served by a young woman, who asked no questions. He tasted the spirit outside the shop and found that it was methylated. He went there again on the 12th and saw a witness named Lindsay go in three times, and as often get a supply of spirit. He knew that people were in the habit of going in there for spirit and drinking it. The people who did so were of a low class.

John Lindsay, tailor, Main Street, Calton, said he knew the defender's shop, and had been several times there purchasing spirit.

The Fiscal: There is a bottle of stuff, taste it? (Having done so)—Is that like what you got?

Witness: That is the stuff. He was in the habit of drinking it as a beverage. He knew other people who did the same thing. He had drank as much as half a gill at a time, and he supposed he took as much as he could get, more or less. He had drank as much as two half-mutchkins. The price was 3*d.* the half-mutchkin; the whisky he used generally cost him one shilling the half-mutchkin. He purchased three half-mutchkins on 12th October at the instance of the witnesses Aitken and

Leggatt. The first time he asked for spirit, and put down the bottle and the money, but on the other occasions he simply put down bottles and money and said nothing. He got the drink without any difficulty, and was supplied by a young woman. He had heard of other persons being refused, and the reason was, he believed, that they were under the influence of drink. He was quite sober when he went for the spirit and got it. He became acquainted with Aitken and Leggatt, the detectives, while he was in prison. He had drank some of the stuff and got himself into a scrape. He did not think he would have got into the scrape had he not taken that stuff.

John M'Gowan, chemical officer to the Board of Inland Revenue, Glasgow, said he examined the contents of the two-gallon jar and five bottles produced, and found that they were filled with methylated spirit. Methylated spirit was a mixture of spirit of wine and wood spirit. It was used for manufacturing purposes.

William M'Nair, inland revenue officer, went to the defendant's shop in London Street on the 13th September, and asked how the spirit was sold. Being informed that the price was 3*s.* 6*d.* the gallon, he asked for two gallons, which were furnished him in jar produced. No inquiries were made as to what purposes he intended to apply the spirit, and he offered no explanations. He was dressed in plain clothes.

For the defence, Jessie Muir, who kept shop for defendant, said she had been strongly enjoined on entering his employment not to sell more than a gallon of spirit to any one at a time, and not to sell any quantity to any person whom she suspected as being likely to drink the spirit. She had frequently to get people ejected who wanted spirit, and whom she refused to serve.

This and the other witnesses for the defence testified that Mr. Fulton had repeatedly cautioned them not to sell small quantities of spirit to any other persons than those who were intending to use them for polishing or other purposes; that they had frequently great difficulty in keep low-like characters out of the shop, people who apparently intended to drink the spirits; that the police had more than once been called in to interfere, and that no one who got the spirit was ever known to have consumed it.

Mr. Douglas then craved for a conviction. He said the case was brought up under the Act 24 and 25 Victoria, chapter 91, which stipulated that methylated spirit was to be used for art and manufacturing purposes solely, and a special provision was added prohibiting its use as a beverage. He thought the various counts had been clearly proved. There was not the least doubt as to the wholesale cases, and the retail one was proved by the defendant himself, who showed that large numbers of dissipated people were in the habit of calling at his shop for the drink. That proved the reputation of the place. The defendant was bound to be satisfied that the spirit was got for no other than manufacturing purposes. He was clearly responsible for seeing that it was not used for other purposes, and if he failed so to satisfy himself then the responsibility of that neglect lay on his own shoulders, and he must take the consequences. If people in Mr. Fulton's position were allowed to sell this spirit to all and sundry without satisfying themselves for what purpose the stuff was to be used, then a most dreadful intoxicating nuisance would be introduced, because the difference in price was sufficient to induce such people as had been referred to to buy the drink for consumption.

Mr. Fulton said he was not aware that it was illegal to sell any small quantities to people for working purposes, and he had done all he could to see that none who were likely to drink the spirit received a supply.

Mr. Miller (magistrate) said it was his duty to make himself acquainted with the law, and to see that in trading in any article he was not infringing the statute.

The Court then retired, and after a brief adjournment returned, and

Mr. Miller intimated that all the three counts were found proved as libelled. The Bench were disposed to inflict the lowest penalty allowed, which was the fourth of each sum in each count, amounting in all to £62 10*s.* They had no power to impose a less sum, and the judgment of the Court was for the amount stated.—*Glasgow Herald.*

PROSECUTION OF A CHEMIST AND DRUGGIST FOR A BREACH OF THE APOTHECARIES ACT.

In the High Court of Justice, Exchequer Division, November 21, Sittings in Banco, before the Lord Chief Baron and Barons Cleasby and Huddleston, the case of the Society of Apothecaries *v.* Witherington, came on for hearing.

This was an action brought to recover a penalty of £20, under the Apothecaries Act, from the defendant, who had not obtained the necessary certificate.

The defendant resided and carried on business as a chemist and druggist at 410, Wandsworth Road, and attended various persons in the neighbourhood, and prescribed for complaints of various descriptions. In reply, he alleged that he was protected by various statutes.

Mr. L. Glyn and Mr. A. Young appeared on behalf of the plaintiffs, while the defendant appeared in person.

Several witnesses were called to prove that the defendant had contravened the Apothecaries Act (55 Geo. III.), and a surgeon for whom the defendant said he had acted denied that he had authorized the defendant to act as his assistant on such occasions.

The defendant, in addressing his lordship, urged that clause 30 of the Act necessitated the action being brought in the county in which the contravention, if any, had occurred.

Mr. Young replied that the clause referred applied to prosecutions instituted against persons who complied with the Act, and not to those brought against persons who contravened the statute.

The defendant then contended that clause 28 protected him from prosecution, inasmuch as he held a certificate as a chemist and druggist.

The learned judge, however, ruled otherwise.

The defendant further stated that he had only acted as the assistant of a surgeon, and contended that the present action was merely a malicious prosecution.

The jury returned a verdict for the plaintiffs for £20.

Judgment was given accordingly.—*Daily Telegraph.*

THE ALLEGED POISONING OF A CHILD AT CARDIFF.—THE CHEMIST'S ASSISTANT COMMITTED FOR TRIAL.

At the Cardiff Police Court, on Wednesday, November 16 (before Mr. R. O. Jones), Edward and Matilda Hayward, man and wife, and George Whitfield Williams, chemist's assistant, were brought up on remand, charged under the coroner's warrant with causing the death of Archibald William Henry Hayward, aged seven months, the child of the two first-named prisoners.

The magistrates' clerk intimated that the charge against the parents of the deceased would be withdrawn, as there was no convicting evidence against them.

They were accordingly discharged, after which the evidence of Hayward and his wife, and Mr. Jones, surgeon, was taken. This was to the same effect as reported last week (p. 426).

The prisoner had nothing to say in answer to the charge, and his solicitor not wishing to call any witnesses for the defence, Mr. R. O. Jones committed him to take his trial at the Winter Assizes, bail being allowed as before, in two sureties of £100 each, and prisoner himself in one surety of £50.

Alleged Attempt to Murder.

At Hampstead Police Court, on Thursday, Nov. 16, Eugene Cousté was brought up on remand charged with attempting to murder his two children by causing poison to be administered to them.

Professor Theophilus Redwood, of 17, Bloomsbury Square, deposed that on the 23rd of October he received from Superintendent O'Loghlen two bottles containing liquid, with instructions to make a careful analysis. Mr. O'Loghlen told him it was suspected that the contents of one or both bottles had been used, or had been intended to be used, for a felonious purpose. Witness made a careful examination of the liquid in each bottle and came to the conclusion that in neither case was there any poison. He made a further examination of some vegetable substance—he believed Peruvian bark—which he found in one of the bottles, and upon submitting it to microscopic examination found that it was incrusted with small crystals, for the presence of which he could not at all account. Witness called on Mr. O'Loghlen and told him that he had made this additional discovery, and that he had not been able to submit these crystals to analysis. Witness was at that time engaged every day and for five days at Westminster Hall on a trial. He set to work as soon as possible at the analysis. The crystals consisted principally of sulphate of potash, a salt which, when administered in rather large doses tc women and children, was capable of producing effects similar to those which had been noticed in the prisoner's children. Several fatal cases had occurred through the administration of that salt in rather large doses. But the quantity here was wholly insufficient to account for such effects. There was nothing of a poisonous nature in the excreta, nor could he find any indication of pain or internal irritation in the children themselves.

Mr. Wontner, who appeared for the Treasury, said he did not wish to carry the prosecution any further.

The Bench discharged the prisoner, remarking that they had thought it a case requiring investigation, and that the police were quite justified in the course they had taken.—*Times.*

Review.

Chemistry: General, Medical and Pharmaceutical, including the Chemistry of the U.S. Pharmacopœia. A Manual on the General Principles of the Science and their Applications in Medicine and Pharmacy. By John Attfield, Ph.D., F.C.S., etc. Seventh Edition. Philadelphia: Henry C. Lea. 1876.

It falls to the lot of but few authors to issue so many editions of a scientific manual within ten years as have been issued by the Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain. In 1867, he tells us in the Preface, the first edition of his now well-known book was issued, and already seven large editions have been produced, the last six alternately in this country and the United States. We have so recently noticed in these columns the sixth edition, of which the seventh is a revised form, suited specially for the United States, that there is little left to say here other than to reiterate that for pharmaceutical students seeking a good groundwork of chemical knowledge that will enable them to pass creditably the Minor or the Major, or for medical students wishing to meet the increased stringency of the examinations of the Royal College of Physicians and other medical bodies, this book is better suited than any other with which we are acquainted.

No doubt a part of the success must be attributed to the author's tact in illustrating the bearing of chemical science on the materia medica and pharmacy of all the Pharmacopœias used by English-speaking countries. In this edition have been inserted notices of some forty substances which are official in the Indian, but not in the British Pharmacopœia, and it is now claimed that the work "includes the whole of the chemistry of the British Pharmacopœia, of the Pharmacopœia of India, and of the United States Pharmacopœia." We say "claimed," because we confess upon looking to see what was said respecting an article included in the primary list of the U.S. Pharmacopœia, and which has recently acquired some favour in this country,—Gelsemium,—we failed with the help of the index to find any allusion to it or the chemical principles attributed to it.

There are spots in the sun, however, and we have noted two or three little things that appear to us to be blemishes in Dr. Attfield's book. In the opening sentence of the introduction it is alleged that all substances of which our earth and atmosphere are composed may be resolved into sixty-three forms of matter. In the sixth edition it was more cautiously and, we think, correctly, said that sixty-three elements have been proved to exist. Is this a breaking forth of the "old Adam" of a still earlier edition or is it intentional? Because in point of fact M. de Boisbaudran's "gallium" added to the list given would make sixty-four; and even if this alleged discovery be not eventually substantiated, though at present it appears to be accepted, perhaps another might be made at some time that would be more fortunate. Another point is that the name and corresponding constitution of "croton-chloral" is retained, although twelve months since Dr. Liebreich admitted that a mistake had been made and that the substance known and used under that name was really butyl chloral. Finally, is it quite correct to say that hydride of salicyl (the essential oil of meadowsweet) may be prepared artificially by the oxidation of salicin?

BOOKS, PAMPHLETS, ETC., RECEIVED.

Report by Dr. M. C. Cooke on the Oil Seeds and Oils in the India Museum, or Produced in India. London: India Museum. 1876.

The Pharmacopœia of the Hospital for Diseases of the Throat (Golden Square). Based on the British Pharmacopœia, 1867. Edited by Morell Mackenzie, M.D. Lond. Third Edition. London: J. and A., Churchill. 1876. From the Author.

The Oil Merchants and Drysalters, Price Book. By W. Slavenhagen Jones. London: Rixon and Arnold. 1876. From the Compiler.

Obituary.

Notice has been received of the deaths of the following:—

On the 22nd of August, 1876, Mr. Joseph Longfield, Pharmaceutical Chemist, Leeds. Aged 47 years. Mr. Longfield had been a Member of the Pharmaceutical Society since 1853.

On the 20th of October, 1876, Mr. Frederick Alfred Price, Chemist and Druggist, Foulsham, Norfolk. Aged 34 years.

On the 31st of October, 1876, Mr. Edward Evans, Chemist and Druggist, Sheerness. Aged 54 years. Mr. Evans had been a Member of the Pharmaceutical Society since 1872.

On the 5th of November, 1876, Mr. Emanuel Taylor, Chemist and Druggist, Bradford-on-Avon. Aged 62 years.

On the 6th of November, 1876, Mr. Thomas Ditchfield, Chemist and Druggist, Chorley. Aged 49 years.

On the 9th of November, 1876, Mr. John Beedzler, Pharmaceutical Chemist, Norton Folgate. Aged 27 years. Mr. Beedzler had been a Member of the Pharmaceutical Society since 1872.

On the 10th of November, 1876, Mr. William Balk, Chemist and Druggist, Hull. Aged 63 years.

On the 10th of November, 1876, Mr. Jonathan Mathers, Chemist and Druggist, Glasinfryn, near Bangor. Aged 67 years.

On the 14th of November, 1876, Mr. John Fife, Chemist and Druggist, High Street, Sheerness. Aged 63 years.

On the 17th of November, 1876, Mr. Henry William Etchells, Chemist and Druggist, Chorlton-on-Medlock. Aged 36 years.

Notes and Queries.

[529]. OL. VIRIDE.—In answer to the query of "J. S. W." I give the following recipe for Green Oil:—

℞ Pulv. Æruginis Æris . . . . ℥iv
Olei Lini . . . . Cj

M. et agit sæpius.

S. F. Nottingham.

[530]. INDIA RUBBER CEMENT.—During my bicycling days I used the following for fastening the india rubber on the tyre and found it answer very well. One part of Shellac to ten parts Liq. Ammon Fort. ·880 to be put in a wide-mouth bottle in a warm place and frequently shaken for three or four weeks; it first forms a transparent mass, but afterwards becomes fluid. Also a solution of glue made into a paste with whiting I have found very good.—J. Munday.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

Toughened Glass.

Sir,—In the hope that the cause may be discovered why toughened glass does not realize the expectations formed of it, will you kindly allow me to give my experience respecting a couple of one ounce toughened glass measures I bought to try if it was really true they possessed the wonderful strength it was asserted they did. As soon as they came to hand I threw one of them a distance of several feet on the wood floor, and found to my very great pleasure that it remained intact, and have tried the same experiment with it many times since, sometimes to a distance of more than ten feet, besides using it in the ordinary routine of business; but on throwing the other not quite so far it was at once broken into scores of fragments of a crystalline appearance, and without the sharp cutting properties of ordinary fractured glass, from which, and the varied experience of your other correspondents on this subject, it is evident that toughened glass when properly made does possess the properties claimed for it, but that from some cause a flaw sometimes occurs in its manufacture.

It is to be hoped that this cause will soon be discovered, and doubtless the manufacturers will endeavour to do so; in the meantime they had better test all glass sold, in the rough and ready manner I adopted, if they wish the public to believe in its wonderful virtues.

While writing you it may be of service to some of your readers to mention an excellent mode I have adopted for some time past at the suggestion of a friend of mine, rejoicing in the name of "Goodenough," to remove tight stoppers from bottles, which is to put a few drops of olive oil around the side of the stopper, and apply heat to the neck of the bottle; during its momentary expansion the oil finds its way between the stopper and neck of the bottle, and of course the stopper can at once be removed.

I have used this plan with unvarying success, even after trying all the other means usually adopted.

James S. Hicks.

Looe, Nov. 20, 1876.

Sir,—Having occasion to return one-quarter dozen toughened glass tumblers for mineral waters at 1*s.* 10*d.* each, packed in straw, I am advised that only one has stood the ordeal of carriage.

A fall of a yard on a boarded floor has proved too much for them; after a few trials they have gone to shivers.

C. C.

Mirfield, Nov. 21, 1876.

A. B. S.—Take the specific gravity with a hydrometer or a specific gravity bottle.

"*Scando.*"—Any good work on the subject would do; the principles laid down are the same in all.

"*Associate.*"—We believe that the only way of obtaining an appointment as a dispenser in the army is by first enlisting as a private in the Army Hospital Corps. Upon attaining the rank of serjeant a man who has qualified himself to act as a compounder of medicine is then eligible to be appointed a dispenser, if there be a vacancy, with an allowance of one shilling daily beyond the ordinary serjeant's pay. For further particulars, see the *Pharm. Journal* for July 26, 1873, p. 79.

"*Sufferer*" and "*B. B.*," who have not sent their names and addresses, are recommended to forward their questions to the editor of a dental journal.

S. F. Nottingham.—See the answer given in the Journal for January 22 last, p. 598.

W. T. T.—Hassall's 'Food and its Adulterations,' published by Longmans.

"*Apprentice.*"—"Leptandrin" is the name given to a resinous substance obtained from the root of *Leptandra Virginica*, Nuthall, or "culver's root," by precipitating a 90° per cent. alcoholic tincture with water. The root is included in the primary list of the materia medica of the United States Pharmacopœia. Leptandrin is said to act as a cathartic and a cholagogue.

A. P. S.—There is nothing illegal in such sales.

A. Z.—Apply to the Secretary at Apothecaries' Hall.

"*Apprentice*" (Canonbury).—See Mr. Pocklington's article on Glycerine Jelly in the Journal for November 21, 1874 (vol. v., p. 401).

"*O. H.*, 49."—Your communication has been received; the address is quite correct.

"*Aggrieved.*"—You should have seen that your name was removed. Section 12 of the Juries Act, 33 and 34 Vict., Cap. 77, provides that "No person, whose name shall be in the Jury Book as a juror, shall be entitled to be excused from attendance on the ground of any disqualification or exemption, other than illness, not claimed by him at or before the revision of the list by the justices of the peace, and a notice to that effect shall be printed at the bottom of every Jury list.

Communications, Letters, etc., have been received from Mr. White, Mr. Kinninmont, Mr. Gibbs, Mr. Jackson.

The following journals have been received:—The 'British Medical Journal,' November 18; the 'Medical Times and Gazette,' November 18; the 'Lancet,' November 18; the 'London Medical Record,' November 18; 'Medical Press and Circular,' November 18; 'Nature,' November 18; 'Chemical News,' November 18; 'Gardeners' Chronicle,' November 18; the 'Grocer,' November 18; 'Journal of the Society of Arts,' November 18; 'Grocery News,' November 18; 'Produce Markets Review,' November 18; Practical Magazine,' for November; 'Educational Times,' for November; 'British Journal of Dental Science,' for November; 'Journal of Applied Science, for November; 'American Journal of Pharmacy,' for November: 'Pharmacist,' for November; 'Canadian Pharmaceutical Journal,' for November; 'Moniteur Scientifique,' for November; 'Pharmaceutische Zeitung,' for November 18; Sanitary Record,' for November 18; 'Medical Examiner,' for November 23.

NATURE'S HYGIENE.

THE HYGIENIC INFLUENCES OF THE PINE AND EUCALYPTUS.

BY CHARLES T. KINGZETT, F.C.S.

In our times, when nations, by reason of their commercial pursuits and other tendencies present crowded populations, it is matter of the greatest importance to understand well, the means resorted to for preserving the health of communities; and in doing this, undeniable advantage is gained by studying what I have termed above, Nature's Hygiene.

The subject, however, is so broad in its aspects that here it will be best to single out a few specific points and to consider certain investigations which have led to their elucidation; after this it will not be without interest to dwell shortly upon some results that may be expected to follow in their train. It was soon after the discovery of oxygen, in 1774, that Van Marum, of Holland, observed that when electric sparks were passed through this gas it acquired a peculiar smell, and Cavallo went further than this and found that the product possessed also great disinfecting powers.

In 1826, Dr. John Davy recognized the existence of a principle in the atmosphere which he considered to be identical with the foregoing, but our knowledge on all these matters was but slight until M. Schönbein, of Basle, established the existence of ozone and investigated its properties more precisely. Since that time many chemists, including Andrews and Brodie, have worked upon this subject, and while during these various researches certain errors have escaped detection, they may be said to have established the true nature of ozone. Without entering into minute chemical considerations, it is sufficient to remind the reader that ozone is an allotropic modification of oxygen, with the molecular volume O_3, compared to oxygen, which is O_2.

In the year 1818 Thénard discovered peroxide of hydrogen, H_2O_2, a substance which, so far as its properties are concerned, admits with difficulty of being distinguished from ozone.

Meanwhile Dr. Davy's observations regarding the presence of so-called ozone in the air were repeated again and again, and simultaneously the belief grew and intensified among men, that ozone as it exists in the air constitutes the great purifying influence in nature. It is therefore not surprising that various investigators have estimated, or endeavoured to estimate, the amount normally and abnormally present, but have also done this having regard to the intensity and direction of the wind, etc. Moreover, tables upon tables have been constructed pretending to establish a relation between certain diseases and the absence of ozone from the air. In fact mortality from various zymotic diseases has been considered to stand in direct relation to the amount of ozone present in the air in certain places at certain times.

Nevertheless, the presence of ozone in the air has never been indisputably established, though there can be little doubt of its existence; but its amount certainly has never been correctly estimated, for, as before said, no method yet proposed is competent to distinguish between ozone and peroxide of hydrogen as they occur in the atmosphere.

But the public has faith in this old theory of health as preserved by ozone, and inasmuch as they are informed by their medical advisers that sea-air is associated with an unusually large amount of it, they migrate annually in the most methodical manner to various sea-side resorts; the more so, no doubt, on account of other charming associations inseparably connected with the sea-side.

At the last meeting of the British Association, Mr. E. M. Dixon read a paper before the Chemical Section, in which he claimed to have invented a new method of estimating atmospheric ozone. As regards his apparatus I will pass over its consideration for what is far more important—his method. This may be said to consist in passing air through a solution of iodide of potassium together with a known amount of arsenite of potassium or arsenite of sodium. The amount of ozone, therefore, contained in a given amount of air is arrived at by a determination of the arsenite left unoxidized. Apart from all other considerations this method, as the writer then pointed out, does not distinguish between peroxide of hydrogen, chlorine, and ozone, etc., so that if Mr. Dixon took his apparatus to St. Helens, in Lancashire, he would, by his method, find unusually large amounts of ozone so called at times, especially when a still is being charged in the neighbourhood of the observing place. Moreover the method is by no means novel. I have employed a similar method for certain purposes during some years past, with this exception, that instead of using arsenite of sodium I have employed the hyposulphite. But for the sake of scientific accuracy it would be well, in the first place, to ascertain whether a current of air drawn through *arsenite* of sodium solution would not oxidize it to *arsenate*. Passing from this digression, it should be stated that it came to be commonly believed, in the process of time, that all slow oxidations were attended with the formation of ozone. Among such oxidations were included that of turpentine and the essential oils generally. Kosmann and Daubeny found that the green parts of plants also gave rise to the production of ozone, but not so in the case of the flowers. But it must be added that the real proof of the nature of this active principle was not forthcoming, for the methods of identification employed did not differentiate between peroxide of hydrogen and ozone. Personally I have great reason to believe plants do not produce ozone, but peroxide of hydrogen. Having made myself acquainted with the whole history of these matters so briefly sketched here, and others, I some years ago commenced a research which had for its immediate object the elucidation of the nature of that active principle which is formed when turpentine and other oils and substances undergo atmospheric oxidation.* The following among many other bodies were thus studied—turpentine, hesperidene, myristicene, wormwood oil, cymene, menthene, and the ethers, etc. Apart from the determination of a *law* which was discovered by these researches continued over a period of four years, and without entering into other scientific technical considerations, I may here mention one fact. It was thus established beyond doubt that all bodies of the chemical formula $C_{10}H_{14}$, or $C_{10}H_{16}$, give by atmospheric oxidation peroxide of hydrogen, and *never* ozone.

* *Journal Chemical Society*, June, 1874; March, 1875; *Chemical News*, vol. 32, p. 138, and vol. 34, p. 127; *Moniteur Scientifique*, November, 1875, Feburary, 1876, etc., etc.

For many years a health-preserving influence has been ascribed in various districts to the presence of pine forests, and more especially of late years the Australian eucalyptus gum tree has enjoyed a like reputation.

Thus Mr. R. D. Glover* relates that by planting the eucalyptus in the cloisters attached to an old monastic institution in the Campagna, the place was rid of the pestilent malaria which had hitherto rendered it desolate and uninhabited. Similar evidence is forthcoming from places in the vicinity of the Douro in Spain.

On the 30th of April last, Dr. Fedeli presented a paper, on the properties of the *Eucalyptus globulus* to the Roman Academy of Medicine,† and adduced much stronger evidence, showing that the plant possessed powerful virtues as a febrifuge. Wherever the plant has been cultivated, endemic malaria has henceforth disappeared. Dr. Fedeli also described the curative powers of various preparations made from the plant, notably the alcoholic tincture.

Since Dr. Fedeli's paper was published the Italian Government has supplied landholders with large quantities of slips of the tree for forming plantations in all malarious districts. It has been difficult to understand these virtues of the eucalyptus, but my recent researches on the oxidation of essential oils have led to an explanation as interesting as it is simple.

The various species of pine or fir tree have a wide geographical distribution, and the reason in nature for this will be seen immediately. All these trees secrete oils consisting originally of hydrocarbons, known in science as terpenes; but for our present considerations they may be collectively and individually regarded as turpentine. Turpentine is indeed distilled largely from the oily and resinous matters formed in these trees, while oil of eucalyptus has been shown by A. Faust and J. Homeyer‡ to consist mainly of a terpene and cymene ($C_{10}H_{16}$ and $C_{10}H_{14}$).

Now, if these naturally-secreted oils be allowed to remain in the tree, they volatilize in great measure, and undergo oxidization in the atmosphere. Some part, however, is polymerized and oxidized by the air while yet in the tree, and thus are produced those resinified substances and camphors which generally accompany the natural oils.

Returning for a moment to my investigations, I found that when turpentine was exposed to a current of air in the presence of water, and especially at summer temperatures, oxygen was absorbed, part of the oil resinified, and the rest was oxidized into a compound unstable in the presence of water, and splitting up thereby into peroxide of hydrogen and camphoric acid.

Now peroxide of hydrogen has been acknowledged for a long time to be one of the most powerful disinfectants known to chemists, but its mode of preparation has been so expensive in the past that it could not be used for sanitary purposes. But as regards its efficacy in this respect medical and chemical literature abounds with the proofs. In this direction, the name of Dr. Day, of Geelong, deserves especial mention.

Lately, salicylic acid has been recognized as a powerful antiseptic (*not* disinfectant), but its slight insolubility in water and certain other properties, especially its price, have militated against its large employment. It is curious to know that camphoric acid, which is allied chemically in certain respects to salicylic acid, has also similar and equal powers of preservation,* while it is more soluble in water; it is also expensive as made in the ordinary way. But by the process I have indicated it is obtained side by side with peroxide of hydrogen in the state of a solution having a pleasant aromatic odour, and which, be it remembered, is both an antiseptic and a disinfectant.

These considerations have led me to conclude that the health of districts where the pine or eucalyptus abounds arises from the influences excited by the peroxide of hydrogen and camphoric acid produced naturally by these trees, and, in short, the process I have indicated is but the repetition in the laboratory of what must occur in every individual tree.

This brings me to one other consideration. It has been observed that wooden hospitals are particularly efficacious as inducing rapid convalescence; and here again the fact admits only of explanation by a knowledge of my researches. The resinous and turpentine-like bodies existing in the wood, under ordinary atmospheric conditions, give rise to peroxide of hydrogen and camphoric acid, two substances, the one of which I have proved to be a most powerful disinfectant, and the second an equally strong antiseptic.

More recently, I have conducted, together with my friend, Mr. Zingler, some larger experiments upon turpentine, and we have found, after corroborating all our former conclusions, that by simply imitating nature as far as possible, that is, by exposing a mechanical mixture of water and turpentine to a current of air at normal summer temperature, we can readily obtain a solution containing peroxide of hydrogen, camphoric acid, etc., with all the characters to which we have previously alluded. The solution is an aqueous one containing no oil of turpentine; it appears to be non-poisonous, and is absolutely without harm to textile, linen, or other fabrics. It does not injure carpets or furniture when applied to them, and is slowly but perfectly volatile. It is hoped shortly to produce large quantities on a manufacturing scale, for use in watering roads and streets, and in private houses, public hospitals, urinals, etc., etc.

In conclusion, it may be said that this is perhaps the first instance on record in which a natural process of atmospheric purification has been imitated to perfection, until in fact, there can be repeated on a commercial scale that which, in pine and eucalyptus forests, constitutes one of the most efficacious processes of Nature's Hygiene.

* *Pharm. Journ.*, February 5, 1876.
† *Pharm Journ.*, May 13, 1876.
‡ *Ber. Deutsch. Chem. Ges.*, 1874 (1429 1430).

* *Pharm. Journ.*, September 23, 1876.

NOTES ON INDIAN DRUGS.

BY W. DYMOCK.

(*Continued from page* 351.)

SUCKMUNIYA, OR BAZAAR SCAMMONY.

That sold in Bombay is all fictitious. It is said to be made in Surat; it does not in the least resemble any kind of genuine scammony; it occurs in irregular fragments of a bright green colour, somewhat translucent at the edges and having a resinous fracture; its odour and taste are suggestive of common resin. Rectified spirit dissolves the resin and leaves a residue of green colouring matter and gum; the former is evidently of vegetable origin. It is difficult to ascertain what is the purgative principle in this mixture—possibly some resin derived from one of the Convolvulaceæ. Sometimes a black Sukmuniya is met with; this is also spurious, and is resinous in taste and smell, but has a more earthy appearance than the green variety. Rectified spirit dissolves out a quantity of resin and leaves a black residue which, under the microscope, is seen to be made up of tufts of vegetable hairs (Mucuna ?), numerous small carbonaceous particles, and small irregular crystalline particles. Treated with dilute hydrochloric acid it effervesces feebly after a a short time; with strong acid it effervesces strongly at once and the vegetable matter is destroyed and forms a green solution. In Persia genuine scammony is to be found, but I have never been able to ascertain whether it is produced in that country or imported. The Bombay article is evidently quite unfit for medicinal use.

LUFFA AMARA.—*Local name*, RAN TURAI.

The vine resembles that of the cultivated Turai. The fruit is smooth, from 3—5 inches long, ovoid, marked with ten prominent, sharp, longitudinal ridges. At the apex of the fruit is a small operculum rather more than half an inch in diameter which is deciduous. Internally it is filled with white spongy pulp, of a cucumber odour. The seeds are grey and marked with small irregular black prominent specks. The leaves are bitter, the fruit only slightly so. The former I have seen used as an external application to sores in oxen. I have no experience of the effects of this plant when given internally.

CANNA INDICA, CANNA LUTEA, CANNA DISCOLOR.—*Local name*, KIMUSKI.

These three distinct varieties are found commonly in the Bombay Gardens. *C. lutea* is stated in the 'Bombay Flora' to be the source of tous-les-mois. I have examined its starch and find it to correspond exactly with the commercial article. I have never known the starch to be prepared here. The rhizomes of *C. Indica* and *C. discolor* yield a similar starch, but they also contain a good deal of colouring matter, from which the rhizome of *C. lutea* is almost free.

MANGIFERA INDICA.—*Local name*, AMBA.

Mango gum occurs in irregular shaped pieces some of them stalactiform and shining; it is black easily broken; the fractured surface is dull, the odour faint and gummy; it is entirely soluble in cold water, forming a solution of the colour of tincture of iodine and very slightly viscid. A resinous exudation occurs upon the fruit of this tree having the colour and odour of turpentine. Neither of these substances appears to have any medicinal value.

SPONDIAS MANGIFERA.—*Local name*, JUNGLI AMBA.

The gum is yellowish, principally in stalactiform pieces, with portions of bark adhering; placed in water it swells into a bulky jelly which is almost tasteless; a small portion is soluble.

CALOPHYLLUM SPURIUM.—*Local name in Canara*, BABBE.

This tree is abundant in Canara, but does not appear to be found in other parts of the Bombay Presidency; the gum occurs in large translucent irregular lumps of a yellowish colour; it is of horny texture, somewhat brittle, without odour; the taste is soapy. When placed in water it gradually softens, and finally disintegrates into a fine granular matter which floats in the form of flaky particles of a dirty white colour, and numerous oil globules which gradually collect upon the surface; the water dissolves a small portion of the gum and becomes slightly viscid.

CAREYA ARBOREA.—*Local name*, KUMBHA.

The gum resembles mango gum in appearance, but forms with water a much thicker mucilage of a dark brown colour.

GARCINIA Sp. ?—*Canarese name of drug*, ARASINA GURGI.

Through the kindness of Dr. Davies, civil surgeon, Canara, I have received a specimen of the gamboge collected there. It is in irregular fragments, and appears to have been collected upon leaves, portions of which still adhere to it. The finer pieces have the colour and consistence of Siam gamboge, but contain many impurities, such as portions of wood and leaves. Fully half the sample is of a dirty yellowish brown colour, and has a spongy structure; this portion, treated with rectified spirit, gives a clear deep orange solution like ordinary gamboge, but leaves a copious greenish yellow marc, which appears to be chlorophyll. As at present collected this gamboge is too impure for commercial purposes. In the Bombay market the ordinary pipe gamboge is alone met with.

ALOE Sp. ?—*Local name of drug*, ELIA.

There are many qualities of aloes met with in this market. Excluding Socotrine, the kind most worthy of notice is known as Jafferabad aloes; it is manufactured at a town of that name on the Kattiawar coast, belonging to the Hubshis of Jinjeera, a family of African origin. I have not yet been able to get an authentic specimen of the plant. The drug in mass is black; it has a glassy fracture; thin pieces are yellowish brown and translucent; the powder is of a dull yellow, the odour powerfully aloetic with some aroma; when treated by Histed's process for aloin it affords a fair yield. The aloin when brought into contact with nitric acid gives a deep red colour which is permanent; tested with sulphuric acid and afterwards exposed to nitric fumes no change in colour takes place. Its reactions are then the same as those of barbaloin; they may be obtained with the crude drug, which is remarkably free from impurities. Jafferabad aloes may well replace Barbadoes in India. The price is about Rs. 14 per hundredweight.

CALOPHYLLUM ELATUM.—*Local name*, SIRPOON.

The gum is black and opaque and much mixed with pieces of corky bark; it has a feebly astringent taste, and is very soluble in cold water. Professor

Lyon, F.C.S., chemical analyst to the Government, has been much interested by this remarkable gum, and has kindly favoured me with the following remarks:—

"It yields to water a yellow brown solution, exhibiting a strong blue fluorescence.

"If the gum is steeped in water for some time the solution becomes very dark in colour. Alum followed by carbonate of soda throws down apparently some of the brown colouring matter without interfering with the fluorescence, as after precipitation in this way the solution, although lighter in colour, is very strongly fluorescent.

"A solution purified by alum in this way has its fluorescence immediately destroyed by acid and restored again by alkalies. Examining its absorption spectrum it is found that while fluorescent the solution gives a broad absorption band at the violet end of the spectrum, extending to about G; this band disappears on destroying the fluorescence by acids, but reappears on addition of alkalies.

"The solution of the gum does not appear to rotate polarized light. The gum itself communicates only a very faint fluorescence to rectified spirit."

GYNANDROPSIS PENTAPHYLLA.—*Local name,* KANPHOOTEE.

A very common plant on cultivated ground; leaves, five foliolate, with obovate leaflets; flowers white; stamens very long, purple; capsules round, tapering towards the point, which is surmounted by the style. The whole plant is viscid, and is covered thickly with glandular hairs; it has a strong peculiar odour, something like essential oil of mustard. The seeds are black, smaller than mustard, and rough from numerous little horn-like projections; they have hardly any taste. The juice of the plant, like that of *Polanisia icosandria*, is used in purulent discharge from the ears. The leaves have an acrid peppery taste.

(*To be continued.*)

HISTORICAL NOTES ON OPIUM.*

From a paper on this subject, by Dr. Otto Billinger, of Munich (*Inaugural-Dissertation*, München, 1876), which contains an interesting *résumé* of the history of opium in ancient and mediæval times, we have prepared the following abstract, and have added to it some commentatory and occasionally emendatory notes of our own, wherever it has seemed to us to be necessary.

The author's aim was not to present a complete history of the drug, as this would involve a study of the chief medical works of all nations, from Suçruta and Charaka† down to our days, but to give merely the main data from ancient and later writers, collected by him.

We find opium mentioned already in the oldest medical writings of the Hindus, besides aconite, hashish and other narcotics, under the name *aiphena*.* It was principally in use in cholera, against which Charaka, in his 'Ayurveda'† recommends a mixture of assafœtida, adstringents, rock-salt, white pepper, and opium.‡

Egypt was celebrated already in ancient times for its excellent opium. Galen especially praises that raised at Thebes as particularly efficacious. The same is done by the later Arabic physician Avicenna. Opium was a principal remedy of the Egyptians, together with bloodletting, squills, and the mysterious Kyphi.§

* From *New Remedies*, August 15, 1876.

† All current works of reference still continue to ascribe a very great antiquity to these medical authors. The fact is, however, that we only know the works, *which we possess* under their names, to have been composed *not later than the 8th century after Christ*, at the end of which *Ibn Beithâr* and *Albirûni* translated the work of Charaka, and (according to Ibn Abi Uçaibiah) also that of Suçruta into Arabic. It is very probable, from internal evidences of the works, that various theories and practices have been borrowed from the Greeks (see *R. Roth, Zeit. D. Morg. Ges.* 26, 441), although the measures and weights which the physician is ordered to use are those in use in Magadha and Kalinga, that is, in the eastern districts, which have never come into contact with the Greeks. As to Charaka, the legend relates that "Cesha, the snake-king, who was in possession of the *Ayurveda*, descended upon earth on a visit of curiosity. Seeing so much suffering and death, he felt compassion, and thought of a plan to alleviate these evils. He became the son of a Muni ('holy seer'), and received the name of Charaka. From the works of the ancient physicians Agniveça and Atreya he composed a new one." Suçruta is reputed to have been the son of Viçvamitra and the disciple of Dhanvantari. But it is utterly impossible at present to fix the dates at which these works have been composed, for Hindu chronology is in a very unsatisfactory condition, owing partly to the didactic poetical form, in which most of the literature is composed, and which does not permit much interlarding of dates,—but mainly to the desire of the leading caste to ascribe the real origin of all knowledge and science to divine agency, which was accomplished by establishing a relationship of the reputed authors with the deity, whereby all inquiry after the date of their real existence was obviated and often made impossible. Charaka's work exists so far only in manuscript; Suçruta's 'Ayurveda' has been published in the original in Calcutta, 1835–36, and in Latin translation by Fr. Hessler in Erlangen, 1844–50, and notes by the same, 1852–55. Wise's 'System of Hindu Medicine,' is a compilation, made for the author by some medical Pandits, chiefly from the work of Bhâva, the son of Miçralatakana, and contains many erroneous statements, as may be seen by a comparison with the original (see Aufrecht 'Cat. Cod. Sansc.,' p. 311).

* This word should be written *aphena*, and occurs with the meaning of "opium" only in very late writers, for instance, in the 'Râjanirghanta,' a medical dictionary, composed by Haraharipandita, of Cashmeer, a few hundred years ago. *It is not found* in Charaka or Sucruta. The Sanscrit aphena really means "foamless," and has afterwards been stretched to ahi-phena, "snake-foam," as a name for opium. It is also called âphûka, and niphena, ("foamless.") Of course, the coincidence of the borrowed word, with a real Sanskrit word, having a meaning of its own, is accidental. It is also called khaskhasa-rasa ("poppy juice").

† *Ayurveda* is the general term for "medical science." It is considered to be a supplement to the 'Atharvaveda,' and is divided into the following eight branches:—1, surgery; 2, diseases of the head and its organs; 3, diseases which affect the whole body; 4, mental diseases (ascribed to demoniacal influence); 5, diseases of children; 6, on antidotes; 7, on elixirs; 8, on the means to invigorate the generative powers.

‡ This is a mistake. The receipt, to which reference is made here, is very common in Hindu medical works, and contains: *haritaki* (myrobalans), *hingu* (assafœtida), *souvarchala* (Sochal salt), *vacha* (calamus), and *ativisha*. The latter word, meaning "very poisonous," has, together with its synonym *upavisha*, been later used of poisons generally, and perhaps of opium (according to Monier Williams' 'Engl. Sansc. Dict.,' s. v.). But there can be little doubt that it means here *Aconitum ferox*, as usual. See Haughton's 'Beng.-Sansc. Dict.,' s. v., and Wallich's 'Plantæ Asiat. Rar.' (where the plant on plate 41, however, is *A. Napellus* and not *ferox*).

§ We have, thus far, no direct testimony that the ancient Egyptians were acquainted with opium, although the latter Greek writers make allusions to it. According to Unger's investigations (1857), Thebaic opium was unknown to the ancient Egyptians. Squills very likely occur in the *Papyros Ebers*, but the corresponding term of the original has not yet been recognized. On the composition of *Kyphi*, see *Medical Record*, April 15, 1876.

The Israelites probably learnt the use of the remedy from the Egyptians, although theriac is only met with in the Talmud, the medical portions of which are taken from Greek sources.*

The knowledge of opium, like that of many other useful agents, reached the Greeks probably from the Egyptians. Homer already mentions a "pain-assuaging" drink,† the preparation of which Helena learned from Polydamna, the wife of Thon, king of Egypt.

The writings of Hippocrates‡ do not mention opium, but allude merely to the use of poppy-seed.

The Alexandrian physicians, however, already are acquainted with it. According to Dioscorides, Erasistratus§ treated snake-bites by a mixture of opium and castoreum, but forbids it in affections of the eyes and ears.

Andreas of Karystos,|| a pupil of Herophilus, and court-physician of Ptolemæus Philopator, according to Dioscorides, one of the most celebrated pharmacologists of his time, first drew attention to the adulterations of opium.

Apollonius¶ is stated by Galen to have used opium likewise in combination with castoreum.

Among the empirics, Heraclides of Tarent** deserves particular mention, on account of having studied the effects of opium, and having established exact indications for its use.

About this time Nicander of Kolophon†† composed a poem in hexameters, entitled 'Alexipharmaca,' in which he first draws attention to the sudorific properties of opium.

The word opium is probably of purely Greek origin; at least it is generally considered to be the diminutive form of ὀπός, "juice."*

We have to mention here one of the most remarkable medical writers, namely, the well-known Mithridates,† king of Pontus. He is famous through the peculiar experiments which he made upon his own body with various poisons and antidotes. He kept a record of his observations, and after the downfall of his empire, and his death, these "memoirs" (ὑπομνήματα) fell into the hands of the victor, Pompeius, who caused them to be translated into Latin by his manumitted slave, the grammarian Lenæus.‡ This work contained the formula of the general antidote, called after its inventor, "Mithridatium;" it contained 40–50 ingredients, the principal of which was opium. In later times a few other ingredients were added, and the preparation formed the celebrated theriac.

The Romans seem to have received the opium through Greek physicians. The first of these of whom we have a somewhat more detailed knowledge, was Asclepiades,§ who was held in great repute at Rome. Galen says of him that he also used opium in combination with castoreum. He also relates of the Methodists,|| a school which had accepted many theories of Asclepiades, that, after they had succeeded in allaying pain by the drug, and the patient happened to die under its influence, they still boasted of having cured the disease. The author through whom we are best informed in regard to this sect is Cælius Aurelianus,¶ a physician who lived at the end of the fourth century, A.D.

Plinius, as well as Dioscorides, makes a distinction between opium and meconium, while Galen already uses the two terms as identical.** At the time of Plinius†† the use of opium seems to have been already quite extended; but the scientific treatment of diseases had already begun to make room to unthinking empiricism and to faith in quacks and nostrum vendors. One of the most noted of these, Philo of Tarsus,‡‡ invented an opiate called after him Philonium; and Andromachus of Creta,§§ the court

* The fact that no earlier Hebrew authority than the Talmud mentions theriac appears to prove that the Israelites were unacquainted with opium, and that the Egyptians, with whom they had warlike and commercial intercourse, were—at least at the time of the captivity of the Jews—likewise unacquainted therewith.

† Odyss., 4, 220-221: Εἰς οἶνον βάλε φάρμακον, ἔνθεν ἔπινον, νηπενθές τ' ἄχολόν τε, κακῶν ἐπίληθον ἁπάντων, "Then he threw into the wine, of which they drank, a grief-allaying remedy, soothing and causing obliviousness of all evils." It must, however, not be forgotten, when drawing chronological conclusions from Homer, that the text of the Homeric poems, as we possess it, has only been permanently established by Peisistratus (died 527 B.C.), and has received further modifications by later Alexandrian "diaskeuasts." On the Homeric *Nepenthe* we possess a number of monographs, the most curious of which are the first one, written about 1620, by Petrus Lasena, a lawyer of Naples, and another by J. G. Graevius (8vo, Frankf., 1689), who concludes it to have been a preparation derived from *Oenopia* or *Oenothera*. See also 'Acta Erud. Lips.,' Nov., 1689, pp. 575–578.

‡ Born at Kos about 470 B.C., died about 356 at Larissa. It is necessary to be very cautious in drawing any *chronological conclusions* from the works which we possess under his name, as the genuineness of none of them can be established beyond doubt. They, however, undoubtedly correctly represent his ideas, and may have been based upon genuine writings of his.

§ Born at Ioulis upon Keos, court physician of Seleucus Nikator, of Babylonia, about 304 B.C.

|| About 216 B.C. See 'Polyb.,' 5, 81. 'Athen.,' 3, 115, e; 7, 312, d.

¶ There have been a number of celebrated physicians of that name. The one meant is probably the pupil of Herophilus, and lived about 220 B.C.

** About 250 B.C. Wrote περὶ σκευασίας καὶ δοκιμασίας φαρμάκων, 'On the Preparation and Examination of Remedies.'

†† About 150 B.C. Wrote two poems: θηριακά, 'Remedies against snake-bites, etc.,' and ἀλεξιφάρμακα, 'Antidotes against Poisons.' The first word "*theriaca*," means really, "remedies against wild or poisonous animals," from θηρίον, "the beast;" later it was employed of special remedies and has finally come to mean a preparation of opium.

* Ὀπός, etymologically related to Latin sap-io, German Saf-t, English sap, is commonly used of the sap of the fig-tree, used for curdling milk. Later Greek writers use the terms ὄπιον, ἐπιούμ, ἄφιον and πιόν, according to Du Cange. An Opium Cyrenaicum is mentioned by Theod. Priscian., 112, D. See also Meyer's 'Gesch. d. Bot.,' II., 37, III., 70. The Sanscrit names were mentioned above in note 2. The Chinese terms, also derived from western nations, are O-fuyung, Ya-pien, O-pien. See 'Pharmacographia,' p. 41.

† Lived 121-64 B.C. The φάρμακα Μιθριδάτεια are mentioned by *Appianus de bell. Mithrid.*, 248, where he relates that M., intent on self-destruction, attempted suicide by poison, but failed on account of being proof against it, and took his life by throwing himself against the point of his sword.

‡ See 'Sueton. de ill. Gramm.,' 15, *Plin. h. n.*, 24, 9, 41.

§ Asclepiades Eretricus (that is, the follower of the Eretrian philosopher, Menedemos), from Bithynia, physician, philosopher, and teacher of rhetoric; friend of Licinius, Crassus; about 100 B.C.

|| Those who treated disease in a methodical, systematic manner, as opposed to the empirics.

¶ Born at Sicca, in Numidia; lived in the *second* century, A.D. We possess two of his works; 3 books on acute diseases, and 5 books on chronic diseases.

** Meconium is an extract of the poppy-leaves and heads; opium the inspissated juice of the capsule. *Plin.* 20, 18, 76. 25, 10, 81. 19, 8, 53 ("used often for self-destruction"). 'Dioscor. de Mat. Med.,' 4, 65.

†† Born at Novumcomum, 23 A.D. Lost his life during the eruption of Vesuvius, 79 A.D.

‡‡ About 75 A.D. Τὸ Φιλώνειον is mentioned by *Galen*, ed. Bas., IV., p. 215, and *Celsus*, 6, 6, 3; according to the latter it consists of washed white of lead, spodium (tutty), gum, and roasted opium ("poppy-tears").

§§ About 60 A.D. 'Galen de Antidotis,' ed. Bas., I., p. 433. 'Fabric. Bibl. Gr.,' IV. 356.

physician of the emperor Nero, completed the transformation of the mithridatium into theriac, by adding various new ingredients, among them chiefly the flesh of vipers. The latter became a precious article, and in some places slaves are said to have been exclusively occupied with the chase and capture of these reptiles.

Among the writers on pharmacology, we must notice particularly Scribonius Largus* and Dioscorides.† The latter exactly describes the manner of incising the capsules, and collecting the juice, which latter he calls ὀπίζειν. He also refers to the adulteration of the drug with the juices of glaucium and lactuca, fat, and gum. As antidotes he recommends oxymel and salts. He also observed that the odour of the drug invades the whole body of the person who has taken it, which statement is repeated afterwards by Paulus of Ægina.

Galen‡ held opium in great esteem. He disapproved the roasting process to which it was often subjected, and usually combined it with castoreum, or gave it mixed with generous old wine. . . . Galen's teachings were followed for a long time with the most scrupulous exactness, and especially Alexander of Tralles (sixth century)§ and Paulus, of Ægina,|| two Byzantine physicians, are mentioned here.

Based upon the medical system of the Greek physicians is that of the Arabs. The science was cultivated and propagated among the latter through the learned schools founded by the Nestorians in Asia Minor. As the cultivation of certain branches of the medical art, however, is in conflict with Muhammedan religious views and customs, Arabic physicians with preference cultivated pharmacodynamics, and we owe to them many valuable additions to our materia medica. Theriac is one of their favourite remedies; the celebrated Arabic philosopher, Averroës¶ even wrote a Tractatus de Theriaco. Wonderful cures are related of this compound; so it is related of the Khalif Al-Motawekkil,** that he caused his guests at table to be bitten by poisonous snakes, in order to be able to cure them afterwards by some extra-powerful theriac.

The most celebrated of the Arabic physicians, Avicenna,* recommends opium especially in diarrhœa and diseases of the eye. The maximum dosis is 2 danich, which is, according to Wedel's 'Opiologia,' as much as one scruple. Serapio† gives it in doses of 1 to 2 danichs; the dosis letalis, according to the latter is, 2 ʒ. Avicenna himself met his death by an overdose of the drug.

Maimonides,‡ the pupil of Averroës, recommends theriac in all varieties of poisoning; and Ibn el Beitar,§ the greatest botanist of the Arabs, who treats of opium at great length, follows Galen in recommending castoreum as its antidote and corrective.

Theriac was used as a popular house remedy during the period of reformation under the name of "triackel" (=treacle), and the dealer was simply called "triackelmann" (treacle-man). But gradually the more intelligent physicians began to discourage the use of it, and in later times the aid of the police had to be employed to prevent its being used. It was prepared for the last time at Nuremberg as late as 1754; at Würzburg in 1736, under many ceremonies; and at Paris in 1787. In the first-named city it had been prepared for the first time under supervision of the senate and many ceremonies, between Nov. 9, 1594, and Jan. 10, 1595, for it was regarded as the master-work of the apothecary. It is yet much used in the East. Theriac having thus entirely superseded the pure opium during the Middle Ages, the latter had to be, so to say, rediscovered. This was accomplished by the school, by which the Galenic system was overthrown, and the chief representative of which is Theophrastus Paracelsus.|| The latter introduced a more simple form of opiates, being opposed to complicated remedies. He named his preparation "laudanum," the etymology of which is dubious. The opponents of the "chemists" explained it by *lauda non!* (bad Latin for "do not praise"); the "chemists" themselves regarded it as an abbreviation of *laudatum opiatum* ("the praised opiate"); others have endeavoured to find in it a corruption of *anodynum* with prefixed article, thus: *l'anodynum.* It is, however, more probable that the word is a corruption of *ladanum*, which denotes a vegetable resin, previously much in use.¶

The rest of the paper follows the history of opium down to the time of Sertürner, and we reserve it for another occasion.

---

* Scribonius Largus Designatianus, author of a work 'De Compositione Medicamentorum,' accompanied the emperor Claudius upon his expedition against Britain (43 A.D.) as physician.

† Pedianus Dioscorides, from Anazarbos, in Cilicia, lived shortly before Plinius. We possess his five books, περὶ ὕλης ἰατρικῆς, On Materia Medica.

‡ Claudius Galenus, born at Pergamum, 131 A.D., died some time between 200 and 203 A.D. Of his medical works, one hundred, of various contents and extent, are preserved and considered genuine; 18 are doubtful, 19 are only in fragments, and 24 others ascribed to him are spurious. A new critical edition, by Professor Iwan Müller, is being published.

§ Alexander, from Tralles in Lydia, physician at Rome. Wrote 6 books of 'Therapeutics.'

|| Very little is known of him. Best edition (English, with commentary), by Francis Adams. 3 vols. Sydenham Society publ.

¶ Latinized from Ibn Rushd. Born at Cordova, 1126, died at Marocco, Dec. 12, 1198. His writings, only preserved in Latin translation, are chiefly commentaries to Aristotle, and also of medical contents, as, for instance, his 'Colliyât,' or 'Medical Therapeutics.' Best ed., Venice, 1489. In 11 fol. vols. A hope of obtaining the original has lately been raised. Napoleon Ney, namely, French Special Commissioner in Africa, for some time has tried to revive the old trade connections which once existed between the coast of the Mediterranean and the tribes of the Sahara. For this purpose he studied the old Italian and Arabic authors, from whom he learned that Tlemcen, Oran, Bougie, Constantine, and Tunis once yielded to European merchants ivory, gum, indigo, etc., and received in return linen, silks, glass and metal wares, and arms. And he found the surprising statements, that caravans, which penetrated as far as the Tschad Lake, *carried thither manuscripts of European classic works.* And the learned traveller, Henry Duveyrier, the most thorough expert of the western Sahara, is convinced that the *library of the Sudanian Sultan at Sokoto contains the works of Greek and Arabic physicians, and even a translation of Aristotle.*

** 847-861 A.D.

* Latinized from Ibn Sina. Full name, Abu-l-Ali Ibn Sina; born 980, at Alfsenna, in the present province of Bochara, died at Hamadan, 1037 A.D. His medical 'Canon' formed the basis of medical and therapeutical knowledge for centuries afterwards.

† There were two Serapios. One is Yahya ben Serabi, or the elder S., of Damascus; and the other, who is meant here, is Ibn Serabi, who lived about 1090 A.D. His work is entitled 'Kitâb ul-adwiyta '-mufradit,' "*de simplici medicina.*"

‡ Moses ben Maimon, vulgarly called Rambam, the great Jewish rabbi, born at Cordova about 1131. Died 1204. He was a physician (in Egypt) and a great authority in law and philosophy.

§ Abu Muhammad Abdallah ben Ahmed, of Malaga, known by the short name of Ibn Beithar. Died 1248.

|| Phillippus Aureolus Theophrastus Paracelsus von Hohenheim. Born 1493, near Zurich, died at Salzburg, Sept. 24, 1541.

¶ Ladanum, or Labdanum, is a resinous exudation of *Cistus Creticus* L., *C. Cyprius*, Lam., and *Cistus ladaniferus*, L. This is occasionally written *laudanum*, as, for instance, in Plin. 'Valerian,' 1, 1, fol. 13 (see Langkavel 'Beitr. zur Gesch. der Botanik,' p. 13), and in rabbinical works of the Middle Age. The Talmudic equivalent is *lidna* 'Ketubot,' 77, where it is named as remedy for running eyes and nose), and it is identical with *Heb. lot* (1 *Mos.*, 37, 25). The Mishna ('Shebût,' 7) identifies it by saying that it comes from the Cistrose.

THE ROOT OF EUPHORBIA IPECACUANHA.*

BY PHILIPP H. DILG, PH.G.

The author collected the root in New Jersey late in September, and on repeating some of Mr. Petzelt's experiments (see *Pharmaceutical Journal*, vol. v., 1873, p. 158) did not obtain any reaction for glucose until after the decoction had been boiled with an acid.

The alcoholic extract obtained by spontaneous evaporation was of a light-brown colour and contained some crystals; ether extracted from it some oil and waxy matter, and a compound, which, on evaporation from petroleum benzin, yielded clusters of radiating crystals.

On percolating the root with petroleum benzin and evaporating the menstruum, a yellow tenacious mass, intermingled with thin colourless needles, was obtained. This benzin extract was completely dissolved by chloroform and bisulphide of carbon, the latter solution being turbid; ether dissolved it partially, leaving a white flakey residue, and alcohol acquired a yellow colour without affecting the shape of the extract, which appears to consist mainly of caoutchouc. From the alcoholic solution a warty crystalline mass was obtained, which responded to the test for euphorbon as given by Flückiger ('Pharmacographia,' p. 504).

The author did not succeed in isolating the emetic principle, and in concluding his essay he states that only two houses in this city quote *Euphorbia Ipecacuanha* in their price lists, but one only had it in stock, charging for it 75 cents per pound. On examining a dozen price lists from eclectic druggists in different parts of the country, one from Boston was the only one quoting it, and from that house a package was obtained, marked *Euphorbia Americana*, but containing the root of *Gillenia stipulacea*.† If it was ever used to any extent, the drug has evidently become obsolete and might well be dropped from the Pharmacopœia.

THE POISONOUS ACTION OF ALCOHOLS.‡

BY DUJARDIN-BEAUMETZ AND AUDIGÉ.

This paper gives the results of experiments on the poisonous action of alcohols on dogs. The authors find that, of the alcohols produced by fermentation. the amount required to cause death within twenty-four hours varies with the atomic composition. The fatal dose per kilogram of weight of the animal, administered by the stomach (I), and by hypodermic injection (II), was found to be:—

	I.	II.
Of ethyl alcohol . . .	7·75	8·00 grams.
„ propyl „ . . .	3·13	4·02 „
„ butyl „ . . .	1·74	2·15 „
„ amyl „ . . .	1·48	2·02 „

Experiments with other monatomic alcohols led to the following results:—

Methyl alcohol is more poisonous than ethyl alcohol, the fatal dose being five grams per kilogram of weight of the dog.

Heptyl and octyl alcohols vary in their action according as they are administered in the pure state or diluted with ethyl alcohol. The fatal dose of the pure substances is about the same as that of ethyl alcohol; but when diluted to ten times their bulk with absolute alcohol, the doses of 2·3—2·5 grams of heptyl alcohol, and 2—2·2 grams of octyl alcohol per kilogram of weight were found sufficient to cause death.

Cetyl alcohol, being insoluble, is not poisonous.

* From the *American Journal of Pharmacy*, November, 1876.

† Our experience has been similar to that of Mr. Dilg; several years ago we were unable to find this root in the market, and on several occasions were supplied with the root of *G. stipulacea*.—*Ed. Am. J. P.*

‡ From the *Journal of the Chemical Society*. *Compt. rend.*, lxxxiii, 80—82.

THE INTERNATIONAL CONGRESS OF THE MEDICAL SCIENCES.

THE MEDICAL EMPLOYMENT OF IMMEDIATE CHEMICAL PRINCIPLES.

The following report presented to the pharmacy section of the late Medical Conference at Brussels has just been published in the 'Transactions.'

Considered in its origin and progress, chemistry is a grand science. Commencing in the lowest practices, and the irrational and empirical processes of alchemy, it has now extended its domain and incontestable influence over all the branches of human knowledge; over the theoretical natural sciences, from botany to geology, and even to astronomy; over the applied sciences, through every industry to the art of healing poor humanity. What a revolution this vast science has occasioned in old and venerable medicine, galvanized, as it were, and roused from its genteel routine! What activity and what energy it has communicated to modern medicine, formerly so drowsy! What force and richness its products have given to the arsenal of Hippocrates—in former days nearly reduced to the employment of plants under the name of simples, but now armed with agents of fearful activity! What a reform in that art, of which the impotency, in the state of palliative medicine, was scarcely able to attack the symptoms of the malady, but which, now become a curative medicine, and provided with new weapons, can attack valiantly in their causes the ills of the human race!

The mission of chemistry in medicine is, however, still far from being accomplished. It has only just commenced; the organic portion, that which is the richest, is scarcely outlined, and yet it has furnished our art with the most heroic remedies. To it we owe quinine, morphine, veratrine, santonin, atropine, without counting a large number of other principles, and modern science demands from vegetable chemistry, every day, new resources with which to combat the powerful army of maladies that attack living beings.

It may be asked whether this movement ought not to be encouraged, and whether it is not even necessary to give a strong impulse to this tendency that has revealed itself to abandon crude vegetable matters and their galenical preparations, in order to substitute for them the chemically definite immediate principles which science knows how to separate, such as the alkaloids, glucosides, etc.

This question is of sufficient importance to be submitted for discussion by learned bodies. It is desirable to examine what utility there would be in encouraging and extending the employment of chemically definite immediate principles, and multiplying their preparations in the Pharmacopœias.

Such an extension would have for its consequence to restrain the employment of plants in their natural state, or their galenical preparations, which are sometimes inert and inferior. It requires, therefore, to be considered whether, on the one hand, the use of these galenical preparations presents inconveniences, and what they are; on the other, whether the employment of immediate principles, chemically isolated, would offer any advantages in medicine.

§ 1. *Confusion and Want of Clearness in the Action of Complex Medicines.*—"Therapeutics," says Claude Bernard, "offers already enough difficulties by itself, without augmenting them by the employment of compound medicaments giving only variable results." Who has not deplored the sad path of empiricism in which ancient medicine was engaged seeking an universal remedy, and heaping up in its absurd quackeries agents the most opposed, wishing to profit from the complex and contradictory actions of the components to create a panacea endowed with the most incompatible properties? Who has not noticed also, since the progress of modern chemistry, that many drugs furnished by nature, and improperly called "simples," are themselves assemblages of diverse substances and immediate principles, possessing different, and sometimes opposite, therapeutic properties? It is known that liquorice contains an irritant resin, and at the same time an emollient saccharine principle. From marine plants, employed as depuratives, are now extracted concurrently, the iodides, depuratives *par excellence;* the bromides, considered at first as substitutes for the iodides, but soon recognized as possessing sedative powers quite different; and finally, the chlorides, which always accompany the bromides in plants, but which in the present day are, nevertheless, accused of destroying their therapeutic action.

What medical man has not encountered, while employing certain medicaments, effects so diverse, sometimes so singular, as often to throw into confusion the most wisely reasoned and best applied therapeutics? These apparent anomalies are due to the presence of immediate principles in varying proportion, and it is in a study of these principles that an explanation of the facts must be sought. We will cite only a single example, perhaps the most curious, namely, opium. The extract and laudanum, the two galenical forms most commonly employed, give sometimes in their therapeutic application effects so different that in medical works the most divergent and even contradictory indications are given on the subject. The study of opium has made known successively six principal alkaloids, perfectly definite, possessing either different properties or well marked modifications of action. Claude Bernard has been much occupied with these opium principles, and according to him each of them differs entirely from all the others in respect to its therapeutic action. Thus narceine, morphine, and codeine, are soporifics, whilst thebaine, papaverine, and narcotine, are devoid of hypnotic properties. On the contrary, the last three bodies are the convulsivants of opium in doses in which the first three do not possess that property. As poisons, certain of these alkaloids are dangerous in doses in which the others are only sedative. It is known further, that to narcotine are attributed antiperiodic properties. Here is the explanation of the eccentricities following the therapeutic use of opium, an unreliability depending upon a variability in the proportion of immediate principles impossible to divine *à priori.* By the employment of isolated principles *the doctor would be able to attain the object he proposes without fear of seeing those accidents, sometimes dangerous, and always disagreeable, which are common in the employment of galenical preparations.*

Another inconvenience is, that the inert matters which form the organs of plants can mask or oppose the action of the active principle which Nature has deposited within them. And with what a quantity of these matters it is necessary ordinarily to fill the stomach in order to introduce a milligram of the active principle, even when the plant employed is in the best condition! How often, before the discovery of quinine, did cinchona bark administered in powder derange the stomach of the patient consumed by fever and compel the abandonment of the treatment.

It will suffice to recall these examples; science will furnish many more facts that cannot here be cited. It will be enough to add that these diverse principles, contained together in one plant, are not present always even in constant proportion, which gives rise to many chances of variability in the therapeutic action of the plant. This truth will be developed in a subsequent paragraph.

It is now asked, in presence of these polypharmic compounds, these artificial mixtures of our shops, in presence of these plants, more or less prepared and reduced to galenical medicaments, or even in presence of these pretended "simples," according to the antique expression, "simples," that are now recognized to be compounds, can the medical man see his way clearly in his treatment from a therapeutic point of view? Could he follow and study with certainty the action, so often complex, of the remedy employed? Would it be possible for him to disentangle the effects due to the different immediate agents introduced together into the organism of the patient and of which one often acts contrarily to another? Could he even distinguish the symptoms of the malady from the action or actions of the remedy employed? They are, as Hufeland remarks, weapons with many edges; it is intended to use one, and it is another that wounds, and in a place where it was not desired. It is not astonishing that, with such weapons, ancient medicine should have often appeared hesitating and uncertain in its intervention, and that sometimes it was the remedy that killed rather than the disease.

To go further. In following the labours of Mialhe upon several chemical medicaments and the beautiful researches of Melsens, who traced in the human body the progress of potassium iodide and iodate, and explained their action, their effects, and their passage into the various organs and organic liquids of the body, it may be demanded whether here is not the future of medicine, and whether this precise and nearly mathematical mode of observation, which might be named *réaliste,* is not destined to replace, in part at least, the therapeutic and physiological observations made at the bedside of the sick, and which, numerous as they are, conduct so rarely to a practical and unchallenged conclusion. Now these precise observations, *impracticable with our actual polypharmic medicine,* become possible, if not easy, by the employment of isolated medicinal agents.

The rare specifics recognized in the present day, as created by nature to destroy the germs of certain maladies, are chemically definite bodies, as quinine, mercury, arsenic, etc. Is it not allowable to hope that every morbid species having its peculiar essence, there might be found antagonistic remedies—antidotes in a sense—of the diseases? May it not be that Nature, by the side of every ill, has placed its specific remedy? Finally, is it not probable that these specifics will be found to be substances with characteristic properties, in fact, chemical individualities?

§ 2. *Variability in the Therapeutic Power of Plants, arising from Collection.*—The first quality of a medicament is its therapeutic constancy, its identity of activity always and everywhere. Agents with inconstant action are quickly abandoned. Now the alkaloids and other chemically definite active principles are, above all others, the bodies which, in their chemical, organoleptic, and therapeutic properties, have a complete and permanent identity. Quinine is always quinine, and strychnine is always strychnine. This truth is absolute and indisputable when these bodies are perfectly pure, and it is one of the principal causes that this category of bodies has been received with the greatest favour into the arsenal of medical therapeutics.

If we wish to appreciate from this point of view the vegetable galenical medicaments, simple or compound, what a difference we are obliged to recognize. A plant differs from itself, in a medical point of view, through a multitude of causes. Two specimens of the same species, collected at the same time from beside each other and according to established rules, necessarily vary between themselves, within certain limits, as to their properties and therapeutic action; the one is older, more vigorous, better nourished, less watery; the other is younger, more succulent and softer. What would be the case if these plants had been born and lived in different conditions of soil and climate?

It is not necessary to teach here that a collection made at the wrong time yields inert drugs: such are the leaves, roots, and bulbs collected from plants in flower or in fruit. Neither is it necessary to do more than recall that cultivated plants are less active than wild plants; that plants vary according as the year is dry or wet; that the poisonous umbellifers are more or less so according to the greater or less humidity of the soil in which they are produced, whilst, on the contrary, the aromatic umbellifers gain in essential oil in dry and elevated soils; this is the case with aconite, valerian, etc. Can there be any comparison between the root of *Rheum palmatum* or *Rheum undulatum* cultivated in European countries and that grown in China? The *Cannabis indica*, which furnishes haschish in its native country, is very nearly inert when grown in Europe. The cichoraceæ lose their bitterness by culture, whilst the labiatæ acquire more aroma in our gardens. Now the pharmacist would be much embarassed in selecting his drugs, to say whether a leaf, a root, or a flower had been collected at the proper time or not; whether it had been yielded from a cultivated or a wild plant, whether it had grown in a dry or a humid place.

These common examples need only be recalled in order to establish a truth which is not less important because it is common, to wit, that the therapeutic power of a plant varies according to circumstances of collection, season, weather, climate, cultivation, age, elevation of place of growth, its humidity or dryness, etc.

Every one knows that the crude opium of commerce is so unstable in its alkaloidal strength that attempts have been made to manufacture it artificially of a constant strength. The manufacturers of sulphate of quinine do not purchase their cinchona until after a careful analysis of those barks, so expensive and yet so variable as occurring in our pharmacies. Scammony differs so much, as to the proportion of resin, that medical men, discouraged by the uncertainty of its action, have almost completely renounced it. To how many supposed active medicaments could not the same reproach be applied? But not one of the active principles which gives to these plants their powers and their properties, and which are found in them in different proportions according to the circumstances that have been noticed, can vary in itself, notwithstanding all these causes; it remains always the same whether extracted from a vigorous or a weakly plant. It is unnecessary to dwell upon this advantage offered by chemically definite medicaments.

§ 3. *Variability in the Therapeutic Power of Plants due to the Galenical Preparation.*—From the moment of their collection, the plants which enter into our pharmacies are liable to undergo change, and their instability is so great that they ought to be employed at once and before any ulterior change takes place; this, however, would be quite an exceptional circumstance. But what must it be when they have undergone all kinds of manipulations, from drying to extraction, from pulverization to pulpation, from infusion to distillation? Pharmacy has established the most rational processes of preparation possible, but are these processes perfect? Unfortunately they are far from that. Perfection is not attained by man; and supposing that these processes were always applied by operators in an irreproachable manner the products would still leave much to desire.

The first operation, the fundamental operation of pharmacy, although the most simple, is itself, in this case, namely, desiccation. The best and most successful desiccation profoundly modifies the constitution of the plants. The water of vegetation in evaporating gives place to air, and this exercises upon the immediate constituents of the plant an oxidizing action by which they are partially decomposed.

Such is the state of imperfection into which the simples or primary matters used to prepare our galenical medicines come in pharmacy. What galenical preparation could they supply that would not be marred by inconstancy and variability in its effects? The tinctures differ considerably in composition according to their source, collection, and preservation, so that the sum of the effect cannot be calculated in advance; extracts of digitalis and tinctures of colchicum are met with differing in the proportion of 1 to 100. It is not without reason that Storck has recommended the employment of the juice of the fresh plants in the preparation of narcotic extracts. Neither is it without reason that Beral has introduced into practice the use of *alcoolatures*, so as to avoid the effects of desiccation, and that it has since been proposed to make *alcoolatures* the basis of all the pharmaceutical preparations, such as syrups, extracts, saccharoles, etc. It is well known that our pharmacotechny sins at its basis, and that the primary matters employed at the starting point of its compounds are suspected of therapeutic variability. But the extracts of Storck also would always give evidence of the effects of heat and prolonged evaporation. Besides, these extracts and *alcoolatures* depend for their therapeutic value entirely upon the constancy of the activity of the plants employed, and we have seen what, in reality, this constancy is. As to *alcoolatures* it is necessary not to lose sight of the fact that the menstruum, alcohol, may itself react upon the immediate products of the plant and cause them to undergo new modifications.

We have only spoken of desiccation; but if at the temperature of the atmosphere there is manifested so profound a decomposition, a much more energetic action ought to be expected when heat, and often a prolonged heat, is employed in the preparations of the pharmaceutical laboratory. From this point of view the liquid preparations, the decoction and infusion, have not been specially studied. But it may be assumed *à priori* that they may differ according to the length of treatment and the degree of heat employed, witness the apozeme of the ancient pharmacologists. As to the residues from the evaporation of these liquors, the extracts, these have been the subjects of a number of learned researches, which have all had for their object the perfection of the mode of preparing this important class of medicines. The most competent men are in fact unanimous in recognizing that the action of these products has an unfortunate variability. This variability is due to the complex reactions which are developed during their preparation. These reactions have been affirmed by authors, but no one has yet been able to disentangle the chaos. It will be remembered that after attempting to employ undried plants, evaporation by means of the least possible amount of heat was tried, then evaporation in a vacuum, sheltered from the oxygen of the air. Unfortunately in Belgium the extracts prepared *in vacuo* are not used in medical practice; and more unfortunately still there is a complication of extracts—alcoholic, aqueous, with or without powder, dry or soft—which not rarely are compounded in prescriptions.

It is not necessary here to criticize every process and every preparation of modern practical pharmacy. From this point of view immense progress has been realized. The time is past when medicinal plants were hung to the door to dry, exposed to the wind, sun and rain, or when liquors to be evaporated were left over the fires for weeks without any means being taken to accelerate the evaporation. But the reporter thinks it is necessary not to arrest this progress, and, whenever it is possible, he would substitute for these complex medicines of variable power alkaloids and chemically definite substances of exact composition and with properties always mathematically identical, upon which the physician could reckon with confidence.

§ 4. *Variability in the Power of Galenical Preparations due to Keeping.*—But when the galenical medicaments have passed through all these critical periods of preparation, and arrived in the pharmacy, there to remain under the surveillance of the pharmacist, are they then safe from variability, and will they remain identical with themselves? This is known not to be the case. In spite of all the care and science the pharmacist may bring to their preservation he cannot resist the internal working that modifies slowly the composition of his galenical preparations. Every one knows how much old medicines are worth: the leaves, flowers, seeds, roots, or other plant organs and their powders, lose their colour, odour and taste, and undergo a slow decomposition, as soon as they are no longer under the laws of life. The modification of the numerous elements that they contain results at last in the alteration of the immediate principles occurring in them, which are gradually decomposed in the fermentation by which they are surrounded.

Neither is the preservation of extracts more assured; they become dry or deliquesce, their solubility diminishes, or certain salts escape from them in the shape of crystals. Briefly, their decomposition is slow, but invincible. The tinctures and alcoholates are not much more stable, as the deposits that separate from them testify.

There is nothing unnatural in this slow, but fatal and invincible, alteration of all these organic matters. They were maintained during life in an equilibrium of preservation by the laws of vegetation; but they have been withdrawn from the action of these organic forces, and, re-entering the domain of general laws, have fallen under the empire of an internal decomposing power that induces in them successively new compounds, proceeding from the complex to the more simple.

This constant alteration, inveterately preying in every way, and at all times, upon the agents which for centuries have constituted the sole resources of the art of healing, has certainly been one of the causes of modern medical scepticism, and the therapeutic deceptions that it has occasioned would have led, without doubt, to the complete negation of all remedies.

This state of permanent decomposition of every galenical compound, imposes upon the pharmacist the necessity and duty of renewing his vegetable preparations, an onerous duty that is often neglected, and one that is difficult in respect to the choice and verification of the primary substances. Whatever, in fact, may be the source of these substances, the pharmacist cannot always be sure of their good quality. It is not so with chemically definite products; these have a well characterized individuality that is easily established. To recognize their quality is an easy and trustworthy operation. This facility of examination has also a valuable consequence; it renders illusory all attempts to sophisticate the alkaloids, glucosides, or other definite products, and deception upon this point is practically impossible; but it is easy and habitual to sophisticate extracts, powders, etc.

§ 5. *Facility of Administering Immediate Principles to the Sick.*—Every one will understand how much more easy it will become to administer to a patient the active principle when it has been reduced to its most simple expression, and disengaged from the mass of inert matters in the midst of which it is lost in the plant; matters consisting of organized *débris* or soluble and extractive substances, but always fermentescible and disagreeable to take; matters which it is necessary to incorporate in so large a quantity to absorb a minimum proportion of the active principles.

The example of cinchona has been mentioned before; add to it all the powders—cubebs at their head—the infusions and apozemes, the tinctures and extracts, although in these the active principles are concentrated to the least volume. Of these extracts only boluses can be made, or rather, bullets compared to the granule containing immediate principles. The patient refuses to swallow the galenic drugs prescribed by the physician; what then becomes of the treatment? On the other hand, the smallness of the dose of immediate principles renders their administration extremely easy. The granule, enveloped in a layer of milk sugar and carefully silvered, is an excellent form, which in the present day tends to become general, because it is at once convenient, agreeable, and certain in its effect. *Tuto, cito, et jucunde.* It may be desired to employ one or other of the immediate principles in a liquid form; the most suitable preparation would be the alcoholate of 1 in 50. Every drop would then contain a milligram of active matter, and with good *compte-gouttes* it would be easy to have very equal drops.

The degree of the alcoholic menstruum would naturally vary with the nature of the principle to be held in solution, and according to whether the isolated principle was employed or combined in the state of a salt.

Galenial Medicaments that cannot be replaced by an Immediate Principle.—In treating the question of pharmacology with which he has been charged the reporter feels that on several sides it comes into contact with therapeutics, and that in this respect he is not competent. He claims to have studied it especially from the pharmaceutical point of view and that his provisional conclusions have been drawn up in that sense. They are justified by pharmacology, and also, he thinks, from a therapeutic point of view. But he appeals to the observations of medical men, the competence of whom he recognizes, and desires that they should discuss his conclusions, to support them if legitimate or modify them if necessary. The following are some objections that have been urged against these conclusions as formulated at the end of the report.

There are some plants that practitioners employ either in a natural state or in the form of galenical preparation, in preference to the alkaloid. Digitalis is an example. Experience has proved that amongst the digitalins, so distinct in their essence and which have given rise to many discussions, not one represents really the properties of the plant. In the reporter's opinion that proves one thing, which is, that the study of digitalis has not yet been completed, but he claims that this cannot be applied against his conclusions. There are many active plants that are found in the same case. From this point of view pharmacology and therapeutics are in a state of transition. The conclusions necessarily bear with them a restrictive character, and can only be applied to well studied and well known principles, having a well established utility. It would be overstepping the object sought to impose systematically a general rule. This application would, moreover, be impossible, since many plants endowed with great activity do not act by virtue of a definite chemical principle. Further the possibility is admitted even of artificial or natural mixtures enjoying special properties not found in the components. For instance, cod liver oil, from which it would be impossible to extract an active principle that could really replace the oil.

It has even been claimed that several galenical mixtures possess certain special properties that are far from representing the sum of the constituents or the products of any of them.

In the presence of these facts is it necessary to withdraw from these conclusions? The reporter thinks not, and that it is simply necessary to consider them as exceptions, and to say that in certain cases it is impossible to reduce a medicament to the simple expression of an active principle, and that then naturally the rule is not applicable.

Conclusions.—(1) It is eminently desirable that the employment of chemically definite immediate principles in medicine should be extended, so as, progressively, to establish the practice of substituting for the use of crude vegetable matters that of their isolated active principles.

(2) It would be useful, with this object, to multiply in the Pharmacopœias formulæ suitable for promoting this movement.

(3) The forms which lend themselves best to the employment of immediate principles and to the facility of their administration are—for internal use, the "grain" and the "granule" containing one milligram of active substance, and in default of them the alcoholate, 1 in 50, which would correspond closely to one milligram per measured drop.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 2, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

MILK OF SULPHUR.

A CHEMIST AND DRUGGIST at Hyde near Manchester has just been fined and condemned to pay the costs of his prosecution for selling "Milk of Sulphur," upon the ground that the article contained only thirty per cent. of sulphur, the remainder consisting of sulphate of lime. The presiding magistrate, Dr. NEWTON, remarked that credit was due to the chief constable of the locality for bringing this case before the Bench because mothers gave sulphur to their children for skin diseases; and he added that if a drachm of this mixture were given to a child the result would in all probability be that the ingredients would become hard, causing congestion and inflammation of the bowels and even death.

Judging from the magistrate's title in this case and the freedom with which he gave his opinions he is probably a medical man, and so far as the majority of persons are concerned it will naturally be supposed that he ought to know when he declared he had no doubt the mortality among children was largely owing to the introduction of mysterious substances into their little bodies, and took the case of the Hyde druggist as an illustration of "how it was done."

After dealing with the case in this manner, it is not to be wondered at that the defendant was informed that the Bench took a lenient view of his case, under the belief that he had no guilty knowledge of what he was selling, and would therefore refrain from imposing on him the penalty of twenty pounds.

Of course a case thus dealt with and commented upon by medical authority would naturally furnish material for the ready scribes of the local penny gushers, and accordingly we have received, from various correspondents, newspaper paragraphs headed "A Cause of Infant Mortality," or otherwise garnished to satisfy the demand for sensation, and editorial articles in which mothers are gravely warned that the infantile constitutions of their little ones, however strong, must almost inevitably succumb to a dose of plaster of paris. Having thus furnished these poor folks with what they regard as an opportunity of realizing the serious nature of the case, and described the presiding magistrate's remarks as being a "revelation," these ingenious writers proceed to descant upon the frightful adulteration of drugs, and the means by which it can be detected; and they may, at least, feel satisfied they have done their best to make some other people uncomfortable besides the unfortunate victim of these misguided proceedings.

In regard, however, to the question whether the sale of the preparation commonly known as milk of sulphur is legitimate or not, it is really time that some mode of deciding the point at issue should be had recourse to. There is no question that precipitated sulphur should always be supplied to those who desire to have it; but there are many who do not approve of this preparation, and prefer the old-fashioned "Milk of Sulphur;" many others, ignorant perhaps of the difference, are at least accustomed to the old preparation, and when they are supplied with it really obtain what they expect. It is monstrous that persons dealing in this article conformably with old established usage should be liable to prosecution and all the detriment attaching thereto simply because it is the whim of some public analyst to assume that "Milk of Sulphur" means the precipitated sulphur of the Pharmacopœia. If the sale of Milk of Sulphur as ordinarily understood is to be treated as offence against the law, some means of warning unsuspecting traders should be adopted, such as an official prohibition. At present the question whether or not it is an offence to sell this article is open to be decided simply by the opinion of one or other local analyst, and that state of things is in our opinion an unmitigated evil.

MORE CORRECTIONS FOR THE BENEFIT OF THE MEDICAL PRESS.

A FORTNIGHT since we had occasion to request a medical contemporary to set us right with its readers in regard to a statement in its editorial columns which was so palpably incorrect that we fully expected an unreserved admission of the error that had been made. That we had good reason for this expectation will be sufficiently apparent when we state that our contemporary's error was the only foundation for the following paragraph:—

"But since that Society [the Pharmaceutical], or at least a majority of its Council, would rather aid and support the druggists in the infringement of the law, it is for our own profession now to consider by what means it may make its voice heard and its authority felt."

We consider this remark by the editor of the *Medical Examiner* calculated to exercise a very mischievous influence in regard to a subject of very considerable difficulty, more especially since it was made upon the erroneous supposition that the Council of the Pharmaceutical Society had resolved to undertake the legal defence of any chemist and druggist threatened with prosecution for prescribing. We regret, therefore, that the explanation now offered by our contemporary that its remarks "were directed more to the discussion on the subject in the Council than to the resolution finally passed by it," is one which we cannot accept as adequate. So far as the formal resolution of the Council is concerned, there is nothing to justify the suspicion that it contemplates the defence of any interference with the functions of medical men, and since the discussion that took place on the subject was, in this respect, perfectly in harmony with the purport of the resolution, we cannot do otherwise than express our opinion that it does not justify the remarks made by the editor of the *Medical Examiner*, but that it still remains for him to furnish a correction of the error into which he has fallen.

While speaking of this subject of illegal prescribing we take the opportunity of pointing out another error in the editorial reference, in last week's *Lancet*, to the case of Mr. WITHERINGTON, who was recently prosecuted by the Apothecaries' Company. It is there stated, upon what authority we know not, that he is a member of the Pharmaceutical Society. The fact is, that Mr. WITHERINGTON is not a member of, or in any way connected with, the Pharmaceutical Society. We are informed however that in 1874 he was placed upon the Register of Chemists and Druggists in virtue of a claim that he was in business before the passing of the Pharmacy Act, and the declaration furnished to support the claim bore the signature of a medical practitionor with the following letters appended, "L.R.C.P. Ed., L.R.C.S. Ed., L.S.A., etc., etc."

If the statement that Mr. WITHERINGTON was a member of the Pharmaceutical Society had appeared in an ordinary newspaper there would have been less need to notice it, but the case is different when such an inaccuracy is published in the *Lancet* without an excuse, so far as we are aware, of being misled by a mere newspaper report.

THE EVENING MEETING.

AN Evening Meeting of the Pharmaceutical Society will be held next Wednesday, December 6th. The papers to be read are:—"A New Mode of Making Grey Powder," by Mr. A BOTTLE; "The Composition and Uses of a New Preparation of Bismuth," by Mr. S. C. BETTY; "Note on Certain Reactions of the Glycerole of Nitrate of Bismuth," by THE PRESIDENT; "Note on Crystallized Hyoscyamine," by Mr. W. MARTINDALE; "Note on Impure Glycerine" and a "Note on a Crystalline Deposit from Tincture of Galls," by Mr. A. W. GERRARD; and a "Note on the Formula of Capsaicin," by Mr. J. C. THRESH. The Chair will be taken at half-past eight precisely.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of the above Association will be held at 17, Bloomsbury Square, on Thursday Evening, December 7th, at eight o'clock, when a paper will be read by Mr. J. C. SHENSTONE, on "The Microscope," with Illustrations.

WE regret to state that Mr. GEORGE BAGOT KENNET, who was in 1873 elected one of the Annuitants on the Benevolent Fund, died on the 20th of November.

Transactions of the Pharmaceutical Society.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN—NORTH BRITISH BRANCH.

The first meeting of the twenty-third session was held in the Society's Rooms, 119A, George Street, Edinburgh, on Wednesday evening, 22nd November. The chair was occupied by Mr. William Gilmour, President of the Branch, who opened the session with the following—

INTRODUCTORY REMARKS.

One of the earliest duties which it becomes me to perform on this, the opening night of our scientific meetings for another session, is to thank you most sincerely for the honour done me in electing me for the third time to the honourable position which I now hold. In doing this I am afraid I shall need to crave your forbearance and sympathy even more than in past years, for I feel that with undiminished wish to serve the Pharmaceutical Society in any way in my power, I bring, from recent illness, somewhat diminished ability and strength.

I know, however, from past experience that I shall not ask this from you in vain, and I feel assured further that you will also for the very same cause overlook any imperfections in the short paper which I purpose immediately bringing before you to-night, seeing I have not had the opportunity of overhauling it which I would have required. Before proceeding with my paper, let me call your attention to one or two important matters which have recently come before your Council, and in which you all are more or less deeply interested.

Most of you will probably have noticed hanging on the wall on entering the room, the beautiful and striking portrait of the late Mr. Tait. This handsome memorial has been presented by the firm with which Mr. Tait was so long connected, and a more acceptable or fitting presentation, I venture to say, could not possibly have been made the Society. We do not, I need scarcely remark, require this to keep Mr. Tait's memory green in our hearts, but we accept it, and place it on the walls of our institution as a mark of honour to one who was worthy of all honour, and a memorial of one whose memory will ever be held in esteem by the Pharmaceutical Society. It gives me great pleasure to think that we may soon have a worthy companion to it in a portrait also of the late Mr. Brown. We have many memorials of Mr. Brown in the many handsome donations which he made to the museum and library, but none the less will we value his likeness and hold it in reverence. One of the last donations which Mr. Brown made to the Society was a valuable collection of minerals—a collection which I question if the parent Society in London has the equal. These will shortly be arranged and displayed in cases at present being made for the purpose, and as I am aware from having heard Mr. Brown repeatedly regret, that the collection is not quite complete, I hope we shall all endeavour to show our regard for his wishes and efforts by individually, so far as we are able, supplying those specimens which are wanting.

This probably is not the time, although I may well be excused referring to the late visit of a deputation from the Scotch to the London Examining Board. The importance of such reciprocal visits has long been recognized, and doubtless one of their outcomes is more immediately to secure, as indeed it is intended to do, the harmony of the two boards, and the assimilation of their standards. The report of the Scotch deputation has not yet been published, but I believe it thoroughly bears out what previous deputations, both from the London and Edinburgh boards, have reported, namely, the complete identity of the examinations. Gentlemen, much has been said in some quarters, and more, probably, whispered, about the one board being more lenient than the other in the matter of these examinations, but if the judgment and honesty of the various deputations are at all to be relied upon, they should, I think, set such opinions and whispers for ever at rest. It will, let me add, be an unfortunate day for the best interests of the Society, if outside rumours and statements made in entire ignorance of the facts succeed in disturbing the harmony of the examinations, or induce the two boards to run a competitive race, either as regards the number they pass or reject. And yet such is altogether the tendency, I am afraid, of these assertions and reports.

When upon this question of examinations, let me refer for a moment to an allied subject which has given your Council of late serious matter for consideration. The question of education must always be ultimately associated with examination, especially when, as in the present instance, the latter is compulsory. It has, therefore, been always the endeavour of your Council not only to encourage, but to give every facility to students to attend lectures bearing on the subject matter of their examinations and profession generally. Consequently the application for the use of the rooms for a course of lectures on materia medica and botany, especially by two such lecturers as Dr. Craig and Mr. Sadler, could not fail to be favourably entertained by them, and they therefore transmitted the request to the Council in London with a recommendation. The Council at once generously granted the request, and Dr. Craig's lectures on materia medica, and Mr. Sadler's on botany, have now been instituted, and will, I believe, continue throughout the whole of the winter months. I need scarcely say that I hope both lecturers will be greatly encouraged in this attempt to institute classes in these very important branches of a pharmacist's education. My firm conviction is that we are rapidly approaching a time when every pharmaceutical student will be compelled to undergo a systematic education, just as he is at the present time compelled to undergo a compulsory examination, and certainly nothing will conduce to bring this to pass more speedily than the numbers who, quite apparently from the percentage rejected at each examination, come up unprepared, or superficially prepared, for their examination.

There are undoubtedly other considerations besides this operating upon and forming the minds of pharmaceutical leaders in this direction; but were there no other, I say again, that this of itself would in the course of time be quite sufficient. It would be a hopeful sign for pharmacy were this time anticipated by a voluntary attendance on the part of every young man at, at least, one complete course of lectures on each subject. I see no reason why this should not be the case, for even commercially it would in the end more than repay the trouble, time and money, it would cost. I have said before to young men, and now I repeat that I know of no investment so certain of return as proper books and lectures; but until this is properly understood by them (which I am afraid it is not at present), we may quite expect that a considerable percentage of those who present themselves for examination will be rejected and sent back poorer if not wiser men.

I cannot refrain from here noticing the marked improvement which has taken place during the past year in the arrangement and general conduct of all the different departments under the charge of our assistant secretary. During the year which Mr. Stenhouse has been in office, he has worked with a zeal and ability thoroughly commendable, and the result is that every department is now in a thorough, or in process of being put in a thorough, state of efficiency, which will enhance its value exceedingly. I am sure that every one who is in the habit of using the rooms, and who has felt the pleasure and comfort of the order and neatness which now at all times obtain, will agree with me in according Mr. Stenhouse this recognition of his services.

Of the papers which are to be brought before us during the session, I can scarcely yet speak with any degree of certainty, but I believe that several will bear more immediately on subjects directly pharmaceutical. The interest which such are sure to command will, I think, be sufficient guarantee of a large and appreciative audience, and I therefore feel it quite unnecessary to add one word either in the way of recommendation or inducement to attend the various meetings.

The Chairman then gave a short summary of a lengthened investigation into the reactions of some of the fixed oils, touching on some of the points which have already appeared in the pages of the Journal, and these he illustrated by diagrams shown by the oxyhydrogen light and also by the spectroscope.

Mr. H. C. Baildon, in proposing a vote of thanks to Mr. Gilmour for his instructive and entertaining paper, congratulated him on his recovery, and also expressed the indebtedness of the North British Branch to him for accepting the President's chair for another year.

Mr. David Kemp, Portobello, commented on Mr. Gilmour's paper with reference to the sources of the oils procured for experimenting and also as to the temperature, and following Mr. Baildon, he seconded the vote of thanks, to which the audience very heartily responded.

Mr. Mackay spoke as to the utility of the experiments, and referred to the old process of testing with mercury and nitric acid as being very unsatisfactory.

The Honorary Secretary then intimated the following donations to the Society:—Portrait, in oil, of the late Mr. Tait, presented by the firm of Duncan, Flockhart and Co.

Museum.—"Job's Tears," the seeds of *Coix lachryma*, a species of grass from the Mauritius; flowers and pods of the cotton plant, from St. Helena, presented by Serjeant John Goodrick, Army Hospital Corps.

Library.—'Introduction to Chemical Philosophy,' by Dr. Wm. A. Tilden, from the Author. Six numbers of the *Canadian Pharmaceutical Journal*, from the Ontario College of Pharmacy; four numbers of the *Pharmacist*, from the Chicago College of Pharmacy; five numbers of 'Proceedings of the Royal Society,' and six numbers of the *Journal of the Chemical Society*, from Mr. Mackay.

The attention of the meeting was called to a very interesting collection of articles kindly sent for exhibition by Mr. Herman Drechsel, of Edinburgh, and these consisted of cases of models of crystals, metals, alkaloids, physiological preparations and imitations of precious stones, all of which were much admired.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The first meeting of the session of this Association was held at Britannia Chambers, on Friday, Nov. 17, the chair being occupied by the President, Mr. J. H. Atherton, F.C.S. There was a good attendance of members and Associates. The Hon. Secretary (Mr. R. Jackson) announced some donations, and then proposed the election of two new members and five associates, after which the President presented the prizes, given by the Council, to the successful associates of last session's classes, the first prize in chemistry being awarded to Mr. W. C. Richardson and the second to Mr. J. Cox; the botany prize being won by Mr. J. Clower.

The President then delivered his inaugural address, an able and exhaustive review of pharmaceutical politics, which was listened to with great attention and applauded at the conclusion.

After a short discussion, a hearty vote of thanks to Mr. Atherton closed the proceedings.

Proceedings of Scientific Societies.

ROYAL SOCIETY.

Chemical Work done on Board H.M.S. 'Challenger.'

BY J. Y. BUCHANAN.*

(*Continued from p.* 445.)

Observations on the Carbonic Acid contained in Sea-Water.

The carbonic acid when boiled out of the water is received by baryta-water of known strength; its consequent loss of alkalinity is measured by hydrochloric acid of corresponding strength. Having observed that the presence of sulphates in sea-water is one of the potent agents in the retention of the carbonic acid,† I always add 10 cub. centim. of a saturated solution of chloride of barium to the water before commencing the operation. This facilitates greatly the liberation of the carbonic acid, and also causes the water to boil tranquilly, even to dryness, without showing any tendency towards bumping. The quantity of water used has been almost invariably 225 cub. centim., and the property possessed by sea-water of retaining its carbonic acid with great vigour makes it possible to perform the determination of it even a couple of days after its collection. As a proof of this, on the 10th July, 1875, the surface-water was found when freshly drawn to contain 0·0291 gramme carbonic acid per litre. A quantity likewise of the freshly drawn water was boiled *in vacuo* for an hour and fifty minutes in order to collect the oxygen and nitrogen, and then allowed to cool protected from the air. One portion of this water was exposed to the air in a flat dish outside the port for three hours, and in another portion the carbonic acid was at once determined. It contained 0·274 gramme per litre, whilst the water exposed to the air contained 0·6273 gramme. The effect, then, of boiling *in vacuo* was only to remove about 5 per cent. of the whole amount, whilst free exposure to the air had no effect whatever. As the determination of the carbonic acid takes a considerable time, it is only by taking advantage of this property that I have been able to determine it in samples from depths in the same locality; for where boiling *in vacuo* has so little effect, there is no danger of losing carbonic acid when the water is carefully decanted.

As in the great majority of cases, where the carbonic acid has been determined, the oxygen and nitrogen have also been collected, and are being preserved until our return home, when they will be analysed: it would be useless to attempt to discuss the results of the carbonic-acid determinations at present, and before these analyses have been made, especially as there is likely to be some relation between the amounts of oxygen and of carbonic acid. Independently, however, of the relations which may subsist between the two bodies, it may be gathered from the inspection of the accompanying table that, taking surface waters alone, the amount of carbonic acid present is many times greater than would be contained in the same volume of distilled water under the same circumstances. I have again and again exposed distilled water, surcharged with carbonic acid, to the air, and after even a very few minutes the carbonic acid was completely gone; on adding to 225 cub. centims. of it 5 cub. centims. baryta-water, the mixture remained perfectly clear; and on titrating with hydrochloric acid there was no diminution of alkalinity.

The temperature of the water on this occasion was 18°·3 C. On that particular day, namely the 8th July, 1875, when in the middle of the North Pacific, there was no determination made of the carbonic acid in the surface-water; but two days later, when the temperature of the surface-water was 18°·9 C., 225 cub. centims. of it contained 0·0066 gramme carbonic acid. Had there been 0 002 gramme CO_2 in the 225 cub. centims. distilled water, it must have been detected and determined. Hence, under the same circumstances, this particular sea-water, whose specific gravity was 1·02528 (at 15°·56 C., water at 4° = 1), contained at least thirty times as much carbonic acid as an equal bulk of fresh water would have done. Further, as might have been expected from the above observations, the amount of carbonic acid contained by surface-waters of the same temperatures increases with the density, and consequently is greater in the surface-water of the Atlantic than in that of the Pacific, the two oceans being very markedly distinguished from one another by the different densities of their surface-waters. Thus we have a mean of 0·0466 gramme CO_2 per litre in Atlantic surface-water of temperature between 20° and 25° C., and mean density 1·02727; whilst in the Pacific the mean is 0·0268 gramme in water of 1·02594 mean density; and the mean amount of carbonic acid in Atlantic water of temperature above 25° C. and mean density 1·02659 is 0·0409, whilst in the Pacific the corresponding water is of mean density 1·02593, and contains 0·0332 gramme CO_2 per litre. As a rule, other things being equal, the amount of carbonic acid diminishes as the temperature increases; thus the mean amount of carbonic acid in waters whose temperature was between 15° and 20° was found to be 0·0446 gramme per litre, the mean density being 1·02642, whilst we have seen that in the Atlantic the surface-water of temperature above 25° C. and of mean density 1·02659 contains 0·0409 gramme per litre. Also there is usually more carbonic acid in waters taken from the bottom and intermediate depths than in surface-water; but if regard be had to the temperature of the water, it will be seen that there is but little difference in the amount in waters of the same temperature from whatever depth they may have been derived. This seems to indicate that the animal life at the bottom and at great depths cannot be very abundant, otherwise there could hardly fail to be a decided excess of carbonic acid in the deep water, owing to constant production and want of the means of elimination of the gas. On this subject, however, it would be premature to speculate before the determination of the oxygen, from which we may hope for much information.

I have made a number of experiments to detect the presence of carbonates in sea-water. If any were present, they should be found in the residues from the determination of the carbonic acid; and I had been in the habit of testing by adding a little acid to them, and invariably with the same result—that carbonates were not present; at the same time it appeared to me to be very unlikely that such should be the case, when there is plenty of carbonate of lime in the shells of the animals living and dying in it, and also plenty of carbonic acid in the water to dissolve it. It was also not improbable that the very considerable amount of sulphate of baryta in the residues might disguise the effervescence. I therefore evaporated a separate portion (about 150 cub. centims.) of the water in a platinum dish to dryness, removed the soluble salts with a little water, and added a few drops of strong hydrochloric acid, which was allowed to flow slowly over the inner surface of the dish, when even the smallest trace of carbonates could be detected by the appearance of minute bubbles on the platinum surface. In this way I have examined a number of waters between Tahiti and Valparaiso, and with the general result that in ocean-water carbonates are never present except in small quantities, and in many samples they have been absent altogether. They are generally present in waters at or near the surface, disappearing, however, as the depth from which the water has been taken increases. They are generally, though not invariably, absent in waters from greater depths than 400 fathoms. They are present or absent in bottom-water according to their occurrence in the bottom; although here also there appear to be exceptions, as I

* From the 'Proceedings of the Royal Society.'

† 'Proceedings of the Royal Society,' 1874, vol. xxii., pp. 483-495.

have observed water taken from a "*Globigerina*-ooze" bottom which contained no carbonate.

In connection with carbonic acid I may mention that I have frequently tested waters, and especially bottom-waters, for organic matter. None of the methods in use for determining this substance in drinking-water giving satisfaction when applied to sea-water, I had to content myself with endeavouring to detect its presence. If the jelly-like organism which had been seen by some eminent naturalists in specimens of ocean bottom and called *Bathybius* really formed, as was believed, an all-pervading organic covering of the sea-bottom, it could hardly fail to show itself when the bottom-water was evaporated to dryness and the residue heated. In the numerous samples of bottom-water which I have so examined, there never was sufficient organic matter to give more than a just perceptible greyish tinge to the residue, without any other signs of carbonization or burning. Meantime my colleague, Mr. Murray, who had been working according to the directions given by the discoverers of *Bathybius*, had actually observed a substance like "coagulated mucus," which answered in every particular, except the want of motion, to the description of the organism; and he found it in such quantity that, if it were really of the supposed organic nature, it must necessarily render the bottom-water so rich in organic matter that its presence would be abundantly evident when the water was treated as above described. There remained, then, but one conclusion, namely, that the body which Mr. Murray had observed was not an organic body at all; and on examining it and its mode of preparation I determined it to be sulphate of lime, which had been eliminated from the sea-water, always present in the mud, as an amorphous precipitate on the addition of spirit of wine. The substance when analysed consisted of sulphuric acid and lime; and when dissolved in water and the solution allowed to evaporate, it crystallized in the well-known form of gypsum, the crystals being all alike, and there being no amorphous matter amongst them.

These observations were made chiefly on the voyage from Hong Kong to Yokohama in the first quarter of the year 1875; and it subsequently occurred to me that an approximate determination of the organic substance in sea-water might be effected in the following way:—Supposing the amount of carbonic acid in the water to be known, let a little permanganate of potash be added to a sample of it, and let the carbonic acid be determined in the usual way by boiling the solution. If the water contained any easily oxidizable carbon compound, we should obtain more carbonic acid in the second than in the first determination, and the difference would correspond approximately to the amount of organic carbon present. In several waters which I have treated according to this principle, I have found from two to five milligrammes of carbon per litre.

(*To be continued.*)

ROYAL IRISH ACADEMY.

On a New Chemical Test for Alcohol.*

BY EDMUND W. DAVY, A.M., M.D.

Professor of Forensic Medicine, Royal College of Surgeons, Ireland, etc.

Whilst making lately some experiments on molybdic acid, I observed that when a solution of that substance in strong sulphuric acid was brought in contact with alcohol, there is very quickly developed a deep azure blue coloration; and this fact, being (as far as I was able to ascertain) hitherto unrecorded, led me to investigate the reaction to determine the cause of this production of colour.

As I found that the protosulphate of iron, and the protochloride of tin, two powerful deoxidizing salts, produced a similar effect on this solution, there was but little doubt that it was due to the deoxidizing action of alcohol on the molybdic acid. And I afterwards found that the blue substance which was formed in the case of alcohol possessed all the characters of the blue compound which is produced when molybdic acid or its salts are acted on by different reducing agents, whereby a substance consisting of five atoms of the metal molybdenum with fourteen of oxygen is obtained, which is usually regarded as a combination of the binoxide of molybdenum with molybdic acid, the following formula (MoO_2, 4 MoO_3) representing its composition.

With certain precautions which I shall presently point out, I have found that this reaction of alcohol on the molybdic solution stated is extremely sensitive, so that by its indications very minute quantities of alcohol, even when diluted with large proportions of water, may be readily detected. Thus, for example, if one part by volume of commercial rectified spirits be mixed with a hundred parts of distilled water, and one small drop of this mixture be taken, the minute quantity of spirit contained in it can be easily detected by the deep blue coloration which will be immediately developed on bringing it into contact with the molybdic solution, employed in the manner about to be described. But this is not the limit of the delicacy of this test, for I have been able by means of it to detect the spirit in one drop of a mixture of distilled water and anhydrous spirit, in which the latter substance constituted only the one-thousandth part of its volume; and as the drop was found to weigh six-tenths of a grain, the quantity of real or anhydrous alcohol contained in it would be less than the one-sixteen hundred and sixty-sixth part of a grain of that substance.

Though small quantities of spirit, even when considerably diluted with water, will produce with the molybdic solution the blue reaction without the assistance of any external heat, still where very minute quantities, diluted with such large proportions of water as those just stated, are to be detected, it is necessary for the success of the experiment that the reaction should be assisted by a gentle heat, and also that too great a dilution of the test solution with the liquid under examination should be avoided, as the blue coloration will not be developed if water be in excess; and even after it has been produced, the addition of a certain proportion of that substance quickly causes its disappearance. Such being the case, the best way of employing the test, according to my experience, is to place three or four drops of the molybdic solution in a small white porcelain capsule, and having heated them slightly, allow one or two drops of the liquid to be examined to glide or fall gently on the acid solution, when there will be developed, either immediately or after a few moments, the blue coloration. And where the alcohol is very largely diluted with water, it is better to continue the gentle heating of the test solution for some time, to concentrate it or expel as much water from it as possible, before adding the liquid to be tested, for in this way I have succeeded in detecting the spirit in mixtures so dilute as to give no blue reaction when added immediately to the test solution on its being simply warmed. As regards the application of heat, I must observe that the temperature of the acid solution must not be raised too high, for if it be heated till the acid evolves its dense vapours, or begins to boil, the solution will of itself alone, from its partial decomposition, develop a more or less blue coloration, which will become more perceptible on its cooling. But such an occurrence can be easily avoided by employing a water-bath as the heating agent; for I have found that a temperature of 212° F. is incapable of so acting on the test solution—at least an exposure of several hours' duration to that heat failed to produce the slightest blue coloration, and a much lower temperature than that suffices for the application of the test.

I should here state that the molybdic or test solution which I have generally employed was made by dissolving at a gentle heat one part by weight of molybdic acid in

* Read May 22, 1876.

ten parts of strong and pure sulphuric acid, but the exact strength of this solution as regards the amount of molybdic acid it contains seems to be immaterial.

I may observe that the coloration produced in the reaction stated disappears after a variable interval of exposure to the air—a circumstance which is due, as I have ascertained, to the absorption of moisture from the atmosphere, and not to the re-oxidation of the molybdenum compound, as might have been supposed; for amongst other facts in proof of this, I may state that after it has thus disappeared, it may be readily restored either by expelling the water so absorbed by a gentle heat; or, more slowly, by placing the mixture under a desiccator, and thus removing it by spontaneous evaporation at the ordinary temperature. Such being the case, it is evident that, where the test solution has been too much diluted for the immediate development of the coloration described, expelling the excess of water by heating the mixture on a water-bath, it may be made to exhibit itself.

But the necessity for such evaporation should, if possible, be avoided, which in most cases will be so, by using only a drop or two of the liquid under examination, and by employing the strongest sulphuric acid in making the test solution; for it is very probable that much of the spirit contained in the liquid would be lost during its evaporation in the water-bath. Besides there would be some risk that the indications of the test might be more or less interfered with from particles of dust or organic matter getting into the mixture during that process.

The reaction which has been described, I should state, is not peculiar to ordinary or ethylic alcohol, but is, more or less, readily developed by others—at least I found it to be so in the case of methylic, propylic, butylic, and amylic alcohols, those being the only ones I had for my experiments. But it is more than probable that some at least of the other alcohols may act in a similar manner; however, the reaction is much more rapid and striking in the case of ethylic than in that of any of the other alcohols mentioned. I found also that certain salts of the radicles of those alcohols produced a somewhat similar reaction, as well as ethylic ether and aldehyde, and also several organic matters which are readily susceptible of oxidation.

The circumstance that the reaction described is not peculiar to ethylic alcohol will, no doubt, lessen its value as a positive test for that substance; but a similar objection appertains to all the other known tests for that compound, as their indications are not peculiar to that alcohol alone, if we except, perhaps, Berthelot's test, which is founded on the development of benzoic ether by the action of benzoic chloride, along with caustic potash on ethylic alcohol. But, owing to the trouble attendant on the preparation of benzoic chloride, and some other practical inconveniences connected with the application of that test, it is not likely that it will ever come to be one of very general employment.

The test, however, which I have brought before the Academy has this advantage over those already known, that it far exceeds (according to my experiments) any one of them in point of delicacy. And though the circumstance that the blue reaction produced in the case of this test is not peculiar to ethylic spirit lessens, as before observed, its value for the detection of that substance, this is just what renders the test of more general applicability; for by its aid certain impurities or adulterations may be at once detected in different substances or compounds, which in a state of purity should not contain any matter capable of acting on the molybdic solution employed in this test. I may refer to two important substances as examples, viz., chloroform and chloral hydrate, which are now so extensively employed in medicine and surgery for a number of useful purposes; and, being agents of great power, it is of much importance that they should be free from the accidental impurities of imperfect preparation, as well as from the frauds of intentional adulteration, which may either impair their therapeutic value, or even increase the danger of their administration. For there can be but little doubt that in some instances the serious and even fatal effects resulting from their use may, in part at least, have been attributable to the impurities or adulterations of the chloroform, or of the chloral hydrate employed. Now, as I find that neither chloroform nor chloral hydrate, in their pure condition, have any apparent action on the molybdic test, but that many of their usual impurities develop the blue reaction, it affords us a ready means of testing their purity. Thus, as regards chloroform, one of its common impurities is ethylic alcohol, which it may contain either from imperfect preparation, or from fraudulent addition, the very high price of chloroform offering a great temptation to the unscrupulous vendor to increase its bulk or weight by the addition of alcohol, which so readily mixes with it. I have found that the molybdic test at once enables us to detect such an adulteration, even where it occurs in very small proportions in chloroform. Thus, in one experiment, I mixed one part of rectified spirit with a hundred parts by volume of pure chloroform, and one drop of this mixture being brought in contact with three or four drops of the molybdic solution, previously warmed in a water-bath, gave an immediate deep blue coloration from the spirit contained in it; and, in a second experiment, with a mixture of one part of spirit to a thousand parts of chloroform, a single drop of the mixture, being similarly treated, developed a faint blue reaction. Indeed, so searching is this test as regards the purity of chloroform, that I was unable to obtain any sample of that substance in commerce sufficiently pure not to give a blue reaction with the molybdic test, owing to the minute quantities of volatile oils, and other impurities, they contain; and for my experiments I was obliged to repurify the commercially pure chloroform to obtain a sample which would give no coloured reaction with my test.

In the case of chloral hydrate, it is stated that one of its usual impurities is the chloral alcoholate (a compound in which alcohol, instead of water, is combined with anhydrous chloral), and that this substance has somewhat different effects on the system from those produced by the hydrate. This compound, owing to the alcohol it contains, gives the blue reaction with the molybdic test, and I have found that where the chloral hydrate contained even so small a proportion of the alcoholate as one part in a thousand parts, a little of such a sample, being taken, indicated its presence when examined by the molybdic test; and it is probable that some of the other impurities which are met with in this important substance may be similarly detected.

Those two examples are sufficient to indicate the use to which this test may be applied in the determination of the purity of different substances used in medicine, as well as in scientific research.

Finally, I would remark that, as the reaction of molybdic acid on ethylic alcohol is so sensitive and prompt in its action, I entertain the hope that there may yet be found in it, not merely this qualitative test, but likewise a means for the quantitative determination of that important alcohol.

Parliamentary and Law Proceedings.

The Sale of Milk of Sulphur.

At the Hyde petty sessions, Mr. Jonathan Harrison, druggist, Hyde, was summoned by Captain Arrowsmith, chief constable, for selling two ounces of milk of sulphur that was not of the nature, substance or quality demanded by the purchaser. On the 18th of November, the sulphur was purchased for the purpose of analysis, and on being tested by the county analyst was found to contain 61 per cent. of hydrated sulphate of lime, or the elements of plaster of paris, and only 39 per cent. of milk of sulphur.

The Chairman (Dr. Newton) said Captain Arrowsmith deserved credit for bringing this case before the Bench, as mothers gave the drug to their children for skin diseases, and if a drachm of this mixture were given to a child the results in all probability would be that the ingredients would become hard, cause congestion and inflammation of the bowels, and even death. He had no doubt the mortality among children was largely owing to the introduction of mysterious substances into their little bodies. In this case the Bench might have imposed a penalty of £20, but believing the defendant had no guilty knowledge of what he was selling they would only inflict the nominal penalty of 5*s.* and costs.

At the Dukinfield Petty Sessions, on Thursday, November 23, before A. Aspland, G. Newton, and J. F. Cheetham, Esqs., Michael Coffey, provision dealer, Wharf Street, Dukinfield, was summoned at the instance of Captain Arrowsmith, deputy chief constable, for having on the 5th of November sold, to the prejudice of one Joseph Downs, milk of sulphur which was not of the substance and quality demanded by such purchaser.

Defendant said his wife had sold it not knowing but what it was genuine.

Captain Arrowsmith said on the 15th instant he instructed acting-serjeant Joseph Downs to procure from the defendant's shop some milk of sulphur, knowing that the drug was largely used amongst the families of the working classes. The officer went to the defendant's shop and bought two pennyworth of milk of sulphur, and the sample was sealed up and sent to Mr. J. Carter Bell, of Manchester, the county analyst. He had since received a certificate from the analyst stating that the milk of sulphur obtained from the defendant's shop contained 59 per cent. of hydrated sulphate of lime, or the elements of plaster of paris. In these cases of adulteration he would like to reach the manufacturers of such rubbish, because in populous districts such adulterated drugs destroyed more human lives, and especially of infants, than half-a-dozen plagues. The purchase having been proved,

Defendant in explanation said, twenty years ago he became tenant of the shop, and at that time there was a large quantity of milk of sulphur in stock. He had never bought any since, and he believed he was selling the article pure and unadulterated.

Mr. Aspland said the magistrates were of opinion that defendant was guiltless of any intention to defraud. They thought he sold the article in good faith, but at the same time it ought to be known that this stuff with which the drug was mixed was poison and might produce an injurious effect upon the health of children. It was the duty of every tradesman to know that his goods were pure articles, and he ought either to get a warrant to that effect or have the goods analysed. The magistrates thought it best to impose a small fine in the case, and a nominal fine of 1*s.* and costs would be inflicted, but if any more such cases were brought before them the fines would be more substantial.

The next case was one in which Jonathan Radcliffe, shopkeeper, Astley Street, was charged with a similar offence. Defendant said he sold milk of sulphur, but he was not aware that he sold an article contrary to milk of sulphur.

Acting-serjeant Downs said on the 15th instant he called at defendant's shop in Astley Street and asked him for three pennyworth of milk of sulphur. He was served by the defendant, and witness told him he had obtained it for the purpose of analysis, and asked him if he wished to keep a portion of it. He said he did not, and added that he had more of the same sort. Witness sealed up the packet, and it was afterwards sent to the analyst

Captain Arrowsmith said he had received from the county analyst a certificate showing the result of his analysis of two ounces of precipitated sulphur sold by the defendant to Downs. The certificate showed that there was 61 per cent. of hydrated sulphate of lime or elements of plaster of paris in the drug.

Defendant said he did not sell the article as precipitated sulphur.

Captain Arrowsmith replied that it was known throughout the trade as precipitated sulphur.

The Chairman said the two terms meant the same thing. In point of law the customer asked for precipitated sulphur, and defendant gave him a poisonous drug.

Defendant called Mr. W. H. Waterhouse, druggist, of Ashton, as a witness, and he said he wished to say a few words in favour of the trade and in order that justice might be done.

Mr. Aspland: Can you say that this article is milk of sulphur?

Mr. Waterhouse: I know it is milk of sulphur.

Mr. Aspland: How do you know.

Mr. Waterhouse: I have examined it.

Mr. Aspland: Here we have the analysis of an expert, and he says it is precipitated sulphur greatly adulterated.

Mr. Waterhouse: I can quote the opinion of one of the most eminent chemists in the United Kingdom to prove my assertions. I am prepared to say that the article supplied by defendant to the officer was milk of sulphur, and not precipitated sulphur.

Mr. Aspland: We cannot entertain your opinion, because you are not an analyst. Have you anything further to say, Mr. Radcliffe?

Defendant: I sold the article as pure for aught I knew; I never altered it, and it is so long since I bought any that I forget where I bought my present stock.

The Chairman: You are selling an article with only 49 per cent of precipitated sulphur, and 61 per cent. of a poisonous article. If you had gone to a respectable druggist you could have got the pure article. You may have poisoned people by selling this stuff.

Captain Arrowsmith: Mr. Radcliffe keeps a druggist's shop, or rather sells a large quantity of drugs, and it is his duty to ascertain that the drugs are good.

Mr. Aspland: You know very well that if you buy drugs that are not pure you may get protection against the person who sells them, and then you will be safe. If you choose to go and buy cheap drugs which are poisonous you will render yourself liable to all the penalties. As this is the first time, you will only be fined 10*s.* 6*d.* and costs, the cost of the analysis, and the police costs. If you come up again you will probably have the full penalty.

THE SALE OF MUSTARD COMPOUNDS.

At the Ashton-under-Lyne County Police Court, a case of considerable importance to shopkeepers was heard before Messrs. J. R. Coulthart and Abel Buckley.

Mr. William Whitworth, grocer, Hurst, was summoned at the instance of Superintendent Ludlam, on a charge of having sold two ounces of adulterated mustard. The defendant pleaded guilty.

The Clerk: The question is, did you know that this was not real mustard?

Defendant: It is Coleman's mustard, and it said "mixture" on the tin.

The Clerk: But you did not sell the whole tin at once.

Defendant: No, I sold two ounces, but I got it out of Coleman's tin, which was labelled "mixture."

Mr. Ludlam said he did not see the label on the tin, but if it had been labelled, as alleged, it was illegal to sell a portion of it unless every such portion was labelled.

Defendant: I have seen Mr, Coleman's manager about it, and he said it was done by all shopkeepers.

Mr. Ludlam said he purchased two ounces of mustard at the defendant's shop, and it was true, as defendant stated, that the mustard was taken from a tin. The article so bought was forwarded to the public analyst, who stated that it contained 25 per cent. of farina, which was put into it for the purpose of diminishing the strength and improving the appearance. It was not sufficient that the tin should be labelled "mixture" unless it was sold whole. If a milkseller labelled his cans "milk and water" he must, as well, attach a label to every quantity he sold if he wanted to escape the law.

The Clerk: To every gill.

Mr. Buckley: If you had sold the whole tin of mustard you would not have been liable.

Defendant: I can buy it in this way in any shop in Ashton.

The Clerk: Then it is illegal.

Mr. Ludlam said this was the first case in the division that they had had under the Adulteration Act. He had made many attempts to get a case, but all the samples of milk and other things that he had sent to the analyst had, with this exception, been found to be genuine.

The Chairman (to defendant): We consider this a very serious case, but as it is the first one of the kind in the division, we shall not fine you heavily.

The defendant was then fined 1*s.* and costs, the fine to be remitted if the costs were paid. — *Manchester Courier.*

Adulterated Arrowroot.

At Shepton Mallet Petty Sessions, Mrs. Caroline Everett, grocer, of Shepton Mallet, was charged by Mr. Bisgood, deputy chief constable of Somerset, with selling adulterated arrowroot. Police-constable Hoddinott stated that he went to the defendant's shop and asked for an ounce of arrowroot, in order that he might have it analysed. Mr. Bowden, the assistant, brought into the shop a tin box of arrowroot that had not previously been opened, and opened it in the presence of witness, and supplied him with arrowroot therefrom. The box was labelled "warranted genuine," and Mr. Bowden wrote similar words on the packet he produced. Mr. Bisgood proved taking the samples to Mr. W. W. Stoddart, Park Street, the county analyst. He had since received a certificate from Mr. Stoddart, which he handed in. It stated that the arrowroot in question contained 50 per cent. of cassava starch. Mr. Wontner, of London, who appeared for the wholesale house that supplied the arrowroot, said he represented the firm of Keen, Robinson, Bellville, and Company, of London, who had sold the arrowroot to Mrs. Everett, and were also themselves summoned. On the part of Mrs. Everett, he submitted that she had sold the arrowroot in the same condition that she bought it, and had given notice to that effect when she sold it to the constable. She was therefore protected by the 25th section of the Act, and was likewise exempt from paying the costs. The Bench agreed with this opinion, and dismissed the case.—Mr. William John Bellville, trading as Keen, Robinson, Bellville, and Company, spice merchants, of No. 6, Garlick-hill, Cannon-street, London, was next charged with selling fourteen pounds of adulterated arrowroot to Mrs. Everett. Mr. Wontner said the facts were admitted by the firm, who claimed the same protection under the Act as Mrs. Everett, and would prove that they had sold the arrowroot in precisely the same condition as they had bought it, and as it was imported. It was the custom of the firm he represented to submit samples of all goods purchased by them to Mr. Piesse, the public analyst of the Strand, for analysis, before warranting them to their customers; but during last summer Mr. Bellville was out of town for the benefit of his health, and Mr. Swinbourne their spice buyer and salesman, was laid up for six weeks by an accident, and when he returned to business he found a great demand for Natal arrowroot, and he went into the market and bought six cases under warranty from Messrs. Bryant and Wheeler, sworn brokers, and being anxious to supply the customers of the firm he did not wait to have it analysed. He however mixed some with boiling water, and it had the appearance of the best arrowroot. Since these proceedings had been taken they had sent samples to Mr. Piesse, who found the arrowroot was not genuine, and they had accordingly withdrawn all that they had sold from that lot. It contained a mixture of starch of cassava, which was a wild arrowroot. He also thought that as this description of goods was imported and passed through the Custom-house its purity should be guaranteed, as in the case of tea. Mr. Swinbourne, the spice buyer and salesman of the defendant, was then called, and he proved purchasing the arrowroot of Messrs. Bryant and Wheeler as it was imported, and selling the same to Mrs. Everett. The Chairman of the Bench (Capt. Ernst) said the only difference they could see in the two cases was that Mrs. Everett had given notice that she sold the arrowroot in the same condition that she bought it, and the defendants had not; they would therefore have to pay the costs, and the case would be dismissed.—*Grocer.*

Accidental Poisoning by Strychnia.

An inquest was held on Friday the 24th November, by Mr. Malcolm, the Leeds Borough Coroner, into the circumstances of a death which occurred through the mistake of a chemist's assistant. It appeared from the evidence that the deceased, Mrs. Conway, on the previous Tuesday, went to the shop of Mr. Manfield, chemist, 85, Kirkgate, Leeds, and complained to the assistant, Mr. Ward, of indigestion. He said he would make up a bottle of medicine for her, and ask her to call for it in about a quarter of an hour. This she did, but, unfortunately, he gave her in mistake a bottle of strychnine which he had made up for Dr. Burchell, and placed beside the bottle of medicine. An hour or two after returning home she took a spoonful of the contents of the bottle, and died shortly afterwards in great agony.

Maria Adams, daughter of the deceased, said she met the deceased in the Market on Tuesday morning, and went with her to the shop of Mr. Mansfield; deceased complained to Mr. Ward, the assistant, that she felt very weak. He said he thought she was feverish, and that if she called again in a quarter of an hour he would give her a bottle of medicine. They called again, and he handed them a bottle. Deceased asked how the medicine was to be taken. He replied two tablespoonfuls three times a day. They then went home to the residence of the deceased. Witness then unwrapped the bottle, and saw that it had a label on it, with the word "poison." She did not know what it meant, and could not read. Deceased also could not read. Witness soon afterwards left, and was subsequently sent for, and found the deceased stretched on the floor. Deceased said, "Oh, it is too late, that medicine is poison." A doctor was sent for, and soon after his arrival the deceased died.

Cross-examined.—When Ward gave the deceased the bottle it was wrapped up. There were no other customers in the shop at the time, nor was Ward attending any one else when he handed the bottle to deceased. The red label on the bottle did not strike her as noteworthy. She could not spell the word poison or read the letters of the word. Had she been able to make out the word poison, she would have taken it to mean that the stuff would be poisonous if her mother took more than she was ordered.

Margaret Adams, 13 years of age, the granddaughter of the deceased, said she was at her grandmother's when the deceased came home with the other witness. The bottle of medicine was put on the mantelpiece and the deceased went upstairs to lie down. She got up about half-past three, and told her to hold the spoon while she poured the medicine in it. Witness said, "Oh, grandma, it says poison." Deceased replied that the druggist would not give her poison; he knew what he was doing. She took a tablespoonful of the medicine, but as it tasted very bitter she did not take another. Soon afterwards she complained of pains in the head, and began to jump about convulsively. Some neighbours then came in, and the deceased told them she had taken poison. Witness then sent for a surgeon.

A neighbour gave some corroborative evidence, adding that she saw the red label on the bottle, and knew, although she could not read, what it meant.

Mr. Whitwell Manfield, chemist, Kirkgate, said that on Monday an order came to his shop from Dr. Burchell for several drugs, etc., including an order for 8oz. of strychnine. Witness was out of town on Tuesday most of the day. On returning in the evening he was not informed of the mistake that had been made until about seven o'clock, when two police officers came into his shop. They asked him if he had sold any strychnine. He said "No." They asked, "Not to a woman named Conway?" He replied "No." They said that a woman of that name had taken poison, and the bottle had witness's label on it. Ward then said that he made up a bottle of strychnine for Dr. Burchell, and had given it to a woman in mistake. The reason he did not inform witness immediately on his return home was that, knowing that witness had trouble on his mind, he did not like to mention it. Ward had been his assistant for about four years and a-half. Previous to that he had been assistant to a chemist in Norfolk. Hitherto he had given every satisfaction.

In answer to a juryman, witness said he did not use distinctive poison bottles, but he put special labels on, and never sold poison without a caution.

Mr. John J. Pickles, surgeon, said that on Tuesday afternoon he was called to see the deceased. He saw the bottle of strychnine, and found the deceased showing symptoms characteristic of strychnine poisoning. She had convulsions, her jaws were tightly clenched, and she was crying with pain a good deal. He gave her an emetic of sulphate of zinc, but it had no effect. He succeeded with great difficulty in pressing the stomach-pump down the throat, but just as it began to run a convulsion came on and she died from suffocation, as is usually the case with people poisoned by strychnine. Before she died he had withdrawn the pump. There was no doubt that death was due to strychnine poisoning. That opinion was verified by a *post-mortem* examination which he had made.

Albert Halliwell, porter to Mr. Manfield, said that about a quarter past ten o'clock on Tuesday morning Ward, who appeared very confused and agitated at the time, said he would give a thousand pounds if he could call back what he had done. Witness asked what he had done, and he replied that he had given away Dr. Burchell's strychnine in mistake for a bottle of medicine, and asked witness if he could recognize the two women who had been in the shop. Witness said he thought he could, and went into the Market to try and find them, but did not succeed. Ward had no means of tracing them, not knowing where they lived or anything about them. There were only two bottles in the place from which the bottle of strychnine was taken.

The Coroner said he did not intend to call Ward, but if he liked to make a voluntary statement, he would hear him.

Mr. Middleton (solicitor) said Ward had every desire to do so.

The Coroner said he would caution Ward, but that was not intended as any imputation upon him, but simply as a warning that his evidence might be used against him.

Mr. Ward said he made up the bottle of strychnine on Tuesday morning, about half an hour before deceased came into the shop. He wrapped the bottle up after labelling it with a poison label, and put it on a shelf. The bottle of medicine he intended for the deceased he put on a shelf underneath. When the deceased came in the second time he was in a great hurry. About twenty minutes afterwards he found out the mistake he had made, but he had no means of tracing the deceased. He had been in the business about fourteen years. He was very loth to prescribe for the deceased, and told her she ought to consult a medical man.

A Juryman said this case ought to be a severe warning to chemists.

The jury then retired, and, after an absence of five minutes, returned with a verdict "That death was caused by a dose of strychnine taken in mistake, and that the mistake arose from the gross carelessness of Matthew Ward."

The Coroner: You find, then, that the death of the deceased was by misadventure?

Mr. Joseph Walker (foreman of the jury): Yes; and we are also of opinion that it is negligence on the part of the chemist Manfield not to have poison bottles.—*Leeds Mercury.*

Poisoning by Strychnia.

At the Central Criminal Court on Monday last, before Mr. Justice Denman, Silas Barlow, alias Silas Smith, aged 26, and described as a labourer, was indicted for the wilful murder of Ellen Sloper. There was also a second indictment against the prisoner charging him with the murder of an illegitimate child of the deceased woman. Mr. Poland and Mr. Beasley prosecuted, instructed by Mr. Pollard, on behalf of the Treasury; Mr. Fulton and Mr. Grubbe appeared for the prisoner. The prisoner was a platelayer on the Brighton Railway, and he had been on intimate terms with the deceased woman, and a child was born in November, 1875. The prisoner visited the woman at her lodgings on the 3rd of September, and on the following day the deceased was very ill, but she got better. On the 10th of September he again visited her, and after he left she complained of excruciating pain, and her body was bent in the form of an arch. She exhibited all the indications of having been poisoned by strychnine, and died in great agony on the following day. Before her death she stated that her illness was owing to something the prisoner had given her, which he described as sarsaparilla water, but the prisoner in reply said that he had taken some of the sarsaparilla himself. A number of bottles were found at the prisoner's lodgings and traces of strychnine were found in some of them, and it also appeared that the prisoner had access to some Battle's Vermin Destroyer, which contained strychnine. There was no portion of strychnine found in the body upon a *post-mortem* examination, but this was explained by the poison being absorbed during the period that had elapsed from the poison being administered and the *post-mortem* examination. On the part of the prisoner it was contended that all the symptoms exhibited by the deceased were consistent with an attack of epilepsy, and it was admitted by some of the medical witnesses that a portion of the symptoms were such as would appear in an attack of epilepsy.

In the course of the case it was proved that the vermin destroyers that were sold contained flour, Prussian blue, and strychnine, and the learned judge observed that it appeared to him that in the interest of the public it would be very advisable that dangerous articles of this description ought to be made up of materials that could not be used for human food, and in such a shape as to render it impossible for them to be administered without detection.

Dr. Bernays, lecturer on chemistry at St. Thomas's Hospital, the witness who was under examination at the time this observation was made by the learned judge, said he was of opinion that these poisons should not be allowed to be sold at all.

Mr. Justice Denman observed that persons who were pestered with rats and mice might entertain a different opinion.

Dr. Bernays said no doubt that was so, but he should certainly suggest that some restrictions ought to be placed upon the sale of these poisonous articles.

On the part of the prisoner, it was urged that the evidence at most had established a case of suspicion against him, and that the death was as likely to have been caused by natural means as by the administration of poison.

The jury found the prisoner guilty of "Wilful Murder," and sentence of death was passed upon him.—*Standard.*

Review.

REPORT ON THE OIL SEEDS AND OILS IN THE INDIA MUSEUM, OR PRODUCED IN INDIA.

This report was at first intended to include the volatile oils or attars, but it was found that the intricate and extensive character of these would cause so considerable a delay that it would be better to report upon them separately. The reader must not expect to find the report containing the results of original research. It only claims to present, in a useful form, a digest of scattered notes and memoranda, obtained from various sources, so that their accuracy may be tested and further information contributed by competent observers.

The various products treated of are arranged under the following heads:—Waxes, solid and semi-solid fats, and fluid oils. The fluid oils occupy the larger portion of the report, and are divided into four groups, viz., Sweet or Edible Oils, Drying Oils, Lamp Oils, and Medicinal Oils.

In a preliminary chapter, the distinguishing characters of the different kinds of oils are defined, and the principal natural orders yielding oleaginous seeds are enumerated, and a great deal of useful information, including methods of readily ascertaining the physical properties and commercial value of oils and oil seeds, is given. This information applies not only to Indian seeds, but to those of any country, and will be found very useful to those who travel in foreign countries.

Under each plant the botanical synonyms, place of growth, native names, description of the parts yielding oil, and the nature and uses of the oil, so far as is known, and its method of preparation, are given. A very useful addition in the present report is the insertion of wood engravings of many of the seeds and fruits yielding oils. These have been rather heavily printed, but give in most cases a very good idea of the object which they are intended to represent. References to specimens in the India Museum are also appended. The report thus forms a useful descriptive guide to the department of the India Museum containing the products here treated of.

The group of waxes is a very small one, including only three kinds; only one of which, commonly known as Japan wax, is represented in the India Museum. The Petha wax (*Bennicasa cerifera*, Savi) is available for candle making.

The more important solid or semi-solid fats treated of are the following:—Shea butter, obtained from the seeds of *Bassia butyracea*, Roxb., which is white, of the consistence of fine lard, does not readily turn rancid, even in India, makes an excellent soap, and burns without smoke or smell; the greenish fat of *B. latifolia*, Roxb., which might be substituted for Russian tallow in candle making; Cocoa nut oil, the solid fat of the tallow tree (*Excœcaria sebifera*, Müll.); Kokum butter (*Garcinia Indica*, Chois.), which has been recommended as a substitute for spermaceti ointment; and Piney tallow, from *Vateria Indica*, L., a substance intermediate between wax and stearin, and forming excellent candles. Among medicinal fats that of chaulmugra seed (*Gynocardia odorata*, R. Br.), used in rheumatism and cutaneous diseases, and that of the Malabar nutmeg, forming an efficacious application to indolent ulcers, are the most important.

Among the fluid oils of those which form staple articles of commerce, the following receive a tolerably full notice:—Poppy seed, gingelly, linseed, cotton seed and sunflower seed, and castor oils. Several oils possessing valuable properties do not appear to be made to any extent in India. Of these may be noticed walnut oil, ground nut oil, country almond oil (*Terminalia catappa* L.). Chironji oil from the seeds of *Buchanania latifolia*, W. and A., a limpid edible sweet oil, similar to olive oil, not made to any extent because the kernels form an article of food. The oil of the seeds of *Moringa pterygospermæ*, from its keeping properties, seems worthy of attention for use in pomades, and for other purposes in which its tendency to deposit is not an objection, as it is not a drying oil and is almost odourless.

The drying oils include several valuable kinds, among which are prominent tobacco-seed oil, a very fluid colourless oil with peculiar drying properties, used in painting; the oil of *Euphorbia dracunculoides*, Lam., not turning ropy when old; the oil of tamarind seeds, used also for burning; the oil of Niger or Kersanee seed (*Guizotia oleifera*, DC.); and that of the candle-nut tree (*Aleurites moluccana*, Willd), used also as a purgative, and forming an excellent lamp oil. The white linseed appears worthy of especial notice since it is said to yield two per cent. more oil than the dark variety and a sweeter cake. The seed produced in the Nerbudda valley is said to be free from rape seed, which so frequently imparts irritating properties to linseed meal. On this account and from its colour, it would probably yield a very superior linseed meal for medicinal purposes. A large number of the oils are used in medicine by the natives, but comparatively few of them appear to possess decided properties. Chaulmugra oil (*Gynocardia odorata*, R. Br.) and Karunje or Chaulmugra Kunjee oil (*Pongamia glabra*, Vent.), for skin diseases, and the oil of *Celastrus paniculatus* for swellings, hold a high place in the native materia medica.

Among the better known medicinal oils occur croton and castor oils, and the oil of the physic nut (*Jatropha curcas*, L.). It appears from this report, that a great deal has yet to be done in investigating the properties and commercial values of Indian oils, and that the resources of that country in this direction are by no means thoroughly known at present. The deficiencies in the museum appear to be very numerous, and it is quite clear that those interested in the matter in India do not follow the excellent advice of the reporter on Indian products—to send home sufficient quantities of oils or oil seeds, to have their qualities and uses tested by manufacturing firms.

The index of botanical names is a feature in which the present report is an improvement upon the report on the gums and gum resins of India, which we had occasion to notice two years ago. This index would have been still more valuable if the native names had been included in it. The woodcuts will be found very useful to those who are in the habit of receiving seeds, etc., from India, for sale in this country.

Correspondence.

"Apprentice" and H. T.—Glycerine Jelly.—For wood sections Mr. Pocklington recommends to soak good clear gelatine in cold water for three or four hours, then pour off the superfluous water and melt the gelatine at a gentle heat. Add the white of an egg in the proportion of a fluid drachm for each fluid ounce of the gelatine, mix well while the gelatine is fluid, but cool, then boil until the albumen coagulates, and filter through flannel. To the clear product add an equal quantity of the best glycerine, in which a few grains of arsenic have been dissolved, or a few drops of carbolic acid. A good jelly for fine tissues is made with double the quantity of glycerine. For very fine tissues a greater proportion of glycerine still may be used, with or without the addition of gum arabic.

"Albus."—(1) We cannot say. (2) The sixth edition was published in October, 1875.

J. Gibson.—We do not think it probable that the tale told you by your customer respecting the explosion included the whole of the circumstances.

"Assistant."—We do not know.

"Major Exam."—(1) Ganot's 'Physics,' published by Longmans, or Deschanel's 'Natural Philosophy,' published by Blackie and Son. (2) We know of no book specially devoted to the subject.

W. H. Butler.—The grasses may be dyed with the liquid dyes now commonly sold.

Chester.—Make a firm mass and expose the pills on trays for a few days after rolling out.

COMMUNICATIONS, LETTERS, ETC., have been received from Mr. W J. Clark, Mr. Wilkinson, Mr. Davey, Mr. Reynolds, H. S. W., E. R. Priest, G. F.

A NEW MODE OF MAKING GREY POWDER.*

BY ALEXANDER BOTTLE.

With a slight alteration in the relative proportion of mercury to chalk, the formula for Hydrargyrum c. Cretâ in the British Pharmacopœia, and the direction for preparing it, remain the same as the formula and *modus operandi* recognized and practised in the first half of the last century. We might from this fact be led to infer that the resulting combination was all that could be hoped for or desired, that it was uniform in its physical condition and reliable in its action, and that from its long and continuous use in medicine there would not be at the present day doubt in the minds of any as to its medicinal value, or difference of opinion regarding the mechanical subdivision or chemical combination of the metal to which its therapeutical action might be more fairly attributed; and yet I venture to assert that there is no preparation in the British Pharmacopœia about which more diversion of opinion has been entertained, and as I believe will, by the discussion that follows, still be shown to exist.

Reference to the observations of writers of good repute who have commented upon this preparation lead us through a chronological labyrinth of contradiction, showing, alternately, mechanical subdivision and oxidation of the metal in the ascendant, and temporarily holding the weather side in the argument. In the first volume of the *Pharmaceutical Journal* is published an elaborate and exhaustive paper on the 'Division of Mercury,' read before this Society by our noble founder and esteemed friend, the late Mr. Jacob Bell, from which I extract the following as the conclusion at which he arrived:—

"The preparations under consideration, *i.e.*, Grey Powder, Blue Pill, and Blue Ointment, are dependent for their efficacy on the impalpably minute division of the mercury, and if any oxide exist in them, the circumstance is accidental, and the quantity so small as to be unimportant."

Professor Attfield, commenting upon the same preparations, writes—"Their therapeutic effects are probably due to the black and red oxide of mercury which occur in them through the action of the oxygen of the air upon the finely divided metal."

Dr. Pereira under the head of Hyd. c. Cretâ, writes —"This preparation is a mechanical mixture. It is an exceedingly mild but valuable mercurial."

Some sixteen years ago Professor Redwood favoured us at one of these evening meetings with the gratification of listening to a paper on "Grey Powder." It was one of those valuable contributions to pharmacy, for which we as pharmacists have been upon very many occasions indebted to him. It is printed in the *Pharmaceutical Journal* [2], vol. i., p. 504. He therein shows, as the result of his examination of six samples of grey powder, that five of them contain oxides in abnormal excess, and suggests the use of sugar of milk as a probable preventive of this tendency to oxidation (a suggestion which appears to have been adopted by our transatlantic cousins), and concludes with a promise to return to this subject hereafter. May I venture to hope that he will deem the opportunity I have now afforded him a fitting occasion to do so?

It has appeared to me that minute subdivision, and not oxidation of the metal, has been the intention of the pharmacopœia process, and that this result is capable of being obtained by a strict adherence thereto; but the process is uninteresting, monotonous and wearisome. I can recall to mind a time when I as an apprentice was first set to make this preparation, and that I looked upon it as a punishment worthy of the inquisition.

In modern times it is, I believe, exceptional to find it made on a comparatively small scale by the pharmacist for the requirements of his own establishment; as a matter of convenience he purchases it from the wholesale houses, by whom it is made in large quantities, and to this I have for a long time past been led to attribute very much of the variation in the condition of the mercury found in different samples of the powder. The quantities directed in the British Pharmacopœia can be prepared with a result containing a very small percentage of mercurous oxide, and a mere trace, if any, of the mercuric; but when made on a large scale by steam power the heat eliminated by the friction and pressure of heavy stones, favours in a marked degree metallic oxidation, and the powder so prepared and afterwards kept for indefinite and comparatively unlimited periods is that in which, more especially, the peroxide in abnormal quantity is found.

Impressed with the conviction that it is alike our duty and to our interest to avoid the use of a powder containing mercury in the higher state of oxidation, and that in every dispensing establishment it is desirable to have Hyd. c. Cretâ prepared at intervals not too far apart, I venture to suggest a slight deviation from the British Pharmacopœia process, to the extent of substituting for the slow process of trituration in a porcelain mortar, active agitation in a wide-mouthed glass bottle, by which means the B. P. quantity may be prepared and the metal minutely subdivided, with an expenditure of very little, if any, more time and labour than is required to be devoted to the preparation of a tincture.

[*The Discussion on this paper is printed at p.* 482].

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, December 6, 1876.

THE COMPOSITION AND USES OF A NEW BISMUTHIC COMPOUND—"THE OLEATE OF BISMUTH."*

BY S. C. BETTY.

The use of bismuth in therapeutics has not been unaffected, I believe, by the insolubility—or at least quasi-insolubility—of the greater number of its compounds.

Of late years one notable preparation, the "liquor bismuthi" of Mr. G. F. Schacht, has found great favour with the medical profession, whilst the laminar "ferri citras c. bismutho" is an elegant, and has proved a useful, remedy.

Yet it may not be inexpedient to advert to the fact that owing seemingly to the long, and for a while the exclusive, use of quasi-insoluble bismuth compounds, the hypothesis gained the credence, which it has virtually retained to this day, that their *modus operandi* is essentially mechanical.

We may be permitted, it appears to me, to question this opinion.

For whilst *a priori*, it might be urged that if alone

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, December 6, 1876.

mechanical, any other substance of similar cohesive properties should act as well; *a posteriori*, the importance of the fact should not be overlooked, that whenever a bismuthic preparation (as the trisnitrate) is administered, the presence of the metal may be detected in the excreta, though, contrary to what may have been anticipated from the preceding evidence, not in the sudatory exhalation.

I have used the words quasi-insoluble on the assumption that in regard to the expression insolubility a merely relative condition has been sometimes mistaken for an absolute one. The term insoluble is meaningless, save when connected with the specification of the proposed solvent.

Because a given compound may be insoluble in water the conclusion by no means follows that it remains insoluble in the gastric juice; and to this latter process of solubility I propound we may without speculation attribute the curative action of bismuth. Thus the liquor bismuthi has been accepted and acknowledged by the medical profession as an efficient medicinal agent, and so fully as to place it in our national Pharmacopœia.

I have ventured to bring before this meeting another preparation of bismuth possessing the characteristic of the liquor bismuthi, solubility. In my experience it is a new compound, or at least so far new that it has not before been introduced to notice publicly. It is an oleate of bismuth containing 20 per cent. of the base.

For the suggestion of such a substance and its first application in medical practice we are indebted to Dr. Louis Lewis, of Albert Street, Regent's Park, who honours us with his presence this evening.

At the commencement of my work I was materially assisted by the advice of Professor Attfield, at one of these gatherings, "that it would prove useful and important for pharmacists not to lose sight of the solvent powers of oleic acid."

Oleic acid and bismuth were brought into contact with such encouraging results that in the end the large proportion of 20 per cent. of bismuth became dissolved.

The oxide of bismuth, B. P. (the trisnitrate and carbonate being useless for this purpose), is ground very fine and the oleic acid gradually incorporated with it. The mixture being placed in a suitable vessel is subjected to a temperature of nearly its boiling point, then allowed to digest, with frequent agitation at a temperature of about 60° during four days or until it solidifies. The result is pharmaceutically a plaster, chemically, an oleate of bismuth.

This process, it should be added, is only mentioned as having effected the purpose of making the preparation now before you. Further experiments will be necessary to prove the easiest or the most reliable mode of its manufacture; as the results of recent operations would demonstrate that under apparently similar conditions results have not hitherto been uniform.

The question of the physiological effects of bismuth generally I leave untouched, as constituting a branch of the subject with which this record does not profess to deal. Yet of its utility as an endermic application I may note that it melts readily in contact with the skin, is bland to an excoriated surface and penetrating by its limpidity.

I grant the employment of the oleate of bismuth would be contraindicated by the proof that the energy of a bismuthic compound became exerted through mechanical contact. We have, however, from Mr. Marshall, the originator of the oleic preparations, a report which places the rapid and specific effects of the oleates of mercury, morphia, and other bases, so far beyond doubt as to justify our entertaining the hope that the "oleate of bismuth," a pharmaceutical product which presents the bismuthic base in the condition most favourable for absorption, will prove a remedy or at least an adjuvant in cutaneous affections of the exanthematous type, certainly superior to those insoluble compounds which have hitherto been employed.

[*The Discussion on this paper is printed at p.* 484].

NOTE ON SOME REACTIONS OF THE GLYCEROLE OF NITRATE OF BISMUTH.*

BY JOHN WILLIAMS.

Chemists and pharmacists generally will feel much interest in the discovery of the so-called "Glycerole of Nitrate of Bismuth," as described in the *Pharmaceutical Journal* of November 11 by Mr. Balmanno Squire. I must say I read the account of the preparation with great pleasure; it is another illustration of the remarkable powers of glycerine as a solvent, and from the fact that the solution is not precipitated when diluted with water, possesses great interest to the chemist. I think we owe our best thanks to Mr. Squire for this important observation.

Having prepared some of the compound, I think that a few notes of the reactions observed may prove of some interest, especially to those who may have occasion to make the preparation hereafter.

I made the glycerole by dissolving 20 per cent. of crystallized nitrate of bismuth in Price's glycerine. I find the solution is best effected in the cold; if much heat is employed in the preparation, the glycerole when diluted does not give a clear solution, but a milky one, at any rate at the end of a few hours.

The property of bearing dilution with water without producing a turbid solution appears to diminish by keeping. Some I have which has been made for three weeks now gives an opaque solution; but a sample made within a couple of days still gives a perfectly bright liquid even when largely diluted.

The diluted solution does not bear boiling, but when so treated deposits a basic salt not afterwards soluble in water.

The most interesting reaction I have observed, and which must be my excuse for bringing this note before the Society, is that caustic potash (or soda), added to the glycerole diluted with water, first causes a white precipitate, which is however perfectly soluble in an excess of the alkali, a bright clear liquid being produced which is perfectly miscible with water in all proportions, and might possibly be employed medicinally as a substitute for the liq. bismuthi ammonio-citratis of the Pharmacopœia. The principal interest of the reaction is, however, from its chemical bearing.

I do not think it had previously been observed that glycerine possessed the property of forming a compound of this nature with bismuth. It would lead us to infer that the glycerole is not a mere solution of the nitrate of bismuth in glycerine, but is really a chemical combination, and that the glyce-

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, December 6, 1876.

rine is playing a part somewhat similar to that taken by the citric acid in the liquor of the Pharmacopœia.

I find this alkaline solution of the bismuthic glycerole is precipitated white by alcohol, the precipitate not being again soluble in water. Also by boiling, a somewhat coloured precipitate is produced, probably containing some peroxide of bismuth, or perhaps the ordinary oxide in an anhydrous state.

Of course I need hardly remind the Society that solution of nitrate of bismuth in water is readily precipitated by caustic potash and that the precipitate is quite insoluble in excess of the alkali.

It is a curious fact that ammonia cannot be substituted for potash in this reaction, no excess of the former making a clear solution, although a trace of bismuth is held in solution, as can be proved by adding sulphate of ammonium to the filtrate.

In conclusion, I would observe that it is already quite well known that other agents as well as citric acid can be used for producing a miscible liquor of bismuth. I place upon the table a specimen of liquor bismuthi ammonio-tartratis, in which tartrate of bismuth has been substituted for the citrate and dissolved in dilute ammonia. Oxide of bismuth also boiled with cream of tartar forms a solution which is quite miscible, and probably many other organic acids are capable of producing similar solutions.

[*The Discussion on this paper is printed at p.* 484].

CRYSTALLIZED HYOSCYAMINE.*

BY W. MARTINDALE.

It is generally stated in text books of materia medica that a crystalline alkaloid can be obtained from the seeds of *Hyoscyamus niger*, to which the name Hyoscyamia is given; but it is only recently, within the present year, that it has become a commercial article, and notices of its properties having appeared in the medical journals, in one of which it is stated that I supplied the alkaloid,† I have thought it might prove interesting to bring a specimen of it before the Society. The first notice that I have seen of it appeared in the *Practitioner*,‡ and was by Robert Lawson, M.B., of the West Riding Lunatic Asylum. He mentions its having been supplied by Messrs. Harvey and Reynolds, and manufactured by Merck, and also having obtained it from Messrs. Smith, of Edinburgh, and calls it an *amorphous* alkaloid. I have little doubt that he refers to the same preparation which is in the London market, which, however, is not amorphous but very minutely crystalline. As no notice had appeared in our English journals of its chemical properties and mode of preparation, I was anxious to know more about it, and therefore wrote to Mr. E. Merck for a supply, with any information he could give or reference to published accounts of its chemical history. He has sent me his circular which gives some detailed information about its chemical and physiological properties. In the meantime, Mr. Passmore pointed out to me that M. Thibaut published in the *Répertoire de Pharmacie*, tome ii., September, 1874, p. 563, a process for manufacturing crystallized hyoscyamine which appears to yield it readily, and as the alkaloid is now offered by several German chemical manufacturers it is probably with slight modifications the process generally adopted. I abstract the following from the notice o the process in the *Archiv der Pharmacie*, July, 1875 p. 75. M. Thibaut directs the bruised seeds to be deprived of their oil by means of bisulphide of carbon (not ether, as this is said to dissolve some of the alkaloid as well as the oil). They are then reduced to powder and mixed with a 2 to 3 per cent. solution of tartaric acid and digested for two days at a temperature of 10° to 15° C. This is repeated a second time, the fluids are mixed and after filtration precipitated with a solution of iodine and iodide of potassium, which consists of 15 iodide of potassium and 7·5 iodine to 250 of water. Having collected the precipitate on a filter and washed it with distilled water, it is then easily dissolved by aqueous sulphurous acid which decomposes it, forming sulphate of hyoscyamine and hydriodic acid. This solution is treated with calcined magnesia, which even in excess does not decompose the alkaloid. The mixture is dried at 30° to 35° C., and exhausted with alcohol of 95°. When the alcohol has been distilled off in a vacuum a slightly coloured substance remains, which is treated with pure anhydrous chloroform, to get rid of any iodide of magnesium that the alcohol may have taken up. On evaporation of this chloroform solution an adhesive mass remains which only exhibits a few entangled crystals. This is neutralized with diluted sulphuric acid—care being taken to add as little water as possible—and shaken with chloroform to get rid of the remaining impurities. The residue after filtration is treated with potash in slight excess. It is then shaken with chloroform and quickly decanted. This treatment is repeated twice, the chloroform solution is allowed to evaporate and the alkaloid is obtained in colourless silky crystals in stellate groups, while at the bottom of the dish remains a syrupy substance, which is still alkaline, and which possesses the same properties as the crystals. In trying to recrystallize the crystals from an alcoholized ethereal solution M. Thibaut did not succeed, he only got a colourless viscous mass. The crystals obtained from the seed by this method were in no way similar to the hyoscyamine then found in commerce under the same name; their odour was quite distinct from it. On the other hand, M. Thibaut found that by making hyoscyamine from the leaves, he obtained a substance which smelt like that of commerce, so that he thinks himself justified in assuming that two different alkaloids are contained in henbane,—one in the leaves, and one in the seeds. The odour of crystallized hyoscyamine is slight, and the taste sharp and biting. The reaction is alkaline; with acids it forms crystalline salts, which he could not obtain from the hyoscyamine of commerce. It is sufficiently soluble in water to make it alkaline, very freely soluble in alcohol and ether, and more so in chloroform, but in benzine it is not so soluble. Solution of iodine in iodide of potassium gives a chocolate-coloured precipitate; iodohydrargyrate of potassium, on the other hand, gives a greenish white, and the iodide of bismuth and potassium an orange-yellow precipitate from an acid, but not from a spirituous solution. Tannin produces in concentrated solutions a greyish deposit.

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, December 6, 1876.

† *Lancet*, September 2, 1876, p. 319, 'On the Action of Hyoscyamine and its Resemblance to Atropine.' By J. Sydney Pearce, M.R.C.S., etc.

‡ *Practitioner*, July, 1876, p. 18.

Heated on platinum, he states it melts into a brown fluid, which ultimately sublimes without leaving any residue. Its melting point is 90° C. Like atropine it has the effect of dilating the pupil of the eye, and for a considerable length of time—twenty-four hours. The last fact is unfortuuate for the oculists, who have wanted a drug like atropine, but whose effects would not be so prolonged; with hyoscyamine Mr. J. Sydney Pearce found the dilatation lasted from two to twenty-one days.

The crystallized hyoscyamine now sold agrees with the description above given. Mr. E. Merck describes it as consisting of snow-white particles, which under the microscope appear as aggregates of very fine needles, and with high power oblique prisms. He says it is soluble in 120 parts of cold water, and much more soluble in hot. Its aqueous solution, as I have stated, has an alkaline reaction, yet I find that it has only about half the power of neutralizing acids that atropine has. Four grains of it only require two minims of diluted sulphuric acid, carefully added, to form a neutral solution, whereas four grains of atropine require about five minims, and four grains of daturine about 3·5 minims to make neutral solutions. The two latter are generally believed to be identical. I find the commercial daturine always requires less acid to form a neutral solution than the same quantity of atropine does. I am unable to explain this if they are identical, unless it be that it is not so completely dried as atropine. I infer from the above that when a combustion is made of hyoscyamine it will be found to have a higher molecular weight than atropine. As I am not aware that it has up to the present received its "baptism of fire" we have probably no right yet to call it hyoscyamine. When heated carefully in a porcelain capsule it first liquefies and then sublimes, producing a white vapour having a peculiar odour, and leaving scarcely a trace of residue. I had last week to pay the penalty of partial blindness of one eye for twelve hours, through getting the vapour into it whilst noticing its peculiar odour. I noticed also that it was readily inflammable. Mr. Merck states that Dr. Harnack of Strasburg found that the smallest dose which paralysed the terminations of the pneumogastric nerve of the frog is $\frac{1}{200}$ of a milligramme. In this respect it acts like atropine, and is antagonistic to muscarine and pilocarpine. The smallest quantity that produced dilatation of the pupil of the eye of a rabbit was $\frac{1}{250}$ of a milligramme. Given internally in moderate doses it produced, in healthy constitutions, not sleep, but increased restlessness, and in some cases confused talk and delusions of the senses, with dilatation of the pupil and dryness of the throat. In cases of mania, Mr. R. Lawson* gave as large doses as one grain, and even three grains, but he considers one grain as a full dose, producing generally in these cases twelve hours' sleep. He makes this curious statement respecting its keeping properties, that on one occasion "hyoscyamine was tried, but with little effect. This result, however, was explicable by the discovery that the hyoscyamine employed had been kept for some time over a stove in an imperfectly stoppered bottle. When a new bottle of Merck's alkaloid was opened and dispensed, one grain produced the same effect as before and in a very short time the patient was again restored to, and still retains the proper use of his reason." Its further therapeutic uses are on trial. It is said to be useful in allaying cough, in cases of gonorrhœa and stricture of the urethra. It seems that crystallized hyoscyamine is obtained from henbane seed, the only use of which with us is to make an inhalation as a household remedy for toothache.

I stated at the commencement that several chemists had years ago found that henbane seed contained a crystalline alkaloid. The late Mr. Morson informed me that Dr. Anthony Todd Thomson had a specimen in the Museum of Materia Medica at University College, which he considered a great rarity and prized very much, having paid a high price for it, and that he asked Dr. Thomson for a small quantity of it, which on testing proved to be nothing more than a salt of lime, whether he said sulphate or phosphate I am not certain now.

* *Practitioner*, July, 1876, p. 18.

Mr. John Tweedy, F.R.C.S., has kindly supplied me with the following information respecting the action of hyoscyamine on the eye:—

"Respecting the action of hyoscyamine locally applied to the eye I have not noticed that it differs in any appreciable degree from that of atropine. Both cause dilatation of the pupil and both temporarily destroy the power of adjusting the eye for the vision of near objects. The only questions for solution are, whether the intensity and duration of effect are precisely identical. Unfortunately, I do not possess sufficient data to warrant a dogmatical assertion of opinion, but I am disposed to believe, from the evidence before me, that as regards intensity hyoscyamine holds the first place, while the duration of effect is, as nearly as possible, equal. It is manifest, however, that an absolute decision on these matters can only be established by numerously repeated experiments under different conditions.

"If a drop of a solution of hyoscyamine, four grains to the ounce, be placed within the lower eyelid the following effects will be produced:—Within ten minutes the pupil will begin to dilate, and before twenty minutes have elapsed the iris will, in most instances, have expanded to its full extent. Almost simultaneously with the enlargement of the aperture of the pupil the nearest point of distinct vision will begin to recede, the range of accommodation will then rapidly lessen, and before one hour has elapsed it will be almost if not entirely destroyed; the nearest and farthest points of distinct vision having become practically indentical, since the greatest distance of distinct vision remains unaffected throughout. This state will continue without any apparent change for at least forty or fifty hours. A careful examination will then show that a slight power of accommodation has returned, and that objects can now be seen through a limited range. After about seventy to eighty hours the range of accommodation will be about one-third its normal amount; after about ninety hours it will be about one-half, but it will not regain the healthy standard until seven, eight, or nine days have gone by. Even then, the pupil will be somewhat dilated; indeed, it will not recover its former activity for at least ten to fifteen days.

"But in none of these particulars can hyoscyamine be said to differ in any marked degree from atropine."

NOTE ON CAPSAICIN.*

THE ACTIVE PRINCIPLE OF CAYENNE PEPPER.

BY J. C. THRESH.

The difficulty I have experienced in obtaining this principle in a perfectly pure state has been so great that it is only within the last few weeks that I have obtained it sufficiently pure for the purpose of submitting it to an ultimate analysis.

The process of purification consisted in dissolving the crude capsaicin in solution of potash (official strength), and precipitating by carbonic acid; collecting the precipitate, washing, drying, and dissolving in hot petroleum. After several days the principle crystallized out, and was washed, dissolved in alcohol, diluted with water, and left exposed to the air, but excluded from dust, until most of the alcohol had disappeared and the capsaicin had crystallized. This was collected, washed, and placed on the water bath until the weight was constant. When the mass had become solid, I sent it to Professor Flückiger, who was already interested in the subject, and who had kindly offered to undertake its ultimate analysis for me, and the following are the results obtained by Dr. Buri, his assistant.

1. Of the capsaicin dried over concentrated sulphuric acid, 0·2987 grms. gave

CO_2	0·7713
H_2O	0·2486

2. 0·2860 grms. yielded

CO_2	0·7363
H_2O	0·2347

From these results are calculated the following percentages:—

	I.	II.
C	70·42	70·21
H	9·25	9·12
O	20·33	20·67
	100·	100·

The simplest expression of the constitution of capsaicin is therefore most probably $C_9H_{14}O_2$, which form agrees very well with the above results.

9 C	108	70·13
14 H	14	9·09
2 O	32	20·78
		100·

This therefore gives an idea of its empirical composition, but as yet there is no means of establishing a structural formula.

Having now received a large supply of alcoholic extract of cayenne, purchased by aid of the grant generously made to me by the Pharmaceutical Conference, I hope soon to have sufficient of the pure capsaicin to attempt the discovery of its relationship to other organic principles, and its structural formula.

THE BEHAVIOUR OF SOLUTIONS OF SOME SUBSTANCES TO POLARIZED LIGHT.†

(*Continued from p.* 412.)

BY O. HESSE.

c. Starch Sugar.—According to Biot, starch sugar varies very much in its optical behaviour. With a sample prepared according to the older method by the action of sulphuric acid upon starch he obtained $\alpha r = +$ 51·43°, and with a similar sample Péligot obtained $\alpha r = +61{\cdot}54°$; whilst with a sugar prepared by treating starch with 1-500th of oxalic acid Jacquelin obtained $\alpha r = +100{\cdot}57°$. Dubrunfaut looked upon the latter as a mixture of ordinary sugar with his maltose, $C_{12}H_{22}O_{11} + H_2O$. Two varieties were examined by the author.

The first, from Nienhaus and Co., had become yellowish coloured through keeping twelve years. It was, therefore, treated in aqueous solution with animal charcoal, after which upon concentration of the solution it separated in white aggregated crystals similar to those of honey sugar; these melted at 82°. Heated up to 100° they lost altogether 8·91 per cent. of moisture. (1 mol. $H_2O = 9{\cdot}04$ per cent.) After preliminary treatment with 60° to 70° alcohol it dissolved easily in boiling 97° alcohol, from which it crystallized on cooling in small prisms resembling those of anhydrous honey sugar; heated to 110° C. these crystals did not lose weight, and first melted at 144° C. When dissolved in water the hydrated form produced perfectly resembled the hydrated honey sugar. The optical examination of this sugar gave the following results:—

Sugar Used.	Modification.	p	l	$a° +$	$(\alpha)_D +$*
Anhydrous . . .	α	3	200	6·06	101·00
" . . .	β	3	200	3·10	51·67
Hydrated	α	1	220	2·04	92·72
"	β	1	220	1·10	50·00
"	α	3	220	6·23	94·39
"	β	3	220	3·17	48·03
"	α	6	200	10·87	90·58
"	β	6	200	5·64	47·00
"	β	12	100	5·62	46·83

According to these results this starch sugar also agrees with honey sugar.

A fine starch sugar, sold in Stuttgart under the brand "grape sugar, Ia. R. and W.," and which plays an important part in the manufacture of wine and beer in South Germany, was the other examined. With the exception of a trifle, consisting of incombustible substance, the whole sample dissolved easily in alcohol; consequently no dextrin worth mentioning was present. Upon evaporation the sugar separated from the colourless syrup in beautiful clusters of crystals. These were washed upon a filter with dilute alcohol and then dried in the air between blotting paper. The sugar proving to be hygroscopic it was rubbed with dilute alcohol to bring the hygroscopic portion into solution; this object, however, was not completely attained. In this condition, with $p=3$, the α-modification gave $(\alpha)_D = +93{\cdot}78°$, and the β-modification, $(\alpha)_D = +55{\cdot}8°$. The sugar in a finely divided state was now kept for two days in contact with 80 per cent. alcohol, after which it lost 8·93 per cent. of water at 105° C., whilst the α-form gave in aqueous solution $(\alpha)_D = +95°$, and the β-form $(\alpha)_D = +51{\cdot}8°$. The sugar was then kept in contact with a large quantity of 80 per cent. alcohol eight days longer at the ordinary temperature, by which the greater part was dissolved. The undissolved portion, which had the composition $C_6H_{12}O_6 + H_2O$, examined optically gave for the α-form $p=3$, $l=220$, $(\alpha)_D = +96{\cdot}21°$, for the β-form $(\alpha)_D = +48{\cdot}18°$. The sugar obtained from the alcoholic solution was beautifully white and contained 9·48 per cent. of water of crystallization. It gave with $p=3$, $l=200$, the α-form, $(\alpha)_D = +92{\cdot}85°$, for β-form $(\alpha)_D = +52{\cdot}16$. This difference between the two portions disappeared after the latter had been recrystallized from water a few times. After this, more recrystallizations led to no further change in its properties, so that that the author looks upon the variety of sugar, of which this sample of starch-sugar principally consists,

---

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, December 6, 1876.

† Abstract of a paper in the *Annalen der Chemie*, vol. clxxvi, p. 95.

* In accordance with the author's request the formula $(\alpha)_D$ is from this point substituted for αj in the original paper.

as being chemically distinct. It loses at 70° C. about 7 per cent. of water and from 95° to 100° 2 per cent. more. It melts at 76° C. If heated to a temperature at which it is not baked together, about 60°, and then treated with boiling 97 per cent. alcohol, an anhydrous crystallized sugar is obtained which is identical with the anhydrous grape sugar. When heated to between 60° and 70° it usually passes into the β-form and is baked together and then is not suited for the preparation of the anhydrous crystallized sugar.

d. **Salicin Sugar.**—This sugar was obtained by the action of emulsin upon salicin. Still adhering saligenin and colouring matter were removed by treatment with alcohol and ether and then in aqueous solution with animal charcoal; the solution was concentrated at a gentle heat, when the sugar immediately crystallized out. The crystals lost most of their water at 70° to 80° and up to 100° C. equal to 1 mol. of water. The hydrated salicin sugar melted in a fine tube at 84° The anhydrous sugar boiled in a sufficiency of 97 per cent. alcohol dissolved and crystallized out on cooling in handsome colourless crystalline needles, resembling the anhydrous honey sugar. When the anhydrous salicin sugar is dissolved in water it crystallizes on spontaneous evaporation in the usual hydrated form containing one molecule of water. The optical examination gave the following results:—

Kind of Sugar.	Modification.	p	l	$\alpha+$	$(\alpha)_D+$
Anhydride	α	2·5	200	5·15	103·00
"	β	2·5	200	2·59	51·80
Hydrate	α	1·0	220	2·20	100·00
"	β	1·0	220	1·10	50·00
"	α	3·0	220	6·39	96·82
"	β	3·0	220	3·28	48·48
"	α	6·0	200	11·78	98·17
"	β	6·0	200	5·75	47·91
"	β	6·0	100	2·88	48·00
"	β	12·0	100	5·72	47·66
Hydrate from Anhydride	β	3·0	200	2·84	47·33

Almost throughout salicin sugar shows a greater rotatory power than honey sugar. It also loses its water of crystallization more easily, and, possibly in connection with this property, it melts at a somewhat higher temperature. The author therefore looks upon it as a special kind of sugar.

e. **Amygdalin Sugar.**—A small quantity of this sugar was examined that had become yellowish by keeping. The colour was easily removed by treatment with animal charcoal. The sugar crystallized very easily, and melted in fine tubes at 84° C., appearing to behave like salicin sugar. With $p=2$ and $l=200$ a freshly prepared aqueous solution gave $(\alpha)_D=+94·75°$; after 24 hours it gave $(\alpha)_D=+49·25°$. The anhydrous amygdalin sugar was not examined optically, but it appeared to be identical with the anhydrous grape sugar.

f. **Phlorizin Sugar.**—This sugar was prepared by decomposing phlorizin with sulphuric acid, decolorizing with animal charcoal, and then dissolving in 80 per cent. alcohol to separate a small quantity of white substance (probably mycelium of a fungus), which rendered the solution turbid and interfered with the optical test. Phlorizin sugar is beautifully white, and consists of spherical aggregates of non-hygroscopic crystals. It loses 6 to 7 per cent. of water between 60° and 70° C., and the remainder of one molecule at 103° C. In a hair tube it melts at 74°; but heated in a larger quantity in a crucible it bakes together at a much lower temperature and passes into the β-modification. Probably from this reason the anhydrous sugar cannot be prepared from the hydrated. With $p=3$ and $l=200$ an aqueous solution of the α-form gave $(\alpha)_D=+82·33°$; the β-form, $(\alpha)_D=+40·78°$; with $p=6$ and $l=200$, β-form, $(\alpha)_D=+39·75$. Examined after two recrystallizations from water and washing the crystals each time with alcohol it appeared to have undergone no change in its properties. Phlorizin sugar is, therefore, essentially different from the foregoing sugars, and most nearly approaches the second starch sugar.

Salicin.

An optical examination of salicin yielded the following results:—

$p=1$, $l=220$, in aqueous solution $(\alpha)_D=-64·54$
$p=2$, $l=220$, " " " $=-63·85$
$p=3$, $l=220$, " " " $=-63·28$

These give the formula $\alpha j=-(65·17-0·63\,p)$. A hot solution and a freshly prepared cold solution showed no difference in the rotatory power; the author, therefore, thinks that salicin contains the sugar in the β-modification.

Phlorizin.

Some commercial phlorizin was freed from its yellowish colour by recrystallization from boiling water containing a little sodium sulphate, and was then obtained in handsome colourless needles. The solvent used in the optical examination was 97 per cent. alcohol.

$p=1$, $l=220$, $t=22·5°$, $(\alpha)_D=-51·81$
$p=3$, $l=220$, $t=22·5°$, $(\alpha)_D=-56·50$
$p=5$, $l=220$, $t=22·5°$, $(\alpha)_D=-61·60$

This gives the formula $(\alpha)_D=-(49·40°+2·41\,p)$. Phlorizin also appears to contain the sugar in the β-modification.

Phloretin.

Phloretin was prepared according to Schiff's method, and by recrystallization from dilute hot alcohol obtained perfectly pure. With $p=1$, and $p=3$, in solution in 97 per cent. alcohol, and at a temperature of 22·5, it showed no deviation of polarized light. This result does not agree with the theory respecting sugar compounds and allied substances held by Schutzenberger. For since phlorizin sugar possesses a smaller rotatory power than phlorizin, according to this observation phloretin must be endowed with a tolerably strong rotatory power in order to cover this fall in the rotatory power of the glucoside.

VERATRINE.*

BY ERNST SCHMIDT AND RUD. KÖPPEN.

Crystallized veratrine was prepared by the authors according to the directions of Merck, partly from commercial veratrine and partly from veratrine made by themselves. The general properties of the substance accord with the statements of Merk and Weigelin respecting it. It melts at 205°. The numbers obtained by analysis (64·63 per cent. carbon, 8·68 per cent. hydrogen, 2·66 per cent. nitrogen) lead to the formula $C_{32}H_{50}NO_9$. The hydrochloride forms with gold trichloride the compound $C_{32}H_{50}NO_9HCl+AuCl_3$, which crystallizes in yellow needles; with platinum tetrachloride an indistinctly crystalline compound $(C_{32}H_{50}NO_9HCl)_2+PtCl_4$; and with mercuric chloride a white crystalline precipitate, $C_{32}H_{50}NO_9HCl+HgCl_2$. The sulphate $(C_{32}H_{50}NO_9)_2H_2SO_4$, and hydrochloride are non-crystallizable.

Crystallized veratrine is insoluble in water, but on prolonged washing therewith it becomes transformed into a soluble modification, the solution of which leaves when evaporated a yellowish amorphous mass having the same composition as the crystals. Veratrine dissolved in water is rendered insoluble, and is consequently precipitated, by heating the solution. Acids also appear to convert the soluble into the insoluble modification.

Several samples of commercial veratrine examined by the authors were found to be almost pure.

* From the *Journal of the Chemical Society*. Deut. Chem. Ges. Ber., ix, 1115—1121.

QUICKSILVER.*

BY SENOR DON R. A. SODA.

Spain for several centuries had exclusive possession of the sources of the supply of quicksilver. The Spanish mines at Almaden,† which, in spite of the important discoveries mentioned further on, are the richest deposit in the world, were worked in the most remote periods. A passage of Pliny shows that the Romans depended on them exclusively for the manufacture of vermilion, and he gives evidence of their immense importance in the ancient world. When the 10,000 *librae* of ore had been extracted from them for the needs of the year, they were shut with solemn ceremonies, and the key of the mines was lodged with the prefect. They could not be opened again without orders direct from Rome. It is generally considered that the Carthaginians, or at least the Phœnicians, preceded the Romans in working the Almaden mines. Historic proof of this fact, it is true, is wanting, but its admissibility seems to me to be possible; firstly, from the great importance attached to their Spanish possessions and their mineral wealth by the Phœnicians; secondly, from the proximity of these mines to the centre of the Phœnician occupation in Spain; thirdly, from the manufacture of vermilion denoting a certain degree of progress in industrial arts, which is more intelligible on the part of a commercial people than on the part of a mere nation of soldiers; fourthly, from the fact that the Romans, who never displayed any marked aptitude for industry, were but the pupils of the peoples who had preceded them in civilization.

Whatever their antecedents, the Almaden mines stood alone in the world during the long period between the rise of the Roman power and the beginning of mineral industry in America.

The separation of silver from its ores, in the amalgamation process, is the principal large use to which mercury is put. The discovery by Spain of the rich silver mines of Mexico and Peru caused a great increase in production, and from that time forward Almaden became important. In Peru the cinnabar mines of Huencavelica had been discovered, and in Austria those of Idria, in the province of Carniola; but the former were closed at the end of last century, the winning having been conducted in a very reckless fashion. The Spanish Government, which retained a monopoly of the trade with the New World, persuaded the Emperor of Austria to an arrangement under which the latter, after retaining sufficient for use in Austria, made over to the Spaniards the whole surplus output of the mines at Idria. The Spaniards carried on a very profitable trade with the mercury which they bought at their own price from Austria, and sold at their own in America. Spain thus remained mistress of the market, although no longer the exclusive producer of the metal. She took from Austria every year 368 tons of mercury, at £240 per ton, reselling it at £360 per ton. At about this time negotiations were entered into with the famous Fugger family by the Spanish Government for ceding to them the right of working the Almaden mines and reducing the cinnabar. This concession was enjoyed by the Fugger family from 1525 to 1645, and enriched it enormously. It members became princes of the Roman Empire, and accumulated one of those colossal fortunes at which history is amazed. Their name, Ibericised into the form Fucar, became a synonym for wealth, and the Spanish proverb, "Richer than a Fucar," is still current.

The mines discovered in Germany and Tuscany being of no great importance, the only apprehenson of the Spaniards was to see China, who was supposed to possess enormous deposits of cinnabar, appear in the market as a seller. The contrary, however, has really happened, China being a buyer in the markets of both Europe and America. Just when no such thing was being thought of by any one, new discoveries were made, on such a scale that the former conditions of the mercury market have entirely passed away.

At the time of the gold fever in California the gold-finders in the Trinidad placers used to come across grains of reddish stone of so high a specific gravity that on washing the sands they always settled at the bottom of the cradles, after lighter matters had been removed. The name of "red stuff" was given to it by the miners, just as that of "blue stuff" was given to other numerous fragments of a bluish colour. The first were cinnabar, the second an extremely rich sulphide of silver.

In a country where science and action are both practical and easily come together for the common good, these indications were speedily utilized. When the importance of the "placers" became less, investigations of a very costly nature were set on foot. At the cost of labours which would have discouraged less energetic and enduring men, the veins were discovered which are now great sources of wealth. At the present time New Almaden, New Idria, Napa, Colusa, Sonoma and Lake Colorado, afford ample field for the energies of that puissant race, which, to its unresting exploration has added unresting winning, and to these an unresting progress in the methods of treatment of the output. Three patents for distilling furnaces are in existence; Randal's, Knox and Osborn's, and Livermore's. These are for treating poor ores, either in cakes or in a pulverulent condition. Ores differ very considerably in richness, the range being from 20 to 2 per cent. All has been the work of less than a quarter of a century, and at the present time more than half the world's consumption of quicksilver is yielded by that privileged country.

The metal is brought to market in iron flasks holding 76 lb. (34·5 kilogrammes) of mercury. Of the total annual production of 100,000 bottles, 60,000 come from California. From the port of San Francisco, where the greater part of this is shipped, there have been forwarded, during the last fifteen years, 400,000 bottles, of the total value, in round numbers, of £2,850,000. New Almaden, which for some years has been the most productive mercury mine in the world, produced 34,765 bottles in 1862, 40,391 in 1863, and 47,191 in 1864. The highest output in any year of the original (Spanish) Almaden Mine was 32,336 bottles; its annual rate at present is restricted to 9600 bottles. The results of the American production have been, in the first place, to arrest the upward tendency of the price of quicksilver, and in the second, to increase the stock, as shown by the contrast between the 23,591 bottles entered at New York in 1874, and the 47,165 entered in 1875. In the third place, the consumption has so increased that China, which in 1873 took 1900 bottles, figures in the statistical accounts of San Francisco in 1875 for 18,190 bottles; while Mexico, which in the first of these two years limited its demands to 3761 bottles, took 5757 in 1875. Lastly, the home consumption has been enabled to rise to 15,000 or 20,000 bottles a year, which is the quantity retained by the States for their own use. The Californian mines produced last year a total of 40,900 bottles, distributed as follows:—Redington, 13,000 bottles; New Almaden, 9000; New Idria, 8800; Guadalupe, 3400; Great Western, 3400; Saint John, 700; Liverdale, 700; Buckeye, 700; Manhattan, 450; Great Eastern, 400; Phœnix, 350. The weight here shown is about 1420 tons. The production of Sulphur Bank, which takes the second rank among American quicksilver mines, and that of several mines of less account, were not included in the documents from which we extracted the foregoing figures.

We can now see to what an extent the market has been modified. Spain has never been in a position to offer more than 40,000 bottles a-year; the Almaden furnaces now producing up to a standard of 25,000 bottles, and the standard consumption being about 100,000 bottles. The difference is furnished by other sources of supply than Spain. The quicksilver market, therefore, it is self-evident, is no longer a monopoly of Spain. It was ours so

* From *Iron*, December 2, 1876.

† Almaden, "The Mine," according to its Arabic name, is situated in La Mancha, at the point where this province joins Andalusia and Estremadura.

long as we were the only producers, but England, for whose custom all producers are desirous, as she consumes on her own account about half the total product, or say 45,000 bottles, has become the field of competition, and the market has been transferred to London. To this change the house of Rothschild has contributed by the share it has taken in quicksilver transactions, the possession of the Spanish mines having been made over to it for a certain number of years.*

Fortunately for ourselves, the heavy cost which the Californian mercury has to defray for carriage before it can make its appearance on the London market, as well as other charges which it has to bear before it leaves its port of exportation, affects it sufficiently to tell very decidedly in our favour, and make our competition possible. The time, however, is come when we should do well to rouse ourselves from any dream of undisturbed possession, and endeavour to get all the profit we can out of conditions which we are not in a position to annihilate. The decided tendency to rise which was marked before the discovery of Californian cinnabar has not only been contradicted, but there has been a considerable decline.

The two principal elements of price are the cost of raising and the cost of purifying.

The first of these elements, the cost of raising, may as well stand out of the discussion; labour is dear at Almaden, as treble pay is given. This cannot be avoided; since the miners cannot work more than three hours a day without being poisoned. But any reduction in the cost of raising would tell very slightly on the cost of the metal, since even the triple pay brings up the first charge to only 2*s.* 6*d.* per cwt. The question is thus limited to one of treatment of ore, and it is in this way that we in Spain have to confess room for improvement.

The furnaces in which distillation is carried on at Almaden are those of Bustamente, invented by that distinguished engineer in 1648 (that is to say, at the time that the Fuggers gave up the mines), and the so-called Idrian, introduced in 1806. This latter year is the latest term of improvement. Idria itself, however, has twice since then reformed its distilling, and in California, as we have already stated, there are three patent systems in use. As it is reasonable to suppose that each and all of these newly-introduced systems have improved on the older ones, this mere recapitulation shows us as very much behindhand.

The treatment of cinnabar is difficult, on account of the volatile nature of mercury, which, if not prevented, escapes with the products of combustion. The damage done by mercury fumes is specified by Dr. Roberts in a remarkable work treating of Berrens' system, by which evaporation is completely avoided.

The ordinary estimate of the loss by evaporation in the Almaden mines is 50 per cent. The result of an experiment by the celebrated engineer Escosura, who obtained a minimum of loss of 4·36 per cent., has sometimes been looked upon as a standard; but the results obtained in a laboratory cannot for a moment be compared with practical furnace-work as carried out at Almaden. Senor Monasterio, director of the Madrid School of Mines, was commissioned some years ago by the Government to report upon the system proposed by M. Pellet, a French engineer, as compared with that followed at the Idria furnaces. He reported unfavourably to Pellet's system, and it is therefore to be supposed that he did the best he could with the San Luis furnace, on the Idria plan. The percentage of loss stated by him was 5·59 per cent.; but the figures are open to question—firstly, for the same reasons as those given in reference to Escosura; and secondly, from the testimony of M. Huyot, who (*Annales des mines*, 1852) states the loss at Idria to be 27 to 29 per cent. Senor Monasterio concludes his report in the following words:—"Can it be supposed that, under normal circumstances, when one has not the same interest (*i.e.*, in the ordinary course of working), the loss rises to twice the amount? Even then it would only be 20·16 per cent., or less than half the amount which has been stated in public documents." It would almost seem as if Senor Monasterio were satisfied with 20·16 per cent. of loss—which, by the way, comes very near to Huyot's estimate of the loss at the Idria furnaces. Letting it, however, stand at this, and supposing that the mines at Almaden have produced to a value of £60,000,000 since the establishment of Bustamente's furnaces, the proportionate loss will be not less than £12,000,000.

The ratio of loss in the patent furnaces used in the United States I am not acquainted with; but I cannot conceive it possible that the Americans would look without concern on the loss of such immense quantities of mercury, discharged uselessly into the atmosphere. It is very possible, therefore, that we are seriously at a disadvantage, relatively to the mines of California.

The advantages which the Almaden mines possess over their rivals beyond sea are very considerable. In the first place, their ores are much richer than those of California; the preliminary costs have been long since defrayed, and the seams are of great thickness, some workings being 12 feet, others 15 feet, and others nearly 30 feet thick. Spanish quicksilver, too, can be put on the English market at only a fraction of the freightage paid by Californian metal. These are conditions which ought to turn the balance in competition, and if the increasing consumption of America absorbs its output, as it tends to do, the market of Europe can and ought to belong to Spain.

Almaden only raises 4 tons of mercury a day, or 25,000 bottles the seven months of working. England wants 45 tons. Since we could let her have them, why do we not?

Fortunately for Spain, an improvement is at hand. A distinguished chemist of Barcelona is now testing at Almaden a furnace of his invention, which is reported to save the whole amount of the mercury distilled, whatever be the quality of the ores. The tests were conducted in the presence of a commission of three mining engineers specially appointed by the Government.

Two experiments were made. In the first, the inventor, Senor Berrens, operating with great care, obtained a quantity of mercury equal to the proportion contained in the ore, less 0·79 per cent. In the second, the inventor, so far from operating with care, seemed to act with studied recklessness, and the commission were surprised to see the ordinary precautions totally abandoned. The inventor hastened the period of roasting; he drove the steam-engine at 126 strokes a minute, he shortened by 25 hours the time taken for roasting in the previous experiment, and raised the temperature of the furnace to a white heat. He did all that could be done to entirely ruin the operation, and yet the loss did not exceed 3·62 per cent. Indeed this loss was apparent only, not real, for the leaf of gold placed at the top of the flue did not show the smallest trace of mercurial change, proving that no loss by evaporation had taken place. This was acknowledged by the commission, which allowed that the mercury thus wanting might be deposited in a part of the apparatus contrived *ad hoc*. The object of the inventor in his second experiment was to show that his system was not easily prejudiced by careless working.

The Berrens furnace has the further advantage of remaining in use all the year round. The two experiments were carried out in August at an exterior temperature of 27° to 33° C., so that, without increasing the proportion of work, the 25,000 bottles produced in seven months could be raised to 43,000 bottles, working all the twelve-month through.

The reality of this important improvement has been testified to by the competent authority of the commission, which presented its report last January.

* The house of Rothschild acquired the right to work the Almaden mines by a cession made in consequence of a contract entered into with the Spanish Government in 1843.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 9, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

EARLY CLOSING AMONG CHEMISTS AND DRUGGISTS.

WE are glad to find that although the subject of earlier closing amongst chemists and druggists has not been so prominently discussed during the present year, this has not been because there has been any general desire to fall back from the ground already won, but rather to give laggards, from one cause or another, opportunity to close up with those in advance. Thus the President of the Halifax Association was recently able to state that although an agreement amongst the chemists and druggists in that town, to put up shutters at 7 p.m. had fallen through in many cases, final closing at 8 p.m. was still general and Sunday business was not only unsought but undesired. A dozen years ago no arrangement on the subject existed, some chemists closing their shops at 9 p.m. and some later. We think this case is typical of what has occurred in many other places; whilst the full extent of the original advance has not always been maintained, there has been sufficient progress to give ample encouragement for fresh efforts.

We are therefore glad to learn that on the 1st inst., a meeting of the chemists and druggists of Notting Hill and Bayswater was held, under the auspices of the Early Closing Association, in the Mall Hall, High Street, Notting Hill. The chair was occupied by Mr. HENRY LONG, Pharmaceutical Chemist, and a very general feeling in favour of the adoption of earlier closing was expressed by the speakers. This feeling was eventually formulated into a resolution to the effect that the business hours observed by the chemists and druggists are unduly prolonged, and might be curtailed without inconvenience to the public or prejudice to trade, whilst conferring great benefit to both employers and employed. A provisional committee was also appointed to carry out the object of the meeting.

We hope that this meeting, in an important suburb of London, may be but the forerunner of many others. Especially we would commend the present season, when many provincial associations are commencing work for a fresh session, as being favourable for taking the matter up. It is an undoubted fact that during the last few years public opinion has undergone a considerable amount of healthy education in respect to the earlier closing of shops, and there does not seem to be any very obvious reason why the customers who have so freely met the wishes of the linen drapers, for instance, should refuse to be as considerate to the chemist and druggist. On the contrary, we believe that the coveted privilege may be obtained by united action, and we would urge that those gentlemen who take an active part in canvassing their brethren on the subject, such as the provisional committee appointed last week, should receive from every chemist and druggist the readiest possible help and co-operation in their work.

A HINT FOR A NEW POMADE.

NOTWITHSTANDING that we owe much to the Baconian philosophy, many discoveries have been the result of pure accident, and the "rule of thumb" has been the predominant feature in their development. When one reads of a Yankee specific for the growth of hair, which when spilt in the neighbourhood of a doorstep over night resulted in a handsome door-mat the next morning, one feels at liberty to exercise the fashionable faculty of scepticism. But when a British Consul tells a "plain unvarnished tale," we presume it must be received with becoming gravity. Still we cannot help remarking that the news conveyed by Mr. Consul STEVENS in his last report to the Government on the trade of Nicolaieff would be indeed a blessing to bald heads, *if true.*

Mr. Consul STEVENS states that a former servant of his, prematurely bald, whose duty it was to trim his lamps, had a habit of wiping his petroleum-besmeared hands in the scanty locks which remained to him, and after three months of lamp trimming experience and practice of his dirty habit he found he had a much finer head of black, glossy hair than he ever possessed before.

Consul STEVENS, therefore, tried the remedy on two retriever spaniels that had become suddenly bald, with wonderful success. During the summer of 1875 his attention was called to several cases of sudden baldness of bullocks, cows, and oxen, and the loss of tails and manes among horses. His previous experience induced him to suggest the use of petroleum to the owners, and it was found that while it stayed the spread of the disease among animals in the same sheds and stables, it effected a quick and radical cure on the animals attacked.

Consul STEVENS says that the petroleum should be of the "most refined American qualities," and should be rubbed in vigorously and quickly with the palm of the hand. It should be applied six or seven times in all, at intervals of three days, except in the case of horses' tails and manes, when more applications may be requisite.

MILK OF SULPHUR.

We have received several letters on the subject of the late prosecutions for the Sale of Milk of Sulphur, in reply to which, we think that a reference to the 12th and 20th sections of the Sale of Food and Drugs Act will enable our correspondents to ascertain the means by which the absurdity of the case they refer to may be effectually demonstrated, and at the same time a service rendered to the trade at large.

The use of a label distinctly indicating that the article sold as Milk of Sulphur is not the Precipitated Sulphur of the British Pharmacopœia would no doubt be a prudent mode of protection, and under existing conditions, we think it should always be used, in accordance with the suggestion made some months since by the solicitors who conducted the defence of a case of the kind at Leeds, a report of which will be found in the *Pharmaceutical Journal*, vol. v., p. 635.

THE NEXT PRELIMINARY EXAMINATION.

We are requested to state that on account of the first Monday in January next being New Year's Day, the Preliminary examination which would in the ordinary course have been held on that day, will take place on the following Monday, January the 8th.

THE PRESERVATION OF COLOUR IN PLANTS FOR THE HERBARIUM.

In a note published in the *Archiv der Pharmacie* for September, Herr Stoelzl indicates a new application of salicylic acid in the preservation of the natural colour in plants dried for the herbarium. It is well known that this, in the case of succulent plants (*Orchideæ, Pinguicula*, etc.), is effected with difficulty, and that during the tedious operation of drying putrid fermentation sets up in the mucus contained in such plants, causing them to become black and indistinguishable. Herr Stoelzl sought to overcome this disadvantage by using alcohol as a coagulant and salicylic acid to prevent putrefaction. A solution of one part of salicylic acid in 600 parts of spirit was heated to boiling in an evaporating dish and the entire plant drawn slowly through (a longer submersion decolorizes violet flowers), then shaken and carefully pressed between blotting paper. Treated thus, the plants dried rapidly, and yielded throughout a favourable result, the red and violet colours especially being preserved exquisitely bright.

The following are the names of a few plants especially liable to become black, which Herr Stoelzl has found can be thus prepared with advantage:— *Orchis moris, O. militaris, Syringa alba, Asperula odorata, Pinguicula vulgaris, Gymnadenia conopsea, Salvia pratensis, Rhinanthus Alectorolophus, Cephalanthera pallens, C. ensifolia, Œnothera biennis, Verbascum Thapsus, Petasites alba, Juglans regia, Pedicularis palustris.*

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, December 6, 1876.

MR. JOHN WILLIAMS, PRESIDENT.

MR WILLIAM DAWSON SAVAGE, VICE-PRESIDENT.

Present—Messrs. Atherton, Atkins, Betty, Bottle, Cracknell, Frazer, Greenish, Hampson, Hanbury, Hills, Mackay, Owen, Rimmington, Robbins, Sandford, Schacht, Shaw and Stacey.

The minutes of the last meeting were read and confirmed.

The President read a letter from Dr. Fowler thanking the Council and Board of Examiners for affording him the opportunity of being present at the last examination.

Appointment of Examiners.

The following Pharmaceutical Chemists were then appointed Examiners for the ensuing year, subject to the approval of the Privy Council:—

ENGLAND AND WALES.

Alfred Allchin.
James Benjamin Barnes.
Frederick Baden Benger.
Michael Carteighe.
Octavius Corder.
Samuel Gale.
Frederick Janson Hanbury.
Adolphus Frederick Haselden.
John Samuel Linford.
William Martindale.
John Moss.
William Southall.
George Spratt Taylor.
Charles Umney.

SCOTLAND.

William Ainslie.
John Borland.
James Buchanan.
William Gilmour.
David Kemp.
Alexander Kinninmont.
John B. Stephenson.
James Robert Young.

It was resolved that the Board of Examiners for England and Wales should meet in the months of February, April, June, July, October and December, 1877, and the Board of Examiners for Scotland during the months of February, April, July, October and December.

Mr. Shaw said Mr. Greenish had on a previous occasion asked if information could not be afforded as to the subjects in which the students failed in the examinations. Now he found that Dr. Maclagan, in his report on the examinations at the North British Branch, stated that where one failed in pharmacy and materia medica, two failed in reading prescriptions, twenty-two in botany, and twenty-six in chemistry. If the education of candidates and the examinations were practically identical in England and Scotland, it might be inferred that the same proportion would hold good.

Mr. Mackay thought the statistics which had been read were founded on an estimate of the marks obtained by those who had passed. By the system now in force, if a candidate failed originally in one subject he was not examined in the others, and therefore these figures were necessarily incomplete.

Mr. Greenish said he should be glad to have the information even in the case of those who passed, though it was evident from what had been stated that the statistics could not be complete.

Mr. Shaw said the figures he had read referred to those who had failed. It appeared that the candidates were pretty well up in the practical part of their business, but with regard to botany and chemistry they were very deficient.

The PRESIDENT said it was quite within the power of the Council to order that such information should be given. The only question was whether it would tend to a useful purpose or not.

Mr. MACKAY said the report of Dr. Maclagan was framed entirely on that gentleman's own responsibility, without any consultation with the Board of Examiners. He could not himself see what useful purpose would be served by making known the subjects in which the men failed.

Mr. HAMPSON thought the statistics referred to would be useful to the students themselves, in showing them that they must be better prepared in certain subjects.

Mr. MACKAY thought this end would be attained to a great extent under the new regulations with regard to fees which would come into operation in 1877, which would prevent young men coming up totally unprepared, simply as an experiment.

ELECTIONS.

ASSOCIATES IN BUSINESS.

William Daird Williams of Hampstead, having passed the Modified Examination, and being in business on his own account, was elected an "Associate in Business" of the Society.

ASSOCIATES.

The following having passed the Minor Examination and having paid (as Apprentices and Students) or tendered their subscriptions for the current year, were elected "Associates" of the Society.

Ferriday, Edwin Joseph Titchford ..Oakengates.
Mann, Edwin ....Atherstone.
Watson, Lund ....York.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

The Registrar was instructed to restore to the Register of Chemists and Druggists the names of the following persons:—

Alfred Faulconbridge ....160, Lambeth Walk.
James Dunkerly ....50, Southgate Rd., Kingsland.
Robert Owen Steed ....189, Wandsworth Rd.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was received and adopted, and sundry accounts were ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow of a registered chemist and druggist.

£15 to the widow of a late member in very distressed circumstances.

£5 to a former member, not now on the register, having had to give up his business from continued ill health; applicant has a brother in affluent circumstances.

£15 to the wife of a registered chemist and druggist who is at present in a lunatic asylum, owing to the effects of a railway accident.

£10 to the widow of a registered chemist and druggist whose case had stood over from August last, applicant having had two previous grants.

The Committee also recommended that the sum of £200 be invested in Consols, and that the regulations which they had carefully considered, be approved by the Council in an amended form.

Mr. SHAW moved the adoption of the report, and explained the alterations which had been made in the rules.

Mr. HAMPSON, in seconding the motion, asked if any hardship had been found to arise from the operation of rule 8.

The SECRETARY replied that he had not heard of any such instance. Some of the proposed alterations gave rise to discussions, especially a clause discountenancing canvassing.

Mr. SANDFORD moved that the consideration of the amended regulations be deferred to the February meeting, as he thought some of the alterations were too important to be decided upon without further consideration. He saw many objections to the prohibition of canvassing.

Mr. STACEY seconded the amendment.

Mr. BOTTLE said it was very desirable to make the alterations at once, if at all, in order that they might be included in the new Calendar.

Mr. OWEN having had a great deal to do with charitable institutions, objected to any alterations being made. The present regulations had worked well, and he saw no reason to change them.

Mr. ROBBINS spoke in favour of the tenth amended regulation, which had been inserted at his request, and which he thought would lead to a better selection of candidates for annuities.

Mr. FRASER said he was prepared to accept the revised regulations, but he could see that some of them were open to argument, and therefore he was willing to accede to the amendment, or even postpone the subject until next year.

Mr. HAMPSON said the members had had time to consider the regulations; they had been very fully considered in Committee and passed almost unanimously.

The PRESIDENT said the questions were not new, having been discussed over and over again.

Mr. MACKAY said the alterations proposed were not of any great magnitude. The main points were, putting the names of approved candidates for annuities in a book for selection at the October meeting, and the discountenancing of canvassing; and he did not think even Mr. Sandford would, on full consideration, object to either of these changes. He did not think it fair to the Committee to postpone a matter to which they had given so much time and attention.

Mr. SCHACHT said he had previously opposed the proposition to discountenance the use of cards and circulars, and must still do so. He thought the Fund would suffer if anything were done to limit the interest taken by subscribers in the elections. Besides the proposed clause was neither one thing nor the other; it might operate prejudicially on the conscientious candidate who would obey it, but would be disregarded by others.

Mr. SANDFORD said he would, in order to meet the views of some members, make his amendment more general by omitting the date upon which the question should be considered.

Mr. ATKINS thought one of the proposed new rules (clause 11) was a most important addition to the regulations, and it would be necessary to know whether it would have a retrospective operation.

Mr. BETTY supported the original motion. He could not see that the Fund would suffer from the abolition of canvassing.

The amendment of Mr. SANDFORD was then put in the following form:—

"That the consideration of the proposed alterations in the Regulations of the Benevolent Fund be deferred until a future meeting of the Council."

On a division being taken, the Council was found to be equally divided on the question,

The PRESIDENT said that in accordance with a principle which he had always followed, that a casting vote should, as a rule, be in favour of leaving matters as they were, and although his vote would thus be against his own opinion, he would give his casting vote in favour of the amendment for deferring the consideration of the matter.

It was moved by Mr. ATKINS and seconded by Mr. HILLS,

"That clause 11 of the amended regulations should be added to the Rules at present in force."

The motion being objected to was not pressed.

The amendment was then put as a substantive motion and carried.

The report and recommendation of the Committee, with the exception of the amended regulations, was then adopted unanimously, and the Treasurer was requested to purchase £200 Consols on the Benevolent Fund account.

Mr. SHAW then gave notice of motion that he would bring forward the question of the amended regulations at the February meeting of the Council.

LIBRARY, MUSEUM AND LABORATORY.

This Committee had met twice during the month.

The Librarian had reported that the attendance during the preceding month had been as follows:—Day, highest, 30; lowest, 11. Evening, highest, 13; lowest, 4.

The circulation of books had been 149 in town; in the country, 27, to 21 places. The Committee recommended the purchase of the following books for the library:—

'Geological Survey of California: Botany,' vol. 1.
Sutton's 'Volumetric Analysis,' 3rd edition.
Wanklyn's 'Water Analysis,' 4th edition.

The Librarian had also reported that Heaton's 'Experimental Chemistry,' which was missing, had been returned; also that progress was being made with the purchase of the foreign periodicals, and that more shelf-room was required in the library.

Professor Redwood had reported that there were upwards of 40 students attending his class, and that he had not found the increase of fees operate prejudicially on the number of entries.

Professor Bentley had reported 36 entries in his class.

Professor Attfield had reported 49 entries in his class. He also reported that there was no foundation for the report that certain of the Jacob Bell Scholars had been irregular in attendance, only one having absented himself for any length of time since the foundation of the scholarships, and for that absence a good reason could be assigned. The Committee nevertheless considered it desirable that a monthly return should be made of the attendance of the Bell Scholars. It also recommended that an application from Professor Redwood for an electric lamp, etc., for the purpose of illustrating extra lectures that he proposed giving on the spectroscope and its application to polarized light, be acceded to; Professor Redwood having undertaken to give occasional lectures on the subject referred to, that would be open to members and associates, free of charge.

At its first meeting the Committee had considered the subject of the prizes for the lecture classes, and adjourned it, the Professors being requested, in the meanwhile, to prepare detailed information.

The Curator had reported the attendance in the museum to have been, in the day, highest, 44; lowest, 7. Evening, highest, 10; lowest, 0. Also, that the catalogue was in a forward state, the materia medica portion being in print, while the chemical portion would be complete by the end of the year. The catalogue of the "Hanbury Collection," however, would not be ready for some time, and it was recommended that the catalogue of the museum should be issued as soon as possible; that of the Hanbury Collection to be published afterwards as a supplement.

The following letter had been laid before the Committee and ordered to be submitted to the Council:—

"Ashburton House, Croydon, Nov. 15, 1876.

"To the President of
"The Pharmaceutical Society, London.

"Sir,—In accordance with what I yesterday expressed when I had the pleasure of meeting you and other Members of the Pharmaceutical Society, I beg to say I have instructed Messrs. Macmillan and Co. to place at your disposal:—

"30 copies of 'Pharmacographia.'
"30 „ „ 'Science Papers.'

"These books I desire to present in memory of my late brother, Daniel Hanbury, F.R.S., through the Pharmaceutical Society, in the following manner:—

"One copy of each to be presented to the recipients of the proposed "Hanbury Medal," and one copy of each to the first prizemen at the sessional examination in each of the three classes of the Society's School of Pharmacy, but no person to receive in any case more than one copy of each work.

"I am,
"Yours faithfully,
"(Signed) THOMAS HANBURY.

"As I am leaving England for some months I have requested my friend, Mr. T. H. Hills, to arrange on my account for the suitable binding of these volumes."

Professors Redwood and Bentley had presented to the Committee a report containing the statistics with regard to the prizes taken during the last three years. It appeared that the Silver Medal had, in several cases, been taken by students who had attended for more than one session; that honorary distinctions had been obtained at these examinations both by students who had attended more than one session and by those who had attended one session only.

School of Pharmacy Prizes.

The three Professors had presented a joint report, in which they gave as their opinion that it would be undesirable to limit the competition for the Silver Medal to students of one session or two courses of lectures in the School of Pharmacy, unless a prize of a higher value than any now given—a gold medal, for instance—be offered for competition by any student of the School, without limit to the length of time he may have been in the School, except that he should have attended not less than one session in each department, and be at the time of competition actually a student in the School. For the competition for this medal the Professors recommended that there should be a separate examination in each of the three subjects—chemistry and pharmacy, botany and materia medica, and practical chemistry—the prize to be awarded to the competitor who should obtain the highest aggregate number of marks, provided a standard number be reached. There would then be three classes of competitors for prizes, viz.:—

(1) Competitors for a Gold Medal, who must have studied in the School for not less than an entire session in each of the three classes, but not necessarily at the same or at any particular time, except that a competitor must be a student in the School when the competition takes place.

(2) Competitors for a Silver Medal in each class who shall have studied for one, but not more than one, session. Certificates of Honour and Merit also being awarded in connection with this competition.

(3) Competitors for the Bronze Medal, in accordance with the present regulations, but with this addition, that besides the Bronze Medal, Certificates of Merit may be awarded to lecture students of one course.

The Committee having considered the Professors' report, and heard further explanations from them, a proposition was made to recommend the establishment of a Gold Medal. This was negatived, as was also another proposition to restrict the competition for the Silver Medal to students of two courses or one session. A third proposition was also negatived to the effect that the competition for the Silver Medal should be restricted to students who had attended four courses or two sessions. The Committee had finally decided to recommend to the Council that Certificates of Merit should be given at the end of each course in addition to the Bronze Medal; that in the event of a student competing for prizes in more than one session he should not be allowed to take any prize unless he obtain one of a higher value than any which he may have previously taken in the same class; and that no student be allowed to compete for any of the School of Pharmacy prizes unless he be an Apprentice or Associate of the Pharmaceutical Society.

A letter having been read from the College of Pharmacy at New York, asking if certain volumes and numbers of the *Pharmaceutical Journal* could be purchased to complete the set in the library of the College it was recommended that the volumes and numbers required be presented to the New York College of Pharmacy, and that in future a copy be sent regularly as published.

The PRESIDENT explained that the practical result of the report was that the conditions for the Silver Medal competition would remain as at present, but that certificates of merit would be awarded, in addition to bronze medals, to students of one course.

Mr. SCHACHT asked at whose instance the books were recommended for purchase. For instance, he noticed the name of a book on Californian geology.

The PRESIDENT said this book was specially recommended by Professor Bentley as being one of great importance. It was published by the American Government, and was the *botanical* portion of the geological survey of the United States.

Some discussion next took place with regard to the proposed purchase of the electric lamp, but the general feeling was in favour of adopting the recommendation.

The letter of Mr. Thomas Hanbury was next considered, in connection with which—

The PRESIDENT said he had received a letter from Professor Redwood, in his capacity as President of the Pharmaceutical Conference, stating that Mr. Hanbury had presented copies of his late brother's works to that body for distribution.

The prize regulations were next discussed.

The PRESIDENT said he hoped the subject of a gold medal would be again brought forward, and that the Council would see its way to offer one hereafter.

Mr. SHAW thought that this subject was still more important than the proposed alterations in the regulations for the Benevolent Fund, and he therefore suggested that the discussion should be adjourned.

Mr. HILLS remarked that no alteration was now proposed except the addition of certificates of merit to the Bronze Medal competition.

Mr. RIMMINGTON agreed with Mr. Shaw that the members of the Council should have a further opportunity of considering the recommendations of the Professors.

Mr. HAMPSON supported the adjournment of the question He still felt that there was an injustice to the students in allowing those who had attended the school more than one session to compete. He also objected to the proposal that no one should be allowed to compete for prizes who was not connected with the Society, both because it would preclude ladies competing and on general grounds.

Mr. FRAZER objected to the offering of certificates of merit to students of one course only.

Mr. HANBURY thought the suggestions of the Professors ought to carry great weight, and if the Council could not give the gold medal, it should at least give the certificates recommended.

Mr. SANDFORD said many people were of opinion that there were too many prizes already. The Professors, however, were very anxious that the certificates should be given, and to that the Committee had agreed; but he hoped they would not be exactly in the same form as those offered at the end of the session. He also suggested that these certificates, with the Bronze Medals for the first course, should be given to the successful competitors at the April Evening Meeting. He should be happy to second the amendment of Mr. Hampson for negativing the provision that only apprentices and associates of the Society should be allowed to compete for prizes.

Mr. MACKAY opposed the amendment. At the Edinburgh University no one could attend the lectures of any Professor without paying a guinea for a matriculation ticket; and it would be only fair that those who came to the school to study pharmacy, and wished to take prizes, should join the Society.

Mr. FRAZER supported the amendment.

Mr. ROBBINS opposed it. Some of the students who attended the laboratory never intended to join the Society at all; they came to study chemistry, intending to follow some other profession, and giving their attention solely to that one branch, they might stand in the way of other young men, who were studying pharmacy and botany also, from obtaining the prizes of the Society with which they were connected.

After a short reply from Mr. Hampson, the amendment was put and lost by twelve to eight.

Mr. GREENISH said he was still as much convinced as ever that a great injustice was done to the students of one session. He would therefore move that the report of the Professors be printed and circulated amongst the members of Council. After some discussion the motion was withdrawn.

The report and recommendation of the Committee was then received and adopted, and,

On the motion of the President seconded by the Vice-President, a vote of thanks was passed unanimously to Mr. Thomas Hanbury for his liberality in placing copies of his late brother's works at the disposal of the Society; Mr. Hills speaking warmly in favour of the motion.

Mr. SCHACHT also added on behalf of the Pharmaceutical Conference his appreciation of Mr. Hanbury's kindness.

HOUSE.

This Committee had held a meeting at which it instructed the Secretary to obtain plans for providing extra shelf accommodation in the library, and for a mahogany case to receive the Herbarium given by the late Mr. Daniel Hanbury. Other small matters connected with the house arrangements were reported, in particular that the supply of water available in case of fire had, since this matter was last reported, been ample and satisfactory.

The PRESIDENT said the estimates had now been received, and they could either be accepted at once, or referred to the Committee.

The report and recommendations of the Committee were received and adopted, and the estimates were remitted to the Committee, with instructions to carry out the work proposed at a price not exceeding the estimates submitted.

LAW AND PARLIAMENTARY.

The report of this Committee included a communication from the Solicitor stating the progress made with various matters placed in his hands. Other communications had also been received with regard to alleged infringements of the Pharmacy Act, with regard to some of which proceedings were recommended to be taken.

The report and recommendations were received and adopted.

PHARMACEUTICAL MEETING.

Wednesday, December 6, 1876.

MR. JOHN WILLIAMS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting were read and confirmed.

The following donations to the Library, Museum and Herbarium were announced, and the thanks of the Society were awarded to the donors:—

Library.—'Report by Dr. M. C. Cooke, on the Oil Seeds and Oils in the India Museum, or produced in India,' from the India Office, per Dr. J. Forbes Watson; 'Pharmacopœia Officinalis et Extemporanea,' by J. Quincy, M.D., twelfth edition, from Mr. F. W. E. Shrivell; 'The Quinology of the East Indian Plantations,' by J. E. Howard, F.R.S., parts ii. and iii., from the Author; 'Medico-Chirurgical Transactions,' vol. lix., from the Royal Medical and Chirurgical Society; 'Atti del Congresso Internazionale Botanico tenuto in Firenze nel mese di Maggio, 1874,' from the Reale Società Toscana di Orticultura; 'Beiträge zur Chemie des Kaffees,' von O. Levesie, 'Untersuchung des gebrannten Kaffees auf Cichorien,' von A. Franz, and 'Ueber forensisch chemische Nachweisung von Blut in wässrigen Flussigkeiten,' von V. Schwartz, from Professor Dragendorff; 'Transactions and Proceedings of the Botanical Society of Edinburgh,' vol. xii., part 3, from the Society.

Museum.—Specimen of Boracite, from the President; Seventeen specimens of minerals, from Mr. Pound; Specimen of pure Stearic Acid, crystallized from Alcohol, from Price's Patent Candle Company; Specimen of Hydrobromate of Conia, from Mr. Morson; Specimen of Phosphorus, from Mr. Harold Senier; Specimens of English Rhubarb and Biennial Henbane, from Mr. Usher, of Bodicote, near Banbury; Specimens of the Glass Rope Coral (*Hyalonema Sieboldii*) with a sponge (*Carteria*) parasitical upon it, and of the Sponge known as the Venus Flower-basket (*Euplectella aspergillum*), from Mr. H. Cape; Fruit of *Amomum Melagueta*, from Mr. W. Hodgkinson.

In calling attention to the donations to the Museum, the Curator stated that the specimens presented by Mr. Pound possessed an especial interest from their having been collected by the late Mr. J. K. Lord, the well-known naturalist. The hydrobromate of conia was in remarkably perfect crystals, some of which were in the form of six-sided tables, and others in prismatic needles. This salt had been lately recommended in the treatment of whooping-cough and asthma, and in the form of subcutaneous injection in sciatica.* The phosphorus was a particularly interesting specimen. It was stated by Mr. Harold Senier to be some of the first ever made in this country, by Ambrose Godfrey Hanckwitz, about 200 years ago. The Curator said that he had examined the specimen, and found that while a portion of each lump still retained the translucency and horny appearance of ordinary phosphorus, the remainder was of a red colour and friable nature. The red portion treated with bisulphide of carbon was, however, almost entirely soluble in bisulphide of carbon, leaving only traces of amorphous phosphorus. The specimens of English rhubarb were of a very fine quality. Mr. Usher had kindly promised a specimen of the root of *Rheum officinale* for exhibition at the next evening meeting There was also a specimen of a glycerole of saffron, which had been presented by Mr. Samuel Elliott, of Plymouth, now a student in the School of Pharmacy, concerning which he read the following letter:—

"*Glycerinum Croci.*

"Having noticed that glycerine and saffron were frequently ordered in the same prescription, it occurred to me that a preparation of glycerine and saffron would be an useful one; also it appeared probable that the colouring matter would be as well or perhaps better extracted by glycerine than by any other solvent, while the whole of the aroma would be retained, heat not being used.

"I therefore prepared, early last June, the sample of glycerole of saffron, which is now upon the table, and may state that there has been no sediment nor apparent change during the six months which have elapsed since it was made. In this point it has a great advantage over syrup of saffron, which after six months generally shows a copious precipitate of a reddish brown colour. The odour of the glycerole is far stronger than that of any syrupus croci I have ever made. These facts may seem to some hardly worth notice, but as this preparation is being ordered by medical men, it is but right that its formula should be published. I consider it is the duty of each of us to do what we can to further the cause of pharmacy, and this addition, though small, is better than none on my part.

Formula:—

Saffron	1 drachm.
Glycerine	9 fluid ounces.

Mix and macerate for seven days, pour off the bright liquor, press the remainder through calico into another vessel, and again strain it. Mix the two liquors, and make up the whole to 9 fluid ounces with glycerine."

Mr. Andrews said that he also had been making a few experiments upon the action of glycerine on various substances, not only on common bark, but rhubarb and other things. It might be suggested to some of the younger members of the Society that there was a very large field open in that direction. Glycerine had an astonishing power of retaining various substances in solution; they were not thrown down after a time, as from tinctures and other syrups.

Mr. Greenish said that having experienced the difficulty in connection with syrup of saffron which had just been mentioned, he made a syrup of saffron, or a preparation of saffron in glycerine, some eighteen months ago, in the same proportion as the syrup of saffron in the Pharmacopœia. It had kept uncommonly well, without any sediment. It seemed as though it would keep any length of time. It had been his intention to keep it for a considerable period and then bring it before the Society.

The Chairman then called upon Mr. Alexander Bottle to read a Note on—

A New Mode of Making Grey Powder.

The paper is printed on p. 469, and gave rise to the following discussion:—

Professor Redwood said that many years ago his attention was directed on more than one occasion to the subject of grey powder,—hydrargyrum cum creta,—and the opinion which he then formed was very much in accordance with that at which Mr. Bottle had arrived. The great evil that had attached to the employment of grey powder as then met with in commerce had resulted from the substitution of the iron arm of the machine for that of flesh and blood in its preparation. It was made by wholesale manufacturers through the medium of the steam engine, and he had found that the common mode was to put the ingredients into a cask set upon a spindle, with three or four round stones or some other substance, and then to rotate the cask for an indefinite length of time by means of machinery. The operation might go on for a day or for a month, according to circumstances, and this very undue amount of trituration had been accompanied by a very excessive exposure of the mercury to the action of atmospheric air and to undue oxidation. What had been done with a view of remedying this evil, as far as the Pharmacopœia was concerned, was to give a clear indication that grey powder ought to be made by trituration in a wedgewood mortar; but, beyond that, the Pharmacopœia gave an indication of the kind of impurity which it was most important to avoid. Among the tests it indicated that on the addition of diluted hydrochloric acid, whilst the calcium was taken up, mercury ought not to be taken up. That is to say, the solution ought not to give any precipitate of mercury to protochloride of tin. If pharmacists submitted their grey powder to that very simple test they might be secured against the employment of a preparation which was liable to become poisonous. Mr. Bottle had fairly stated that the process for its preparation indicated that it should consist mrely of minutely

* *Pharm. Journ.* [3], vol. iv., p. 23.

divided mercury, mixed with chalk, with, at the most, a small quantity of suboxide of mercury which was the grey oxide. The great point for the pharmacist was that the preparation should not contain the peroxide or red oxide of mercury. If it gave no solution of mercury to dilute hydrochloric acid, which could be precipitated with subchloride of tin, it would be in a perfectly suitable state for use. But suboxide of mercury, present to any considerable extent, became undoubtedly converted into peroxide. The sub-oxide could not be kept for any length of time without splitting up into mercury and peroxide, and that peroxide was quite as poisonous as corrosive sublimate itself. No grey powder ought to be used which would not stand the test which was given in the Pharmacopœia, and which could be applied in two minutes. He had tried the use of sugar of milk as indicated in his original paper, but he did not find sufficient benefit to result from it to indicate that it was worth while to make a change in the process. He believed that Mr. Bottle had done more than anybody else towards securing to pharmacists the means of having the preparation in the state in which it ought to be used. The great object was to facilitate the preparation of the compound in a short space of time without undue labour, and if that could be accomplished by merely shaking the ingredients in a wide-mouthed bottle, that would undoubtedly be the best and the right mode for preparing grey powder. He (Dr. Redwood) saw no other objection to the adoption of that mode than the fact that it a little too nearly approximated to the process of shaking the ingredients up in a cask, and that some people might jump to the conclusion that, if the bottle process was a proper one, the use of the cask might also be allowed. With reference to the condition in which the mercury existed in grey powder, he would call attention to a fact which must be obvious to every one who was in the habit of testing it, namely, that the mercury, after it had been minutely divided, whether it was taken as it existed in grey powder, or in blue pill, or in mercurial ointment, would not run together as it would if it were in a perfectly clean state. It had always appeared to him that the minute globules of mercury as they existed in grey powder, blue pill, and mercurial ointment, were coated with a film, the nature of which he was not prepared to indicate; but his conclusion had been that there was some low state of oxidation existing upon the surface of these minute globules, and that probably that low oxide might give to the mercury a greater amount of activity than it would possess in its bright metallic condition. This oxide might still be a lower oxide than sub oxide of mercury, and it might account for the peculiar efficacy, and at the same time the extreme mildness of the action of these preparations.

Mr. Andrews said that he had his attention drawn to this subject some twenty-five years ago, when he was an assistant in a West-end establishment, at which a large quantity of grey powder was sold. A complaint was made that the preparation caused children to vomit and that it purged them violently. The substance was examined, and it was found to contain, as Professor Redwood had suggested, peroxide of mercury. Since that time he had always been in the habit of making grey powder by a method somewhat similar to that described by Mr. Bottle. He got that hint from a paper by Mr. Stoddart, published in the *Pharmaceutical Journal*. He put the mercury and the chalk together, and shook them till the chalk was reduced to a fine powder. He then put the mixture in a mortar and triturated it in the usual manner. The process was not a long one, and the result seemed to be everything that was desired.

Mr. Umney said that, during the last twelve years, he had made many hundredweights of grey powder by a process certainly the very opposite to that which Professor Redwood had indicated. He had triturated the mercury and chalk under mill-stones, the weight of which was prevented from resting upon the granite bed of the mill by means of a screw. The whole process of manufacturing ninety pounds had been completed in from four to six hours, and the powder so made in no way differed from that which was produced by the ordinary process of trituration with a pestle and mortar. He thought that, perhaps, the presence of mercurous oxide (and upon keeping mercuric oxide) in grey powder was to some extent due to very damp prepared chalk being used; he had always been in the habit of drying the chalk before using it. He was convinced that the age of the grey powder had a very great deal to do with the presence of the mercuric oxide. About twelve or fourteen years since his attention was directed by the late Mr. Thomas Herring to a specimen of grey powder which had caused very serious results in the North of England. Upon examining it, he found a very considerable quantity of mercuric oxide present. Up to that time he had been in the habit of preparing larger quantities of grey powder at once, but since then he had always operated upon smaller quantities in order to avoid excessive age. As to machine-made powder, he could not see why there should be any difference between that made by mill-stones and that prepared with the pestle and mortar, provided the operation was carried on rapidly and completed within four or five hours.

Mr. Greenish inquired what means Mr. Bottle adopted to ascertain the condition of the sub-division of the mercury in his method.

Professor Attfield said that he should like to propound one question, and that was, What is grey powder? Really he did not know, and he had never been able to gather. It might be a mixture of mercury with chalk, and if so, in what exact state of division ought the mercury to be? Or it might be a mixture of chalk and mercury and black oxide of mercury, or a mixture of chalk and mercury and black oxide of mercury and a little red oxide of mercury. If so, what were the maximum and minimum proportions in which either or both of the oxides might be present. His colleague, Professor Redwood, had told them them that it was a mixture of chalk and mercury with a certain "small proportion" of black oxide, but he (Professor Attfield) wanted a definition of a "small proportion" of such extremely powerful medicine. Though he had heard Mr. Bottle's paper with great interest, he thought that pharmacists had now threshed this subject out, and that the next step to be taken was that therapeutists should tell pharmacists exactly what preparations they wanted under the name of grey powder and blue pill, and so on. When that was done there would not be the slightest difficulty in meeting their requirements. For instance, if a mixture of pure mercury and pure chalk without any oxides were required, just for the purposes of that therapeutical research without which pharmacists could not much further move in the direction of improvement of such mercurial preparations, it probably could be prepared by an adaptation of the method described by Mr. Bottle, shaking the substances together in an atmosphere devoid of oxygen. Preparations of such materials as chalk with definite proportions of either oxide of mercury could also be supplied to any therapeutist who would undertake to endeavour to do mankind and his fellow-healers the service of supplying to medicine, pharmacy and the Pharmacopœia formulæ of trustworthy and useful, instead of variable and sometimes harmful mercurial compounds.

Mr. Bland said that there could be no doubt that the greater part of the mercury remained in the metallic state. He had often observed in making up a pill mass with grey powder and some sticky extract, such as extractum lupuli, that the greater part of the mercury had actually separated in the mortar in a bright metallic state, and the globules were very easily united together by agitation.

Professor Attfield said that he wished to draw the attention of the Society to a paper which was read before them last year on pilula hydrargyri, by Mr. Harold Senier.

The author of the paper showed that, of course, by far the greater part of the mercury was in the metallic condition. But still in eight samples, of stated ages, there were proportions of the black oxide, varying from 0·25 up to 4·22 per cent., and associated with the black oxide there was yellow oxide varying from 0·09 up to 1·8 per cent.

Mr. BOTTLE, in reply, said that his attention was called to the existence of peroxide of mercury in grey powder some twenty or twenty-five years ago, in consequence of some grey powder, which had been for some years in a medicine chest in India, having been given, in an ordinary dose of two or three grains, to two little girls, and produced salivation. In reply to Mr. Umney's suggestion as to the oxidation being caused by the chalk being wet, he (Mr. Bottle) must state that, as a matter of convenience, he dried his chalk so as to make it more easily worked. He did not, however, concur in the view that water favoured oxidation, for, if it did, the mercury which was rubbed down with conserve of roses to form blue pill, would, it might be expected, contain more oxide of mercury than grey powder, but such was not found to be the case. In reply to Mr. Greenish, he (Mr. Bottle) would state that, in order to ascertain the state of division to which the mercury was reduced in the grey powder, he adopted the plan which he was taught as an apprentice, and which was to moisten his finger with saliva, and take up a very small portion of the powder and spread it upon a piece of writing paper, and then apply a lens to ascertain whether the mercury had fairly disappeared. In reply to Dr. Attfield, as to what grey powder consisted of, he must really refer him to the Pharmacopœia, for he had nothing beyond that to offer.

A paper was then read on—

"A NEW BISMUTHIC COMPOUND—THE OLEATE OF BISMUTH.

BY S. C. BETTY.

This was followed by a note on—

"SOME REACTIONS OF THE GLYCEROLE OF NITRATE OF BISMUTH."

BY THE PRESIDENT.

The papers are printed on pp. 469 and 470, and gave rise to the following discussion:—

Dr. LEWIS said, with reference to the oleate of bismuth, that Mr. Betty had prepared it at his suggestion, and that he (Dr. Lewis) had used it in the few cases to which he thought it would be applicable, which were principally cases of exanthema, and with favourable results.

Mr. BALMANNO SQUIRE said that he had noticed that the addition of water to the glycerole of bismuth caused a precipitate, and he was very much puzzled by that fact until he had heard the President's explanation. He had, as he stated in his paper, in the first instance obtained a clear mixture, but after a time he found that the addition of water caused a precipitate, and he (Mr. Squire) had thought that he had arrived at a too hasty conclusion.

Mr. GALE said that he had placed on the table a sample of the first glycerole of nitrate of bismuth prepared for Mr. Squire; it had gone quite opaque. The proportion was a drachm to an ounce. It had been prepared by means of heat.

The PRESIDENT said that heat ought not to be applied.

Mr. POSTANS said that his experience enabled him to corroborate what the President had stated, which was that the glycerole ought to be prepared without heat. About a fortnight ago, at the request of Mr. Balmanno Squire, he had tried to find out how much nitrate of bismuth one ounce of glycerine would take up. He ultimately found an ounce of glycerine would dissolve an ounce of nitrate, but the glycerine would only dissolve it slowly. The concentrated solution of one ounce of nitrate in one ounce of glycerine was rather milky, though weaker solutions had been tolerably clear. Thinking that this solution was nearly a saturated one, it occurred to him that the addition of a little warmth might make the solution bright, or enable him to dissolve a larger amount of nitrate. He then took an ounce and a half of nitrate and added it to one ounce of glycerine, putting it in a bottle which was placed in a water-bath and gently heated. Directly the heat was applied a certain amount of effervescence and a whitish froth were produced. The heat was kept up, and ultimately it seemed as though his satanic majesty had got into the bottle. After a short time fumes and a dense smoke came off. A little while afterwards the mixture in the bottle began to rise gradually, and at last it came out of the bottle like what was commonly known as a "Pharaoh's serpent," and reached the length of seven or eight inches. Shortly afterwards the mass gave off sparks from that portion of it which came out first, and ultimately the whole thing became a mass of sparks and gave a brilliant light for about half a minute. That was the end of the whole matter, and there was only the smallest possible trace of anything left behind. With regard to the dilution, his experience was limited, but he had found that on taking a drachm of the concentrated solution which had been made with one ounce of the nitrate to one of glycerine by the cold process, and adding an ounce of water to it, he at first got a bright clear liquid, though at the expiration of about a quarter of an hour there was a whitish crystalline precipitate. A drachm of the solution of the same strength prepared by heat, had been treated in the same way, and gave a dense yellowish bright precipitate, presenting quite a different appearance.

Mr. BLAND suggested that the phenomenon noticed by Mr. Postans when he was making a solution in the water-bath might be due to the formation of nitro-glycerine. If that was the case, and if the stopper of the bottle had been tied down, his satanic majesty might have manifested himself in a much more disagreeable way.

Mr. UMNEY said that he noticed that the specimen which had been handed round the room smelt very strongly of nitrous acid. If they were to have a compound of bismuth with oleic acid or glycerine, there could be no doubt that the oxide of bismuth was preferable to the nitrate, and he fancied that it would be less liable to irritate.

Professor REDWOOD said that it appeared to him that the principal objection to the preparation which had just been recommended by Mr. Betty was the dificulty of getting pure oleic acid. The preparation which had been handed round smelt much more strongly than it would have done if pure oleic acid had been employed. If they always had perfectly pure oleic acid, he should feel much more confidence in such a preparation than in the other. With regard to glycerole of nitrate of bismuth he was disposed to put the very pertinent question which had been put by his colleague with reference to grey powder, which was, "What is this preparation supposed to be, or intended to be?" He was afraid that the glycerole was rarely likely to be uniform in its composition, and it would not be if it was kept for any length of time. This was a natural result considering that the nitrate of bismuth was an acid salt, in which the greater part of the nitric acid was held by an affinity so weak that water itself was capable of removing it, and hence complicated reactions were likely to take place. If the new preparation in question was introduced into medicine they ought to know its nature and have some security that it could be used from time to time without any great alteration.

Mr. LINFORD said that, after hearing the remarks which had been made, and smelling the little bottle which had been handed round, which was then giving off nitrous acid, it was not improbable that nitro-glycerine might be formed, in consequence of age or through the application of heat. He did not, however, think that the effect mentioned by Mr. Postans was due to nitro-glycerine.

A paper was then read on—

CRYSTALLIZED HYOSCYAMINE.

BY W. MARTINDALE.

The paper is printed on p. 471.

IMPURE GLYCERINE.

Mr. A. W. Gerrard reported to the meeting that having been induced to examine a sample of glycerine that had been received as genuine, he obtained results which led him to the conclusion that it was contaminated with lead and butyric acid. Seven other samples were then obtained from various sources and examined. It was found that while four of them might be termed good, the other three upon being burnt gave residues sufficient, he considered, to warrant him in characterizing them as very impure and unfit for medicine or domestic use.

CRYSTALLINE DEPOSIT FROM TINCTURE OF GALLS.

At the request of the Chairman, Mr. Gerrard briefly referred to a crystalline deposit met with in tincture of galls. The tincture was prepared by percolation, and after about ten days a light-brown deposit was noticed on the bottom and sides of the bottle, which increased during the following week, the tincture becoming perceptibly paler. The deposit examined under the microscope proved to be crystalline, and when tested with various reagents it answered completely to the description given in Watt's 'Dictionary' of the characters of ellagic acid, $C_{14}H_8O_9$, a product of decomposition of tannic acid.

The last paper read was a—

NOTE ON CAPSAICIN.

BY J. C. THRESH.

This paper is printed on 473.

The Chairman then announced that the next Evening Meeting would be held on Wednesday, February 7th.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

A General Meeting of the Chemists and Druggists of Sheffield and district, called by the Council of the Sheffield Pharmaceutical and Chemical Association, was held at the society's rooms, Tudor Place, Sheffield, on Wednesday, November the 22nd, at 9 p.m., to meet the Secretary of the Chemists and Druggists' Trade Association and hear from him a statement of the aims and objects of the Association.

There were upwards of forty persons present.

Mr. W. Jervis, President, occupied the chair.

The minutes of the previous meeting of the local society having been read by Mr. Learoyd, the Honorary Secretary, the Chairman said that owing to the important nature of their business he should not trouble them with any remarks, but simply introduce Mr. Haydon who, as they were quite aware, had come to address them.

Mr. Haydon then gave the history of the Association and explained its aims, objects, and contemplated system of organization. In the course of his remarks he said that the Association intended to proceed at once to the prosecution of unregistered vendors of poisons, by collecting the necessary evidence and forwarding the same to the Pharmaceutical Society, as the power to actually take the proceedings is, by the Pharmacy Act, visited in that body. It is in some quarters thought that the Pharmaceutical Society would not accept help of this nature. He did not anticipate any hitch of this kind, as the difficulty the Pharmaceutical Society had hitherto experienced in instituting proceedings had been in obtaining the necessary evidence for dealing with particular cases, as many chemists would give the Secretary information as to certain persons infringing the Act, but would refuse to go into court and prove the purchase of the poison. This difficulty had been acknowledged, and in substance often repeated by the Secretary, as the Pharmaceutical Society has no official authorized to undertake the collection of evidence of this nature.

Respecting co-operative trading he said, that the drug trade was being seriously injured by these large trading companies was an unquestionable fact, and that some means should be taken at once to test the legality of their dealing in poisonous drugs was equally certain, but as the power to take the necessary steps to bring a case into the law courts was in the hands of the Pharmaceutical Society only, and the Council objected to take action in the matter, the situation was very perplexing. That the stores were clubs and only supplied there own members was a hollow sham, as any one taking the trouble to peruse the reports and balance-sheets of any of these so called societies would at once discover. The number of "friends" (who of course were the public) trading at these stores, in some cases, amount to upwards of 15,000 as compared with about 7000 of its members.

It is a fact worthy of note that since the Association has been formed not a single case of prosecution of a member of the trade for an alleged infringement of the Adulteration Act had (as far as he was aware) taken place, whereas in the first six months of this year such prosecutions were increasingly numerous—prevention was better than cure.

Mr. Ellinor moved the following resolution:—

"That this meeting fully approves of the formation of the Chemists and Druggists' Trade Association, and thoroughly agreeing with its objects as expressed by the Secretary, pledges itself to give it its hearty support."

Mr. Radley in seconding the resolution, said he did so with confidence. He had, as they well knew, been connected with the Pharmaceutical Society since its formation, and he believed that the Association now in question was one that would not interfere with the elder society. As they were aware the Council of the Pharmaceutical Society devoted themselves to the work of education and the support of the Pharmacy Act, and he was sure from personal knowledge that the Council had quite enough on their hands already, and if they were ever so desirous of undertaking the duties proposed by the new Association they could not possibly do so. They had for upwards of thirty years tried to raise the status of chemists and druggists and he thought the machinery that had been set at work would do so thoroughly and effectually. The time seemed to have come for them to take steps for the defence of the trade from attacks and encroachments. They must all, every one of them, have found some inconvenience from the various requirements of the Poisons Act and other Acts of Parliament interfering more or less with the free action of their trade. He took it that no chemist and druggist had the right to call himself a medical man; he quite disapproved of "Medical Hall" being put over a chemist's shop window, yet he contended, as a matter of ancient usage and of pharmaceutical rights extending over a great number of years, that members of the trade ought to be at liberty to attend to little ailments over the counter to the benefit of the community at large. It was for them as chemists and druggists to say whether they would submit to that usage and imprescriptible right being taken from them. He was very much gratified that there was now an Association formed to take up the defence of the trade; it was one that they should all support, and he wished to impress on every one present the advantages of joining the Association. It appealed to the personal interest of all, and he thought it was their duty to give it a very free and hearty support.

Mr. Learoyd, in supporting the resolution, referred to the Medical Defence Association, and thought Medical Aggressive Association would be a more appropriate title. He held with Mr. Radley, that they had, and always had, from before the passing of the Apothecaries

Act, the right to prescribe. He was much pleased that the Association proposed to take up the contravention of the Poisons Act; it did away with the individuality in these cases, the onus of local associations having to collect evidence. There had been a great want of something of the kind, and he should give it his hearty support.

Mr. Cubley said the subject had been very lucidly put before them by the secretary. He was very much pleased with the mode of constituting the Association, it was thoroughly representative, as it gave each district the right of sending a representative of its own choice to the general committee, and thereby of acquiring a knowledge of the different customs in each district, with the peculiarities or any particular hardships affecting that part of the country, and the best means of dealing with it. In the constitution of the Pharmaceutical Society it was different. There were other points the Association would find from time to time crop up; for instance, the registration of firms. It seemed a small thing, but they had no means at present of getting correct information as to whether all the parties trading as Diddleum and Co., or any other firm were really registered men. He therefore thought one of the objects of the new Association should be to promote a bill for the registration of firms. He should most heartily support the Association, for so long as the druggist could be caught unprotected, and they could fight him by himself, he would be beaten, because he frequently could not find the time and money to ensure a good defence; that was the way they were beaten one by one, but let them only combine and get, say four or six thousand members, and the case would be very different, he would impress on those present the necessity of joining the Association.

Mr. C. Ibbitt also supported the resolution. He said, although they had not been yet much troubled with co-operative trading, there was a very large co-operative store in course of erection in Trippett Lane.

The Chairman then put the resolution to the meeting, when it was carried unanimously.

Mr. Radley inquired if any members were served with a summons, and in their opinion it was a case in which the Association should defend them, would their proper course be to write direct to Mr. Haydon.

Mr. Haydon replied that should any member receive notice of legal proceedings having been taken against him for an alleged infringement of an existing act, the better course would be to write immediately to their head quarters at Birmingham, as in his (Mr. Haydon's) absence the honorary secretary looked over the correspondence.

Mr. Learoyd asked if the Association intended to support all cases which occurred.

Mr. Haydon said any case which might be brought forward would be submitted to the law committee, and should it meet with their approval, would be defended. He would call their attention to rule 10, which stated the Association retained within their discretion the right of determining what action should be taken in any cases suggested to it. He went on to say some considerable discussion took place when this rule was framed, as to whether they should defend members only. He thought he should be able to make it very clear to all of them that it would in some cases be wise to defend a member of the trade, although he was not a member of the Association, as at any time such a person might become the subject of an unjust prosecution, and that in the absence of a good and sound defence, judgment might go against him. By this means a precedent would be formed which might, and in all probability would, be detrimental to the success of the Association if called upon to defend a similar case for one of its members.

Mr. Ellinor said he should like to suggest that the Association should be well supported. He further asked that all the members of the trade in the town should join their local association; it was to be regretted that so few did so, as it left them with the whole burden.

Mr. Haydon said it gave him great pleasure to support Mr. Ellinor in his last remarks, and he felt quite satisfied that the Association he represented would be materially strengthened and upheld in a variety of ways by the local associations up and down the country. Further than that, local associations did an immense good, they brought members of the same trade, who were perhaps necessarily somewhat jealous of each other, into friendly intercourse, and promoted a better feeling all round; they ceased to regard each other as opponents; when they met together in that room they talked to the persons sitting next them as friends, and the friendly feeling which sprang up at their meetings was, to a great extent, carried into their every day life. He had also great pleasure in proposing a vote of thanks to their chairman; he wished to add his own personal thanks for the very able manner in which he (the chairman) had supported him.

Mr. Appleton seconded the resolution, which was carried with acclamation.

Mr. Jervis, in replying, thanked them exceedingly for the kind manner in which they had received Mr. Haydon's proposition. He might say he had the honour of representing them on the Executive Committee of the Association, and he assured them that should anything go wrong with any who had become members, they need not fear; if they had done nothing illegal they would have his strenuous assistance.

Mr. Wilson proposed a vote of thanks to Mr. Haydon, which was seconded by Mr. Learoyd.

Mr. Haydon having replied, the proceedings were brought to a conclusion.

Parliamentary and Law Proceedings.

The Pharmaceutical Society of Great Britain v. Edward Mickle.

This case was tried on the 6th inst. at the Liverpool County Court, before the Judge, Mr. Perronet Thompson. The defendant was the same person against whom an action was tried on the 12th January last before the same judge and a jury when a verdict was found for the plaintiffs for two penalties of £5 each.

Mr. Lucas from the office of Messrs. Flux and Co. appeared for the plaintiffs, the defendant appeared in person.

Mr. Lucas reminded the Judge of the former trial and and stated that since it, the defendant had twice presented himself for the Modified examination and proved to be unable to pass it, and that notwithstanding the former verdict and his failure to pass the examination he had continued the business of a chemist and druggist, and that the penalty sued for was in respect of a sale of red precipitate or red oxide of mercury on the 30th of October last.

George Tweddle a retired chemist, proved that on the 30th October last he went to the shop No. 48, Stanley Road, Liverpool, and asked for a pennyworth of red precipitate, and was supplied with the same. The packet purchased was taken by him to Mr. Thomas Williams and left with that gentleman. The shop was as he believed kept by the defendant.

On cross-examination by the defendant, the witness expressed his belief that the defendant was not the person who effected the sale.

Mr. Thomas Williams proved that he was a Fellow of the Chemical Society, and practised at No. 23, Lord Street, Liverpool, as an analytical chemist. He received from Mr. Tweddle the packet produced, and subsequently tested the contents and found them to be red oxide of mercury. The packet was labelled poison, and without any name, address, or other words upon it.

The defendant stated that ten days prior to the date of the sale he had sold the business and parted with the possession of it, and that his name did not, at the date of the sale, in any way appear in connection with the business, and he would call the purchaser as a witness.

George Augustus Churchill, called by the defendant, deposed that he was a Member of the Royal College of Surgeons and a Licentiate of the Apothecaries' Company, and, as such, registered as a duly qualified medical practitioner.

The Judge warned the witness that his evidence, if to the purport stated by the defendant, might criminate himself, and that he was not bound to answer any question which would so criminate him, and section 17 of the Pharmacy Act, 1868, was referred to.

The witness in continuation deposed that, on the 20th or 21st October last, he purchased of the defendant, and paid for, and entered into possession of the chemist and druggist's business, which had previously belonged to the defendant, on the premises mentioned, and that from that date the business had been carried on by him alone, and not by the defendant; and that he personally effected the sale of the packet of poison produced.

Mr. Lucas submitted to the Judge that the case was a proper one for an adjournment, on the ground of surprise, for that notwithstanding sundry communications with the defendant on the subject of the sale and the action, no intimation of the facts set up as a defence had previously been made.

The Judge said he was bound to non-suit, but that he would do so without costs if Mr. Lucas would bind the plaintiffs not to bring a further action in respect of the sale in question, and he gave the choice between that and a non-suit with costs, but with leave to bring a further action.

Mr. Lucas elected to take a non-suit in the latter alternative; and 10*s*. in respect of the defendant's attendance, and £1 in respect of the attendance of Mr. George Augustus Churchill as a witness, were paid accordingly.

Review.

CURRENT CHEMICAL LITERATURE.

INTRODUCTION TO THE STUDY OF ORGANIC CHEMISTRY. By HENRY E. ARMSTRONG, Ph.D., F.C.S. London: Longmans, Green and Co. 1874.

INTRODUCTION TO THE STUDY OF CHEMICAL PHILOSOPHY. By WILLIAM A. TILDEN, D.Sc. London, F.C.S. London: Longmans, Green and Co. 1876.

A COURSE OF PRACTICAL CHEMISTRY. Arranged for the Use of Medical Students. By WILLIAM ODLING, M.B., F.R.S., etc. Fifth Edition. London: Longmans, Green and Co. 1876.

So great of late has been the rage for the publication of books on chemical subjects, that it becomes a duty to watch carefully these publications and how far they exert an influence for good or for evil in education. Thus many books have recently appeared which it were better for science had they never been written, while others have been the merest reproductions, not always even in new garbs, of pre-existing manuals. But the more valuable literature may be expected to come from men who are either rising in their science or who have already exerted an influence on scientific teaching. Nevertheless, there are instances of this latter kind in which the work has been badly done, and we, therefore, turn with especial interest to the books whose titles form the heading to this article, in order to ascertain how far they are truthfully representative of the branches of science of which they treat and how far it is reasonable to hope they may effect the objects they profess. As regards organic chemistry so called, or what has been better termed the chemistry of carbon compounds, most of our standard manuals are written in accordance with the old philosophy; in other words, their authors have written them holding as their creed what is known as the type theory in chemistry. This type theory, so much advanced by Laurent and Gerhardt, received in this country great recommendation at the hands of Williamson and Odling, but since then it has been abandoned in Germany in great measure, for what may be termed the theory of structure. That is to say, chemists in these days rather endeavour to express the nature of various organic substances, not merely on a plausible theory, but as far as possible to assert the actual manner and even form in which the component nuclei of larger molecules are combined. With then, the exception of Schorlemmer's book, Dr. Armstrong's treatise is almost the only one in our language which pretends to treat this branch of chemical science in a systematic manner, based upon modern German thought. In doing this the author has adopted, to a large extent, the classification of Kekulé, describing the various series of substances under the divisions of hydrocarbons, alcohols, ethers, aldehydes, acids, ketones, amines, and organo-metallic compounds. After some introductory matter, there is described in excellent manner the general action of reagents on the carbon compounds; and, in short, the author professes to have indicated and has succeeded in indicating a study of the relations existing among substances rather than the enumeration and description of individual bodies.

We are glad that he has not, in doing this, adopted the general division of bodies into two great groups of fatty and aromatic substances. Altogether it must be admitted that Dr. Armstrong has performed the task he set himself well, for while it must be granted that structural chemistry has not yet solved the dark problem of isomerism, it has led to the formation of many new bodies and to the discovery of some relations between them, and it is in this direction that students should be taught thoroughly and clearly. At the same time it would be foolish to adopt what may be called the Kekuléian system to the utter ignoring of others which have led and may still lead to comparable results. For above all things it should be remembered that the primary result to be attained in science is the discovery of general laws, not individual truths, and too often as it is taught, structural chemistry leads to the making of bricks whose positions, however, in the whole structure are left undetermined.

Dr. Armstrong, then, describes briefly the best known substances and others which form connecting links between them; he also describes the general methods of experiment employed in the study of derivatives, and endeavours to group substances into great divisions, explaining their constitution by Kekuléian definition. There is, however, a tendency, as in all such works, to limit the number of possible compounds, and this tendency here and there assumes an assertive nature not perfectly justifiable, and not invariably supported by facts. Moreover it must be borne in mind that Kekulé's benzene ring fails to explain certain facts and is a mere useful hypothesis *pro tem.*; the danger to be anticipated from its use is that it is apt to impress the student with the idea that the figures thus elaborated actually express the constitution of bodies, while in truth they are only images for explaining the existence of a possible number of isomers and derivatives.

The book is to be cordially recommended as a text-book for students.

The second book on our list, by Dr. Tilden, is also a most useful book, for into it has been condensed vast series of facts regarding the properties of bodies and the laws regulating them so far as it is possible to express them. But it is rather a compendium of facts than a system of philosophy in its truest sense. Thus, while the author adopts the molecular theory of matter, and admits the significant influence which physics exert in constructing a philosophy of this kind, he in great measure does not enter into physics as ordinarily understood, and the consequence is that the philosophy is imperfect considered as a system.

In regard to the ultimate constitution of matter he rather neglects the theory of its homogeneity which, held in ages immemorial, has had in more modern times great numbers of adhering supporters.

Our own idea of a system of philosophy would lead us to start first with our system based upon broad facts, and to then demonstrate its various ramifications and show how it was possible that there should exist varieties as regards the forms of matter, and only finally demonstrate the relation of those forms to certain properties and functions. That is to say, matter and force should be sufficient in the mind to admit of the construction of a system, but Dr. Tilden rather takes certain so-called special laws and general properties and then shows certain relations and indicates other probable or possible ones, but fails to band them into a broad system, explanatory of all facts and all functions. Nevertheless, as a compendium of knowledge, and not without originality of conception, as regards its form and comprehensiveness, it is a most useful book, and deserves a good place in educational literature. It is supplemented with a great number of valuable exercises and questions for the student to work out for himself, but as we have said, taking the book according to its title, it is somewhat disappointing. As regards details in such a book, accuracy is guaranteed by the author's name and by the fact that it does not treat of new acquisitions or original views; it would therefore be hypercritical to point out a few doubtful statements and debatable opinions.

We now pass on to the last book on our list, namely, Odling's 'Practical Chemistry,' and we would particularly dwell upon the fact that it is intended for the use of medical students. In reviewing this book, therefore, we must bear in mind that the only practical use to which a medical man can put chemical knowledge is in regard to the chemical identification and treatment of disease. Such knowledge is supposed to be here given. After an introduction, which has reference to general statements regarding matter, chemical reactions, and chemical manipulation, there follows a long chapter on analytical chemistry. Then comes a chapter on toxicological chemistry based upon the analytical knowledge furnished by its predecessor.

The last chapter in the book is on 'Animal Chemistry,' and has been revised in this edition by Dr. T. Stevenson, while the chapter on analysis has undergone the same treatment by Dr. J. Watts. Confining our immediate attention to the chapter on animal chemistry, we find it is, in the first place, very meagre in kind, for the chemistry of many important individual organs is sufficiently known to enable one to write a book fully as large as the whole chapter or indeed the whole book, and, moreover, what information is here given is not free from error, while those general philosophical speculations, which alone have power, when used by those who possess them, to produce good, are neglected. Thus no theory or explanation of the form in which water exists in animal tissues is given. This water, amounting in many cases to 90 per cent. of the total matter, is in true chemical combination, and cannot be squeezed out; in its relation to the tissues it is comparable to the water of crystallization of salts, and may indeed be regarded as water of colloidation. Among other loose statements made in this book, the colouring matter of urine is called Urohæmatine, and the description of it is neither correct nor comprehensive. The name Urohæmatine is based upon an alleged relation or identity of blood and urine colouring matters, which requires substantiation before it can be accepted. Minute traces of sugar are said to exist normally in urine, and Pettenkofer's test is given as the best one adapted for the detection of biliary matter in the urine. Now, not only does this reaction fail to distinguish between biliary and many other matters, but Gmelin's test, employing nitric acid containing nitrous acid, is a far better agent for discovery in this direction. The spectroscopic characters of acid-hæmatine are also incorrectly described. Acid-hæmatine is said to furnish one absorption band in the red; it really gives four, and sometimes a fifth is faintly visible. Reduced hæmatine gives two, and alkaline hæmatine only one broad band. The brain, much less its chemistry, finds no mention. The biliary colouring matters, bilirubine and biliverdine ($C_9H_9NO_2$ and $C_8N_9NO_2$) are also not mentioned. In the face of these facts we are not surprised to find recent investigations ignored. We regret to have to condemn this book, therefore, as regards the purpose it professes to effect. The chapter on Animal Chemistry, so far as it goes, is in the main correct enough, but it does not cover one-tenth of the ground, and that which is surveyed is surveyed in particular parts wrongly.

The human body, consisting as it does of matters which admit of being distinguished and isolated, and subject to changes which elaborate other substances from pre-existing mixtures (these substances being again broken up in their turn with other compounds) is essentially a living laboratory, and has a chemistry more difficult and more profound than any other branch of this science. What is required, therefore, by a medical man before he can make use of chemical knowledge is primarily its possession, and even this he could not secure from the book under notice. In so saying we do not wish so much to criticize the book adversely as to display the glaring short-comings of medical studies. No man is competent to apply his knowledge to the explanation and cure of disease until, beyond his anatomical, histological, and other knowledge, he has a fundamental acquaintance with what is still more important, viz., chemical physiology, and this cannot be obtained without first studying thoroughly the sciences of physics and pure chemistry, general and analytical. And yet the work before us professes to teach the student of medicine all he needs to learn.

Apart from the errors this book contains, it is very good as a general introductory text-book, but considered as a final means of acquiring knowledge for any one of the branches of science it necessarily includes it is a failure, and as regards animal chemistry in this sense, it is a sad failure.

Correspondence.

E. R. Priest.—Our answer does not appear to need explanation; it is simply, as represented, a paraphrase of the 4th section of the Act 9 and 10 Vict. cap. cx., relating to the use of stills. The section is permissive, and provides that the Commissioners of Excise *may* allow a person to keep and use a still for the manufacture of articles other than spirit mixtures, upon complying with regulations laid down by them. The regulation in your case appear to be that you should pay 10s. a year. This is a matter left entirely to the discretion of the Commissioners.

G. F.—(1) Try powdered soap and rectified spirit, using an equivalent quantity of the powder for the compound rhubarb pill. (2) Use powdered tragacanth and mucilage of acacia. (3) No.

"*Nemo.*"—(1) The arsenious acid is itself unchanged, otherwise than by forming an alkaline arsenite as it slowly decomposes the alkaline carbonate. (2) Probably a solution of arsenous acid in dilute hydrochloric acid.

"*Cymro.*"—The use of a 5 per cent. solution of chloral hydrate, rubbing one-half to one ounce of it into the scalp with a sponge every morning has been recommended in the *American Journal of Pharmacy*, but we are unable to say how far it would be beneficial or safe to use. For other remedies see vol. ii., pp. 637 and 878.

S. A.—We are not aware that there is, at present, any law to prevent the title referred to being used by any person wishing to do so.

F. T. Gibson.—The cases are not parallel, Such a case as that you instance from your own experience belongs to a class that requires the exercise of individual discretion.

COMMUNICATIONS, LETTERS, ETC., have been received from Mr. Kersham, Mr. Gilmour, Dr. Hesse, Mr. Alderton, Mr. Ellidge, Mr. Waterhouse, Mr. Nockolds, Country Chemist, Oxfordshire, M. P. S. G. B., G. E., H. S. W.

CHRYSOPHANIC ACID OINTMENT.

BY BALMANNO SQUIRE, M.B.,

Surgeon to the British Hospital for Diseases of the Skin.

A year or two ago a discussion arose in medical and pharmaceutical circles on the subject of a remedy largely used in India in the treatment of skin diseases under the name of Goa powder. This debate resulted in the tracing of that remedy to its botanical and geographical origin, of proving its absolute identity with certain powders used under various names for the same purpose in widely different parts of world, and last but not least, the attention thus directed to the drug led to the determination of its chemical composition in which chrysophanic acid was found to take a prominent part.

The discussion was begun by Sir Joseph (then Dr.) Fayrer.* His paper called forth one from Dr. J. F. Da Silva Lima,† of Bahia, in Brazil, and this occasioned an admirable chemical research into the composition and physical properties of the powder on the part of Professor Attfield.‡ Professor Attfield's paper was followed by one from Mr. E. M. Holmes,§ and thereupon a discussion ensued in which Messrs. Plowman, Moss, and Postans, and Professors Bentley and Attfield took part.

Hence it happened that the powder, which is supplied to the rest of India from the Portuguese settlement of Goa, was clearly traced to its geographical source in Bahia, in Brazil; it was ascertained, moreover, that the powder is a vegetable powder and that it is derived from some kind of leguminous tree, probably from the medulla or pith of the stem and branches of the tree, the tree most likely being a species of Cæsalpinia or of some nearly allied genus.

As the debate progressed it was discovered that the ringworm powder used in Cochin China and in the Malay peninsula under the name of *Poh di Bahia*, the ringworm powder used in Bahia under the name of *Araroba* powder, and the ringworm remedy used in India under the name of *Goa powder*, were all of them one and the same thing, and lastly it was ascertained by Professor Attfield that the Goa or Bahia or Araroba powder consisted almost entirely (namely to the extent of 85 per cent.) of pure chrysophanic acid, a principle common to Goa powder and to some other drugs, for example, to rhubarb, dock-root, etc.

At the time this discussion took place, Goa powder commanded very high rates although its reputation was such that these rates, were by no means prohibitory of a very extensive employment of it. Thus at Saigon in Cochin China a gramme of it cost 2 francs. A quantity of it obtained from Bombay cost £3 12*s*. per pound. Its retail price in London was about 10*s*. an ounce, but rather as a curiosity than as an article of commerce. From the papers I have quoted, it came to light that there was a remedy largely employed in the treatment of skin diseases in many widely distant parts of the world, namely, in South America, in various parts of Asia, and probably also in Africa, but not in Europe. The use of this remedy appeared to be confined to the tropical regions of the world—regions where, as I may mention, skin diseases prevail more commonly even than they do in Europe. It seemed that the reputation of the drug over this very wide geographical area was such as to preserve its popularity in spite of a very high price having to be paid for it. But notwithstanding all these facts in its favour, evidence was at the time adduced that whenever the drug found its way in quantity to England there was no sale for it here, except for the purpose of exportation to India.

I therefore think that a remedy with such a history deserves, as Sir Joseph Fayrer suggested, a trial of its properties in Europe. I think this all the more because I am convinced from some experiments I have recently made with the drug that the popularity it has achieved in the tropics has been won in spite of a very bungling method (speaking pharmaceutically) in the customary manner of employing it.

The favourite mode of applying it in the tropics seems to be to wet the powder with water, or with vinegar or lemon juice, and to smear the thin paste thus produced on the affected skin. I find that the paste thus produced dries up very speedily on the skin, but not into a cake or crust, or paint of any kind, so that it adheres to the skin, but into its original condition of a fine dry powder, the greater part of which may at once be blown away by the breath, and every fraction of which may be easily rubbed off by the slightest touch.

Ointment is unquestionably a much better form of applying the remedy. The form of *ointment* seems occasionally to have been had recourse to; but *wetting* the powder and smearing on the paste is obviously the orthodox custom.

So far as my investigations have yet led me I have every reason to suppose that chrysophanic acid is the *active agent* as well as the chief ingredient of Goa powder. What Goa powder appears to effect therapeutically seems to me to be achieved equally by chrysophanic acid, only in a somewhat more marked degree. I therefore believe that an ointment of chrysophanic acid is the best mode of using the remedy. It is as to the best mode of making that ointment that I have now to speak.

Those who have much to do with the prescribing of ointments, especially if they are in the habit of inspecting what they have prescribed, will probably have noticed, as I have, that ointments even when compounded at the very best houses are rarely quite all that they might be—in short, they are almost invariably somewhat more spotty and gritty than is positively necessary. It is not generally appreciated what a very great quantity of pains and trouble is required for the making of a small quantity of ointment in a really excellent manner.

Now, chrysophanic acid ointment is apt, as I find, to present the more or less gritty quality to which I have alluded, and the object of this paper is to draw attention to a method by which, in the case of chrysophanic acid, this drawback may be effectually prevented, and thereby the activity of the ointment considerably increased.

This latter aim is the more necessary because my experiments show me that the strength in which it has been proposed to use Goa powder in the form of ointment by two of the writers whose papers I have referred to (namely, the strength of a scruple of the powder to the ounce of lard) is a great deal too feeble.

The method I have adopted is suggested by Professor Attfield's researches, which prove that chrysophanic acid is more soluble in hot benzol than in any other of the ordinary menstrua.

Now lard also is soluble in benzol. I accordingly

* *Medical Times and Gazette*, Oct. 24, 1874.
† *Medical Times and Gazette*, March 6, 1875.
‡ *Pharm. Journ.*, March 13, 1875.
§ *Pharm. Journ.*, April 10, 1875.

dissolved two drachms of chrysophanic acid and an ounce of lard in the smallest necessary quantity of boiling benzol, applying heat by means of a water-bath. Then as the brown solution cooled (the vessel containing it being placed in cold water), and the chrysophanic acid, much less soluble in cold than in hot benzol (Attfield), became rapidly deposited, the mixture was briskly stirred in an evaporating basin.

As the mixture speedily became "set" a most perfect ointment was produced in really a very ready manner. After leaving the ointment spread about the dish for a short time, the benzol almost completely evaporated from it, leaving it quite hard.

By this process two desirable results are achieved. In the first place the comparative insolubility of chrysophanic acid in *cold* benzol, and the rapid evaporation of the benzol itself, cause the acid to be deposited not in a crystalline condition, but as a very fine precipitate. In the second place, the evaporation of the benzol causing the lard to be deposited at the same time from the same solution, an intimate and even mixture of the acid with the lard (favoured of course by the constant stirring) is produced. Indeed I have never seen a more perfect ointment; the lard looks as if it had been stained, or rather as if it were some soft sort of yellowish wax.

This, as I take it, is the most efficient sort of preparation that can be used when it is sought to employ Goa powder as a remedy. The ointment of course has more or less of a smell of benzol for some little time, but at last this goes off completely, or it may be concealed by the addition of a little essential oil.

It is now more easy than it recently has been to make trial of Goa powder in Europe, since its price has become very considerably moderated. It can now be obtained for 1*s.* 6*d.* an ounce, or 20*s.* a pound, and if there were to be any general demand for it, no doubt it could be sold for say 2*s.* 6*d.* a pound. Chrysophanic acid, however, is still an expensive commodity, but if it were worth while to manufacture it on a fairly large scale, it would doubtless soon become cheap.

I find that the properties of chrysophanic acid are by no means confined to its being a remedy for ringworm, but that it is likely to prove a valuable addition to the list of drugs as a remedy in many other diseases of the skin. I have, for example, obtained some unquestionably good results with it in the treatment of psoriasis, and it is a serviceable application, as I find, in cases of lupus also. I instance these as two of the most inveterate of the diseases of the skin.

Goa powder ointment has hitherto been advocated as a mere remedy for ringworm, that is to say as a merely indirect therapeutical agent, acting solely or at the least, chiefly, by virtue of its presence being antagonistic to the life and reproduction of such vegetable organisms as are wont to infest the human skin. Now if it were no more than this it would scarcely be worth while to occupy the attention of your readers so much with it. But I find from therapeutical investigations with it in which I have for some time been engaged, that it is much more than this. It is beyond question a valuable remedy also in a large proportion of the *non-parasitic* diseases of the skin.

Chrysophanic acid, as a separate principle, has, so far as I know, never been tried as a remedy in skin diseases. I am, therefore, glad to be able to announce that Professor Attfield's research into the composition of Goa powder, as detailed in this Journal, has not been altogether without fruit.

In showing, as he has, that chrysophanic acid is the chief constituent of Goa powder he had made it possible to construct an agreeable looking and most useful ointment.

I trust it may be thought worth the while of some wholesale house to bring chrysophanic acid within the reach of the general body of prescribers.

In conclusion I ought to say that some special care is necessary in the preparation of the ointment if it is to turn out such as I have described it. In the first place, the acid must be thoroughly dissolved in the hot benzol, and, in the next place, the cooling and evaporation of the benzol must be conducted as rapidly as possible. With this view the process of dissolving may be conducted in a small glass "beaker" placed in a water-bath, and when solution of the acid and the lard has been perfectly accomplished the solution should be promptly turned out into a cold evaporating dish, placed in cold water and immediately briskly stirred with a glass rod until the solution has become fully and firmly "set."

THE DISPENSING OF SALICYLIC ACID.

BY JAS. W. WHITE.

Although much information has reached us from many quarters respecting the chemical history and therapeutic uses of salicylic acid, the prescriber and dispenser have but few data for their guidance in exhibiting the requisite doses of this substance.

As long as a few grains only of the acid were required as an adjunct to a quantity of vegetable infusion, or small doses were ordered in combination with an alkali or an alkaline salt, the dispenser met with little or no difficulty in this matter; but latterly there has been a tendency to prescribe the free acid in increased quantity without indicating suitable means for its administration. This is illustrated by the following prescription—

℞ Acid. Salicylic. ʒij.
Aquæ, ℥vj.
Misce. Sumat cochl. magn. ter die.

An unattractive mess. Continued trituration does not prevent the immediate precipitation to the surface of the liquid of an uneven flocculence, which on agitation does not remain diffused sufficiently long to admit of being accurately divided into doses. It was endeavoured to improve the suspension of the acid by adding an ounce of mucilage of acacia, and with a satisfactory result, which however was greatly improved upon by substituting tragacanth for the acacia. Twenty grains of powdered tragacanth triturated with the acid and water produced an even, emulsion-like mixture, in which the acid remained suspended for many hours before reaching the bottom of the bottle; with this, prescriber and patient were perfectly satisfied.

It may perhaps be useful to give a few memoranda relating to the solubility of this substance in various media.

Boiling water takes up a large quantity of the acid, in fact a solution can be made which will solidify on cooling; but a cold saturated solution does not contain more than 1 in 310. If an aqueous solution be distilled, an appreciable quantity (not a large proportion) of the acid passes over with the vapour of water; loss must therefore be anticipated if such a solution be boiled or concentrated by evaporation.

It is well known that many alkaline salts assist the solution of salicylic acid. I find that a permanent solution of 10 grs. in 1 fl. oz. of water may be effected by the addition of 10 grs. ammonium citrate, 10 grs. potassium citrate, 6 grs. ammonium acetate, or 5 grs. borax.

A fl. oz. of glycerine in the cold takes up about 12 grs., which separate on dilution with water; if however, half its weight of borax be added with the acid, a glycerine solution may be obtained containing 25 per cent. of acid, and this can be diluted to any extent. (*Vide* note by Mr. C. L. Mitchell, *Pharmaceutical Journal*, 3rd series, p. 103.)

Sugar has no apparent influence as a solvent in this case, but oils and fats dissolve the acid readily, especially when heated. A fl. oz. of almond oil will retain 10 grains.

Lastly, if salicylic acid be beaten with $\frac{1}{10}$th its weight of borax, and the same proportion of glycerine and tragacanth, an excellent pill mass is procured, of which 6 grs. represent 5 of acid, and do not form an inconveniently large pill.

It appears, therefore, that except in small doses, this drug is best prescribed in suspension with tragacanth or in the form of pill, more especially as there is little doubt that in soluble combinations with alkalies and alkaline salts the properties of the free acid are more or less modified.

Clifton.

NOTES ON INDIAN DRUGS.

BY W. DYMOCK.

(*Continued from page* 452.)

RANDIA DUMETORUM.—*Local name*, GHELAPHUL.

A good description of this fruit, with an interesting account of its properties, will be found in Mr. Moodeen Sheriff's 'Appendix' to the Pharmacopœia of India. I may add that the greyish pulp surrounding the seeds is composed of large oval cells containing a little granular matter. The pulp of the pericarp is remarkable for numerous large reddish brown stony cells. The epidermis is formed of tesselated cells of irregular size and shape; the albumen of the seeds is horny and translucent. This drug is much used in native practice, and is well worthy of attention.

BALSAMODENDRON Sp.? PERSIAN MYRRH.

This substance has only recently made its appearance in the Bombay market, occurring in very large masses, the contents of a bale often adhering together. It is of a rich reddish brown colour, and much of it is translucent; very oily; in taste and odour it resembles African myrrh; pieces of papery bark are found adhering to it. I have not been able to ascertain its source, but it is imported from the Persian Gulf ports, and consigned to merchants who deal in Persian goods. I understand that none of it has as yet been sent to England. It readily forms an emulsion with water, and appears to have all the medicinal properties of commercial myrrh.

KALANCHOE PINNATA.—*Local names*, AIRWAN, MAIRWAN, *and* GHAIMARI.

A tall, fleshy, erect, suffruticose plant, having thick ovate-crenated leaves, consisting of one large leaflet and two smaller ones; petiole and margin of leaf purple; blossom a terminal panicle of pendulous, tubular, yellowish red flowers. The fleshy leaves are much used by the natives as an application to boils, wounds, and the bites of venomous insects, etc. They are slightly heated and crushed and applied as a poultice. Their taste is strongly acid and astringent

ARGYREIA SPECIOSA.—*Local name*, SAMUDRA SHOK.

This convolvulus has handsome heart-shaped leaves 9—12 inches long, and 8—10 broad, or even larger; upper surface dark green and smooth, under surface white, and silky from the presence of a felted layer of long simple hairs. Under the microscope these are seen to be simple tubes gradually tapering to a point, and much like the fibre of flax. They are very strong, and not easily removed by pulling, or by scraping; they retain moisture well. Samudra leaf is a kind of natural impermeable piline, and is used in much the same way as that substance. With regard to the alleged blistering properties of the upper surface there must be some mistake, as I find it has no effect when applied to the skin, nor has the leaf any acridity when chewed.

CELASTRUS PANICULATA.—*Local name*, MALKUNGNEE.

The expressed oil of the seeds is not mentioned in the Pharmacopœia of India. It is of a reddish yellow colour, and deposits a quantity of solid fat after in has been kept a short time; the odour is pungent and acrid. Sp. gr. ·951. Treated with sulphuric acid it turns of a dark bistre colour. This oil is used as a stimulant application to relieve local pain in rheumatism and fever. The seeds also crushed are used for the same purpose; they are generally combined with aromatics such as the seeds of *Barringtonia*, and *Ptychotis Ajwan*. Internally the seeds are sometimes administered as a stimulant and aphrodisiac, commencing with a dose of one seed, to be gradually increased to fifty by daily increments of one.

GARDENIA GUMMIFERA AND LUCIDA.—*Local name* DIKAMALI.

The gum of these trees as met with in commerce is described in the Pharmacopœia of India. In the pure state it has a very different appearance, being transparent and of a bright golden yellow; the odour is powerful and like valerian without its camphoraceous aroma. Pure Dikamali dissolves very rapidly in rectified spirit, forming a solution the colour of pale sherry, which when poured into water forms a delicate primrose-coloured emulsion. This after standing for twenty-four hours deposits a portion of the resin in an opaque condition, and of the colour of precipitated sulphur, but not sufficient to visibly affect the colour or opacity of the emulsion. Besides the external uses generally mentioned in books on Indian Materia Medica, Dikamali is in Bombay much prescribed by Hakeems in dyspepsia attended with flatulence. I have heard it spoken very favourably of by those who have taken it.

MORINGA PTERYGOSPERMA.—*Local name*, SHEGUA.

The root of this tree is universally accepted in this part of India as a substitute for horseradish, The oil of the seeds is not expressed, the pods being always gathered in an unripe state for use as a vegetable; they may be boiled and served with melted butter, or cut in pieces and mixed with curries. The flowers are eaten in curries, and also fried with butter. The leaves boiled with onions and spices are used in the same manner. A decoction of the bark is used as a fomentation to relieve spasmodic pain arising from various causes. The gum when it first exudes is opaque and white; from exposure to the sun it soon becomes pink, and finally of a dull red colour on the surface, the interior remaining white. It occurs in pieces of considerable size, and generally more or less vermicular in form. Placed in water it swells up and forms a salmon-coloured, firm, bulky jelly. The taste is mildly astringent. Shegua gum is said to be used to produce abortion, but it is difficult to obtain any reliable evidence upon a point of this nature; it would be quite possible to use it as a tent to dilate the os uteri, as it is very tough and swells rapidly when moistened.

JATROPHA GLANDULIFERA.—*Local name*, JUNGLI ERENDI.

A small shrub, remarkable for the shining reddish brown colour of its young foliage. The leaves are palmate, 3—5 cleft; panicles terminal, short, few flowered; flowers reddish brown in the monsoon, in the dry season both flowers and leaves lose much of their red colour. The young branches and petioles of the leaves are thickly studded with sticky red glandular hairs. The capsules are three celled and three seeded, with an outer adherent fleshy epicarp, which dries up as the fruit ripens; when this takes place the three triangular woody cells of which it is composed divides into six pieces suddenly with a sharp report, and the seeds are projected to a considerable distance; it is, therefore, necessary to gather the fruit before it is quite ripe and dry it in a covered place. The seeds, including the strophiole, are three-tenths of an inch long, and two-tenths broad; they are of a grey colour with two brown stripes on the dorsum, which is convex, the under side has two flat surfaces, divided by a central ridge. The kernel is without smell, and very oily, it has a sweet nutty taste. Under the microscope it is seen to consist of a delicate stroma, completely filled with small oil cells; when these are crushed large oil globules make their appearance. In this part of India the juice of the plant is used as a counter-irritant, to remove opacities of the cornea, or thickening of the conjunctiva, and the oil of the seeds as a stimulant embrocation in chronic rheumatism. The shrub is very common on waste ground in the Island of Bombay; it appears to have been introduced from the Deccan.

JATROPHA NANA.—*Local name*, KIRKUNDI.

It much resembles the above mentioned plant, and has the same medicinal properties.

ADHATODA VASICA.—*Local name*, ADULSA.

The leaves of this shrub are elliptic oblong, attenuated at both ends, glabrous, upper surface dark green, under surface much lighter, margins waved, petioles half an inch long, length of leaf 4—5 inches, breadth one and a half to one and three-quarters inch, venation reticulated, taste bitter. Adulsa has a very considerable reputation an an expectorant amongst native practitioners in this neighbourhood. From the remarks in the Pharmacopœia of India it will be seen that this drug is very generally esteemed in other parts of the country. It would be interesting if further experiments could be made with a reliable preparation; a succus might answer very well.

ECLIPTA PROSTRATA.—*Local name*, MAKA.

A small prostrate or ascending plant; stem reddish; leaves lanceolate, attenuated at the base, with waved edges, one to one and a half inch long. The whole plant is rough to the touch, from the presence of numerous adpressed white hairs. The flower heads are in pairs, one having a peduncle twice as long as the other; flowers numerous; corolla white; root much branched, woody, fibrous rootlets, about four inches in length. The whole plant is used; it has a strong disagreeable smell when bruised. The structure of the hairs is peculiar: the base is red and turned upwards, upon it is attached a conical white glandular structure. The seeds are wedge-shaped, about the size of lettuce seed, and marked with rough irregular prominences on both sides. Maka has been very favourably mentioned as a substitute for Taraxacum in the Pharmacopœia of India. In Bombay it is used by the natives as a tonic in combination with aromatics, such as *Ptychotis*, *Ajwan*, etc. The bruised leaves are also applied to wounds and sores. It is a very common weed.

ASTERACANTHA LONGIFOLIA.—*Local name*, TALMAKHARA.

The seeds of this plant are not mentioned in the Pharmacopœia of India; they are very generally used, and are to be found in every druggist's shop. they are small and flattish, of irregular form and brown colour; the largest one-tenth of an inch long, one-sixteenth broad. When placed in the mouth they immediately become coated with a large quantity of extremely tenacious mucilage which adheres to the tongue and palate, and is of rather agreeable flavour. When a section of the seed is placed under the microscope with a drop of water the development of the mucus may be observed. It appears to spring in filaments from the columnar cells of the testa; these spread rapidly in every direction, and form a network which resembles the growth of some of the lower forms of algæ; it does not dissolve when much water is added. Talmakhara (vulg. Talimkhana) seed is considered to be very efficacious in promoting the concoction and increasing the quantity of the seminal fluid; it is diuretic. The powdered seed is administered with sugar or milk in doses of from one to three drachms.

ZANTHOXYLON TRIPHYLLUM.—*Local name*, TRIPHALI.

The fruit is a small, roundish-ovate, somewhat flattened capsule about the size of a large pea; it has a fleshy dotted pericarp, which in the dry drug forms a rough dark brown aromatic covering to the tough woody shell enclosing the seed. The small peduncles of the fruit often remain attached. The seed is single of the shape of a lentil, black and shining. The capsules when ripe dehisce, and the seeds fall out and are thrown away as useless. Upon pressing the pericarp with the nail the essential oil exudes; it has an agreeable lemon odour, and tastes hot and aromatic. Sections of the capsule placed under the microscope show that the outer portion of the pericarp is thickly studded with cells containing the essential oil, and that the elasticity of the capsules is due to the presence of strong bands of spiral fibre. The dry open capsules when soaked in water close and resume the shape which they had before dehiscence. Triphali is an agreeable aromatic and stimulant; it grows abundantly in the Goa territory.

BARRINGTONIA ACUTANGULA.—*Local name*, SAMUNDAR PHAL.

The seed of this tree resembles a nutmeg in size and shape; externally it is somewhat rough, brown, and marked with longitudinal striæ; internally it is of a chocolate colour, hard and brittle when dry, but easily softened by immersion in water, when a section for microscopic examination can readily be made. A small central cavity of an oval form contains the germ; the rest of the seed consists of starch. The granules are small, and their natural form, which appears to be oval, is much modified by compression; they are contained in a delicate cellular stroma. Samundar Phal is considered by the natives to be warm and stimulating; it has a starchy taste; in Bombay it is generally prescribed in combination with other and more active medicines.

(*To be continued.*)

SERUM SANGUINIS EXSICCATUM*.

BY FRANCIS VACHER,

Medical Officer of Health, Birkenhead.

In a recent paper "On Serum Sanguinis as a Therapeutic,"† I gave the particulars of some experiments I undertook for the purpose of discovering any agent or agents by means of which this most unstable liquor might be prevented from decomposition. The conclusion I arrived at was that *serum* might be preserved for a period of eight days, "in four ways, viz., (1) by the weak solution of chloride of aluminium known as chloralum, in the proportion of 1 to 16; (2) by spirit of chloroform in the proportion of 1 to 32; (3) by chlorate of potash, 15 grains to the fluid ounce; and (4) by a scarcely appreciable quantity of camphor." Of these methods I stated the first appeared a little uncertain, and was open to objection from the mixture of *serum* and chloralum having a disgreeable smell and taste. The use of spirit of chloroform as a preservative, or chlorate of potash, was also seen to be not altogether unexceptional, as circumstances might arise when it would not be expedient to combine the *serum* with either of these drugs; so that the *serum* I supplied to the practitioners who kindly offered to make trial of its therapeutical properties, and that which I myself prescribed, was always, when not quite fresh, kept sound by the camphor dissolved from a small floating fragment. Even when the *serum* was protected with camphor, I dared not use it after the eighth day, reckoning from the date of the shedding of the blood from which it was obtained.

The results of my investigations in this respect were therefore far from satisfactory, and I could not but be conscious that in advocating a remedy which, besides being bulky in form, was difficult to preserve for a week, I was little likely to receive attention. The preparation I desired to introduce to notice, and whose claims to a place among recognized therapeutical agents I wished to have fairly tested, was of so unstable a nature as to be practically only within reach of a few. Druggists could not be expected to procure it, butchers would not take the trouble to learn how to prepare it, and thick unfiltered samples discredited it. The fate of a therapeutic agent difficult to obtain, bulky in form, exceedingly susceptible of change, and when changed noisome and poisonous, was a foregone conclusion. No remedial agent, however manifest its uses, could contend against such odds. The conviction forced itself upon me, that if *serum* was to struggle into favour, and be of real service to the public and the profession, all these conditions must be reversed —it must be presented in a convenient portable form, insusceptible of change; and I set myself to solve the problem how this was to be accomplished.

Receiving advice from a correspondent that glycerine possessed the property of preserving *serum* (his statement was that the addition of about one per cent. of this kept *serum* sweet for a month), it occurred to me that a mixture of *serum* and glycerine might be reduced in evaporating dishes to the consistence of condensed milk, and put up in hermetically sealed tins. This, however, could only have been attempted on a large scale, and would have entailed considerable outlay, so the experiment was not made. It was next suggested to me that if the *serum*, instead of being reduced to the consistence of honey or an ordinary extract, were simply evaporated to dryness, it would then be light, portable, and practically immutable without the addition of any preservative or foreign substance whatever. All that was necessary was to be careful that the *serum* was, in the first instance, perfectly sound, that it was dried without loss of time, and that in drying the temperature did not approach too closely a height liable to coagulate the albumen, about 145° F. A preparation of dried *serum* was accordingly made, the drying chamber being maintained at a temperature of from 130° to 140° F., and the process of manufacture in no respect differing from that observed in producing albumen mordant. Whereas, however, the latter, as I explained in my previous paper, is often made from stale *serum* which has been acidulated and "corrected," and always from the whole of the *serum* that can be separated, the dried *serum* made for me has been derived from selected samples of fresh *liquor sanguinis*, having only a trace of colouring matter, but retaining the alkali and soluble salts normal to it. Removed from the evaporating dishes it occurs as thin yellow flakes, bright on the surface and more or less curved. After being ground, the yellow colour is nearly lost, and it appears as a fine light almost white powder, with a peculiar faint odour, and a salt, somewhat fishy, taste. It dissolves in cold water, but more readily in water slightly warmed.

The *serum* has been obtained indiscriminately from the blood of sheep and oxen, but the yield of *serum* sufficiently pure to be suitable for medicinal purposes is as regards either very small. The average quantity of blood collected from a slaughtered ox is about 3½ gallons, or 35 lbs., but the clot holds so much *serum* that the whole quantity separable is often not more than 7½ lbs., and under the most favourable circumstances rarely exceeds 12½ lbs. So the average yield of an ox may be estimated at 10 lbs., and only from a third of this will clear enough to make a neat preparation. The average quantity of blood collected from a slaughtered sheep is about 4 lbs. In Watts's 'Dictionary of Chemistry' the percentage of water in the serum of ox-blood is stated to be from 90·8 to 91·5, in the *serum* of sheep from 91·6 to 91·8. An ounce of the preparation made for me may therefore be considered equal to ten ounces of fresh *serum*.

As regards the uses of *serum sanguinis exsiccatum*, I

* From the *Practitioner*, December, 1876.

† *Liverpool and Manchester Medical and Surgical Reports*, 1876.

submit that any specific properties which *serum* may possess as an anthelmintic (evidence on this point is still wanting) can hardly be affected by drying, while now that *erum* is presented in a light portable form, which will keep sound as long as it is free from moisture, it may serve many purposes for which fresh *serum* is not adapted. Proteic substances are not largely represented in the Pharmacopœia. They putrefy readily when not dry, and putrefying act as ferments, so that part of the process of manufacture of many pharmaceutical preparations has for its object the removal from them of protein compounds. Thus the practitioner who wishes to prescribe an animal or vegetable "flesh-former" is exceedingly limited in his choice of materials.

One of the most important uses to which *serum exsiccatum* can be applied would, therefore, appear to be in the treatment of the subjects of emaciation, whether from phthisis pulmonalis, struma, or diabetes, especially adult patients. If, for instance, the dried *serum* be made into a thick mucilage with a little water, and then added to an equal quantity of cod-liver oil, a compound is obtained somewhat resembling the yolk of an egg, and exceedingly nutritious. When cod-liver oil is ill borne, sweet oil might be substituted for it. Secondly, inasmuch as *serum* in a dry condition may be combined with water to any required spissitude, its value as an emollient or demulcent is obvious. I would suggest a trial of it in diseases of the alimentary mucous membrane and of the urinary organs. Then it might occasionally be at hand when the usual antidote for poisoning with perchloride of mercury, soluble salts of copper, etc., was not. Thirdly, this form of *serum* cannot but prove convenient for suspending camphor, oils, resins, copaiba, etc., in aqueous vehicles. Turpentine also, especially when exhibited as an anthelmintic, might be fitly combined with a strong solution of this preparation.

Externally it occurs to me that *serum exsiccatum* may be of use in three ways. Mixed sparingly with water and made into an emulsion with oil, it forms a suitable dressing for burns and scalds, etc.; mixed with a little water and an equal volume of rectified spirit, it may be used as collodion for painting over the skin when red or excoriated from pressure, or in cases of erysipelas, or to prevent or diminish pitting in small-pox; and the precipitate produced by agitating the dry serum with alum-water (after the water had been strained off through muslin) forms an excellent astringent poultice—alum-curd, a similar preparation, used to be a favourite application in ophthalmia.

In conclusion I would advise that the dried *serum* be only mixed with water just before being used. If introduced into a mixture the mixture may not be finished before decomposition begins, and calculations as to the time it will continue sound are liable to be falsified by patients incautiously exposing it to the sun. When kept carefully corked, *serum exsiccatum* may be preserved unchanged for any length of time. The presence of water being in all cases necessary to decomposition, so long as *serum* remains dry, exposure to the sun will not alter its properties.

REACTIONS FOR CARBOLIC ACID.

The following list of reactions for carbolic acid is quoted in *New Remedies*, from a lengthy article, by Dr. Richard Godeffroy on the "Modes of Formation, Methods of Preparation, Properties and Reactions of Carbolic, Benzoic, Salicylic, Oxybenzoic and Parabenzoic Acids," which has appeared in the *Zeitschrift* of the Austrian Apothecaries' Society :—

1. Solutions of *caustic alkalies* dissolve phenol readily, with formation of *phenates* (carbolates) of alkali metals.

2. On treating phenol with an excess of fused *caustic potassa*, a copious disengagement of hydrogen gas occurs after a short time, while at the same time there are formed oxybenzoic and salicylic and diphenol.

3. *Potassium* or *Sodium* dissolves in melted phenol, with disengagement of hydrogen and formation of *phenate* of the alkali metal.

4. On passing dry *carbonic acid* into phenol containing *sodium* in solution, sodium *salicylate* is formed, together with paraoxybenzoic acid.

5. Pieces of *caustic potassa* brought into a solution of phenol in *chloroform* became covered with a rose-red shell, but the mixture soon became very hot, dark-coloured, and thick.

On adding to an aqueous solution of phenol a little *potassa*, evaporating to dryness, and, after the residue has become cold, pouring over it some *chloroform*, a magnificent purple colour makes its appearance, which is ascribed to the formation of rosolic acid. (J. Guareschi.*)

6. A watery solution of phenol immediately discolours *potassium permanganate.* If the latter be added until the colour ceases to disappear, the products of oxidation are only carbonic and oxalic acids ; if, however, the oxidation remains incomplete, the products are a resin, closely allied in composition to phenol, a small quantity of oxalic acid, and a few other bodies.

7. Strong *hydrochloric acid* is poured upon *potassium chlorate* in a test-tube, so that the fluid stands a few centimetres over the salt; after the subsidence of the first reaction, and the removal of the chlorine vapours from the upper portion of the test-tube by blowing, the liquid is diluted with $1\frac{1}{2}$ volumes of water ; *water of ammonia* is now poured into the test-tube, so that the latter forms a separate layer over the other. On adding to this test-liquid a watery solution of phenol, the *ammoniacal layer assumes a tint*, varying with the quantity of phenol, from rose-red, through blood-red, reddish, or dark-brown. One part of phenol may be easily recognised in 12,000 parts of liquid. (Ch. Rice.†)

8. On passing the vapor of phenol over *zinc* in powder, *benzole* and zinc oxide are formed : $2C_6H_5OH + Zn_2 = 2ZnO + 2C_6H_6$.

9. On adding an excess of *bromine water* to a dilute aqueous solution of phenol, there is immediately formed a yellowish-white flocculent precipitate of *tribromphenol*, $C_6H_2Br_3OH$. This reaction is said to be distinguishable in a dilution of 1: 43,700, and by waiting for a few hours, even in one of 1 : 54,600 parts.

10. On shaking a watery solution of phenol with *aqueous ammonia*, and exposing the liquid to the vapour of bromine, the liquid assumes a distinct blue colour, even in presence of only $\frac{1}{20000}$th part of phenol. (F. A. Flückiger.‡)

11. On mixing a solution of a *hypochlorite* with *ammonia* and a liquid containing phenol, an intense blue colour is developed. Very small quantities of phenol may be detected by this reaction.

12. Dilute solutions of phenol are coloured violet by *neutral aqueous ferric chloride* solution. *Alcoholic* ferric chloride solution produces a blue colour with alcoholic phenol solution. Free acids prevent the reaction.

13. A watery solution of phenol reduces *metallic mercury* from a solution of *mercurous nitrate*, and the liquid assumes a red colour, which is said to be visible still if only $\frac{1}{30000}$ phenol is present.

14. By united action of *iodine* and *mercuric oxide* upon phenol, substitution products of the latter, containing iodine, are formed. (P. Weselsky.§)

15. *Albumen* is immediately coagulated by phenol.

16. Concentrated *sulphuric acid* dissolves phenol without colour, and produces *phenol-sulphuric* (sulphocarbolic, sulphophenic) acids. Warmed with *fuming sulphuric acid*, phenol yields phenol-disulphuric acid,

* *Gaz. Chim. Ital.*, 3,402.
† *Am. Journ. Pharm.*, 1873, 98.
‡ *Arch. d. Pharm.*, [3] 3, 30.
§ *Wien Ber.*, 69, II., 832.

which latter imparts a *ruby* colour to ferric chloride solution.

17. On heating phenol with *oxalic* and *sulphuric acids*, a beautifully red mass is obtained, which assumes a magnificent purple shade with *alkalies*. This is owing to the formation of *coralline*.

18. On heating phenol with sublimed (and, therefore, dehydrated) oxalic acid to 110-120° C., rosolic acid is formed. (Prud'homme.*)

19. Nitric acid acts upon phenol with more or less violence, depending upon its concentration, and produces either mononitrophenol $C_6H_4(NO_2)OH$, or dinitrophenol $C_6H_3(NO_2)_2OH$, or trinitrophenol, $C_6H_2(NO_2)_3OH$. This latter is commonly known as picric acid.

COTO BARK AND ITS CRYSTALLIZABLE CONSTITUENTS.†

BY JULIUS JOBST.

The author reports that the crystallizable body some months since separated by him from Bolivian coto bark, and named by him "cotoin,"‡ has since, on account of its excellent anti-diarrhœic action, been used to a considerable extent, but unfortunately the importation of the crude material has not kept pace with the demand. After a long interval a larger parcel of coto bark came into his possession, but the new bark showed marked differences in its exterior which were also manifest in the taste and smell. Upon the extraction of the bark by the process given for cotoin, a body similar to cotoin crystallizing in yellow flakes was obtained, which, however, was not cotoin, and differed from it essentially in its reactions.

In the first place the new body wants the biting taste of cotoin; further it is much more difficultly soluble in water, alcohol, ether, ammonia and potash solution. Concentrated sulphuric acid does not give with it the characteristic reaction of cotoin, but only a yellow solution; lead acetate causes no precipitate.

The author proposes for this substance the name "paracotoin," and states that in the last imported coto bark several other crystallizable bodies are contained in smaller quantities.

Upon making complaint respecting the varying quality of the bark, the author was told that the parcel in question came from the banks of the river Mapiri, in Bolivia, and represented the best coto that it furnished. No further information could be obtained.

The author's stock of cotoin, prepared from the original coto bark, being almost exhausted, he was induced by the undoubted similarity of the two barks and their principal products to seek to ascertain the therapeutic action of the new body. The experiment was made by Herr Burkart. He found that paracotoin exercises the same anti-diarrhœic action as cotoin, the difference between the two preparations being only one of degree; paracotoin, in accordance with its inferior solubility, showing a somewhat weaker action than cotoin, consequently the dose slightly varies. In his therapeutic experiments, Herr Burkart administered it either in the powder form, 0·1 gram with 0·2 gram of saccharum album every three hours, or in emulsion, 0·5 gram. On account of its insolubility, the powder form, in the above doses, was preferred, the patients taking the powder more readily on account of its complete tastelessness.

A relation appears, therefore, to exist between the two coto barks similar to that observed in the case of the cinchonas; where barks have been found within narrow limits in which alternately quinine or cinchonidine or cinchonine predominate.

The author is engaged in an investigation of the relation in which cotoin, paracotoin and the other crystalline constituents of the coto bark stand to each other in respect to their chemical composition.

* *Monit. Scient.* [3], 3890.

† *Ber. d. deutschen chemisch. Gesellschaft*, vol. ix., p. 633. Read November 11, 1876.

‡ *Pharmaceutical Journal* [3], vol. vi., p. 764.

EXAMINATION OF SPURIOUS BEESWAX.*

Not long ago some yellow beeswax was offered for sale in a German city, which, on account of its cheapness, found a ready market at first, but was afterwards ascertained to be a gross fraud. As the method of examination adopted presents a few novel features, we reproduce it here.

In appearance, colour, fracture, brittleness, pliability, and odour (on the outside portions) this pseudo-wax could scarcely be distinguished from the genuine. But the freshly-cut surfaces had a lustre different from that of true wax, and on breaking the mass into pieces, a distinct odour of resin was perceptible. On melting it with a gentle heat, the honey odour disappeared entirely, but the pitchy odour became gradually more intense and oppressive. These simple means having already pointed out the probable composition, the melting point and the specific gravity were determined in the following manner: A wide-necked glass flask was filled three-fourths with water and into the middle of this was immersed a thermometer and a test-tube containing some fragments of the wax; the mouth having been loosely stoppered, heat was carefully applied, until about one third of the wax had melted. The temperature at this point was 70° C. (158° F.). To determine the specific gravity, two equally large pieces were dropped into a beaker containing dilute alcohol, in which they sank; distilled water was now gradually added, until after stirring, the pieces floated a little below the level of the liquid. The specific gravity of the latter, being found to be 0·962, corresponds to that of the wax.

One gramme of the substance was warmed in a small flask with 10 gm. of chloroform. The solution was clear and yellow, but on cooling became opaque, and deposited on the sides an almost transparent and colourless mass. Another gramme was dissolved by heat in 15 gm. of 70 per cent. alcohol, and set aside to cool. This caused the deposition of globular colourless masses, leaving the liquid of a clear yellow colour. The globules having been separated by filtration, they were dried and weighed. They amounted to 0·6 gm., and had a specific gravity of 0·910. The filtrate, on evaporation, left behind a brittle, yellow resin, weighing nearly 0·4 gm. One gramme of shavings was next boiled in a solution of 1·4 gm. of borax in 20 gm. of distilled water, whereby a colourless mass was obtained, floating on top of the liquid, which latter was cloudy, but did not become either milky or gelatinous on cooling. Japan wax was therefore not present.

Another portion, in fine shavings, was shaken with dilute ammonia, but the liquid remained clear and transparent and the substance unaltered, which proved the absence of stearine as well as turmeric and orleans. The above mentioned globular masses, free from resin, were now examined for paraffin. They had a lustrous, alabaster-like appearance, became soft on kneading without getting adhesive, and dissolved easily and completely in oil of turpentine and benzine, but were entirely insoluble in five parts of hot absolute alcohol. They were hence pure paraffin. The composition of the substance was therefore 60 parts of paraffin and 40 parts of yellow resin, covered with a thin coating of genuine beeswax. The specific gravity in this case was identical with that of many samples of genuine beeswax.

* *New Remedies*, November 15, 1876; from the *Pharm. Centralh. fr. Ph. Post.*

PILOCARPUS PINNATUS (JABORANDI).*

BY ERNEST HARDY.

America has been a privileged land for therapeutics. It has yielded most active and valuable medicines, and although it has been explored by naturalists and travellers for three centuries it is not yet exhausted. In the present day observers still describe plants from these prolific lands, the origin and properties of which are unknown. Others rescue from oblivion plants already described, but only partially made known by an imperfect description; so that a definite introduction of one of these species into scientific classification becomes equal to a new discovery.

Pilocarpus pinnatus has had this fortune. Formerly described and imported into Europe under the name "jaborandi," given to it by the natives of South America, it had been forgotten and confounded with other plants designated under the same popular name, when a happy chance recalled attention to its properties.

Two years since, a Brazilian physician, Dr. Coutinho, visiting France, brought with him for his personal use some jaborandi leaves, a popular remedy in his own country, the efficacy of which he had frequently tested in various affections. Ignorant whether this plant was known in Europe he attended a lecture by M. Gubler. The learned Professor of Therapeutics to the Paris Faculty of Medicine spoke of sudorifics, and regretfully remarked that no medicine was truly worthy of that name. At the close of the sitting Dr. Coutinho made known to him the properties of jaborandi, and to demonstrate its efficacy he immediately instituted an experiment; the next day M. Gubler and his pupils were able to testify to its astonishing effects as a sudorific and sialogogue. After repeated experiments MM. Gubler and Coutinho published their researches, which have since been verified by a large number of observers.

Very soon jaborandis were imported in large quantity and delivered to the public. Then commenced an era of deception. These jaborandis possessed different properties, whilst some were nearly inert. Serious doubts were raised in the minds even of the least prejudiced. It was possible that they had to do with various plants, but the absence of flowers and fruits prevented them from being distinguished. However, by the simple examination of a leaf, M. Baillon, Professor of Botany to the Paris Faculty of Medicine, succeeded in tracing the history of the plants designated under the name "jaborandi," and in distinguishing them one from another.

About the middle of the seventeenth century, Pison and Margraff, in their celebrated work 'De Medicina Brasiliense,' described three ligneous frutescent jaborandis. One of them, better studied than the others, has been since described by Gaudichaud under the name *Serronia Jaborandi.* Pison's second frutescent jaborandi is described as having seeds that are powerfully burning. The third, analogous in its exterior characters to long pepper, has acuminate linguiform leaves, and is employed in Brazil in the preparation of baths and fomentations. All these jaborandis have roots that taste rather insipidly at first; but after having been chewed some time burn the tongue and palate like the pyrethrums. They are employed as odontalgics and cephalics; also in cases of poisoning, suppression of urine, and affections produced by chills.

There are some jaborandis that belong to the Scrophulariaceae. The *Herpestes gratioloides*, a South American herb, has a sudorific antirheumatic action; *H. colobrina* is an alexipharmic employed by the Peruvians; *H. Monnieria*, Kunth (*Gratiola Monnieria*, Linn.), has a root that is aperient, diuretic and sudorific; it is used also in cases of fever and poisoning, and as an antidote to the bites of venomous serpents.

A fourth jaborandi of Pison and Magraff was, according to the custom of the time, separated as a herb from the others, which were ligneous plants. The description which those authors have given of it agrees completely with *Monnieria trifoliata*, a rutaceous plant of the Cuspariæ tribe, which grows in all the warm eastern region of South America. It is especially common on certain portions of the littoral of Brazil, where it is known as *Alfocava de cobra.* Like most of the plants of the same group it is a kind of aromatic stimulant; the odorous root is as strong as that of pyrethrum.

This classification of the plants designated under the name "jaborandi," illustrates the errors that the employment of a popular name may introduce into science; moreover, it does not include the plant upon which public attention has been fixed for some time.

This jaborandi, the only one to which the subsequent remarks apply, is a *Pilocarpus*, recognized by M. Baillon as *P. pinnatus* or *pennatus.* It grows in the north of Brazil, in the provinces of Céara and Piauhy, the warmest in the empire, in the neighbourhood of Pernambuco; it is found especially upon the sides of mountains in the Sierra de Biapaba. In these provinces there reigns an eternal spring and a soft climate; the winter is marked by torrents of rain; in the summer the land is refreshed by numberless streams and springs that break forth in every part; forests cover the tops of the mountains and descend into the plains in the midst of the most luxurious vegetation. The *Pilocarpus pinnatus* is met with on the hill slopes, upon the borders or in the clearings of the forest.

Bonpland found this jaborandi in the province of Corrientes. The first plants sent to Europe were collected by Lebon in 1847, in the province of St. Paul, near Villafranca. They flowered soon afterwards in the conservatories of the Duke de Croy, at Dulmen, in Westphalia, and afterwards in Belgium and in Paris. MM. Baillon and Planchon describe *Pilocarpus pinnatus* as a very beautiful shrub, eight or ten feet high, completely glabrous when full grown. Its cylindrical branches are covered with a pale bark, sprinkled all over with whitish projecting lenticular spots. This bark is easily detached from the ligneous portion; its internal surface is white and finely striated longitudinally. Examined microscopically it presents below the suberous layer a circle of well characterized glands, analogous to the oil glands of *Citrus;* in the liber layers are sclerogenous cells, each containing a drop of resinous matter; and further in the interior are resiniferous cells. These same cells are found disseminated in all the layers of the roots, except in the thin epidermic flakes which exfoliate on the surface of that organ. The taste of the root bark is very strong.

The leaves are compound, alternate, without stipules, imparipinnate, with 9 (sometimes 7, rarely 11) leaflets, and sometimes attain a length of 18 inches. The leaflets are in oposite pairs, borne on a short petiole, articulated at the base, varying in form with the individual and with the position of the leaf; they are sometimes 6 inches long and 2 inches broad. The mid-rib is very prominent on the under surface, less so on the upper. Under a microscope numerous oil glands can be seen on the leaves, the glands being constituted like those of the exterior parts of the bark and the stem.

The flowers are disposed in a long flexible raceme, sometimes nearly 20 inches long, and bearing upwards of a hundred flowers. Some of the inflorescence is terminal, but the greater part occurs upon the stems and branches. The flowers have a short peduncle, a small calyx with five slightly marked teeth; the corolla before opening forms

* *Bulletin de la Société d'Acclimatation* for October, 876, p. 671.

In this paper the author, following M. Baillon, calls this species "*pinnatus*," or, alternately, "*pennatus.*" But the original name given to it by Lemaire was "*pennatifolius*," as may be seen by referring to Lemaire's paper in the *Jardin Fleuriste*, vol. iii., tab. 253, July, 1852.

an ovoid, nearly globular, bud; the petals are thick, tawny grey, marked with numerous oil glands, $\frac{1}{10}$ to $\frac{1}{8}$ inch long. There are five stamens, alternate with the petals. The pistil is short, surmounted by five stigmata. The shell-like fruit usually contains a single seed.

Animals avoid touching the leaves and shoots of this shrub; but according to popular opinion it loses the greater part of its active properties after the rainy season, recovering them afterwards. The leaves and buds have their maximum effect in the spring, at which time it is preferable to collect them.

The botanical study of *P. pinnatus* indicates especially the presence of an essential oil, which is easily obtained by distillation. This oil possesses peculiar characters, but it is not the active principle of the plant. That is an alkaloid* met with in the leaves and existing also in the branches. MM. Bochefontaine and Galippe, and afterwards Guido Tezzoni and Chiacconi, have shown that it was seated in the bark. According to their researches the wood of the branches deprived of bark is devoid of all physiological action. The experiments that have been made with *Pilocarpus pinnatus* may be grouped as follows:—(1) Study of the action of infusions or extracts of the leaves or stems; (2) The examination of their chemical composition; (3) Study of the various bodies that enter into the composition of the plant.

1. *Physiological Action of Infusions of P. pinnatus.*—The leaves and stems of this plant have a remarkable action upon the system. An infusion, of the strength of 3 to 4 grams to 100 or 150 c.c. of water, has an agreeable odour, recalling that of camomile; it has a sweet taste, and its physiological effects are very energetic and prompt upon most subjects. It is rarely necessary to exceed this dose; frequently it is rather too strong and leads to symptoms of intolerance that are not serious.

Soon after the infusion has been introduced into the system, often after only a few minutes, an abundant sweating is produced, and generally prolonged during several hours. The sweat runs over the face and all parts of the body, without causing either lassitude or fatigue. A method has been employed to give an idea of the amount of transpiration, which, however, is only approximative. The trunk and limbs of a patient were enveloped in an impermeable covering, and after several hours the quantity of sweat collected amounted to a litre, and even more in some cases.

To ascertain whether the liquids secreted under the influence of jaborandi have been modified in their composition, MM. Hardy and Ball† examined the urine, saliva, and sweat. They found that the quantity of urea excreted in the urine was diminished, that the saliva contained only a trace of urea, and that the sweat showed the presence of a large proportion of urea. But the amount of urea excreted in the sweat added to that eliminated in the urine did not equal the quantity of urea present in the urine before the experiment.

Pilocarpus pinnatus produces other effects also which, without being so constant or remarkable, are worthy of note. It provokes hypersecretion of the nasal and bronchial mucus, and that of the lachrymal passages; sometimes its administration is followed by nausea and vomiting, and it causes diarrhœa. It has been employed by Messrs. Sydney Ringer and Gould to increase the secretion of milk. It decreases the power of accommodation of the eye at certain distances. These results are most striking when operating on animals. When the infusion is injected into the femoral vein of an animal, tubes being previously fixed in the Steno's and Wharton's ducts, the quantity of saliva secreted is fifteen to twenty times greater than that secreted by the animal in the normal state. But not only the salivary glands are influenced by this medicine. Upon fixing the tubes in the biliary and pancreatic ducts, or in one of the ureters, it is found that the secretion of the liver, pancreas, or kidney is five times greater than the normal quantity. These phenomena are accompanied by a considerable slackening in the beats of the heart.

* Hardy, *Comptes Rendus de la Société de Biologie*, March, 1876.

† *Comptes Rendus Soc. Biologie*, 1874, p. 342.

One of the most remarkable of the properties of *Pilocarpus pinnatus* is its action antagonistic to the salts of atropine. MM. Vulpian and Carville found that when infusion of jaborandi leaves was injected into the leg of a dog having a tube fixed in Wharton's passage, the salivary secretion was increased after a few minutes and the number of heart beats diminished. The injection of a solution of atropine under the skin of the animal was sufficient to arrest the hypersecretion and to cause the beats of the heart to recover their normal rhythm.

2. *Chemical Composition.*—The leaves and stems of *Pilocarpus pinnatus* have a complex chemical composition. They contain an essential oil, a peculiar alkaloid (pilocarpine), and various salts.*

Submitted to distillation with water, the leaves yield an essential oil which is easily collected. Ten kilograms of the leaves gave 56 grams of crude essence; this essence, fractionally distilled, yielded a hydrocarbon boiling at 178° C., a substance passing over at 250° C., and a third product which distilled at a still higher temperature and after a time formed a solid transparent mass.

Pilocarpene, the hydrocarbon boiling at 178°, is a colourless, transparent, mobile liquid, having a peculiar and rather agreeable odour, and is lighter than water. Its sp. gr. at 18° C. is 0·852. It rotates the plane of polarized light to the right, its rotatory power for the D ray being $\alpha_D = + 1{\cdot}21$. Its composition corresponds to the formula $C_{10}H_{16}$. It forms with hydrochloric acid a solid and a liquid bihydrochlorate, both corresponding to the formula $C_{10}H_{16}2HCl$. They are obtained by passing a current of dry hydrochloric acid into the pilocarpine or a mixture of it with ether.

The solid hydrochlorate is a crystallizable colourless transparent body, melting at 49·5°. It crystallizes immediately when a crystal of hydrochlorate of terebinthine is added to its saturated solutions. With solution of perchloride of iron it gives the successively rose, red, and blue colours characteristic of the bihydrochlorate. The author is certain that there is no monohydrochlorate or artifical camphor produced during the reaction.

In its boiling point, and some of its characters, the essential oil of *Pilocarpus* appears to approach the isoterebenthenes, and on the whole it presents a great analogy with oil of citron.

The active principle of *Pilocarpus pinnatus*, or "pilocarpine," has been obtained by various methods.† One way is to make from the leaves and stems an aqueous and an alcoholic extract successively; these are treated with water and then precipitated with ammoniacal acetate of lead. After filtering, excess of lead is removed by sulphuretted hydrogen, leaving an uncrystallizable acetate of pilocarpine. Bichloride of mercury is added to the solution, which precipitates a double salt of mercury and pilocarpine, and by decomposing the precipitate with sulphuretted hydrogen a solution of hydrochlorate of pilocarpine is obtained. To set free the base the salt is decomposed by ammonia in the presence of an excess of chloroform. Upon evaporation of the chloroform the free pilocarpine is left behind.

A more simple method of obtaining the pilocarpine is to make an infusion of the leaves of the plant, reduce it to a syrupy consistence, mix it with an excess of magnesia, evaporate to dryness, treat the mixture with

* Hardy, *Comptes Rendus de la Soc. Biologie*, 1875, p. 109.

† Hardy, *Bull. de la Soc. Chim*, vol. xxiv., p. 497.

chloroform, evaporate the chloroform and take up the residue with water.

Upon placing the solution in a vacuum, the water is disengaged and the base remains in the free state as a colourless viscous mass, soluble in water and alcohol.

With hydrochloric, sulphuric, and nitric acids pilocarpine gives crystalline salts; with acetic and oxalic acids it forms compounds that do not appear to be crystallizable. Hydrochlorate of pilocarpine gives with chloride of platinum a precipitate soluble in water, which is deposited upon evaporation in perfectly crystallized golden yellow plates.

Since the publication of these methods of extraction, M. Duquesnel, in France, and Mr. Gerrard, in England, have proposed other methods by which they obtain also a semi-liquid alkaloid and crystalline salts.

3. *Physiological Action of Pilocarpine.*—Numerous experiments made by MM. Hardy and Bochefontaine have shown that pilocarpine has a physiological action upon the heart and the glands similar to that of the infusion of jaborandi. The injection of a solution of pilocarpine into the foot of a frog, the heart of which had been exposed, arrested the movements of the heart, and when they were nearly stayed the introduction of sulphate of atropine into the other foot was sufficient to re-establish the action. Injected into the veins of a dog, a tube being introduced into Wharton's duct, pilocarpine induced in a few minutes a flow of saliva that continued during several hours. The injection of a salt of atropine under the skin of the animal arrested in a few moments this morbid secretion. In another dog, curarized and subjected to artificial respiration, tubes were placed in Wharton's duct, the biliary duct, Wirsung's duct and one of the ureters, then the number of drops of liquid running from the first three passages was noted, and the cardiac contractions. 0·06 gram of hydrochlorate of pilocarpine was then injected. Twenty seconds afterwards the secretion augmented considerably, the submaxillary glands secreting thirty drops of saliva per minute; the contractions of the ureter were nearly doubled, the beats of the heart were diminished by one-third.

With man, according to P. Dumas, the temperature decreases during the administration of hydrochlorate of pilocarpine; on the day following or the evening of the day on which the medicine has been taken it is always below that of the commencement. It decreases especially during the first hour; during the two or three hours in which the medicine is most active it remains stationary, but it never increases. Five or ten minutes—fifteen minutes at most—after the injection of the hydrochlorate salivation becomes manifest; it continues to increase and attains its maximum after about half an hour; it then diminishes and ceases after about another half hour. The sudation generally manifests itself when the salivation begins to decrease; in half an hour it attains its greatest intensity, and diminishes in three or four hours. Sometimes the salivation has been observed to reappear upon the stoppage of the sweating.

The mixed saliva secreted under the influence of hydrochlorate of pilocarpine has a greater density than normal saliva, from 1004 to 1015; it becomes also more stringy and viscous. This change in the composition of the saliva is explained by supposing that the hydrochlorate acts specially upon the submaxillary and sublingual glands, which produce a thick and ropy saliva, and has no action upon the parotid gland, the secretion of which is clear and limpid.

The employment of *Pilocarpus* is extending and increasing quantities of it are being imported from America. But the question arises whether the material consists of the leaves and stems of a single species, or of those of several varieties possessing analogous, or perhaps slightly varying properties. Several species of *Pilocarpus* grow in our conservatories, and among the most interesting are *P. pinnatus* and *P. simplex*. The physiological study of these two plants has shown that they possess properties similar to those of the leaves and stems actually imported from Brazil.

A first experiment was made with a single leaf of *P. pinnatus*, gathered in the conservatory of the Jardin des Plantes. An infusion of this leaf contained an alkaloid which was easily detected by the use of proper reagents. The solution was reduced to a small volume and injected into the femoral vein of dog, previously chloralized; five minutes afterwards the salivary liquid appeared and the flow continued upwards of an hour.

Another experiment was made with an infusion of the leaves of *P. simplex*. The presence of an alkaloid in the aqueous infusion was shown by reagents, and two minutes after injection into the femoral vein saliva appeared at the end of a tube fixed in Wharton's duct.

It was previously ascertained that the injection of a small quantity of water by itself had almost no influence.

So far as the action upon the salivary secretion these results are analogous to those obtained with the *P. pinnatus* from Brazil. The sudorific effects could only be tested upon man; but, unfortunately, it was then impossible to deprive the young shrubs of any more leaves. The author, however, thinks the preceding facts justify him in affirming that the *Pilocarpus* plants raised in conservatories preserve the same physiological properties as those which grow in tropical countries.

The acclimatization of these shrubs in Europe presents great interest; the author thinks their efficacy as a medicine would not be modified. The species of *Pilocarpus* possess a botanical character and chemical composition which bring them near to species of *Citrus*, and favour the belief that they would grow in the same soils. Moreover, a knowledge of the place of their origin facilitates the placing of them in similar conditions. The *Pilocarpus pinnatus* grows in the equatorial regions of Brazil, remote from places exposed to burning heats; it seeks a soft climate, modified by vegetation, gentle breezes, and elevation of the soil. The surrounding temperature never rises above 36° C.; the difference between day and night is about twelve degrees; that between winter and summer is only a few degrees. The rains commence in autumn and last until June; humidity stimulates its vegetation. Other species of *Pilocarpus* grow in Brazil in colder regions, and resist better the inclemency of the seasons. *P. simplex* is more robust; other species seem still more so, and very probably their physiological action would not be less efficacious. When the *Pilocarpus* is raised in conservatories a temperature of 25° C. is considered necessary for their development; perhaps a lower temperature, if constant, would suffice. Their multiplication would appear to be facilitated by their being reproduced easily by either cuttings or by seeds. The cuttings should be placed under a layer and covered with a bell-glass until they have struck. The sowings should be made at the bottom of drained pots and put under a layer. The seeds only require to be one-half to one inch under a friable and sufficiently moist earth—peat is preferable—and the watering should be rather frequent. No difficulty is met with in the growth of these shrubs in conservatories, and it is believed that acclimatization experiments made at a similar altitude and temperature, and in a soil of the same nature as that in their native country, would meet with full success. They climatic conditions can be met with in the south of France upon spots sufficiently sheltered and humid. They occur more numerously still in certain parts of Algeria, the latitude of which approaches that of the equatorial regions. The author, therefore, brings the subject before the Société d'Acclimatation in the hope that by the acclimatization of the *Pilocarpus pinnatus*, or neighbouring species, France may be enriched by the possession of this valuable medicine.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 16, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

INDIAN QUININE.

ACCORDING to the last reports we published respecting the cultivation of cinchona in India, a very glowing account was given of the results that had been obtained at the plantations at Darjeeling, and great anticipations were held out as to the probable value of the mixed alkaloids that were prepared from the bark grown in that district.

As we then stated a considerable quantity of this mixed alkaloid was sent to medical officers in various parts of India for the purpose of having the preparation practically tried in the treatment of fever, and the results reported upon. We have now received a copy of the *Neilgherry Courier* of the 7th November, containing a report addressed to the Chief Secretary of the Indian Government, by Surgeon-General G. SMITH, of the Indian Medical Department, in which a summary is given of the reports which have been sent regarding the effects of the Darjeeling preparations of mixed cinchona alkaloids in the treatment of fever. It appears that two pounds of the drug were sent to twelve hospitals and that reports have come in from ten of them. The drug is described as being a fine brownish powder, somewhat gritty and astringent in the mouth and having a strong bitter taste, insoluble in water, but completely soluble in about four times its weight of dilute sulphuric acid.

The doses in which this preparation has been administered ranged from five to twenty-five grains, and the total quantity given in each case in which a cure was effected varied from 30 to 120 grains. In large doses it was found to produce the usual symptoms of cinchonism, and in various instances it produced, even in moderate doses, vomiting and other signs of considerable gastric irritation. In referring to these disagreeable effects, the Civil Surgeon at Cochin, an officer of long experience, says that "if the patient can *tolerate* the medicine, I believe it will probably stop the fever, but I found it to produce so much sickness, giddiness, and prostration, that, as far as my experience goes, I would not recommend it for general use, as long as quinine and the other febrifuge preparations of bark can be procured." It is suggested in the reports of Surgeon-General SMITH that the insolubility of the drug is probably the main cause of the marked gastric disturbance which it induces and that although it may be dissolved by acid, the large quantity that is requisite for this purpose makes the administration of the drug, in many instances, highly objectionable. In an experiment made in his presence three drachms of dilute hydrochloric acid failed to make one drachm of the powder dissolve in two ounces of water. This character of sparing solubility he considers to be very objectionable, and, together with the tendency to cause gastric irritation, sufficient to prevent the general use of the preparation in India as a febrifuge. It is also deserving of notice that of sixteen cases of fever treated with this preparation at Salene and thirteen cases treated at Cochin five and four of the patients absconded after getting one or more doses, the inference being that they were alarmed at the effects produced. With few exceptions, the whole of the trials were made in cases of mild uncomplicated intermittent fever, the paroxysms of which are easily arrested by the ordinary preparations of bark. In a more complicated case the powder induced diarrhœa, but a cure was effected by resorting to quinine. On the whole, therefore, Surgeon-General SMITH comes to the conclusion that the results obtained in the trial of the new preparation have not been satisfactory, and consequently he is not able to recommend a continuance of its use.

The following is a summary of the remarks in the reports of the several medical officers upon which bases the foregoing conclusion was arrived at:—

General Hospital.—Was used solely in such cases as are usually treated with quinine in doses of from 15 to 25 grains in solution with acid. Has every reason to be satisfied with its power as antiperiodic. It was also given, with benefit, in large doses in low continued fever. Found at times to disagree with the patient. The first dose may induce vomiting, but not subsequent doses, which are retained on the stomach: no action on the bowels.

Monegar Choultry.—Reports thirteen cases of fever in which the drug was used, and in eleven of these, of a mild intermittent type, it affected a cure. Two of the cases were complicated with enlargement of the spleen, and in these the powder had no effect. Quinine was then resorted to with marked benefit. In two cases it appeared to bring on diarrhœa, the passing of the motions being attended with severe gripping pain. Produces decided cinchonism.

Royapettah Hospital.—Tried in several cases and not found superior to any of the cinchona alkaloids given separately.

Rajahmundry.—Treated mild and uncomplicated cases of ague with the febrifuge. Results on the whole favourable, but doubts its efficacy in severe cases, compared with quinine. The average quantity of the drug required to completely subdue an attack was 85·27 grains, and the average number of days under treatment 5·77.

Guntoor.—In slight cases of fever seems to act fairly well, but in severe and urgent cases it altogether failed, having, when given frequently in five grain doses, caused incessant vomiting. Used hypodermically had no effect on fever, and seemed to disagree.

Under these circumstances it is likely that the three tons of mixed alkaloids intended to be manufactured during the present year will be too literally a drug in the market, and that we have thus an additional reason for congratulating Mr. WOOD on his recent appointment as Professor of Chemistry at the Calcutta Medical College.

GLASGOW CHEMISTS' RETAIL PRICE LIST.

WE are glad to notice numerous indications that chemists and druggists in different parts of the country are showing an increased disposition to come to an understanding as to the charges that should be made in their respective localities, for drugs, prescriptions, etc. Pharmacists have too long trusted alone to their customers for information as to the prices charged by their neighbours; the customers have sometimes been, perhaps, not so exact as they might have been in their statements, and the result has been considerable heartburning and dissatisfaction, which has manifested itself frequently in strongly worded epistles, sent to this and other journals. The work performed by the committees that have been entrusted with the task of drawing up "price lists" has generally met with acceptance. In fact, we have this week been favoured with a copy of the fourth edition of the price list compiled by a committee appointed at a general meeting of chemists and druggists of Glasgow and its neighbourhood. The Manchester price list, issued by the council of the local association, has reached a second edition, and one which resembles it in many respects was a short time since issued by the newly formed association at Plymouth. It is satisfactory to find that although, as might be expected, the prices vary in these lists, there is considerable similarity in the general rules laid down in them, and the adoption of the same private trade price mark will much advance the object in view.

We believe that copies of the new edition of the Glasgow price list may be obtained from Mr. J. A. CLARKE, Convenor of the Committee, 132, London Street, Glasgow.

PROPOSED ACCLIMATIZATION EXPERIMENTS IN PERU.

M. MARTINET, writing from Lima, in Peru, to the Paris Acclimatization Society, calls attention to the advantages that might result from an attempt to acclimatize in the Lima district the better kinds of Bolivian and Carabayan barks, giving to the plants the same care in cultivation as the English give to those in their stations in the Himalaya, Ootacamund, etc. It appears that the proposition has been made to the Peruvian Government, and actually accepted in principle, but the financial crisis through which the country is passing has prevented any attempt to carry out the experiment.

M. MARTINET says that the rich cinchona forests in Bolivia and Southern Peru, where the Calisaya is found, are becoming further and further removed from the coast. No attempt is ever made to restock the nearer forests in the cinchoniferous zone with these valuable trees, and now the nearest forests are upwards of ten days' march from inhabited districts. The convex portion of the arc described by the cinchoniferous zone is, it is true, scarcely sixty leagues from Lima, and will soon be connected with it by the trans-andean railway, but in this district only cinchonas poor in alkaloids at present grow.

M. MARTINET also describes an unsuccessful attempt that has been made in Lima to acclimatize the coca plant (*Erythroxylon Coca*). The change from the warm and humid climate of the interior of Peru was too great; the nights, even in the hot season, being far too cold. Of one hundred plants planted in the open air one-half died during the first winter, and the remainder disappeared during the next two years. Some plants kept in conservatories flowered when four years and a half old; they were then about four feet high, but not robust.

COCHINEAL FROM THE CANARIES.

THE evil of making haste to be rich appears to have received a fresh illustration in the Canaries. Mr. Vice-Consul WETHERELL says that the prosperity of the Island of Grand Canary has undergone a serious decline, principally in consequence of the depreciation of cochineal, now the principal product of the country. Between July 1, 1874, and June 30, 1875, the quantity exported was nearly 3,000,000 pounds, valued at nearly £300,000 sterling. The large profits realized from cochineal in former years led to the exclusive cultivation of the cactus wherever it would grow. The profits were as a rule squandered before even they were realized. Soon the value of cochineal declined; but, although at last yielding little or no profit, the growers cannot realize the necessity for cutting down the cactuses, which to them represent so much capital, and replacing them with other crops. The production therefore continues to increase in the face of falling prices.

In the palmy days of cochineal, it was an object of competition amongst shippers as furnishing almost the only return cargo available in the island. Sometimes therefore they were induced to bid a higher price for it than it was actually worth. But some of them were equal to the occasion; by paying for their cochineal in coin made of platinum coated with gold, which was purchased in Barcelona for 28 per cent. of its nominal value, they got their cochineal at a low price and added largely to the ruin of the island.

THE CHRISTMAS HOLIDAYS.

WE are requested to state that the Library and Museum will be closed from Saturday, December 23rd, to Monday, January 1st, both days inclusive. The School of Pharmacy will be closed during the same period.

ERRATA.—We are informed by the Solicitors to the Pharmaceutical Society that the medical man, who in the recent case of the *Pharmaceutical Society* v. *Mickle* deposed that he had purchased the defendant's business, stated that his name was AUGUSTUS HENRY CHURCHILL, not GEORGE AUGUSTUS CHURCHILL, as reported.

On p. 479, in the list of Associates elected, the first name should have been, "FERRIDAY EDWIN JOSEPH PITCHFORD, Oakengates.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The usual monthly meeting of this Association was held at Britannia Chambers, Pelham Street, on Monday, the 11th inst. The President, Mr. J. H. Atherton, F.C.S., occupied the chair, and there was a large attendance of members and associates. The Hon. Secretary (Mr. R. Jackson), read the minutes of the last meeting (which were confirmed), and announced that the *Pharmaceutical Journal* had been received regularly, and on the motion of the President a vote of thanks was awarded to the donors.

Mr. H. Major, B.A., B.Sc., then delivered a lecture on "The Senses." In commencing, the lecturer said the great difference between the higher and lower animals lay in their senses, the lower animals not having distinct organs for the different senses as in the higher. Man, the highest and noblest animal, has six senses, which he placed in the following order:—muscular consciousness, touch, taste, smell, hearing, and sight. He remarked that there are no sharp contrasts in Nature, that she abhors sudden jumps, consequently the senses merged almost imperceptibly into one another. He placed muscular consciousness lowest, because it is not confined to any particular member, but is diffused through the whole system; next he placed the sense of touch which is confined to the outward part of the body, and is not felt inwardly; taste, the next sense, is more localized being only felt at the back part of the mouth, and the lecturer showed that nothing can be tasted which is not capable of being dissolved and so passed through the membranous covering of the mouth and tongue. Of smell, the next sense treated, he remarked it is more limited and localized still, being confined to the nostril, and only such subjects are smelt as can be oxidized. He called attention to the intimate connection existing between touch and taste and smell, saying that the two latter had been called sentinels to the passage of the body, because they gave instant warning of the approach of injurious things, such as foul air for instance. The next sense is that of hearing, the organ of which is very complicated and very localized, the sensation which affects it being a vibration of the atmosphere which strikes on the drum of the ear and is thence carried to the brain. The last and highest sense being sight, which he described as being the nearest approach of physical to vital force. The lecturer showed how very inferior man is to some of the lower animals in his senses, being only superior in his sense, and gave as instances the acute sense of sight possessed by the vulture and scent by the bloodhound, and concluded a most eloquent and able lecture amid loud applause.

A hearty vote of thanks to Mr. Major, proposed by Mr. Rayner, seconded by Mr. T. B. Fletcher, and supported by the President, brought an agreeable and instructive evening to a close.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday 7th December, 1876, Dr. J. H. Gladstone, F.R.S., Vice-President, in the chair. After the names of the visitors had been announced and the minutes of the previous meeting read and confirmed, the following names were read for the first time:—Messrs. W. Hampton, J. Napier, D. W. Vadle, J. C. Leach, and W. V. Ellis. Messrs. Walter Charles Davis, John Clark, Frank Herbert Marshall, John Wood, Griffith Jones, B.A., John Falconer King, and Charles Cecil Capel, were elected fellows of the Society by ballot after their names had been read for the third time.

The first communication was by Professor A. H. Church, "On Colein." This, the red colouring matter existing in the stems and leaves of the *Coleus Verschaffellii*, was prepared from the bruised stems by exhausting them with cold alcohol, slightly acidulated with sulphuric acid, removing the acid by barium carbonate, and concentrating by distillation. Various processes were tried for the purification of the red colouring matter, the best being to dissolve it in alcohol, precipitate with ether, again dissolve in alcohol, and pour the solution into water, repeatedly washing the precipitate with water at 50°–60° C. On analysis it gave numbers corresponding with the formula $C_{10}H_{10}O_3$; this was confirmed by the results obtained from the lead compound, $C_{20}H_{18}PbO_4$. This was prepared by precipitating the colein with excess of lead acetate, both in alcoholic solution. It is of a dull indigo blue colour. Colein is insoluble in ether, only slightly soluble in water, but readily in alcohol, yielding a solution, which is at first crimson, but fades rapidly, owing to a combination taking place between the alcohol and the colouring matter. On evaporating the nearly colourless solution, or on adding an acid, the crimson colour is restored however. By gradually adding ammonia to a solution of colein, the colour is changed successively to purple, violet, indigo, chrome green, and finally to greyish-yellow. Stannic chloride gives a precipitate of a beautiful violet colour, when added to a strong alcoholic solution of colein. The author also described and exhibited the spectra of colein, both in a pure state and also when submitted to the action of various reagents.

The Chairman having thanked Professor Church for his interesting paper, a member said that when working with ivy he had extracted a colouring matter from the pericarps of the fruit, which appeared to be analagous if not identical with the colein of Professor Church. Its colour was intensified by the addition of acids, whilst alkalies on the contrary change it.

Mr. Prosjean, in reference to the author's remark as to the close resemblance between the colouring matter of the grape and colein, stated that when determining the value of red argol, he had noticed that the colouring matter present gave a very sharp reaction with alkalies, almost as distinct in fact as litmus. In this case, however, the yellowish tint produced by a slight excess of soda was again changed to red on the addition of an acid, whilst colein appears to be decomposed, as the colour when once changed by an alkali does not come back.

Dr. Otto Webb made a short verbal communication on "Phenylene Diamine." This was prepared by the action of reducing agents on dinitrobenzene, and is employed in the manufacture of the brown dye known as "Vesuvine." It may be obtained from the solution as a crystalline hydrochloride, after the removal of the lime by oxalic acid. On distilling the hydrochloride with lime the phenylene diamine passes over. It is a colourless crystalline substance which, however, rapidly becomes dark coloured on exposure to the air. The author has obtained the diacetyl compound, and also several brominated derivatives of the latter. He hoped soon to lay before the Society a detailed account of the manner of preparation and the properties of these compounds.

Dr. Gladstone, having thanked the author in the name of the Fellows, the Secretary read a paper by Mr. J. B. Hannay, "On Calcium Sulphate." The paper contains a description of various double and triple salts containing $CaSO_4$, which were deposited in the interior of pipes in a manufactory. Solutions circulated through these pipes containing simultaneously, potassium sulphate, sodium sulphate, magnesium sulphate, and yellow chromate of potassium, the last being in by far the largest proportion. The temperature of the liquids varied from 40° to 80° C. In one instance most of the incrustation consisted of $CaK_2(SO_4)_2+H_2O$, but there were also present two other compounds, $CaSO_4$, $K_2CrO_4+H_2O$, and $CaSO_4$, $2K_2CrO_4$. They were both of a bright golden colour, resembling lead iodide, and very similar in appearance. By the action of water they were decomposed, the potassium dissolving out, and leaving calcium sulphate, but without any change in the form of the crystal. In another pipe where there were large quantities of the salt $CaNa_2(SO_4)_2$, a salt having the formula $CaSO_4$, Na_2SO_4, $K_2CrO_4+H_2O$ or some multiple of this was found. The author has also made several experiments to ascertain if the following series of compounds existed:—

$$2\,CaSO_4+4\,H_2O$$
$$2\,CaSO_4+3\,H_2O$$
$$2\,CaSO_4+2\,H_2O$$
$$2\,CaSO_4+\ \ H_2O$$

The first of these is deposited when a solution of calcium sulphate is evaporated at 100° C. under the ordinary pressure, and the last by evaporatiou under a pressure of 90 lbs. to the square inch. No definite results could be obtained at intermediate pressures. On heating $CaSO_4+4\,H_2O$ (pure selenite) to 118° it begins to lose water at 150°. The loss indicated the formation of $2CaSO_4+H_2O$; at 190° the last molecule of water is driven off. By heating the selenite, first at 118° to start the dissociation, and then at 100° for a long time, indications were obtained of the existence of $2\,CaSO_4+3\,H_2O$, but none of the compound $2\,CaSO_4+2\,H_2O$.

Dr. H. E. Armstrong said he had made some experiments with a view to ascertain if there was any relation between the loss of water experienced by certain isomorphous salts under precisely similar circumstances. He had found that at the ordinary temperature over sulphuric acid the sulphate of zinc, magnesium, nickel, and iron, parted with their water of crystallization in ratios represented by the numbers Zn ·7460; Mg 2686; Ni ·1570; and Fe ·4013. With potash and chrome alums the ratios were K ·0865 and Ca ·4625, the nitrates of cobalt, nickel, and manganese gave Co ·272, Ni ·032 and Mn ·210.

The Chairman having thanked the author for his paper and Dr. Armstrong for his interesting observations, Mr. G. S. Johnson read some "Additional Notes on Potassium Triodide," consisting of a corrected determination of the specific gravity of the crystals, which was found to be 3·498, and the atomic volume, which is 120·2. The theoretical number calculated on the supposition that an atom of potassium unites with three of iodine without condensation is 122 2.

The meeting was then adjourned until Thursday 21st December, when Mr. W. N. Hartley will give a paper entitled "A Further Study of Fluid Cavities."

ROYAL SOCIETY.

CHEMICAL WORK DONE ON BOARD H.M.S. 'CHALLENGER.'

BY J. Y. BUCHANAN.*

(Concluded from p. 463.)

Observations on the occurrence of Manganese Nodules on the Sea-bottom.

Occasionally pieces of stone of a black colour have been brought up, and been found to consist of peroxide of manganese mainly. Several interesting specimens were obtained between Bermuda and the Azores, which were apparently steps in the formation of the black substance out of concretions of the bottom at the place in question. They were obtained on the 17th and 27th June, and may be divided into four classes:—1st, those which contain no manganese at all; 2nd, those where the manganese formation has commenced; 3rd, those where it is well advanced; and 4th, those where the bulk of the substance is peroxide of manganese. Those of the first class are, as far as can be learned from qualitative analysis and microscopical examination, merely mechanical aggregations of the bottom existing at the place in question. Of a white colour, and generally the same appearance, are those of the second class; they contain, however, numerous perforations, whose walls are lined with a very thin black film peculiarly striped. On treating with dilute hydrochloric acid, the mass is found to consist chiefly of carbonate of lime with a considerable quantity of clay. Strong hydrochloric acid decomposes the latter, when a certain amount of chlorine is given off. In another concretion, belonging to the same class, the manganese is seen forming in minute mammillary concretions on the outside surface, as well as on the tube linings. Belonging to the third class is one (also brought up on the 27th June) where the outside is wholly covered with oxide of manganese; and in cutting through the substance of the stone, the layer is seen to be of a sensible thickness; also all the worm-holes are seen to be completely coated; and numerous more minute holes are found, all of which are coated in the same way. A very considerable percentage of the whole mass has thus become manganese. On the face of a fresh cutting the interior of the mass may be seen to preserve its white colour. From the edge of the black layer inwards, however, the mass is stained of a brownish colour, which gradually disappears towards the centre. Blackish brown veins are also seen to traverse the whole mass. Pulverized, it effervesces strongly with dilute hydrochloric acid. The residue is easily decomposed by strong acid, evolving large quantities of chlorine; silica is left undissolved with a little sand. In the hydrochloric acid solution there was found, besides alumina, manganese, and a little iron, a certain quantity of nickel and cobalt. A concretion of the fourth class came up on the 17th June. It is an irregular nodule, about 1½ inch long, of a brownish-black colour, having its outside surface mammillated all over. This mammillated surface is so peculiar that, by its means, the manganese may be at once recognized. When broken it is found to consist of irregularly concentric layers of peroxide of manganese, alternating with fine seams of calcareous and earthy matter. It contains a small, white, earthy nucleus. The broken surface resembles the figuring of polished walnut wood. It consists of peroxide of manganese, alumina, iron, silica, small quantity of lime, magnesia, cobalt, and phosphoric acid. Heated in the tube it gives out, like all these concretions, water with a strong alkaline reaction.

The most remarkable occurrence of peroxide of manganese on the bottom was met with on the 18th February, in latitude 35° 45′ N. and longitude 20° 12′ W. The dredge was put over in 1500 fathoms, and came up full of dead coral of a jet-black colour on the surface. Some of the sticks adhered to large black masses, and on breaking them the inside was seen to be perfectly white, the black substance forming merely a very thin rind which cracked off easily on receiving a smart blow. This black rind, as well as the masses to which some of the sticks were attached, consisted of peroxide of manganese, the white part or inside having the composition of ordinary coral (chiefly carbonate of lime). The black masses to which some of the sticks were attached present, like the concretions already described, a minutely mammillated appearance on the outside, and when broken across are seen to consist of concentric layers, blacker and more compact towards the outside, and browner and more earthy towards the inside. The layers are separated from each other by numerous very fine layers of mud, chiefly carbonate of lime. They increase in number towards the inside, and in some instances can be seen to be composed in part of fragments of foraminiferous shells. The black mass was found on analysis to consist of peroxide of manganese, alumina, oxide of iron, silica, small quantities of lime and magnesia, and traces of copper, cobalt, and phosphate of lime. Compared with the manganese concretions already described, they appear to have the same chemical composition, and their internal structure in layers points to a similar mechanical origin; in fact they

* From the 'Proceedings of the Royal Society,'

differ from the others only in being fragments of much larger concretions. Where the coral sticks adhere, they do not penetrate into the mass at all, but their flat roots are as sharply divided from the black mass as the black rind is from the inside coral.

On the 27th June, amongst the concretions, a fragment of slate, coated on the outside with mammillated peroxide of manganese, was brought up.

The preceding notes on the occurrence of the manganese nodules was written at the Cape of Good Hope, and sums up our knowledge of the subject at the close of the Atlantic cruise. In the Antarctic Ocean the soundings obtained showed in a remarkable manner the general comparative shallowness, the depth being in general under 2000 fathoms. Whenever the dredge or trawl was used in that ocean it brought up large quantities of stones; but they were invariably fragments, more or less rounded, of granitic and igneous rocks, and I did not notice any manganese. On the 13th of March, however, when approaching Australia, the depth increased to 2600 fathoms; a very large haul of manganese nodules was obtained, presenting the same general characteristics as those in the Atlantic. In the Pacific the amount of manganese found has been immense, there being hardly a sounding where it could not be detected in small particles amongst the mud; and, indeed, in many parts the nodules occur in such quantity that the sounding-tube has brought them up in considerable numbers at one time; they have also frequently come up sticking to the bottom of the water-bottle. Here, however, they have chiefly come under the observation of my colleague, Mr. Murray, and will be treated of in his report. Chemically they are very much alike, as far as qualitative analysis can supply information. They all contain one of the higher oxides of manganese in preponderating amount, cobalt and nickel in notable quantity, and copper in traces, besides argillaceous and often sandy matter. I hope, when the cruise is over, to be able, by means of quantitative analysis, to render a detailed account of their nature, from which it may perhaps be possible to obtain some hints as to their origin and development.

Since the discovery of this most remarkable and unexpected occurrence of a mineral, having much resemblance to psilomelate, evidently forming at the bottom of the sea, I have taken every opportunity of examining specimens of peroxide of manganese from terrestrial sources; and in many cases I have found them to resemble the marine mineral in several points, especially in nodular structure and in giving off alkaline water when heated. Some peroxide of manganese which I got from the mines near Paarl, about thirty miles from Cape Town, had most perfectly nodular structure, but was extremely hard, whereas our nodules, when freshly brought up, can generally, although not invariably, be easily cut with a knife; but they increase very markedly in hardness when exposed to tke air, even for only a few weeks. I do not attach very much importance to the fact of its giving out alkaline water, for this is a property which I have found to be very generally possessed by rocks and minerals. Of the zeolites, for instance, which were found in Kerguelen, there was not one which did not give out alkaline water with a very perceptible empyreumatic smell when heated.

It has been mentioned above that the dredge frequently brought up large quantities of stones in the Antarctic Ocean. Amongst them were almost invariably fragments of granite or syenite, as well as of both basalt and trachyte. On the 2nd February, 1874, when between Kerguelen and Heard Islands, a very large quantity of stones was brought up in the dredge from a depth of 150 fathoms. Amongst them were a piece of granite, also two varieties of basalt, one coarse-grained with porphyritic olivine, and the other exceedingly fine-grained and compact, without any separate crystals being visible to the naked eye. It was chiefly remarkable from the fact that the stones, though fresh from the bottom and still quite wet outside, were, when broken, perfectly dry inside, the moisture not having penetrated beyond the thickness of a sheet of paper. The edges of these stones were less rounded than those of the other species which accompanied them. In order to be perfectly sure that there was no mistake, I broke about a dozen of them, the species being easily recognized by the edges of the stones being less rounded than those of the others and always with the same result; while those of the other species were not only wet inside, but, especially in the trachytic ones, decomposition in concentric shells had made considerable advances. As a drop of water applied to the fractured face was readily and quickly absorbed I can only account for the dryness inside by considering that the stones in question had passed but a very short time under water. As they were found in latitude 52° S., and the first iceberg was only met with in 60° S., it would be difficult to imagine that they had come ice-borne from the Antartic land; at the same time it was equally difficult to imagine any other adequate means of conveyance than ice. I believe that they come from Heard Island, whose ice-bound shores are constantly despatching miniature bergs into the sea, which, from their insignificant size, would suffer rapid destruction alike from the violence of the seas and from the temperature of the water, which, on the occasion in question, was between 3° and 4° C. Many small ice-masses, such as I have supposed, were floating off the southern shore of Corinthian Bay, which on this side had a continuous icy coast line formed by a glacier descending from the central high grounds which culminate in Kaiser Wilhelm Peak, and reaching the sea both on the west and on the east side of the inhabited isthmus, as I have described in my short note on the island. The position where the stones were dredged is within 100 miles of Heard Island, and through the above mentioned agency there must be a constant conveyance of the *débris* of the island out to sea, which would account for the very stony character of the bottom found.

Observations on Sea-water Ice.

Many different opinions have been expressed as to the nature of ice resulting from the freezing of sea-water, all agreeing, however, in one point, that when melted the water is unfit to drink. During the Antarctic cruise I took an opportunity of examining some of the broken pack-ice, into which the ship made an excursion on the morning of the 25th of February, and also some ice which had formed over night in a bucket of sea-water left outside the laboratory port.

The piece of pack-ice which I examined was in substance clear, with many air-bells, most of them irregularly shaped. Two portions of this ice were allowed to melt at the temperature of the laboratory, which ranged from 2° to 7° C. The melting thus took place very slowly, and made it possible to examine the water fractionally. My experiments consisted in determining the chlorine in the water by means of tenth-normal nitrate of silver solution, and observing the temperature of the ice when melting.

A lump, which when melted was found to measure 625 cub. centims., was allowed to melt gradually in a porcelain dish. When about 100 cub. centims. had melted, 50 cub. centims. were taken for the determination of the chlorine; they required 13·6 cub. centims. silver solution, corresponding to 0·0483 gramme chlorine. When 560 cub. centims. had melted, 50 cub. centims. were titrated, and required 1·6 cub. centim. silver solution, corresponding to 0·0057 gramme chlorine. The remainder (65 cub. centims.) of the ice was then melted and 60 cub. centims. titrated; they required 0·39 cub. centim. silver solution, corresponding to 0·0014 gramme chlorine. We have, then, in the first 50 cub. centims. 0·0483 gramme chlorine, in the next 510 cub. centims. 0·0579 gramme chlorine, and in the last 65 cub. centims. 0·0015 gramme. Hence the whole lump (615 cub. centims.) contained 0·1077 gramme chlorine, or, on an average, 0·1723 gramme chlorine per litre. A qualitative analysis of the water showed lime, magnesia, and sulphuric acid to be present.

Another piece of the ice was pounded and allowed to melt in a beaker. When about half was melted, the water was poured off and found to measure 95 cub. centims.; 75 cub. centims. were titrated with silver solution, and required 1·9 cub. centim. The remainder, when melted, measured 130 cub. centims., and required 0·9 cub. centim. silver solution. Hence the first fraction of 95 cub. centims. contained 0·0085 gramme chlorine, and the second of 130 cub. centims. 0·0032 gramme chlorine. The whole quantity (225 cub. centims.) of ice, therefore, contained 0·0117 gramme chlorine, or, on an average, 0·0520 gramme per litre.

From these results it is evident that the ice under examination was very far from being an homogeneous body; and, indeed, nothing else could be expected, when it is borne in mind that the ice in question owes its existence, not only to the *bonâ fide* freezing of sea-water, but also the snow which falls on its surface and is congealed into a compact mass by the salt-water spray freezing amongst it.

The ice formed by freezing sea-water in a bucket was found to have formed all round the bottom and sides of the bucket, and forming a pellicle on the surface, from which, and from the sides and bottom, the ice had formed in hexagonal planes, projecting edgewise into the water. The water was poured off, the crystals collected, washed with distilled water, pressed between filtering-paper, and one portion melted. It measured 9 cub. centims., and required 4 cub. centims. silver solution, corresponding to 0·0142 gramme chlorine, or 1·5780 gramme per litre. The other portion was used for determining the melting-point. The thermometer used was one of Geissler's normal ones, divided into tenths of a degree Centigrade, whose zero had been verified the day before in melting snow. The melting-point of the ice-crystals was found to be —1°·3. The temperature of the melting mass was observed to remain constant for twenty minutes, after which no further observations were made.

In the same way the melting-point of the pack-ice was determined. The fresh ice began to melt at —1°; after twenty minutes the thermometer had risen to —0°·9, and two hours and a half afterwards it stood at —0°·3, having remained constant for about an hour at —0°·4. Another portion of the ice rose more rapidly; and when three-fourths of the ice was melted, the thermometer stood at 0°.

These determinations of the temperature of melting sea-water ice show that the salt is not contained in it in the form of mechanically enclosed brine only, but exists in the solid form, either as a single crystalline substance, or as a mixture of ice and salt crystals. Common salt, when separating from solutions at temperatures below 0°, crystallizes in hexagonal planes; sea-water ice, therefore, may possibly have some analogy to the isomorphous mixtures occurring amongst minerals.

A very important practical consequence follows from these observations, namely, that pack-ice, though unfit to drink when a lump of it is melted as a whole, may serve as a source of fresh water if melted fractionally. As the melting-point of the salt ice is lower than that of pure ice, it melts first, and at the same time, by keeping down the temperature of the mass to its own melting-point, it prevents any of the fresh ice being wasted. When the salt ice has all been melted the brine may be thrown away, and the remainder of the ice will supply fresh water. If a thermometer be kept in the ice during the process of melting, it will indicate by its reading when drinkable water is being formed.

Parliamentary and Law Proceedings.

Poisoning by Carbolic Acid.

Dr. Hardwicke held an inquiry on Saturday, December 9, in the Board Room of the Hampstead Smallpox Hospital relative to the death of William Smith, aged 43, one of the inmates. Dr. Brewer, Chairman of the Metropolitan Asylums Board, was present on behalf of the managers, and expressed his great regret as to what had occurred. Deceased, who had been an inmate for a fortnight, came from Gifford Street, Islington, where he had a wife and five children, having been sent to the hospital under a parochial order while suffering from smallpox. Dr. Henry Case, resident medical superintendent, said deceased was a convalescent from the worst case of smallpox he ever saw when the accident occurred. On Wednesday morning he asked for his allowance of 1oz. of port wine, but in mistake Sister Rachel, one of the Protestant sisters from East Grinstead, having charge of the ward, gave 1oz. of carbolic acid instead, which, being the same colour as the wine, he drank off before perceiving the error. In 20 minutes deceased became insensible, but by the aid of artificial respiration he lived for an hour and a half. The doctor said death arose from carbolic poisoning, the mistake occurring in consequence of the wine and carbolic acid being in gallon stone bottles, exactly alike in size and appearance, although properly labelled. The carbolic acid had just been used for disinfecting purposes, and the Sister quite inadvertently took up the wrong bottle. Usually the wine was sent to the ward in proper wine bottles, but owing to the large quantity used in the convalescent ward, the steward had sent it in the large bottle. Dr. Case gave Sister Rachel a very high character as a nurse, and said this was a pure accident. Dr. Brewer also eulogized the services rendered by Sister Rachel. There was 300 smallpox patients, and they were scarcely got into order. Sister Rachel elected to make a statement. Her explanatory remarks were quite satisfactory to the Coroner and jury, who desired it to go forth that they exonerated her from all blame, and sympathized with her in the circumstances. The Coroner referred to the frequency of death from carbolic acid poisoning, and expressed his belief that the fluid was not one of the most safe disinfectants, after which the jury agreed to a verdict of "Death from accident or misadventure."—*Times.*

Poisoning by Vermin Killer.

On Monday, December 9, an inquest was held by Mr. Phillips, at Brierley Hill, respecting the death of a servant girl named Eliza Round, aged 16. The employer of deceased stated that hearing screams proceeding from the kitchen, on going there he found deceased lying upon the floor. He asked her what was the matter, and she first exclaimed "cut," and afterwards uttered the word "poison." She was apparently undergoing much suffering, and he immediately sent for medical assistance.

Mr. Chapman, surgeon, said he was called in to see the deceased, and she was apparently suffering from the effects of poison. He administered an emetic, but this had no effect, and he then administered a strong dose of mustard and water. He found some stains upon the front of deceased's dress of a corresponding colour to Battle's "Vermin Killer." The girl died, no doubt, from strychnine poison.

Mr. John Rawlings, chemist, Brierley Hill, deposed that he sold a packet of "Battle's Vermin Killer," and a pennyworth of ammonia to a girl who called at his shop on the evening of the 1st inst., about nine o'clock, but he could not identify the body of deceased. The girl, however, told him that she came from Mrs. Emery's.

Mrs. J. A. Emery said that upon the return of the deceased after being out she was carrying a white packet, which she said contained ammonia, with which she intended to make a hair wash.

The jury found that the deceased committed suicide whilst in a state of temporary insanity, and added the following recommendation:—That some more stringent restrictions be placed on the sale of such a deadly poison as Battle's "Vermin Killer," so as to prevent an unknown person getting such on a simple application.—*County Express.*

INFRINGEMENT OF THE LICENSING ACT.

On Thursday, December 7, George Herbert, grocer, attended at the Leeds Town Hall to answer two summonses charging him with selling certain liquors and allowing them to be consumed upon his premises without a licence. The alleged offence arose from the carrying out of an advertised promise to give a glass of wine to every purchaser of a quarter of a pound of tea. The defendant pleaded that there was no sale of the wine, it being given, and therefore that there had been no offence committed. The magistrate ruled, however, that there was a contract to supply the wine which was part of the inducement to part with the purchase money, and he inflicted a penalty of £5 and costs. The defendant said he would appeal against the decision.

Reviews.

CURRENT CHEMICAL LITERATURE.

A MANUAL OF INORGANIC CHEMISTRY. THE NON-METALS. By T. E. THORPE, Ph.D., F.R.S.E., etc. 1874. William Collins, Sons and Co., London and Glasgow.

CHEMIA COARTATA, OR THE KEY TO MODERN CHEMISTRY. By A. H. KOLLMYER, A.M., Ph.D., etc. J. and A. Churchill, London. 1876.

MANUEL DE CHIMIE PRATIQUE (Analytique, Toxicologique, Zoochimique a l'usage des étudiants en médecine et en pharmacie). Par E. RITTER, Docteur des Sciences, Professeur agrégé de l'ancienne Faculté de Médecine de Strasbourg, etc. Paris: Librairie, F. Savy. 1874.

PROCÉDÉS PRATIQUES POUR L'ANALYSE DES URINES, DES DÉPOTS ET DES CALCULS URINAIRES. Par E. DOLEFOSSE, Docteur en Médecine, Professeur particulier des Maladies des Voies urinaires et d'Urologie. Paris: Librairie, J. B. Baillière et Fils. 1877.

There is a well known story of an Eastern King, who employed a squeezer to condense the learning contained in his whole library into a few volumes. Such a functionary would find plenty of work requiring to be done if the same process were applied to chemical treatises. The only excuse that can be advanced by many authors for ever having written books, is the inordinate vanity which causes their souls to rejoice at the sight of their names printed on the title page. Such a sight has a marvellous fascination and exerts its baneful influence alike on the professor, the quack, and the student. It is the "my novel" rage which pervades society.

But to pass on to our immediate subject; namely, the review of the books in the above-given list.

We may commence our remarks by admitting that Professor Thorpe's book is of a superior order to those in common use, because it is constructed on a more philosophical basis. Instead of going through the various non-metallic elements and compounds in the ordinary routine manner, the author takes advantage from time to time of certain stated facts to impress on the mind of his readers the truth of a law or a theory.

To instance our meaning; from explaining the action of admixed metallic oxides on potassic chlorate when heated, Professor Thorpe passes on to review briefly those general actions known in chemistry as catalytic or contract actions.

Again, in treating of the solvent power of water, he seizes the opportunity of presenting some observations and speculations on the absorption of gases by water and the conditions upon which the amount absorbed depends. These considerations lead to remarks on the solubility of solid substances, then to the phenomena of liquid diffusion, and finally to a study of water of crystallization.

In like manner, in describing the properties of carbonic anhydride, a brief summary is given of Andrews' famous researches on the continuity of the gaseous and liquid states.

Professor Thorpe also includes in his book short accounts of various manufacturing processes, and generally speaking, these attempts are well sustained. But in treating of the manufacture of bleaching powder, he says the chlorine "is generated from a mixture of manganese dioxide and hydrochloric acid, or from manganese dioxide, sulphuric acid and common salt." In the first of these modifications no mention is made of Weldon's process for the regeneration of the manganese, and we may remark that the second method has not been used for many years.

En passant we may remind the reader that the constitution of bleaching powder has been elucidated by the isolation of calcic hypochlorite from it, as produced by the action of water (Kingzett). This discovery shows that the substance is properly formulated $Ca\left\{\begin{matrix}Cl\\OCl\end{matrix}\right.$

Certain small errors may be pointed out in the work under review. Thus on page 84 we are told that ozone is produced by the action of strong sulphuric acid upon peroxide of barium. But no proof has yet been furnished that the active agent thus set free is not simply nascent oxygen or peroxide of hydrogen. The old story regarding the formation of ozone from ether vapour and air is also repeated. It is peroxide of hydrogen which is formed. We are surprised further, to find Professor Thorpe (p. 178) expressing it as highly probable "that the salubrity of country air and the depressing effect of the air of towns is intimately related to the presence or absence of ozone, and to its action in organic matter." Yet, according to Houzean, country air contains as a maximum only 1 part of ozone in 450,000 parts of air by weight. Further this determination would also include peroxide of hydrogen, and there are those who believe ozone does not occur at all in air.

We had hoped that Professor Thorpe would have directed special attention to the similarity in the chemistry of silicon and carbon compounds. Lastly we would point out that the author opines that the blue compound produced by the action of iodine upon starch is not a definite chemical compound. We think it a compound which is definite enough, but it has not yet been sufficiently well studied to ascertain its exact nature.

Altogether, however, the book, which reminds us of the late Dr. Wilson's excellent little manual, is an extremely good one; in fact we know none better.

The next book on our list is by Dr. Kollmyer and is an American production. The author's professed object in writing it has been "to compress into as small a space as possible everything connected with the study (of modern chemistry) that deserves attention." If he seriously meant this in its full signification, he has signally failed. But we are persuaded he has not expressed his meaning clearly. The author first gives some general considerations on matter, symbols, atomic weights, quantivalence, nomenclature, synthesis, analysis, and formulæ, etc. Then in tabular form are presented the names of the best know substances in chemical science, together with their synonyms and historical notes, sources, equations referring to their production, and their chief properties including the symbol, combining weight and specific gravity, etc; finally follow a few characteristic tests or reactions of each substance.

In this way Dr. Kollmyer goes first through the nonmetals and their compounds, then he takes organic chemistry, while in the last division is given a synopsis of poisons together with a list of antidotes and general treatment.

This last chapter is extremely useful, but taken as a whole we cannot recommend the book to students. It is rather useful to persons who are cramming facts preparatory to undergoing examination, but, like all such productions, is not calculated to develop those powers of mind in the student which connect effects with causes. To men, read in their science and practising their profession, the book forms a useful index for reference.

We now pass on to the volume by Dr. E. Ritter. This book is a kind of *Gradus ad Parnassum* for medical students; and indeed, between it and the work by Professor Odling, there is a remarkable similarity of arrangement and matter.

It consists firstly of a methodic series of analytical exercises in qualitative inorganic chemistry, extending over 114 pages out of a total of 430. After this there follows an elaborate attempt at a general system of qualitative analysis of organic matters in which a few well-known substances are arranged according to their solubility in water, alcohol, and ether. This chapter is very useful so far as it goes, but it is imperfect in scope. Then follows a section devoted to toxicology, and afterwards one on volumetric analysis. There are also divisions devoted to the analysis of some more usual medicines, foods, and drinks. Finally is given the methods of estimating the inorganic substances in animal fluids and tissues; analyses of the blood, the chemistry of the digestive and respiratory organs; and lastly, that of the urine. Much of the matter and the engravings relative to volumetric analysis are evidently taken from Mohr's "Titrir methode."

There are several matters worthy of attention in this book. Thus the author gives on the last page the atomic weights with the whole of the decimals cut off.

On page 17 the student is directed to filter a solution of Nessler's test, consisting of two volumes mixed with three of strong potash.

On page 361 there are given drawings of crystals of hematoidine (hemine), and bilirubine, and the statement of their identity is also made. This assertion is one without foundation in truth. There are no facts on record, and not a single analysis throughout chemical literature, which proves this identity. Bilirubine, indeed, has the formula $C_9H_9NO_2$, whereas hemine, as made from the blood, consists of hematine $C_{32}H_{32}Fe\,N_4O_6$, its hydrochloride, and a phosphorized substance. Acid hematine is said to present one band when its absorptive spectrum is examined, whereas it really presents four or five.

The brain and its chemistry receive in this book the barest mention.

We could point out many other errors and omissions, but those we have alluded to are sufficient to demonstrate that this work is a mere compilation (like many others), from pre-existing works, and constructed without reference to original memoirs, while it neglects in great measure recent scientific research.

Now according to Dr. E. Ritter his students are passed the whole of the course indicated in his book in a single year. In reference to this matter we only express our regret, but we are more sorry for the students, because throughout the course they are not made acquainted with the methods of elementary organic analysis, and while men devote themselves to test-tube chemistry only, physiological chemistry will most certainly stand still.

We cannot say in fairness, that the book is without use; indeed to a certain class of students it must prove extremely useful, owing to its comprehensiveness, but we cannot recommend it as heartily as we could wish.

The last book on our list is by Dr. E. Delefosse. In reference to it we would first observe that its stated date of publication is 1877, and this together with an advertisement opposite the title page, renders it too evident that the whole book is simply a puff for its author's particular pursuit. We reproduce the advertisement:—"Dispensaire pour l'enseignement et le traitement des maladies des voies urinaires, 2 rue des Poitevins. Consultations gratuites les mardis, jeudis et samedis, à midi et demi. Les samedis, après la consultation, les élèves sont exercés gratuitement aux manipulations micro-chemiques pour l'analyse des urines." In a plate on p. 90 referring to urinary deposits we have represented, among other microscopical objects, hair, cat's whiskers, linen fibre, cotton fibre, tea leaf, fragments of feathers, etc., etc. In fact nearly all the plates are as sensational in character as most of them are valueless.

The strongest condemnation of the book is to be found, perhaps, in the fact that not a single chemical formula occurs once in the whole treatise. The subject matter proves that the author is not acquainted with the true chemistry of his subject, for it abounds with errors, while it is also incomplete. In dismissing the book without further notice, we must also condemn its use.

Les Richesses de la Nature.—Le Regne Animal.—Etude de ses Matières Premières et des Procédés industriels modernes qui en permittent l'Exploitation. Par P. L. Simmonds. Traduit de l'Anglais sur la 2e Edition, refondu et considerablement augmenté par le Dr. Jul. Morel. Ghent: A. Hoste. 1877.

Upon the occasion of noticing in these columns Mr. P. L. Simmond's little volume, 'Waste Products and Undeveloped Substances,' it was pointed out how much the wealth of materials suffered in appearance from the want of method and judgment in setting them out. In this respect Dr. Morel's edition is a great improvement upon its original, for as he himself says, "l'ouvrage, rédigé suivant une méthode plus rationelle, est devenu plus conforme a l'esprit du lecteur française," and, it may be added, of the English reader likewise.

The subjects are in this book confined to the animal kingdom, and are now arranged so systematically as almost to dispense with the necessity for an index, the place of which is supplied by a "Table des Matières," containing suitable divisions and subdivisions. The following are the principal divisions and will indicate the nature of the arrangement now adopted:—Skins, including furs, feathers, hides, hair, wool, horns and hoofs; Flesh, Bones, Blood, Milk, Eggs, Animal Fats, Useful Insects, Crustaceæ, Molluscs and Zoophytes, and Animal Manures.

There is so much that is curious in this book that selection is difficult, but we translate the following instance of "*exploitation*" of the animal kingdom, which may be new to some of our readers.

"In Paris there exists a public pound,* upwards of ten acres in extent and surrounded by stone walls, to which are carried the bodies of dead animals in order to obtain the bones for sale. These bones have a certain value, but it is necessary that they should be cleaned and deprived of adherent and sometimes putrid flesh. To carry out this operation by hand would have been tiresome and costly; but the authorities, remembering the greediness of rats for horseflesh, have stocked the pound with thousands of rats from the catacombs of Paris. These little creatures achieve admirably the desired work, so that animals placed in the enclosure over night are found on the morrow in the proper and polished skeleton state.

"But one result is that, in consequence of this excellent feeding the rats grow and multiply in a prodigious manner and it is necessary to have recourse to some

* The word in the French edition is *étang*, but this is probably a mistranslation of the English "pound," the French "*fourrière*."

means to control this multiplication. Every three months, therefore, there is a general battue made in this colony of rats and all the rats found above the soil are trapped. This operation is excessively curious. Horizontal cylindrical troughs are drilled in the lower part of the walls surrounding the pound, the depth and diameter of these openings corresponding to the length and size of the body of a rat. On the day of the battue men armed with saucepans, kettles, drums, etc., pass into the inclosure and treat with rough music the poor rats, who, seized with a mortal fear, push their heads into the first openings that present themselves. But every rat that attempts to save itself in one of these holes has a tail that it leaves outside. The man charged with the collection of the rats then makes his rounds, sack on shoulder, and adroitly seizes the rats by the tails and throws them into his sack. These rats, fat and provided with beautiful sleek skins, are a source of great profit, for the whole of them is utilized, fur, skin and flesh."

The proximity of the following lines in the same pages is rather suggestive of one method of utilization:—"In China the soup prepared from the tails of rats is as much esteemed as is that made with ox-tails by us; a dozen rats are there worth a couple of dollars."

THE CHEMISTS AND DRUGGISTS' DIARY. 1877. London 44A, Cannon Street, 1876.

Everybody who keeps a Diary, and the name of such is now "Legion" will soon be on the look out for the form which will best adapt itself to the wants of the coming year. To those chemists and druggists who have hitherto used the Diary issued in connection with our contemporary the *Chemist and Druggist* advice will probably be superfluous; to those who have not, but who wish for a good desk book, specially adapted for the memoranda of the chemist and druggist's business, we can conscientiously recommend it. Besides the Diary itself, and various almanack and other information, there is a collection of about three hundred recipes. We agree with the editor that it would be indeed curious if out of this large number thus brought together, a purchaser failed to discover something of value and service to himself.

Obituary.

Notice has been received of the deaths of the following:—

On the 14th of October, 1876, Mr. John Rowntree, Chemist and Druggist, Copenhagen Street, Islington.

On the 24th of October, 1876, Mr. William Gardner Hill, Pharmaceutical Chemist, George Street, Edinburgh. Aged 36 years. Mr. Hill had been a Member of the Pharmaceutical Society since 1869.

On the 15th of November, 1876, Mr. John Alexander Carrington, Chemist and Druggist, Bakewell, Derbyshire.

On the 18th of November, 1876, Mr. Henry Bard, Chemist and Druggist, St. Thomas, Exeter. Mr. Bard had been a Member of the Pharmaceutical Society since 1875.

On the 22nd of November, 1876, Mr. James William Read, Chemist and Druggist, Chelsea.

On the 25th of November, 1876, Mr. Samuel Penrose Kernick, Pharmaceutical Chemist, Duke Street, Cardiff. Mr. Kernick had been a Member of the Pharmaceutical Society since 1858.

On the 25th of November, 1876, Mr. David Viney, Chemist and Druggist, South Street, Isleworth.

On the 27th of November, 1876, Mr. Samuel Aldred Darby, Chemist and Druggist, St. Botolph Street, Colchester.

On the 30th of November, 1876, Mr. William Morton Coombes, Chemist and Druggist, Old Kent Road.

On the 30th of November, 1876, Mr. John William Taylor, Pharmaceutical Chemist, Lincoln. Mr. Taylor had been a Member of the Pharmaceutical Society since 1873.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

HYOSCYAMINE.

Sir,—My attention has twice to-day been directed to your report of Mr. Martindale's paper on Crystallized Hyoscyamine. Mr. Martindale seems to have made a mis-statement which calls for immediate correction. He says that in one of my papers on Hyoscyamine I speak of the drug as an amorphous alkaloid and states that he has little doubt that I refer "to the same preparation which is in the London market, which, however, is not amorphous but very minutely crystalline."

Acting on this assumption he subsequently states that I have given "as large doses as one grain and even three grains," but that I consider one grain as a full dose.

Now it should be very definitely understood that what has been called "the amorphous alkaloid" is not identical with the crystalline principle. The latter is very much more powerful than the former. As Harley had already written about this distinction, as far at least as concerned the amorphous drug as different from the sulphate of the alkaloid, I did not consider it necessary to comment on the subject. There seem to be in reality three forms of the principle: the first is an extractive, that which has been called the amorphous alkaloid and which I have employed in all observations the result of which I have as yet published; the second is the sulphate of hyoscyamine, a specimen of which Harley prepared for himself and employed in numerous observations (see *Old Vegetable Neurotics*); the third form is offered by chemists under the name of crystalline hyoscyamine, and appears to be the form to which Mr. Martindale refers.

The dose of the amorphous or extractive form which I have found necessary to produce full physiological action in man is three-quarters of a grain. The dose of the sulphate to correspond to this seems to be about one-twelfth of a grain and Mr. Sydney Pearse appears to have got a similar action from one-sixtieth of a grain of "crystalline hyoscyamine."

It will be at once seen, therefore, how grave the consequences might be if I were to allow Mr. Martindale's statement that the drug used by me and that supplied by him to Mr. Sydney Pearse are identical, to escape without contradiction.

I had intended to write to Mr. Martindale to give him the opportunity of correcting his own statement, but the desire to ensure the insertion of this letter in this week's issue of your Journal caused me to change my intention. I am sure, however, that he will appreciate my motive and exempt me from any suspicion of discourtesy.

Both Mr. Martindale and Mr. Sydney Pearse appear to be unaware that I published a long account of the actions of the drug in the fifth volume of the West Riding Asylum Medical Reports. May I add that a new series of observations on the therapeutic actions of the extractive principle will appear in the forthcoming volume of the same Reports?

ROBERT LAWSON.

West Riding Asylum, Wakefield,
December 12, 1876.

GREY POWDER.

Sir,—From the report in last week's Journal, the preparation and composition of blue pill and grey powder does not appear very satisfactory. Have the goodness to allow me space in your next to give the result of my experience in the matter, which may lead to other observations.

From 1830 to 1837, I was in the habit during my apprenticeship of making large quantities of both preparations, the whole of which were made by hand with an ordinary mortar and pestle. Finding the process very tedious and unsatisfactory, I frequently thought if mechanical power could be applied to the pestle it would be a great advantage, both in saving labour and producing a more uniform action.

In course of time I was led to accomplish that object, which has been a great advantage to me in my business, and I think the following experiment may be interesting to some of your readers.

A chemist in the town said he could not procure a satisfactory sample of blue pill and wished me to make him four pounds. I put the mercury into the mortar with the confection of roses and applied the pestle without any weight at a gentle speed. In about two hours it appeared finished, but, being anxious to make it perfect, the process was continued until the evening, when a sample was sent to him; he said the mercury was almost killed.

The same process was continued through the next day, with the same result. I then applied a weight on the pestle and drove it at a greater speed, and in about two hours the mercury was separated and visible at the bottom of the mortar. The weight was then removed and the pestle driven at a gentle speed, and in about two hours the mercury was again obliterated. I then applied the weight and increased the speed, which again separated the mercury. This alternate process was continued for a week, with the same result, thus proving that the mercury in fresh-made blue pill is merely a mechanical division of the mercury.

Some time afterwards the person for whom I tried the experiment told me he had recently examined with a powerful microscope the sample I sent him, but could not discover the slightest trace of metallic mercury.

H. GOODALL.

Derby, December 12, 1876.

GLYCEROLE OF NITRATE OF BISMUTH.

Sir,—With your permission I will reply in your columns to the questions that were put to me by two of the speakers at the discussion on the President's paper on December 6th. I did not think that I ought to venture on any reply at the time although the President had courteously invited me to speak, for I saw that the time of the Society was already fully occupied.

Mr. Umney and Mr. Linford noticed that the specimen handed round smelt of nitrous acid. As I was sitting next to them I had opportunity for observing that the specimen they referred to was the one prepared for me by Mr. Gale. As Mr. Gale had just stated, this was prepared by means of heat, which the President's researches had enabled him to say ought not to be applied. Mr. Umney stated if we are to have a compound of bismuth with oleic acid or glycerine there could be no doubt that the oxide was preferable to the nitrate, and he requested me to give an opinion as to the therapeutical bearing of such an option. To this I reply that we are not compelled to choose the one and leave the other, we may have both of them at our disposal if we please, but I fancy any choice between the two can only apply to outward use. I tasted some of the oleate as it was handed round, and feel convinced that the extremely nauseating quality of it as well as its chemical composition quite unfits it for internal uses; whereas one of the chief uses of the nitrate would be for inward administration.

It is hardly fair on Mr. Umney's part to put the difference as oxide *versus* nitrate, for it properly stands thus, namely, as oleate *plus* a large excess of oleic acid as against nitrate *plus* glycerine. Professor Redwood objected to the oleate on account of the difficulty of obtaining pure oleic acid, but then the oleates have by the balance of convenience become an article of wholesale instead of retail manufacture, and the difficulty here put has not interfered with our having always at our disposal in any part of the kingdom the best possible oleate of mercury. The professor's inquiry "What is glycerole of nitrate of bismuth supposed to be or intended to be?" may be thus answered. It is, or rather *was*, intended by me to be a simple solution of the salt in glycerine; the President, however, has shown that it is not so, but Professor Redwood is himself the very man who is best able to discover by means of a chemical analysis what reply ought now to be properly given to his question. "If the new preparation is to be introduced," said Professor Redwood, "we ought to know its nature and have some security that it will not undergo any great alteration." To this I reply we by all means ought *if we can*, but then was not opium a valuable drug long before we knew that it contained morphia, and did not Jesuits' bark do good service to mankind before quinine had been dreamt of. Let me take a later instance. Goa powder was a favourite and efficient remedy in the tropics long before it was discovered in the laboratory of the Pharmaceutical Society that it contained 85 per cent. of chrysophanic acid. Then again if the preparation will not keep for many weeks unchanged, no more will any of the infusions which are so largely prescribed and no more will sulphurous acid solution.

Lastly, as to the professor's objection that the nitric acid of the nitrate is held by an affinity so weak that water itself is capable of removing it, it must be remembered that my own experiments, confirmed by the more careful researches of the President, have shown that this remark does not apply to the nitrate when recently dissolved in *cold* glycerine, inasmuch as water under those those conditions has no effect on the nitrate in whatever quantity it may be added to it.

BALMANNO SQUIRE.

THE HYGIENE OF PINE PRODUCTS.

Sir,—I have read with interest the paper in your last issue by Mr. C. T. Kingzett, on the Hygienic Influences of the Pine and Eucalyptus, and am somewhat surprised that in the elaborate recapitulation which the author has given in it of both the literary and practical contributions which have been made to this subject, he should have omitted any reference to terebene, a derivative from oil of turpentine, to the valuable properties of which, as a deodorant and disinfectant, I first called public attention nearly two years ago. I am unable to attribute this omission on Mr. Kingzett's part to ignorance, first, because his own important researches on the terpenes must have made him quite familiar with this body itself; and, secondly, because at the Pharmaceutical Conference at Bristol in 1875 he specially referred to it in some remarks which he made.

I abstain at present from entering into any discussion on the point which is raised in Mr. Kingzett's paper, whether the volatilization of the aromatic hydrocarbons is accompanied by the production of ozone, as some authorities allege, or of peroxide of hydrogen, as he asserts, or of both of these bodies as appears to me the more probable assumption, since the whole subject is beset with considerable difficulty. My object here is to call attention to the practical point; that if, as Mr. Kingzett states, and as is, I think, highly probable, the admitted hygienic influence of the emanations from pine wood are due to the oxidation of turpentine, and to the production of a volatile body or bodies, whose presence is indicated by the characteristic odour which pine wood exhales, we have in terebene the exact body by which these exhalations are produced, since the aroma of this liquid, when diffused through the air, is so nearly identical with that of pine wood that it immediately suggests the comparison.

Of the practical value of terebene for disinfecting and deodorizing purposes it is unnecessary for me to speak, as its large use by the medical profession and the public, not only in this country, but abroad, has already amply established it. I refrain also from criticizing the new disinfectant for which Mr. Kingzett bespeaks attention until it is open to precise examination; but from Mr. Kingzett's own description of his method of producing it, and from my own researches on the subject, I shall be somewhat surprised to find it anything else than terebene under a new name.

FRANCIS T. BOND, M.D., B.A. Lond., F.C.S.
Medical Officer of Health to the Gloucestershire Combined Sanitary District.

Gloucester, December 6, 1876.

J. Kershaw.—You are recommended to apply to Messrs. Williams and Norgate, Henrietta Street, or Messrs. Dulau, Soho, for a catalogue of such works.

J. E.—The quinine is incompatible with the other ingredients of the mixture. Probably rubbing the three salts together with about one drachm of powdered gum arabic, adding a little water, and continuing the trituration for a few minutes, afterwards adding the other ingredients—spirits last—will produce the best result.

"Assistant."—The formulæ of a series of elixirs, including a "simple elixir," have been issued by a committee of the American Pharmaceutical Association. See vol. iv. of this series, p. 682.

COMMUNICATIONS, LETTERS, ETC., have been received from Mr. A. E. Ekins, Mr. Rimmington, Mr. Stevens, Mr. Gilmour, Mr. Nicols, Mr. Davenport, Mr. J. B. Austin, Inquirer, Bonus Puer.

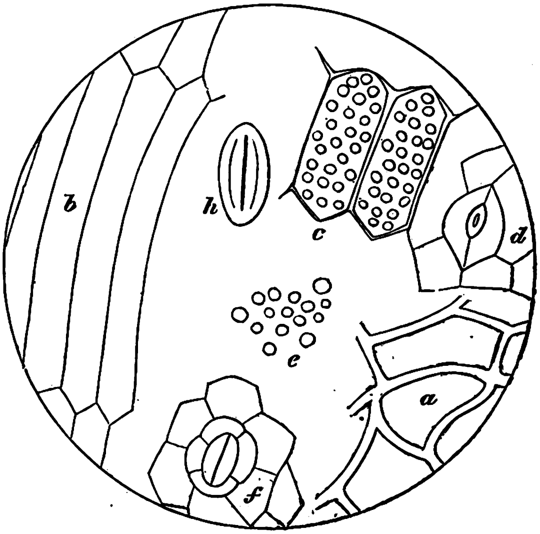
THE MICROSCOPY AND ADULTERATIONS OF COLOCYNTH POWDER.*

BY WILLIAM INGLIS CLARK.

At a time such as the present, anything bearing on adulterations, whether intentional or accidental, must be interesting to pharmacists in general, but, as the physician to be useful should be able not only to detect the disease, but also to point out the cure, so it is desirable that not only should an adulteration be pointed out, but also some easily applicable method of detection be at hand.

It is under this apprehension that I shall endeavour in this paper to place on record my investigations on colocynth. The *Citrullus Colocynthis* belongs to the natural order Cucurbitaceae, and like many of the other plants in this order, as for instance *Momordia elaterium*, the pulp of its fruit contains an active cathartic principle, colocynthin, much used in medicine as a trustworthy purgative in the form of extract of colocynth. The fruit of this plant (as may be seen from the transverse section of it) is a pepo, globose, smooth, and yellow when ripe, and divided internally primarily into three loculi or chambers, and finally into six by spurious septa. It will be noticed in the pepo that the septa have attached to them a cellular portion termed the pith or pulp, and it will be remembered that it is in this pulp alone, and in no other part of the fruit, that the active principle resides. The seeds, on the contrary, are oily and albuminous, and perfectly bland, the albuminous matter present being actually made into cakes in some parts of Africa, and used as an article of food. It is with a view to the exclusion of the inert rind, and also of these inert seeds, that the Pharmacopœia directs the use of the pulp, freed from the rind and seeds, in the preparation of the extract; and it will be apparent that if the seeds be not removed, a powder made from the whole pulp containing all the seeds will be much less active than one prepared from the pulp alone, the proportion of seed to pulp being as 1 to 2., *i.e.* the seed weighs fully one third of the whole fruit. Now any such admixture must be regarded as an adulteration, and it is to be regretted that the greater part of the commercial powdered colocynth contains more or less of the seeds. Indeed it may be safely stated that the colocynth powder sold in shops invariably contains some seed, and this, even although very considerable care be taken in removing the seeds. As in many other cases, the microscope is here a useful servant, pointing out readily the presence of even a very few seeds in a large bulk of the powder.

In order to facilitate a comprehension of the method of detection, it will be necessary before going further to describe briefly the various tissues which are present in the pulp itself, the rind, and also in the seed. Beginning with the seed, we find that it consists of a hard outer layer or episperm, and a soft part inside, the embryo, which in this case is exalbuminous, that is to say, it consists of the radicle, plumule and two large leafy cotyledons only, without any extra supply of albuminous matters for the young plants' nourishment. On making a very thin section through the outer layer of the seed, we find that there is a superficial layer of epidermis, below which are stellate cells, shaped much like a jelly mould, and consisting of a raised up central portion, having ridges on folds of the cell wall radiating out from the centre. This structure is at once shown by an examination of the transverse section, from the lower or inner side. If a section be made of any spherical body, it is evident that at the margin of the circular slice obtained, the section will be very thin, while in the centre it will be thickest. If therefore we look from below (*i.e.* from the flat side) at such a section, through the stellate cells above referred to, we shall see at the margin only the outline of the cells themselves, hexagonal or otherwise, as the case may be, while as we gradually approach the



470 Diameters.

a, inner layer of embryo sac; *b*, outer layer of ditto; *c*, cells of palisaded layer with granules; *d*, stomata from cotyledon; *e*, granules from cotyledons; *f*, epidermis of rind; *h*, starch granule (side view.)

centre, the ridges will appear at first as mere dots finally developing into well marked rays. Such corresponding exactly with what we see in the section represented in the diagram, we conclude that the cells have the shape indicated. This is even more fully borne out by the isolation of individual cells by means of potash solution, when the structure is well seen, and the rays stand out prominently. As we proceed deeper into the seed, we come upon several layers of dotted cells, more or less hexagonal in section, and having very thick, striped cell-walls. These constitute the hard part of the seed, and are thickened by deposits of ligneous matter in them. Closely investing the inner side of this hard layer is a very thin layer of tissue, the cells of which are much flattened, and nearly resemble figure *a* in the diagram. This layer is not truly separable from the episperm. If a seed, after being steeped in water for some time, or better still, in solution of potash, be opened, and the embryo removed, a very thin walled sac will be readily separated from the included cotyledons. On examination, this will be found really to consist of two tissues, not readily separable, each consisting of a single layer of cells. The outer, represented by fig. *b* consists of elongated

* Read at an evening meeting of the North British Branch, Edinburgh, December 13th, 1876.

narrow hexagonal cells, and is often met with in the commercial powder. The inner, in like manner, is also to be found, and in structure (fig. *a*) much resembles the inner layer of the episperm, previously referred to. Between these, however, and the episperm are to be found spiral vessels, forming a kind of sheath round the embryo and its coverings. We now come to the cotyledons, the structure of which can be seen in the transverse section. This is specially interesting, as showing us, not only what the structure of a cotyledon really is, but also its complete homology to an ordinary leaf. In fact, small though these cotyledons are, they present to us exactly the same layers of cells as we find in the fully developed leaf. First of all, then, there is an epidermal layer of irregular, flattened cells, shown in fig. *d*, covering both the inner or upper side, and the outer or lower side, and even at this comparatively early stage, stomata, well developed, and capable of contraction and dilatation, are to be found leading into loose spaces among the cells, and, no doubt, to some limited extent carrying on the functions of transpiration and respiration. This epidermal layer with the stomata, is exceedingly difficult to separate, or even to examine *in situ*; for, it being of extreme tenuity, the cells below are readily visible through it, in most cases rendering it impossible to detect such a tissue. If the albuminous cells, however, be very carefully removed, we get such a structure as we have referred to above. Immediately below the stomata there are two layers of small cells, measuring about $\frac{1}{1800}$ inch in diameter, and underneath these are one or two palisaded layers, viz., layers of very regular elongated cells, hexagonal in section.

Now come a considerable number of rounded cells, followed by three palisaded layers and a single row of small cells, covered by the epidermis. Besides this general structure, I would, however, specially direct attention to the fact, that all the cells of the cotyledons are filled with a very large number of small, oily, albuminous granules, about $\frac{1}{8000}$ inch in diameter, represented as fig. *e* in the diagram. These must not be mistaken for starch, as has been done, for the form is much more rounded than we usually find in starch grains, and the absence of blue colour with iodine, as well as the behaviour with polarized light, at once shows the difference. The grains above mentioned constitute the nutritive portion of the seed, and are able to withstand the action of solution of potash. By gently pressing the cells containing them with a little water the cell walls are ruptured, and the little granules as they float about are so characteristic as to be an infallible proof of the presence of the seed in a sample of the powder.

Having now run over the chief tissues to be found in the seed, I have still to describe those of the rind and pulp, before referring to the adulterations. The rind is of a light yellow colour, and is comparatively thin. The epidermis (see diagram *f*) when carefully removed is rather a pretty microscopic object, exhibiting as it does irregular flattened cells with thickish cell walls, and numerous stomata. If examined by a transverse section, it will be seen that the stomata are raised above the general surface, and open into loose spaces among the cells. These cells, underneath the epidermis, resemble much in appearance the thickened cells of the episperm, previously described, but are larger, looser, and with narrow cell walls. The pulp, on the other hand, consists of the most irregular cellular tissue, the cells, which are easily separable by means of potash, being oval or elliptical in form, and lying together in no very definite order. This pulp is traversed by vessels of various kinds, the most important of which for us to remember are the spiral vessels, which are of large size, larger as a rule than the corresponding structures in the seed, but as the size is no criterion, it is necessary for us to remember that the same structures are present in both parts, and that therefore the presence of spiral vessels in the powder is no proof of the presence of seed.

We are now in a position to recognize an admixture of seed or rind, with the true pulp. The most general and characteristic test for the former, as was before mentioned, is to be found in the small albuminous granules contained in the cells of the cotyledons. If a small portion of the suspected powder be placed on a glass slip, a drop of water added, and the cover glass gently rubbed on it, so as to extend the drop, these granules will be readily noticed. In the true powder, no granules are to be seen, or at the most but one or two, but in proportion as more or less seed is present, so are the granules more or less numerous. Unless these constitute a considerable bulk of the powder, their presence should only be considered accidental, and the powder not be condemned on this account. With most pharmacists, I believe, this will be considered a perfectly satisfactory test, but confirmatory proofs are easily pointed out. It will be evident that when the seed is powdered, the tissues will be also broken up, and fragments of these may be noticed. The commonest and most easy of detection is the double walled sac enveloping the embryo (see figs. *b* and *a*), showing on the outer side, elongated, more or less hexagonal cells, and on its inner side, the structure shown in figure *a*. Besides this, the spiral vessels are sometimes present, but these cannot be with certainty distinguished from those of the pulp. Stomata may and do occur, but their presence is so difficult of detection that they cannot be depended on. The episperm again, although it shows a characteristic structure on section, yet, in the state of powder, cannot be recognized. The rind, on the other hand, is still less frequently met with, but the characteristic stomata, in this case easily seen, would furnish a ready means of detection. In none of the samples I have examined have I detected any of the rind. Besides the admixture of the seed, powdered colocynth is liable to contain other substances, foreign to it, and these, fortunately, are easy of detection. As in most cases of adulterated powder, so here, starch is the most common adulterant. When I say adulterant, I do not mean that perhaps a few grains are to be found scattered through a large bulk of the powder, because such can hardly be avoided if the colocynth be ground at any ordinary mill; but if the starch bulk largely, so as to constitute a reasonable proportion of the whole, then it may be safely concluded that its presence is intentional. If the powder contain very much starch, the readiest method of detection would be the use of iodine, without the aid of the microscope, but unless a large proportion be present, this could not be relied upon. With the microscope, however, each individual grain coloured blue is visible, and therefore this test is perfectly satisfactory. By the use of polarized light, also, we are able readily to decide on the identity of a starch granule, independently of the use of iodine. When polarized light is passed through a cereal starch grain, a more or less well marked black cross will be noticed. The only exception to this rule is the oat starch, which does not present a cross, but in this case the granules are polygonal. I have examined about one dozen samples of the commercial powder, obtained from different parts of the country, and of these three contained starch. In one of these, about 75 per cent. or more of the powder consisted of wheat starch, while only occasionally was a fragment of pulp to be seen. In the other two the quantity was smaller, but in one, starch granules with a three or four-rayed star in the centre, greatly resembling rye starch, were detected. These, however, were evidently stragglers, and not intentional adulterants. They may have been simply wheat grains with folds of the cell wall giving the appearance described, for it must be remembered that the wheaten starch granule is not of invariable shape, and when viewed from the side it presents an oval shape (see fig. *h*), with a longitudinal furrow, described by some authors as the hilum, but really only a fold of the cell-wall.

In concluding, it may be satisfactory to remark that although in none of the samples which I have obtained is the seed absolutely separated, still the proportion present in more than half of them is not so large as to prevent our believing them to have been honestly prepared. In bringing forward these investigations I shall be fully repaid for my labour if I have succeeded in demonstrating how easy it is for every chemist who possesses a microscope to ensure the genuineness of his colocynth, and to guard against the rapacity of dealers.

[*The Discussion on this paper is printed at p.* 517].

A DEPOSIT IN SOLUTION OF BICARBONATE OF SODA.*

BY WILLIAM INGLIS CLARK.

Some time ago my attention was drawn to a deposit in a bottle in which bicarbonate of soda had been dissolved in water. There appeared to be a white film obscuring the glass; but as it occurred that probably there was some simple explanation of it, the subject was passed over, and no steps were taken to examine the nature of the film. Some time after this, however, some hard, apparently sandy matter was found lying at the bottom of a block-tin cistern containing a solution of the above salt. Under the impression that this had entered accidentally, I examined the cistern, and found an incrustation on the sides and bottom, some of which I removed and analysed, the result showing it to be pure carbonate of lime, with a trace of colouring matter. An examination with the microscope revealed the presence of very minute hexagonal prisms, the form in which carbonate of lime usually crystallizes, measuring from $\frac{1}{1000}$ to $\frac{1}{4000}$ inch in diameter. Besides these, I recognized three species of diatoms, namely:—gomphonema, pleurosigma, and a discoidal form, the name of which was not determined. These were of very minute size, and had passed through the carbon filter along with the water.

The composition of the deposit being settled, the question as to how its presence could be accounted for remained. It was suggested that perhaps the crystals were present in the soda before solution. This being shown not to be the case, and a chemical examination indicating the absence of lime and the purity of the salts, the only possible cause seemed to be the Edinburgh water. From an analysis of it, the number of grains of carbonate of lime per gallon was 6·286, whilst of sulphate of lime there were only 1·0214 grs. present. The carbonate present would then account for the deposit. But how came it to deposit? The cistern was very cold, and Edinburgh water is not known to deposit carbonate of lime in the cold. To determine more carefully, and for myself, the conditions under which the precipitate falls, I treated 90 gallons of water with 5¼ lbs. of subcarbonate of soda ($Na_2CO_3 10H_2O$), and weighed the deposit, which amounted to about 300 grains. In like manner, with bicarbonate of soda, $NaHCO_3$, the deposit weighed 200 grains, while with the corresponding salts of potash the weights were 40 and 9 grains respectively. Now to account for this the action of the carbonates on the sulphate of lime seemed competent, but the largest deposit obtainable in this way could be no more than 75 grains, and even this would not fall, as carbonate of lime is sufficiently soluble in water to prevent this. I have found that even with more sulphate of lime than one grain per gallon of distilled water no precipitate was thrown down by an alkaline carbonate. The tendency of sodic carbonate to become bicarbonate by removing carbonic acid when in a loose state of combination seemed a plausible explanation, as in the case before us the carbonate of lime, 6·286 grains per gallon, was chiefly retained in solution by the carbonic acid dissolved in the water.

The equation representing the change would be—

$$Na_2CO_3 + CaCO_3, CO_2 + H_2O = 2NaHCO_3 + CaCO_3.$$

Of course the bicarbonate could have no action on such a water; but, in practice, as we have seen, there is a deposit of 200 grains. On testing with mercuric chloride, the copious red precipitate showed the presence of carbonate, and when absolutely pure bicarbonate was used no precipitate was thrown down from the water. This then, is sufficient to explain the greater deposit with the carbonates than with the bicarbonates; but why the soda salts should show more action than the potash salts remains a question. Although potash has undoubtedly a greater affinity for most acids than soda, yet, with carbonic acid the case is different, the bicarbonate of potash being even more readily changed to carbonate than with the salts of soda, so that, in like manner, it seems unable to remove the carbonic acid from the bicarbonate of lime so perfectly as the soda.

It is evident then that the deposit is due to the carbonate alone, and that, in proportion as the bicarbonate contains more of the carbonate so is the precipitate increased.

As has been brought recently before the public, little of the soda water of commerce contains carbonate of soda, so this deposit can have no interest to those makers to whose waters this statement applies. To those, however, who adhere to the Pharmacopœia strength, it may be an interesting point. In practice, at least in my own experience, the deposit has occurred, not only in the cistern, but also in the taps and

* Read at an Evening Meeting of the North British Branch, Edinburgh, December 13th, 1876.

pipes leading to the aerating machine, so much so, that several times the pipes have been filled solid with this deposit, which in a week's time will weigh from 7 to 24 oz., and if the crystals referred to pass into the machine and bottles the carbonic acid may be, and actually in cases on record has been, unable to effect solution of them. If the solution be made in small quantity, and immediately bottled, no doubt the deposit will not fall, the carbonate of lime being retained in solution. Those waters which contain little or no lime, such as distilled rain, or Loch Katrine water, would be free from the objection, as also boiled water, but where these are not to be had, some device must be resorted to. The best and simplest way of dealing with the matter is to allow the deposit to settle in some special vessel before using the water. In the absence of this, the saturation of the bicarbonate with carbonic acid before use is an effectual preventive. Whether the deposit can be accounted for in the way I have proposed, or whether some other explanation is the right one, I leave be to decided, trusting that in the discussion which may follow, some facts may be elicited which shall throw light on this point, interesting alike from a theoretical and a practical point of view.

[*The Discussion on this paper is printed at p.* 517].

FOURTEENTH ANNUAL REPORT OF THE GOVERNMENT CINCHONA PLANTATION IN BRITISH SIKHIM.

BY GEORGE KING, M.B., F.L.S.,

Superintendent of the Royal Botanical Garden, Calcutta, and of Cinchona Cultivation in Bengal.

The record of work done on the cinchona plantation during the year 1875-76 is, unlike that of any former year, more one of harvest than of planting. After thirteen years of expenditure, at first on experiments and latterly on *bonâ fide* planting, during which period but little return was received, the scale has now begun to turn, and for the first time in its history the plantation has yielded a tangible result in the way of crop, 211,931 pounds of dry bark having been collected since last annual report. This amount considerably exceeds the forecast made by the Government of India in the seventh paragraph of Mr. Hume's letters reviewing the plantation report for 1873-74, in which it is estimated that, by the year 1877, the plantation should begin to yield at the rate of 150,000 pounds of dry bark per annum. The collection, within a year short of the date fixed by the Government of India, of a quantity of bark exceeding the estimate by nearly 62,000 pounds, may therefore, I hope, be regarded as satisfactory.

2. *Details of the year's crop.*—The bark collected during the past year was taken from different parts of the plantation, and in a variety of ways. The taking of the crop divided itself into eight operations, which I shall now proceed to sketch briefly, premising that the first three of these were cultural, having been undertaken primarily in the interest of the piece of plantation worked on, while the remaining five were undertaken with the double object of getting bark and of adding as much as possible to that practical experience of the various modes of harvesting it which is the only sure basis on which a regular working plan for the plantation can be founded. The crop consists entirely of red-bark (the produce of *Cinchona succirubra*), and the eight operations by which it was harvested were as follows:—

(1) The whole of the plantation of 1867 (with the exception of eight acres, to be subsequently accounted for), extending to about 180 acres and situated on Rungbee, was carefully gone over and thinned where necessary. From this there were obtained 8017 pounds of dry stem and 12,388 pounds of dry branch-bark.

(2) The upper part of the Rishap spur, planted in 1869 at 6 by 6 feet, was thinned and pruned,—an operation which yielded about 74,000 pounds of dry bark, of which about one-fifth was stem-bark and four-fifths were branch-bark.

(3) In like manner the whole *succirubra* plantation of 1872 (with the exception of eleven acres, to be afterwards mentioned) was subjected to a moderate thinning and pruning. The year 1872 was the first in which close planting was adopted. The trees in this piece of plantation stand only four feet apart, giving 2722 trees to the acre, against 1210 trees to the acre in the older planting at 6 by 5 feet apart. As these trees stand in very good soil, and as their growth has all along been luxuriant, a certain amount of thinning had become absolutely necessary for their general welfare. About 16,153 pounds of dry bark were thus obtained, which was composed in round numbers of one-fourth root-bark, and rather less than a fourth of stem-bark, the remainder being branch-bark.

(4) About eight acres of trees on Rungbee, planted in 1867, were cut down close to the ground, only a small proportion of trees being left standing. This operation will give further experience as to the result of nearly complete coppicing of nine-year old red-barks. I say *nearly* complete coppicing, because a few trees are left standing, but not enough to afford any material amount of shade to the shoots that will rise from the stools of the felled trees. The trees cut on these eight acres yielded 6400 pounds dry stem-bark and 3781 pounds of dry branch-bark, or a total equal to 1272·5 pounds of dry bark per acre. These figures do not, however, by any means show all the bark which has been collected from these trees since they were planted, for they have from time to time been thinned and pruned in years past; but of the bark thus obtained, unfortunately no separate record has been kept. This patch of eight acres lies contiguous to a one-acre patch (also planted in 1867), which, on being coppiced in a like fashion in December, 1874, yielded about 2000 pounds of dry bark; but from this patch also bark had been, previously to 1874, taken by thinning. The young shoots that have risen from the stools on the one-acre piece now promise very fairly indeed, as also do those which are beginning to spring from the stools on the eight-acre piece. The future history of the coppice on these nine acres will be of much value and interest, therefore have I entered into so much detail regarding it.

(5) A patch of thirty-five acres of trees near the site of the old Rishap hut, planted in 1866 and 1867, and therefore about nine years old, was entirely uprooted. The yield of bark was as follows:—

	Pounds.
Dry root-bark	41,374·28
„ stem-bark.	19,677·48
„ branch-bark	21,576·00
Total. . . .	82,627·76

This is equal to 2360·8 pounds of dry bark per acre, of which about half is root-bark containing 8 per cent. of alkaloids, and nearly a fourth is stem-bark containing at least 6 per cent. of alkaloids. The present is not the first occasion on which this thirty-five-acre plot has formed the subject of report: it will, therefore, I think, be instructive to trace briefly its past history. Originally planted at distances of 6 by 6 feet apart, the trees, when two and a half years old, were thinned, and 1600 pounds of dry bark were thus obtained. Shortly before the sitting of the Commission appointed to consider the subject of a disease which then (in the opinion of some) threatened the plantation with destruction, and when the plants were about three and a half years old, each alternate row of them was cut down, and dry bark was thus obtained to the extent of 3200 pounds. One of the witnesses who appeared before the Commission was the late Mr. W. G. McIvor, Superintendent of the Government Cinchona Plantation on the Nilgiris, and in April, 1872, or shortly after his examination by the Commission, Mr. McIvor put on record his opinion that, if cut down then (*i.e.*, in April, 1872), these thirty-five acres might (including the 4800 pounds already taken from them) yield a total of about 273 pounds of dry bark per acre, but that, if allowed to remain uncut, a large proportion of the trees would be dead before a year should elapse. Mr. McIvor even went so far as to say that in his opinion more good bark would be got by cutting the trees then than could ever again be taken, bark from dead and dying trees being worthless. Some time after this opinion had been given, a further thinning (the third) of these trees was undertaken, which yielded 8000 pounds of dry bark. Prior to uprootal, these thirty-five acres had therefore yielded 12,800 pounds of dry bark, or at the rate of about 365½ pounds per acre: at uprootal, as we have just seen, they yielded at the rate of 2360½ pounds, bringing their total yield per acre up to 2726 pounds of dry bark, or about ten times the quantity estimated by Mr. McIvor. Mr. McIvor was the most experienced cinchona cultivator of his day, and his opinion carried much weight. These thirty-five acres were about as much affected by the disease of which Mr. McIvor took so gloomy a view as any part of the plantation: it is therefore satisfactory to find that the ravages of any disease that has hitherto appeared amongst cinchonas need after all be but little dreadful.

(*To be continued.*)

HULL CHEMISTS' ASSOCIATION.

The annual supper of the members of the above Association took place at the Cross Keys Hotel, on Wednesday evening, December 13. The President, Mr. C. B. Bell, occupied the chair, the honours of the vice-chair being sustained by Mr. J. F. Smith. There were also present the Mayor (Dr. King), Councillors Chapman and Smith, Mr. B. Stoakes (Secretary), Mr. A. Smith, Mr. H. J. Parsons, Mr. G. Wokes, Mr. E. Allison, Mr. Oldham, Mr. Grindell, and other prominent members of the Association.

The Secretary announced that he had received several letters of apology from gentlemen unable to be present.

The usual loyal toasts having been given and duly acknowledged, Mr. A. Smith proposed the "Mayor and Corporation of Hull," remarking that when Dr. King resigned the mantle which the Corporation had unanimously placed upon his shoulders he would do so with credit to himself and the Town Council.

The Mayor, who was warmly received, observed that this was the first occasion upon which he had had to respond to this toast since he had been for the second time elected to the mayoralty, and he might say that he could not have chosen an assembly to which to respond more congenial to his feelings than was this Association. He had heard it said, again and again, that medical men could scarcely be good sanitarians, because it was a means of reducing their own revenues and cutting their own throats, as some people vulgarly put it. Underneath this assertion there is a fallacy, because it was natural that no man wished to devote a portion of his revenue to burying his family. It was said that enough had been done in these matters, and that our bills of mortality were not increasing; but it must be borne in mind that there was much disease which did not affect the bills of mortality. He knew for a fact, by comparing his practice and those of other gentlemen, that during the short epidemic of scarlet fever which occurred in Hull about two years ago, no less than 800 persons suffered from it. After alluding to the proposed appointment of a public analyst, the Mayor remarked that he hoped there would, eventually, be several medical officers in the town, and that they would divide the town into sections. The trade was well represented in the council chamber by his friends Mr. Councillor Chapman and Mr. Councillor Smith. In conclusion, the Mayor expressed his great acknowledgments for the toast.

Mr. E. Allison briefly proposed the "Town and Trade of Hull," and Councillor Smith, in responding, observed that he thought there must be some benevolence agitating the members of the chemists' trade, because it was not a business to which much profit was attached. The members of the profession were very inadequately paid for their labours, and for the great responsibility which rested upon them. Mr. Smith then alluded to the office of public analyst, and the duties which he considered that officer should fulfil, and, in conclusion, expressed the hope that the Corporation would long maintain the position and credit of the town.

The Mayor then proposed "Success to the Hull Chemists' Association," remarking that he could not help thinking that this Association had done a great deal of good in the town, and that it had it in its power to do a great deal of good in the future. He understood that a much severer test had been established for those who wished to enter the trade. He believed that these examinations had a beneficial effect upon the trade, and he thought this was a wise piece of legislation, and would tend to elevate and educate the minds of the people engaged in it, and thus would be so much the better for the whole trade. He believed the chemists of the future would deserve, and would obtain, a higher recognition than they had done in the past, and would eventually attain an improvement in standing, in social position, and in the profits of the trade.

The Chairman returned his hearty thanks to Dr. King for the kind and handsome manner in which that gentleman had proposed the toast, and he also thanked the members of the Association for the honour they had conferred upon him in re-electing him to the dignity of president. This Association, he believed, had made its mark not only in this country, but throughout the world, because one particular case in which they were interested had been published and circulated all over the world. He was alluding to the celebrated "pick-me-up case." During the past year they had not had any more "pick-me-up" cases to deal with, and he hoped they would have no more. The Excise had looked after them, and they had not to go again before the magistrates. He was glad the Executive Committee had been allowed a little rest, and he was also glad to find that the number of members had not fallen off, but had increased. There had been a slight change in the executive, their friend, Mr. Oldham, finding that he could not now spare the time necessary to devote to the office of secretary. This was a subject of regret, because that gentleman had been a very able and painstaking officer; but the present secretary, Mr. Stoakes, would, he felt sure, be an able substitute for Mr. Oldham, and would render every assistance in his power.

Councillor Chapman briefly proposed "The Officers of the Association," to which toast Mr. J. F. Smith, Mr. B. Stoakes (Secretary), and Mr. Oldham responded.

Mr. Thyer proposed "The Medical Profession," and Dr. Sawden responded.

"The Pharmaceutica Society" was proposed by Mr. G. Wokes, and acknowledged by the Chairman, as Local Secretary of that Society.

The Vice-Chairman gave "The Visitors," who found a respondent in Mr. Lane, the representative of Messrs. Maw, Son, and Thompson.

"The Press," "The Ladies," and other toasts followed.

THE SUNDERLAND CHEMISTS' ASSOCIATION.

The annual dinner of the Sunderland Chemists' Association was held on Wednesday, December 13, at the Palatine Hotel. Alderman Thompson, President of the Society, occupied the chair, supported by Lieutenant-Colonel Gourley, M.P., Councillor Sidgwick, Dr. Yeld, medical officer of health for the borough, Mr. J. J. Nicholson, Mr. R. T. Nicholson, and Mr. Alfred Thompson; Mr. B. Robinson filled the vice-chair.

The company having drunk to "the Health of the Queen and Royal Family," the Vice-Chairman briefly proposed "The Army, Navy, and Volunteers," coupled with the name of Colonel Gourley.

Colonel Gourley, M.P., in the course of his remarks in acknowledgment of the toast, said that, he would like to see all the young men in Sunderland bearing arms, and he was sure that if they were to form in connection with their Society a Pharmaceutical Company they would prove not only a credit to themselves but to the town in which they resided. To persons daily engaged as the gentlemen he saw around him were, the physical exercise involved in the military training would be advantageous in preserving their health and maintaining their mental activity. As commanding officer, he would only be too glad to witness the addition of a pharmaceutical company to the corps. If the chemists took such a step, they would not only be doing themselves good, but they would have the satisfaction of knowing that they were doing something for their country.

The Chairman next proposed "The Borough and County Members," and Colonel Gourley, M.P., who was heartily received, responded in appropriate language. In the course of his speech he asked whether, as an association, the chemists of Sunderland were doing anything for the education of the members of the profession? They represented a branch of one of the most important professions and interests in the whole world—a profession which had its representatives even among the savage races, who, like civilized races in this respect, were obliged to have recourse to the science of medicine. Seeing Sunderland was so deeply dependent upon them, it was important that they should endeavour to raise the educational status of the members of the profession to the highest point. He was not aware whether they were doing anything in this direction, but he suggested that the society should provide a laboratory for the use of students, engage lecturers on professional subjects, and take other steps with the object he had mentioned. Such facilities ought to be accepted as extremely valuable aids to further knowledge by the rising intelligent young men in the profession in this town who ought to occupy a high educational position amongst their fellow men. On the Tyne they found large chemical works, and even the small town of Seaham had got chemical works; but he looked in vain for such works at Sunderland. The attainment of the highest professional position was possible to the young men he saw around them, if they gave themselves to the study of their profession; and he hoped that at some future time they would be able to congratulate themselves on having chemical works established at Sunderland Proceeding to advert to the desirability of the Association forming a class for the study of botany, the hon. speaker urged that for the benefit of the people at large, the names of various plants and flowers in the Park should be placed on labels. When he first occupied the position of Mayor of the borough, Mr. Hartley offered to give glass, Mr. Backhouse £500, and the speaker £250, to build a glass house on the Park, for the protection of rare plants, etc., so that the pleasure of the people might be increased; but the offer was neglected by the "powers that be" at the time.

The Chairman said the promotion of education amongst the young members of the profession had not been lost sight of by the active members of the Association. He had recently suggested that the Corporation should provide in the proposed Library and Museum Buildings rooms in which lectures could be given to classes on various subjects, amongst others chemistry, materia medica, etc. If the Corporation were to provide such a room, the chemists would be prepared to furnish it, and provide lectures, etc.

Mr. Harrison proposed "The Mayor and Corporation of Sunderland."

The Chairman responded, as also did Councillor Sidgwick.

Mr. Alfred Thompson proposed "Success to the Sunderland Chemists' Association." The number of chemists in the town, he said, is 47; while there are 42 or 43 in the Association. They had every reason to congratulate themselves on the position of the Association. He hoped to see the day when they would possess a laboratory, etc., but he would not have them be under obligation to the Corporation for it. He coupled with the toast the name of Mr. J. J. Nicholson, who, he said, had shown very great interest in the Association, and had done all he possibly could to promote its interests.

Mr. J. J. Nicholson responded. He said the report he had to give concerning the society was a most favourable one. Circumstances had occurred which had caused them to draw more closely together in unity, and there had been a considerable accession to their number. There was inaugurated at the beginning of the year a national society, having something like the same objects as were professed by the local society, namely, the protection of their trade interests. The chemists in Sunderland approved of the society, and they sent delegates to the meeting. With two or three exceptions they all joined it, and he believed the national society was going to be a very strong society. It had been objected that its objects were hostile to those of the Pharmaceutical Society, but it should be remembered that while they desired through the Pharmaceutical Society to attain to the dignity of a profession, it was important that at the same time they should not forget to protect themselves as a trade, which they could do through the new society. There was a separate work for each society to do, and he had every hope concerning them. Referring to Colonel Gourley's remarks, Mr. Nicholson said they had aimed in the direction the hon. member had advised ever since the commencement of the Association eight years ago. They had rented rooms and engaged teachers; but there had been inertia in their own body—they could not get the young men to avail themselves of the facilities afforded them. As the funds which were available at the beginning were, he believed, still available for such a purpose, he trusted they would now see a desire manifested to take advantage of the facilities suggested.

Mr. Sharp proposed "The Medical Profession," to which Dr. Yeld responded. The doctor referred to the benefits which were likely to accrue from the new sanitary scheme of the Corporation, and said in the Mayor he found one of his best helpers in carrying out this scheme. The speaker intimated that he had not concurred in the getting of drugs from chemists in the town for analysis, because from his experience of them he knew they did not adulterate the articles they sold. He also commented on the fact that when cases of milk adulterations had been brought before the magistrates, the justices had in some cases inflicted only a fine of 2*s.* 6*d.* and costs, and in others dismissed the persons summoned. In London, the other day, an offender was fined £10 and £3 13*s.* 6*d.* costs. Farmers would rather pay the small fine of a retail dealer than that their names should be published. The magisterial decisions he had alluded to were very little encouragement to the Health Committee and the officers of the Corporation to direct their attention to a most valuable article of food.

"The Officers of the Society" (proposed by Mr. Turnbull) and other toasts having been drunk, the company separated.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 23, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE MILITARY PHARMACEUTICAL SERVICE IN RUSSIA AND TURKEY.

THE possible outbreak of war between Russia and Turkey may give interest to a few particulars respecting the military pharmaceutical service in those countries.

In Russia, the mobilization of the army, by which the number of troops under arms has been considerably increased, naturally required also a corresponding strengthening of the medical *personnel.* It is estimated by the military authorities that in case of war, besides the ordinary number on the peace establishment, there will be required 1140 additional medical men, 324 pharmacists and 60 veterinarians. We learn from the *Pharmaceutische Zeitung* that in order to obtain this increased number in the event of an outbreak of war, a plan has been drawn up and sanctioned by the military medical department. In this it is provided that the time of discharging the students from the Medico-Chirurgical School shall be hastened; that all persons serving in the military medical reserve shall be called into active service, and that their places shall be supplied by others in the civil service or in independent practice, and that medical men living in districts where military operations are being carried on should be induced to join the service.

The pay of physicians on active service is to range from 994 to 2291 roubles, or from about £156 to £350 sterling. The pay of pharmacists on active service ranges from 994 to 1411 roubles, or £156 to £220. The independent and retired practitioners entering the military medical service temporarily are to be paid from 150 to 250 roubles, or £23 10*s.* to £39, monthly. Pharmaceutists of this class are to be paid from £23 10*s.* to £30 monthly.

Concerning the Turkish apothecaries, Professor LANDERER writes that those specially available in the military service are trained in a school in Constantinople. In this pharmaceutical school the French language is used by the professors, though few among their auditory are conversant with it. Their pupils are Turkish apprentices, who at some time have had the fortune to serve with some of the French and Italian immigrant pharmacists who are scattered by hundreds over the kingdom, from whom they have acquired such an amount of knowledge as a respectable German apprentice would pick up in six months. In the school they are taught botany, pharmaceutical chemistry (with practical examples, limited, however, to the preparation of plasters, ointments and similar preparations) and the elements of physics. These pupils are remunerated by the Government, and after a theoretical pupilage of twelve to eighteen months they are drafted into the military service.

The Greeks who settle in the Turkish empire as physicians or apothecaries are required to undergo an examination at the Medical College in Constantinople. But, says Professor LANDERER, with true *amor patriæ*, those who have received a pharmaceutical training in the University of Athens are admitted to the distinction of apothecaries, although their experience in practical chemistry may be imperfect, as they would know more than the examining members of the Medical College. What the native pharmacists lack in knowledge, however, they appear to make up in show, for according to the same authority there are in Constantinople, Smyrna and Alexandria pharmacies as handsome as any in Europe, in which prescriptions are made up without a laboratory and with only the assistance of a few pans for the preparation of decoctions, plasters and extracts. Apparatus for filtration and distillation, and other similar vessels, kept only for show and to delude the public, are stored like jewels in a cabinet. A set of reagents for chemical analysis or the testing of the medicines imported from the outside world would be looked upon as a superfluity. Indeed, what use would they be? Preparations imported at fancy prices, especially chemical products, are enclosed in handsome bottles with splendid labels. In fact it would be a pity to examine them, since they bear on their exterior the stamp of genuineness. At least, so says the Turkish apothecary. "These medicines are all very good, for they come from the land of the Franks!" What childlike faith!

THE COLOURING OF CHEESE.

A WELL known public analyst, while giving his evidence before the last Committee of the House of Commons on Adulteration, expressed his opinion that the public had as much right to be supplied with green tea, if it preferred tea of that colour, as to be supplied with brown coats. But the present standards of purity being somewhat personal are also local, and the circumstances which now make it penal in some districts to sell as milk of sulphur the compound known under that name for a couple of centuries, whilst it can be freely sold in others, would probably make it risky for a grocer to sell an artificially coloured tea until he has studied the idiosyncrasy of the public analyst who might be called upon to examine it. But how is it that coloured cheese has been tolerated so long, and that it has been left to the cheesemakers to initiate a movement for its abolition?

The subject was mooted at the last meeting of the Cheshire Agricultural Society, in the shape of a proposition that in future all cheese exhibited at the Society's shows should be free from "colouring adulteration." The speaker enforced his argument by describing the colouring matter as nasty to look upon, nasty to smell, and unpleasant to taste, whilst at the price of 3*s.* to 4*s.* a hundredweight it was estimated to cost the farmers of the county at least £10,000 per annum, for which they received no return. Another speaker, while admitting that the colouring was of no benefit, but rather injurious to the cheese—"in fact, a sham, a delusion, and a snare"—objected to the prohibition unless it could be shown that the colour was detrimental to the health of the consumer. The chairman seemed to express the opinion of the meeting in saying that the question lay between the producers and the consumers, for everybody knew what coloured cheese was; some people liked coloured cheese, and some did not. Such reasonable arguments, however, as shown by previous experience, would have as much effect upon the stern purism of some public analysts as the pouring of water upon a duck's back.

THE COPAIBA TREE.

MR. ROBERT CROSS, who has just returned to England from South America with a large number of india rubber plants (*Hevea brasiliensis*), has also brought with him, we learn from the *Gardeners' Chronicle*, a small quantity of well ripened seeds of the Copaiba tree, which gives the balsam of capivi of commerce. The seeds were collected, after much searching, in the forests of Pará. The balsam obtained from the Pará tree is reported to be more transparent than that from other districts, and is called *copaiba blanca*. A large quantity of it is sent annually to the French market, where it commands the highest price. In the Pará forests the trunks of the trees are seen rising to a height of about eighty feet without a branch. Such trees, if tapped at the proper time,—which has yet, however, to be determined,—will often yield 4 "potos," or about 84 pints, each. Mr. CROSS describes the life of the balsam collector as being a very wretched one.

THE ROYAL INSTITUTION ARRANGEMENTS.

IT is announced that the probable arrangements for the Friday evening meetings of the Royal Institution before Easter will include lectures by Professor TYNDALL, Professor HUXLEY, Professor OSBORNE REYNOLDS, Mr. FRANCIS GALTON, Professor F. GUTHRIE, Mr. J. F. MOULTON, Sir JOHN LUBBOCK, Mr. F. J. BRAMWELL, and Professor GLADSTONE. The Christmas lectures, adapted to a juvenile auditory, are to be delivered by Professor GLADSTONE, the subject being 'The Chemistry of Fire.'

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

December 13, 1876.

Present—Mr. Savage, Vice-President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Schweitzer, Southall, Taylor and Umney.

Dr. Greenhow was present on behalf of the Privy Council.

MAJOR EXAMINATION.

Seven candidates were examined. *Three* failed. The following *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Andrews, William Leatham ...Scarborough.
Gostling, William Ayton.........Diss.
Hart, Philip ....Bolton.
Wilkinson-Newsholme, Geo. Thos. Huddersfield.

MINOR EXAMINATION.

Sixteen candidates were examined. *Eight* failed. The following *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Asher, James ....Derby.
Barrow, Frank Arthur ....Newmarket.
Cæsar, Julius.......................Cosham.
Colling, Herbert ....Brighton.
Hume, John Wm. David ......Stokesley.
Ottey, Thomas ....High Wycombe.
Saunders, James Edwin ....Stamford.
Wilmer, Frederick Joseph ......Newport Pagnell.

December 14, 1876.

Present—Mr. Savage, Vice-President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Schweitzer, Southall, Taylor and Umney.

MAJOR EXAMINATION.

Six candidates were examined. *Four* failed. The following *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Frank, John ....Whitby.
Hatch, James Oliver ....Lancaster.

MINOR EXAMINATION.

Eighteen candidates were examined. *Nine* failed. The following *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Curtis, Frederic George ....Dorchester.
Dester, Joseph ....Warton.
Dixon, Richard Dobson ....Sharow.
Greenish, Henry George.........London.
Hogg, James Edmund............Worcester.
Jenkins, Thomas ....London.
Newton, Arthur James ....Dudley.
Wells, Albert Charles ....Leamington.
Wright, Watkin Valentine......Wrexham.

December 15, 1876.

Present—Mr. Williams, President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Schweitzer, Southall, Taylor and Umney.

Dr. Greenhow was present on behalf of the Privy Council.

MINOR EXAMINATION.

Twenty-three candidates were examined. *Eleven* failed. The following *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Alcock, Henry ....Coventry.
Anderson, James Johnstone ...Epworth.
Aves, Arthur Kerner ....Mansfield.
Burrows, Charles Wm. Grimes...Ironville.
Cluett, Benjamin...... ....Kingston-on-Thames.
Davies, Thomas William.........Cardigan.

Gibson, John Chambers .... Manchester.
Ives, Robert Hanworth .... Norwich.
Jenkins, Thomas .... Swansea.
Palmer, George Smith............ Lincoln.
Parkinson, Frederic William ... Peterborough.
Wheeler, Frederick Ebenezer... Manchester.

December 20, 1876.

Present—Mr. Williams, President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Southall, Taylor and Umney.

MAJOR EXAMINATION.

Six candidates presented themselves. *Four* failed. The following *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Davidson, Alexander .... Insch.
Robinson, Thomas Dexter ...... Bedford.

MINOR EXAMINATION.

Nine candidates presented themselves. *Seven* failed. The following *two* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bate, Joseph William .... Walsall.
Blackbourn, Arthur .... Birmingham.

MODIFIED EXAMINATION.

Seven candidates presented themselves and passed, and were declared qualified to be registered as Chemists and Druggists:—

Bannister, Sam...................... Bewdley.
Coates, George .... York.
Evans, David .... Croydon.
Judge, James .... Kilburn.
Morton, Samuel Edward......... Newington, Surrey.
North, Thomas Henry............ Hull.
Spurgeon, Frederick John ...... Chelmsford.

October 21, 1876.

Present—Mr. Savage, Vice-President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Southall, Taylor and Umney.

MINOR EXAMINATION.

Twenty-two candidates presented themselves. *Eleven* failed. The following *Eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Beall, Samuel Smart .... Cambridge.
Biddiscombe, Charles .... London.
Bond, Alfred......................... Fallowfield.
Brayne, John William Ward ... New Mills.
Colegrove, John Thos. Faulkner. Liverpool.
Jones, George Henry .... Hanley.
Kent, James Stephen .... London.
Marshall, Charles William ...... Devonport.
Mayne, James .... Chertsey.
Thornber, William .... Preston.
Webb, William James............ Melbourn.

PRELIMINARY EXAMINATION.

The undermentioned Certificates have been received in lieu of the Society's examination:—

Certificate of the College of Preceptors.

Sherwood, Joseph.................. Stockton.

Certificate of the Royal College of Surgeons of England.

Bellingham, Timothy Barney... Dudley.

Certificate of the Society of Apothecaries of London.

Bell, Charles T. .... Retford.

Certificates of the University of Cambridge.

Kemp, Herbert William .... Horncastle.
Sergent, William Thomas ...... Croydon.

Certificates of the University of Oxford.

Carter, Joseph Montague ...... Manchester.
Hart, William .... Bolton.
Shephard, William Arthur ...... Spalding.

NORTH BRITISH BRANCH.

The second meeting of the present session was held in the Society's rooms, 119A, George Street, Edinburgh, on the evening of Wednesday, 13th December, 1876, Mr. William Gilmour, President of the North British Branch, in the chair.

Mr. William Inglis Clark, Edinburgh, read a paper on the Microscopy and Adulterations of Colocynth Powder, which is printed on page 509 of the present number.

Mr. Clark also read a short paper "On a Deposit in Solution of Bicarbonate of Soda," which will be found on page 511.

Mr. Clark illustrated his paper on colocynth powder by numerous diagrams and microscopic specimens; and the one on Bicarbonate of Soda by chemical experiments in proof of the different points alluded to.

On the conclusion of the paper on colocynth powder, Mr. Gilmour, in proposing a vote of thanks to Mr. Clark, remarked that the subject of adulteration of colocynth was one that would come home to each one present, and he felt more and more convinced of the great benefits to be derived from the use of the microscope in practical pharmacy. He had no doubt Mr. Clark could mention many other powders, drugs, etc., which might be as easily and as certainly examined as powdered colocynth; the great point necessary in such an examination being the thorough acquaintance with the microscopic structure of all the tissues to be met with. He felt sure that the subject had been made more interesting and more easy to be followed by the numerous diagrams which Mr. Clark had prepared in illustration to the parts referred to.

Mr. J. R. Young said that he was astonished to hear of the large proportion of starch present in a sample of the powder, but he hoped that this was an exceptional case, and that the exposure of this instance, drawing attention to the adulteration, would prevent a continuance of the practice. He felt sure that each one who had a microscope would be able and anxious to examine the purity of his colocynth.

In reference to Mr. Clark's paper on bicarbonate of soda, Mr. Gilmour remarked, that although it did not come home to each one as the paper on colocynth, yet it was a thoroughly practical paper, and showed how many little points often overlooked, when properly investigated, could be made very instructive and interesting. The deposit referred to, he said, had annoyed several soda-water makers for a long time, and he believed in order to remedy it, they added some acid or chemical which would be able to dissolve it, and yet not act on the soda-water. He said that it was difficult to follow such a paper fully without going over it in detail, but it appeared to him that the theory suggested by Mr. Clark was the true one as it certainly was a possible one. Referring to a large glass jar of Edinburgh water which had been treated with solution of carbonate of soda, and which had turned almost milk-white with the deposit, he expressed his astonishment not only at the copious deposit but also at the rapidity of its formation—the experiment taking about half an hour. Mr. Gilmour in pointing to some pieces of soda-water apparatus exhibited, which were incrusted with carbonate of lime, said that the subject was one of considerable importance to soda-water makers and worthy of further investigation.

Mr. Mackay in referring to the experiment with the Edinburgh water, before mentioned, asked what was the strength of the solution of carbonate of soda used. In reply, Mr. Clark stated that it was equivalent to a little less than 30 grains of bicarbonate of soda per pint, while in another experiment with carbonate of potash, instead of the soda salt, little or no precipitate was thrown down, the solution of potash being of an equivalent strength.

In speaking to Mr. Clark's statement that this deposit does not fall with Loch Katrine water, Mr. Mackay pointed out the great advantages some makers have over others, and mentioned the case of a famous soda-water maker, who had long drawn very pure water from an artesian well, when suddenly and without warning the water smelt strongly of sulphuretted hydrogen, and the result was for a time, he believed, very damaging to the maker. No chemical explanation had as yet been offered for the occurrence, unless a discharge of gas from the interior of the earth had happened. He then said that it was interesting to learn that the sole cause of the deposit, as had been demonstrated by experiment, was the presence of the carbonate in the bicarbonate of soda, and that the passing of carbonic acid through the bicarbonate would effectually remove it, as had, he believed, been already demonstrated.

Mr. J. R. Young asked if the deposit of 200 grains per gallon occurred with Howard's bicarbonate, and was answered in the affirmative.

At the request of Mr. Gilmour, Mr. Clark made a few remarks supplementary to his paper on perchloride of iron, read before the Society last February. Referring to the decomposition of perchloride of iron, he reminded them that if it had been prepared from a basic liquor, it would contain a large quantity of ferric oxide which would be deposited, and that if the tincture again was heated in a closed bottle, a similar result would be obtained and ferric oxide thrown down, but that in this latter case, if the tincture was then exposed to light for some months, the precipitated ferric oxide would be re-dissolved, a very brown tincture resulting. On further exposure, chlorine is abstracted from the ferric chloride and partially used up in forming chlorine compounds, and partially in converting the alcohol into aldehyde, leaving a tincture, having a pure green colour due to ferrous chloride. The decomposition proceeds still further however, for in a sample exhibited the ferrous chloride itself had been entirely decomposed, ferric oxide being thrown down, and the clear liquid left containing but very little iron. Samples of the tincture in all stages of decomposition were exhibited and presented to the museum.

Mr. Gilmour stated that he had been investigating the decompositions of tinctures by heat and light, and that although not analogous to the one in question, he had found even an hour's exposure to sunlight sufficient to induce decomposition in most of them. He asked if the samples exhibited and described had been openly exposed to the air, or contained in a stoppered bottle.

Mr. Clark said that they had been kept in stoppered bottles and exposed to light, in some cases, for more than a year.

Mr. Young asked if anything could be done to restore a sample of tincture which had decomposed to the extent described.

Mr. Clark considered such a tincture as incorrigible.

Mr. Mackay then read the following note:—

"5, Lorne Terrace,
"December 12, 1876.

"John Mackay, Esq.,

"Dear Sir,—Mr. T. Knott having now finished the portrait of my late father, I have much pleasure in handing it to you for presentation to the North British Branch of the Pharmaceutical Society.

"I am, dear Sir, yours truly,
"DAVID BROWN."

Mr. Mackay said it was not often as honorary secretary to the Society he was privileged to ask the acceptance of such a gift as the portrait now before them. In doing so he could not refrain from reminding those present of the high position which his late much-esteemed friend Mr. David Rennie Brown had occupied as a member of the Society. His whole career pointed to a man of great natural ability, combined with an amount of energy and indomitable perseverance which had resulted in placing him in the foremost rank of British pharmacists. He had a very quiet and unpresuming manner, and to those privileged to know him it was frequent matter of regret that from this cause he was so unwilling to come to the surface, for had he done so, much valuable information might have been gained on pharmaceutical and chemical subjects. A more honest, upright man never lived, and this was more especially shown in connection with his position as a member of the Board of Examiners for Scotland, where, with a calm genial mode of questioning, he soon put the candidate at ease; but in the results he was most particular and unflinching. Making every allowance for the nervous trepidation of many young men coming before him, he yet felt how important it was for those about to be placed on the register to possess a fair knowledge of chemistry in all its details, and when he found real deficiency no one was more firm in denouncing and recognizing such a state of matters. By many his memory will be long cherished, while his contributions to the library and museum will form a lasting memorial of the strong desire he had that both these departments should be worthy of this branch. He (Mr. Mackay) therefore hailed the presentation of this portrait not only as an adornment to their walls, but as a remembrance of one much respected and esteemed, while a glance at the likeness could not fail to act as an incentive to those of their young friends who were already acquainted with the name, if not with the efforts of him who had so recently left them.

Mr. Mackay then moved that a special vote of thanks be accorded to Mr. David Brown for his kind presentation; and further, that the same be expressed in writing and sent to the donor, who in honouring the memory of his father had also honoured the Society in asking it to accept the excellent portrait.

Mr. Gilmour, in seconding the vote of thanks proposed by Mr. Mackay, could endorse all that had been said regarding the late Mr. Brown. It so happened that he had been examined by Mr. Brown in chemistry, and it would be difficult to express how much he had benefited by having been thus brought in contact with the deceased gentleman. He cordially seconded the vote of thanks proposed, to which the meeting heartily responded.

Mr. J. R. Young briefly, and with much feeling, endorsed the sentiments expressed by Mr. Mackay in reference to his late partner in business.

The following contributions to the library were announced:—'The Chemists and Druggists' Diary for 1877,' from the publishers; the *Canadian Pharmaceutical Journal* for November, from the Ontario College of Pharmacy.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fourth general meeting was held at the Royal Institution, November 23rd 1876. The President, Mr. A. H. Mason, F.C.S., in the chair.

Mr. J. F. Raimes was elected a member, and Mr. G. Oldershaw an associate.

The inquiries in the question box were answered.

Mr. T. Garside, F.C.S., detailed the results of some experiments on sulphuric acid, stating that he had found lime present in some samples. On diluting the acid with distilled water and letting it stand, a white deposit subsided, which upon treatment with sulphuretted hydrogen was not blackened. He believed that it was often taken for granted that the deposit formed when testing sulphuric acid by the Pharmacopœia process was sulphate of lead, but he found it to be lime, and the only way he could account for its presence was from the plaster of paris used to cover the stoppers of the vessels containing the acid.

Mr. E. F. Morton read the following paper:—

Notes on some Organic Substances Produced in Certain Saline Solutions.

BY E. FORBES MORTON.

The production of some organic substances in certain saline solutions at the Queens' College Laboratory, was noticed by Professor Hamilton, and afterwards by myself; more especially in those solutions which were exposed to the direct light of the sun.

At his suggestion that I should try some experiments on the subject, I performed the following, of which I will give an account after naming the solutions in which we found the development taking place, and describing the appearance of the substance produced.

Magnesium Sulphate. In solution of this salt the organic substance forms as a layer, somewhat similar in appearance to mould, on the bottom of the bottle, and is at first white; it then gradually changes in colour, becoming pale green. This pale green substance changes slowly to dark green, and is slightly altered in character, until it resembles miniature foliage. It chiefly confines itself to the bottom of the solution, but after a considerable development has taken place, it is produced on the surface and on the sides of the bottle.

Sodium Phosphate (common). The organic substance is produced in a similar manner in solution of this salt, the above description therefore will apply to its formation, with the exceptions that it is developed on the sides of the bottle at an earlier period than in the magnesium sulphate solution and the green colour makes its appearance more slowly.

Calcium Sulphate. The formation of the organic substance in solution of this salt takes place slowly, and the colour of it seldom becomes more than pale green.

Water. A very slight development takes place in distilled water.

The solutions were kept in glass stoppered bottles, they were moved frequently during the winter, but in the summer remained almost untouched.

The organic substances produced became dark green only in those bottles on the side of the laboratory which is exposed to the direct light of the sun, those on the other side becoming light green, but not dark green. Similar solutions kept in the dark showed no such organic products.

When shaken, the green substance was broken into small portions, which floated about in the liquid; some having the appearance of flexible laminæ then subsided and continued to flourish, ultimately uniting together again.

When examined with the microscope the substance was seen to consist of cells, some of which were very slightly developed, others contained nuclei and others again occurred in groups of three or four. Mr. G. F. Chantrell, Honorary Secretary of the Microscopical Society of Liverpool, has been kind enough to examine them for me, and is of opinion that most probably they will develop into fungi.

The green substance formed in the solution of magnesium sulphate, also that occurring in the solution of sodium phosphate, as well as the white primary deposit produced in the latter solution, each when washed, dried, and then ignited, charred and gave off a disagreeable odour. On adding potassium chlorate to the residue, and heating again, deflagration took place; proving the black residue to be carbon.

At the commencement of last March I made the following solutions, and introduced them into wide mouthed bottles fitted with loose corks.

Consisted of	Together with
No. 1. 100 c.c. Distilled Water	
No. 2. 100 c.c. Distilled Water	1·0 gram Magnesium Sulphate
No. 3. 100 c.c. Distilled Water	0·5 gram Magnesium Sulphate
No. 4. 100 c.c. Distilled Water	1·0 gram Zinc Sulphate
No. 5. 100 c.c. Distilled Water	1·0 gram Alum (Common)
No. 6. 100 c.c. Distilled Water	1·0 gram Sodium Phosphate
No. 7. 100 c.c. Distilled Water	1·0 gram Sodium Chloride
No. 8. 100 c.c. Distilled Water	1·0 gram Microcosmic Salt
No. 9. 100 c.c. Distilled Water	0·5 gram Magnesium Sulphate and 0·5 gram Sodium Chloride
No. 10. 100 c.c. Solution of Calcium Sulphate (Saturated)	0·5 gram Magnesium Sulphate and 0·5 gram Sodium Phosphate
No. 11. 100 c.c. Solution of Calcium Sulphate (Saturated)	
No. 12. 100 c.c. Solution of Calcium Sulphate (Saturated)	0·5 gram Magnesium Sulphate 0·5 gram Sodium Phosphate 0·5 gram Sodium Chloride 0·5 gram Sodium Silicate and 0·5 gram Microcosmic Salt.

I then placed these bottles in that part of the laboratory where they would be most exposed to the sun's rays.

In numbers 10 and 12 it will be observed that precipitates must have formed; these I allowed to settle down to the bottom and remain there.

The results obtained up to the present time have been as follows:—

Nos. 1, 2, 3, 5, and 12. In these no visible change has occurred.

No 4. Early in April a yellow sediment formed at the bottom; probably owing to some impurity in the salt used.

Nos. 7, 8, and 9. A slight white sediment was produced in each of these during April, and has since remained unchanged.

No. 6. About the 23rd March white specks appeared on the bottom of the bottle; by the 30th March these had developed into white tufts. which formed at the surface of the liquid, as well as on the sides and bottom of the bottle. These tufts continued to increase in size and number, varying slightly in appearance, but still all having a radiated structure. On the 8th May one of the tufts had become brown towards the centre, but since this date no marked change has been observed.

No. 10. No visible change took place until about the 20th July, when small patches of a green colour formed on the precipitate. Probably the substance had been already produced, and owing to its colour being white had escaped observation. The substance has since become darker in colour, and increased in amount, though it continues to form irregularly.

No. 11. About the 20th April a white sediment appeared, which gradually changed to yellowish green, and by the 12th May had become green. On the 20th June it had commenced to form on the sides of the bottle, round about the surface of the liquid, and since this date has slowly increased in amount, and darkened in colour.

From the facts observed it would appear that the substance formed is a vegetable organism; that the direct light of the sun, acting for a considerable time (many weeks) is essential for its full development and the production of its green colour; and that of all the solutions employed, magnesium sulphate, calcium sulphate, and sodium phosphate, are most favourable to its growth.

A discussion followed in which several members took part, and on the motion of Mr. Garside, seconded by the Honorary Secretary, the President conveyed the thanks of the meeting to Mr. Morton, hoping that he would lay before the Association the results of his further investigations on the subject.

The fifth general meeting was held at the Royal Institution, December 7th, 1876, the President, Mr. A. H. Mason, F.C.S., in the chair.

Several donations to the library were announced, and the thanks of the meeting passed to the donors.

The President spoke of the loss which the Association had sustained by the death of Mr. J. H. Johnson, who was one of its oldest members.

The following inquiries were found in the question box:—

"Does sodium carbonate become decomposed by intense heat?"

"What is hyocholic acid?"

and were answered by Mr. Davies and the President.

Mr. E. Davies, F.C.S., called attention to an important trial that had recently taken place respecting the shipment of some zinc powder, the ruling of the court certifying that it was of a combustible and dangerous nature. Mr. Davies explained that the zinc powder is metallic zinc in a very finely divided state, being produced in the process of zinc smelting. He had noticed in operating on small quantities with addition of water that a considerable elevation of temperature takes place, but not actual fire.

Mr. Thomas Williams, F.C.S., said that during long experience which he had had in the management of zinc works he frequently had noticed a spontaneous combustion of zinc powder. The usual circumstances under which this happened were—1st. When newly produced powder was inadvertently deposited in a damp situation. 2nd. The zinc powder, which is collected in sheet iron pipe-condensers attached to the mouths of the retorts, on being emptied undergoes active combustion. When the best zinc ores are under operation the zinc sublimate is of remarkable purity. The condensation of zinc powder takes place in an atmosphere of carbonous oxide gas.

The President read a paper, "Notes on Glycerole of Subacetate of Lead." Alluding to the paper published by Mr. Balmanno Squire, M.B., in this Journal, in which he gives the formula for preparation as follows:—"Acetate of Lead, 5, Litharge, 3½, Glycerine, 20 parts: heat for half an hour in a boiling glycerine bath, constantly stirring, and filter in a gas oven or other kind of heated compartment; the result is a perfectly clear and colourless liquid, etc.;" the author alluded to other methods for the preparation, and exhibited various specimens of glycerole of lead. In the *Pharmaceutical Journal*, May 6th, Mr. Squire publishes a communication for pharmacists, in which he summarizes his pamphlet for their consideration and modifies his previous suggestions for manufacture. The President considered Squire's process most unsatisfactory and recommended the suggestion made by Mr. Parry (*Pharmaceutical Journal*, May 27th), that equal parts of liq. plumbi subacetatis and glycerine be gently heated until the water is evaporated, by which method a very satisfactory and elegant preparation was produced.

In the absence of Mr. Michael Conroy, through indisposition, the President read the following paper—

Summary of a few Laboratory Notes on Glycerole of Nitrate of Bismuth.

Mr. Balmanno Squire, M.B. Lond., in his very interesting paper on the above subject, published in the *Pharmaceutical Journal* of the 11th ult., states that he found nitrate of bismuth to be readily soluble in glycerine without decomposition. As my experience is to the contrary I beg to put before the meeting the results of experiments. In the first experiment one part of nitrate of bismuth and nineteen parts of Price's pure glycerine were shaken together for three hours, and occasionally afterwards for a couple of days, without the salt becoming entirely dissolved, showing that it is most difficult to dissolve this salt in cold glycerine. In the second experiment the same proportions were placed in a water-bath and warmed up to 140° Fahr., when the nitrate of bismuth became slowly dissolved; the operation taking altogether about fifteen minutes. By this latter process I noticed that before solution the crystals became considerably effloresced, owing, undoubtedly, to the dehydrating property of glycerine, while the glycerine itself became slightly tinged brown, owing to the action of free nitric acid. From these observations I am inclined to believe that a decomposition occurs, part of the water of crystallization with part of nitric acid being taken up by the glycerine, converting the normal nitrate into a basic salt; probably it is the salt mentioned by Graham, which he obtained by heating the nitrate to 78° C., viz., $2BiNO_4H_2O$ (Watts's 'Dictionary of Chemistry,' vol. iv.). Be this as it may, the preparation is the result of a very happy idea, and destined, in my opinion, to come into very general use.

An interesting discussion followed, in which Dr. Symes, Messrs. Tanner, Abraham, Davies, Haddock, Williams, and the President took part.

Mr. Arthur Haddock made the following communication:—

Notes on Dr. Davy's Molybdic Acid Test for Alcohol.

I have had occasion to try Dr. Davy's molybdic acid test for alcohol,* and found it to succeed admirably. I prepared a solution of molybdic acid by digesting it on the water-bath with ten parts by weight of pure sulphuric acid until a clear solution was obtained. I then made two solutions: one containing 1 per cent. by volume of absolute alcohol and the other 0·1 per cent. Three drops of the molybdic acid solution were then placed in a porcelain dish and heated for a short time in the water-bath and a single drop of the alcohol solution allowed to fall into them. With the 1 per cent. solution streaks of blue immediately appeared which gradually spread through the whole of the solution and an intense blue coloration was the result. With the 0·1 per cent. solution the colour was much fainter but still quite distinct. With amylic alcohol and with the ordinary chloroform I also obtained the reaction, although with pure chloroform no colour is produced, alcohol being generally added to chloroform for the purpose of preserving it. It is necessary in applying the test that the liquid to be tested should be gently dropped into the molybdic acid solution, as the least agitation destroys the colour. It reappears in the 1 per cent. solution after heating on the water-bath for ten minutes, but shortly after finally disappears. In the 0·1 per cent. solution the colour does not reappear after agitation.

The President took exception to Dr. Davy's statement that chloroform which was affected by this test was necessarily adulterated with alcohol; the addition of alcohol to pure chloroform being necessary to preserve the chloroform.

Mr. Abraham said it was the first time he had heard an official statement that spirit was added by the manufacturers to chloroform, and he should be inclined to dispute it, for although this article was labelled by the manufacturers sp. gr. 1497, he believed in reality it would be found 1501. He alluded to Dr. Gregory's method of the manufacture of chloroform and to some investigations he had made several years ago, which resulted in Dr. Gregory's method being condemned.

The President said he agreed with Mr. Abraham that pure chloroform had a specific gravity of 1500, but he considered that the fact of the British Pharmacopœia giving the specific gravity as 1497 justified, and was purposely so given to allow the addition of 1 per cent. of alcohol. He would feel obliged if Mr. Abraham would examine the specific gravity of Duncan and Flockhart's chloroform and report at the next meeting.

---

* See before, p. 463.

Some discussion took place upon the application of the molybdic acid test for the detection of alcohol in urine.

The thanks of the meeting being given to the authors of the various communications, the members adjourned.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The usual monthly meeting of this Association was held in Anderson's University, on Wednesday evening, the 13th inst., Mr. Kinninmont, the Vice-President, presiding. The minutes of former meeting having been read and confirmed, the Chairman stated that it had been thought advisable to give the members of the Association an opportunity of expressing their opinion as to the necessity for a Trade Protection Association, and this meeting had been called for the purpose of discussing the question,—Is the Pharmaceutical Society, as at present constituted, capable of protecting the interests of the entire trade, or is the existence of a special Trade Association necessary? A letter had been received from the President, as follows:—

"113, Buchanan Street, Glasgow,
"December 13, 1876.

"My dear Mr. Fairlie,

"I hope you will excuse my absence from the meeting of the Society to-night.

"I think it quite right to ascertain—now that the question on both sides of it is fairly before them—the feeling of our members as to the Trade Association, but as I have said my say on the subject and have nothing to add to it, I think my presence may be spared. I just hope that every one present will give as full and frank an expression of their views on the subject as I myself ventured to do, and that should there be a divided vote, that whichever view prevails the minority will loyally fall in with the majority, so that we shall henceforth have, as in the past, a united society with which to confront any or all foes who may seek to molest us in the *lawful* pursuit of our anxious and irksome calling.

"I am very truly yours,
"DANIEL FRAZER."

Mr. Kinninmont said he regretted the President's absence, but he had no doubt but that they would act upon his advice; he had now to call upon the Secretary, who had kindly consented to open the discussion.

Mr. James M. Fairlie (Hon. Sec.), then read the following paper:—

Mr. Chairman and Gentlemen,—In introducing the subject that has been placed upon the programme for discussion this evening, I feel that I have undertaken a somewhat delicate if not a difficult, task, as it may be necessary for me, at least indirectly, to refer to the objections our much esteemed President made against the necessity for a Trade Protection Association in his inaugural address last month; and this I believe in ordinary circumstances is a breach of etiquette, but as the subject of the unwillingness or the inability of the Pharmaceutical Society's representatives at London to cope with all the little matters which crop up from time to time to worry and annoy members of our trade, and the apparent necessity there is for a special Trade Defence Association has been engaging the minds of pharmacists throughout the country for some months, and as this Association has had no opportunity hitherto of considering the matter, there appears a reason why we should discuss the subject, and if possible come to some decision upon it. I place two points therefore before you. First,—The Pharmaceutical Society is not able to protect the interests of the entire trade. This is denied by not a few of the leading members of the Society. But there are such performances as going up in a balloon, and we are told by people who have made such an ascent that when they reach a certain altitude they see trees like men, and men like insects on the ground; with all due respect, however, to those parties, and no one can deny their disinterested labours and enthusiasm in trying to advance the common interests of the trade, I venture to suggest that they go up in a balloon when they make the assertion, "That the Pharmaceutical Society is able and ready to do all that is required in the interests of the whole trade." What I mean is that their position in business prevents them from understanding the exact position of those who happen to be in a smaller way of business than themselves. Their own statements prove this; they say, "let every member of the trade join the Pharmaceutical Society, and they have the power to change the membership of the Council in their own hands; in two years the whole of the present Council could be turned out, and a new council substituted." There are two reasons, however, why a change of this kind could not produce such a complete alteration in the composition of the Council as might be necessary or expedient, even though every chemist in the kingdom joined the Society tomorrow; in the first place, the constitution of the Council is in one respect definite, the majority *must* be pharmaceutical chemists; and second, it is only the few that can afford the time to attend to Council business, although they had the qualification in every other respect. Now the number of pharmaceutical chemists are very few in comparison to the number of registered chemists and druggists, and such being the case it can hardly be possible to get a Pharmaceutical Council that could fairly be said to represent the bulk of the trade. Bear in mind I do not find fault with this arrangement in the composition of the Council at present, I bring it forward only as an illustration of the absurdity of such a line of argument. But they say the Council as representing the Society is prepared to defend the interest of any chemist that is harassed unnecessarily. To prove that this is not the case, need we go back so far as 1871, when a Poisons Bill was before Parliament, and which but for the existence of the Defence Associations which were then formed in three parts of the country would in all probability have been in one form or another forced upon us as a trade, and with the consent too of the majority of the then Pharmaceutical Council? Need we refer to the numerous prosecutions under the Adulteration Acts, most of which I am certain that had the Council the power as well as the will to bring their authority to bear upon the cases in question the law would be so laid down that no druggist would have the shadow of an excuse to be entrapped by inspectors either of one class or another? If it is wrong to sell precipitated sulphur for milk of sulphur, or the effervescent saline for citrate of magnesia, and the Council have the power, let a circular be issued to every member of the trade making a declaration to that effect; such would leave individual members of the trade in no doubt as to their duty in the matter. If on the other hand, it is right and proper to sell these articles according to "use and wont," then let the Society's law agent or his representative defend the cases, and let us not have in one case a conviction and in another a verdict of "not proven," with one section of the trade thinking it is all right and another that it is all wrong. Or need we refer to the action of the Medical Defence Association in its raid against prescribing druggists. Those of us who read the trade journals know that by a narrow majority the Council decided to defend any unjust case of prosecution in this respect, but the bulk of the trade know nothing about it, and we know well that very many druggists do prescribe, and are probably ignorant of the fact that they are liable to prosecution; here again is a case where a circular might do a world of good. The question of expense comes in here, however, when a matter of this kind is suggested. It is possible that the Council have no money to spend in this way; if not, then my argument holds good that they cannot protect the interests of the whole trade aright. If, however, they have the power, but withhold it on the ground of the expenditure, then, I say, it is short-sighted policy. One of the reasons I believe why so few become connected with the Society is just because they know little or nothing about it; they seldom see a trade journal; they scarcely ever receive a circular from the Society that governs them, and unless some national movement takes place—such as a fight over a poisons bill—they hardly remember such a body exists, and then they imagine it is not fulfilling its province, and when the agitation is over they go back to their old habits, and continue to nurse their old grumbles about the existence of a society that is not doing its duty. A body such as the Pharmaceutical Society must keep itself prominently before those who ought to be its constituents, if it is to exercise that power and influence it ought; and I feel warranted in asserting that if but once a year a circular were issued to every person on the register, touching on some of those points I have indicated, accompanied by a leaflet explaining the object of the Society, an annual addition would be made to the membership which would more than repay the outlay; and though the Society did lose financially, it would gain in the respect with which it would be looked up to by all sections of the trade. There are other reasons than these why the Society does not and cannot represent the entire trade; one of these I would instance is the publication of its Journal. The great mass of the matter that is contained in its pages is far beyond the reach of the great majority of the trade to comprehend—it is, in fact, at least a dozen years in advance of the trade it represents; and while speaking of the Journal I cannot but refer to the conduct of present and past Councils in conducting their business with closed doors, serving up to its constituents month after month a "cooked" report, which in every case I am satisfied gives but a poor account of the amount of business they get through. If the Society could adopt with propriety some such action as I have indicated, then I would acknowledge at once that there was no need of a Trade Association. But is it advisable that it should take upon itself the *rôle* of a trade protection society? If so, it must do much more even than I have here indicated; there must be a disposition to regulate the retail prices for medicines and hours of closing, together with a more active interest in provincial matters; the doors of the Society itself must also be made a little wider by doing away with the entrance fee, if not reducing the annual subscription under certain circumstances—as well as a Council drawn from a wider area. But is this advisable? I think not, and I would not be in favour of it if it were proposed. Unless, however, the opponents of the Trade Association are prepared to grant all this and a great deal more, they are tied down to the other alternative, and that is my *second* point, that the formation of a Trade Protection Association has become absolutely necessary. But the opponents ask what good can it do? It can have no legal status! As a prosecuting agent I acknowledge it cannot; but as has been before argued, it can do work in the way of preparing evidence, defending and getting up cases, which the Pharmaceutical Society is quite unable to do with its present machinery. The Trade Association requires no legal status to defend cases of unjust prosecution on the part of the Excise, the Medical Defence Association, or Adulteration Act inspectors. But, say our opponents, "these cases are few and far between, and when they do arise there are always other members of the trade ready to help to overturn any unjust proceeding." Very true, but we have no guarantee that the cases will continue to be few and far between; already they are thickening, and is it business-like to trust to haphazard in a matter of this kind? I think not. We will take a case in point; a dozen men are summoned for some assumed offence, and from some slight error on the part of a local law agent, who perhaps does not understand the case, a conviction is made, and as one case is taken as a type of the whole, each are fined; the fines and expenses of the whole, we shall say, amount to £30, the amount is subscribed among the local friends; but is there any guarantee that another batch may not be taken up the following week? None whatever. But looking at it from another standpoint, this case is perhaps a test case, the whole trade are interested in the decision one way or the other. If it is unfavourable they will know to comply with the laws. In this way the whole trade benefits, but the few in one district have to pay the piper. Why should the money to defend such a case not come out of a common fund? and why should any withhold from aiding such a fund? Another objection presents itself for our consideration, namely, it is a species of trades' unionism. If trades' unions are conducted on right principles there is not much objection to them, it is only when ignorance and spleen cause men to go beyond the bounds of law and justice that such organizations become obnoxious. But there are trades' unions and trades' unions, we have them more or less in all grades of society. Medical men combine, lawyers combine, and why not pharmacists? It appears to me that want of unity is one of the hindrances to progress. We have an instance of what union has done in our own city. When I commenced business it was everyone trying to undersell his neighbour; now a common cause has bound us together, and we now get better prices, we understand each other better, and we feel that we do not live for ourselves alone, but that each depends upon one another. What the local association has done for the West of Scotland so the Trade Association will benefit the whole trade. The Pharmaceutical Society in all these years has only brought in a tithe of the trade;* the Trade Association, however, from its liberal constitution, nominal fee, and the good work it is bound to accomplish as time progresses, will, I anticipate, break down barriers which at present exist, preventing good men from joining the Pharmaceutical Society, and induce them to come within its fold also. But another objection presents itself. The objects of the Trade Association are futile, as instanced by its failure to take up the co-operative store question, one of the grand aims it had when first instituted. My answer is, that expediency can only be a makeshift; it may be inexpedient to prosecute openly at present, but surely if a powerful organization presented a case to the proper authorities, showing clearly there was hardship, I hardly think that any government would decline giving redress. The patent medicine question is another of a similar nature to that of the co-operative stores, and it is my opinion that very little would convince the government to amend the law in this respect. In this matter at all events we have the medical profession at our backs; it is their desire that the sale of quack medicines should be greatly diminished; and the intelligent portion of the community are becoming alive to the fact that the great majority of them are not what they are represented to be. We have a strong case at all events in endeavouring to keep within ourselves the sale of all poisonous patents, and combined and determined effort on the part of the Pharmaceutical Society, the Trade Association and the local associations will have a wonderful effect in bringing about an approximation to the desired change.

And now the question arises will the Trade Association affect our own special grievance—the surgeon-druggist? Had we been as united in 1869 as we are approaching to now, we might have amended the Pharmacy (Amendment) Act of 1869 more in our favour than it was done in that of the medical profession. We have still, however, a good case. In the first place, I believe I am correct when I say that it is only those who receive the diploma of L.F.P.S.G. that have the power granted them to practise pharmacy. The university, I understand, gives no such authority, and as the great bulk of the surgeon-druggists in and around Glasgow hold university degrees they are carrying on an illegal business in keeping

* If Mr. Fairlie will turn to page 687 of the Journal for February 26 last, he will see that at the commencement of the present year 33 per cent., or nearly one-third, of all the chemists and druggists on the Register were connected with the Pharmaceutical Society as Members or Associates. This is a matter of fact, not of opinion.—ED. PH. J.

open shop. Then many of the medical men have abused their privileges by giving their names to protect unqualified men. All this gives us a hold on the General Medical Council, which has the regulating of affairs under the Medical Acts, and one of their duties is to see that the interest of the pharmacist is not in any way interfered with. The Trade Association can approach that body and if within their province, the General Medical Council are bound to remedy what is at fault. We can never for a moment hope to shut up the surgeon's shops altogether. They must have the privilege of supplying their own patients with medicines if they desire to do so, which will cover the case of small country districts entirely, but in all cases where the surgeon engages in a general drug business, it seems but fair and reasonable that they should be made to place a qualified dispenser in charge in their absence. The chief objection to the Trade Association is probably that it may at some future time clash with the interests of the Pharmaceutical Society. This is a contingency as likely to occur without the existence of a special organization as with it, as instanced in the formation of the defence associations five years ago. If there is anything that will engender such a possibility it is by leading members of the Pharmaceutical Society either holding aloof from the Trade Association, or engaging themselves in active hostility to it. Such conduct will not check the progress of the Trade Association; it is now an accomplished fact, and if those who fear collision will do their duty to the Pharmaceutical Society as well as to the trade generally, they will give the defence association their hearty support, and thus by their weight and influence help to guide its destinies, and at the same time aid in drafting an occasional contingent from the Trade "Light Foot" into the Pharmaceutical "Artillery." And now it only remains for me to refer to one other objection, viz., "It is a reactionary policy." But I have to ask is reaction always wrong? I think not; at the same time I fail to see wherein the reaction lies, in so far as the Trade Association is concerned. I look upon it from the opposite standpoint, and I say it is the very essence of true progress. Ask any merchant if he is not a member of some society for the protection of trade. I know I have subscribed a guinea a year to what is known as "The Guardian Society" for many years, and I look upon it as the best spent guinea I make in the whole year. It was only the other day I had an application for goods from a firm, and in the ordinary course of business I made inquiry respecting them through the Guardian Society, and got back a reply shortly advising, "No Sales." I acted on their advice, and a few days afterwards I was informed that this firm had turned out to be what is known as a "long firm," and that the parties had been apprehended with a great quantity of goods got from all quarters, for which they were unable, and had no intention, of paying. Had I written for references simply, I would have got them, and probably to some extent, satisfactorily, which might have induced me to send off the goods. I saved, however, a ten-pound note by it; and it is just such aid I expect from this Chemists' Trade Association. I quite believe that had it been in existence when the liquid extract of meat was first introduced we would all have been put on our guard respecting the nature of that substance before recent prosecutions took place. They had known of it in England for eighteen months previous, and it would have been the duty of the executive of the Association to warn at least all its members of the danger, because, with the Trade Association, nothing is to be taken for granted; it will not be assumed that every member reads the trade journals and keeps himself posted up in small matters; but the executive will always be on the alert. What I consider the best feature in the Trade Association is, that while it will have its head-quarters in a central part of the country, it will also have attached to it a great number of local centres. It will have something more than a local secretary in each district. Already much good has been done in this way. In small towns, such as Chesterfield, the trade has been drawn together such as it never was before. Men of one trade or profession come by frequent contact to see that they have a common interest and a common cause; that jealousy and distrust of each other is a great hindrance to their own advancement, and that by united and harmonious action they can advance themselves and their fellow-tradesmen at the same time. And when we are thus united, and have managed to shunt aside many, if not all, of those petty and vexatious annoyances, let us hope we may have time left us to look into the many attractions and wonders which lie within our reach in our mixtures and potions, and by diligent study and careful research may we then show to the world that we are a disinterested body, aiming at a greater knowledge of nature and nature's laws, that we may have them with us and not against us, for we believe there is not an atom but contains volumes of contemplation.

At the close of the reading of Mr. Fairlie's paper, which was heartily applauded, the chairman invited the members to express their opinion individually.

Mr. John W. Pettigrew said, that at first he had a doubt as to the propriety of the Trade Association, but after carefully reading and hearing the views on both sides he had come to the conclusion that there was a need in the country for some such organization as the Trade Association was likely to occupy. He had always thought that the Pharmaceutical Council was composed of gentlemen whose knowledge of the requirements of the great majority of the trade was very meagre, and it was natural to suppose that such would be the case as long as the present system of election continued. The gentlemen of whom the Council had been composed of late years were elected to office chiefly because they were known and respected by the members, and not because they held certain views on pharmaceutical politics, because there was no opportunity of judging what their opinions were until the reports of their speeches appeared in the Journal. Mr. Pettigrew thought that the members of the Society ought to have some means of judging of the various candidates' fitness to hold the office of councillor; as it was at present, a list of names were sent down, and one had either to pitch the paper aside or vote at random. Regarding the Trade Association, he did not see why any jealousy should exist, as the two bodies ought to work to each others hands and help each other.

Mr. J. A. Clarke coincided with much of what Mr. Pettigrew had said. He was surprised at the statements some of the members of Council had made when in Glasgow in September last, in regard to the position of the Glasgow Druggists and the competition they had to contend against with surgeons' shops. It showed that they could not understand the position of their less fortunate brethren unless they visited the different parts of the country and saw for themselves what work they ought to take in hand. He believed in the Trade Association because he could now carry on his business with some peace of mind. He took every precaution he could with respect to the purity and genuineness of his medicines, but even with these precautions, he felt that he might be pounced upon for keeping some such article as rhubarb or scammony over which he had little control. He had been once visited by an inspector, and for some days, until he learned that the result of the analysis was favourable, and although he was convinced in his own mind the article was all right, yet he felt anxious for fear of a prosecution and an unjust conviction. He now felt, however, that being a member of the Trade Association he had some one to appeal to for help, and if help was needed he would get it.

Mr. McGill Murdoch could only say "ditto" to the remarks of the other speakers, he could not see how any gentleman having the interest of his profession at heart could say a word against the Trade Association.

It was a body which with judicious management could effect much good apart from the Pharmaceutical Society. There was work to be done which it was very evident the Pharmaceutical Council either could or would not do, and as it was necessary it should be done he thought the Trade Association was the body to do it.

Mr. R. Brodie referred to the milk of sulphur cases and said he thought the Pharmaceutical Society should have appealed against the adverse decisions that were given by some magistrates, and with the decision of the Court of Queen's Bench before it, both the trade and the analysts would have known whether they were right or wrong, and an end would have been put to such fighting as has taken place over what seemed to him a mere quirk. If the Trade Association made this matter alone quite clear to the trade, it deserved the support and countenance of every pharmacist.

A few remarks were then made by Mr. McCann, who referred to the surgeons' open shops, but expressed his neutrality regarding the question under discussion; after which several other members spoke in favour of the Trade Association.

Mr. Thomas Davison said that he had from the first thought highly of the Trade Association, and he further thought it would be a help rather than a drawback to the Pharmaceutical Society. He noticed that the leading members of the Trade Association were members of the Pharmaceutical Society, and he thought the Pharmaceutical Council ought to trust its own members that nothing would be done derogatory to the parent society. He had faith in the members of the Pharmaceutical Society having always sufficient influence and weight in the executive of the Trade Association to prevent any unnecessary collision or clashing of interests. He had much pleasure therefore, in asking the Glasgow Association to adopt the following resolution, viz.:—"That this Association cordially approves of the formation of the Chemists and Druggists' Trade Association, and urges its members to give it their hearty support."

Mr. Pettigrew seconded the resolution.

The Chairman said he believed they were all but unanimous, and he might be excused also expressing his opinion on the subject. He believed there was a great deal of apathy in the trade generally. It was most difficult to get them aroused at all unless it was a question of warlike importance, such as the poisons agitation in 1871. He felt that the prosecutions under the Adulteration Act were the things they had most to fear, and where the Trade Association would stand them in good stead. They are under this act practically prosecuted by scientific men, and it required that law agents and others who understood their position should be pitted against such men, so as to enable the magistrate—who generally in such cases has no mind of his own—to come to a proper conclusion. With regard to the Pharmacy Act, he thought there was a grave error in it, as no one in reading it would think for a moment that medical men had anything to do with the sale of drugs. A clause ought to have been added making it imperative that every separate drug-shop, whether possessed by a surgeon or a druggist, should have a qualified and responsible person in charge of it. He was not anxious for a prosecution of co-operative stores, as he believed that if they did succeed the same men would engage a registered person, put up his name, and carry on the trade in the same way as at present. He did not put much faith in counsels' opinions, as they differ so that you might not get two to give the same opinion. He thought, however, that the class who were supporting the co-operative store system at present were showing an example to those beneath them in station, which might ultimately come back upon themselves.

The motion was then put to the meeting, and carried unanimously. Several new members were then proposed, and after the announcement of some donations by the Treasurer, the proceedings were brought to a close.

LEEDS CHEMISTS' ASSOCIATION.

The third general meeting of this Association for the present session was held in the Library, on Wednesday evening, the 13th inst., at 8·30 p.m. The President, Mr. Yewdall, in the chair. The Honorary Secretary, Mr. S. Taylor, read the minutes of the last meeting, which were confirmed. It was announced that two books of the value of 15*s.* and 7*s.* 6*d.* each were offered as prizes for the students in Mr. Abbott's botany class, and two books of a similar value to those students who were attending Mr. Ward's chemistry classes and were associates of this society.

The remainder of the meeting was occupied in a discussion upon the position of chemists and druggists under the Apothecaries and Medical Acts, the subject being introduced by the President as follows:—

About the year 1618 a charter was granted to a certain class of individuals calling themselves apothecaries, by virtue of which all such persons were formed into one body under the name of the Master, Wardens and Society of the Art and Mystery of Apothecaries of the City of London.

This corporate body seems to have enjoyed the privileges of their charter and to have rested satisfied with it until the year 1815, when "An Act for the better regulation the practice of apothecaries throughout England and Wales" was passed and became law. It is the provisions of this and subsequent medical acts which I propose to bring before you to-night. It seems necessary that we should in the first place clearly understand the meaning of the term apothecary.

According to the 5th section of the Act previously referred to the duty of every person using or exercising the art and mystery of an apothecary is "to prepare with exactness and to dispense such medicines as may be directed for the sick by any physician;" and it is further enacted that if such a person (that is, the apothecary) here referred to shall refuse to make such medicines or to sell to any person any medicines or medicinal compounds, or negligently, falsely or unfaithfully mix or make any medicines, he shall be liable to certain penalties mentioned in the section. It appears, therefore, that an apothecary was formerly a tradesman dependent upon the physician for his occupation, and having by study advanced his position nearer to the physician than the chemist and druggist, it was thought desirable to incorporate all such persons into a separate body. According to the provisions of the Act, it does not seem, however, that they gained any legal right to visit or prescribe for the sick, and although no person (unless in business prior to the passing of the Act) can carry on trade under the title of an apothecary unless he has passed the examinations therein referred to, yet it is evident that it was not intended that they should interfere in any way with those who preferred to carry on the business of chemists and druggists, as by the 28th section it is provided "that nothing in this Act shall extend or be construed to extend to prejudice or in any way to affect the trade or business of a chemist and druggist in the buying, preparing, compounding, dispensing and vending drugs, medicines or medicinal compounds, wholesale and retail, but all persons using or exercising the said trade or business or who shall or may hereafter use or exercise the same shall and may use, exercise and carry on the same trade or business in such manner, and as fully and amply to all intents and purposes as the same trade or business was exercised and carried on by chemists and druggists before the passing of the Act."

The character of the examinations of the Society of Apothecaries was evidently changed from time to time until the knowledge required fitted the apothecary to occupy a higher sphere and to undertake the treatment of some if not all the diseases to which we are liable. Yet they possessed no powers to recover any charges for attendance, and, therefore, in the year 1858, another act was obtained, entitled "The Medical Act," in the preamble of which it is stated "it is expedient that persons requiring medical aid should be enabled to distinguish qualified from unqualified practitioners," to which end it is directed that a register of all persons holding certain qualifications, of which a list is given in a schedule appended, and in which Licentiates of the Apothecaries' Society are included, shall be made and continued from year to year.

The advantage gained by being upon this register is the right to practise medicine either with or without surgery and to be able to demand and recover reasonable charges for professional aid, advice and visits, also for the cost of any medicines and medical or surgical appliances rendered or supplied by the medical practitioner.

By the 32nd section of this Act "No person shall be entitled to recover for any medical or surgical advice, or attendance or for the performance of any operation or for any medicine which he shall have both prescribed and supplied unless he shall prove upon the trial that he is registered under this Act."

The word prescribe is here used for the first and only time in any of the medical acts, and whilst it clearly indicates that you may not recover for any medicine the formula for which you have devised, yet there is no clause throughout any of the acts which makes it unlawful to construct formulæ or treat any disease; and further by the 53rd section it is enacted that "nothing in this act contained shall extend or be construed to extend to prejudice or in any way affect the lawful occupation, trade or business of chemists and druggists."

The business of the retail chemist and druggist being that of a dealer in drugs and chemicals used as medicines or for the preparation of medicinal compounds, if a person desires to purchase a draught for indigestion, a cough mixture, or any other similar preparation, the order given indicates that they have formed an opinion of their ailment; and in such a case we are justified in supplying them with the remedy which we think is best for the purpose. Let it not be understood that I am in favour of the course adopted by some of visiting sick people in their own homes; although there is no law to prevent such a course providing it is distinctly understood by the patient that he is under the treatment of a person who does not pretend to be a properly qualified person according to the Medical Act, yet it is assuming a position which we have no right to occupy, not having received the education necessary to fit us for such an important work.

It must be remembered also that any error of judgment, want of skill or improper treatment on the part of the unregistered practitioners, whereby a person loses his or her life, not only renders the person so practising liable to be charged with manslaughter, but also to a civil action for damages. He was indebted to Mr. F. Reynolds for an extract from the 'Chemists and Druggists' Diary,' which he read, and in which the legal aspect of the case had been treated by Messrs. R. G. Glen and Tompson Chitty, Barristers-at-Law, who, whilst expressing slightly different views, were each of opinion that unless a person, chemist and druggist or any one else, assumed the title of a properly registered medical practitioner he was not prevented from supplying any medicine.

An interesting discussion was carried on by Messrs. Freshfield Reynolds, E. Brown, W. Child, E. S. Payne and Thomas Iredale, in the course of which it was incidentally mentioned that the character of the trade carried on in the premises was indicated by the facia, and was a sufficient guide to the public as to the pretensions of the tradesman conducting the business.

There was a unanimous expression of opinion that from the digest of the acts bearing upon the question now laid before the meeting, there appeared to be no law to prevent anyone prescribing; and further, that in the event of any retail chemist and druggist being prosecuted and convicted it would be the bounden duty of the Council of the Pharmaceutical Society or the Chemists and Druggists' Trade Association to carry the case to the highest Court of Appeal.

A vote of thanks to Mr. Yewdall for his paper was carried on the motion of Mr. E. Brown, seconded by Mr. Iredale.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION.

The first ordinary monthly meeting of the session was held on Friday evening, December 15th, in the Memorial Hall, the President, Mr. W. S. Brown, occupying the chair.

A communication was read from the Manchester Chemists' Assistants' Association to the following effect:—

"That owing to the indifference with which every endeavour to further the objects of the Association had been met by the assistants of Manchester, it had been decided to wind up the affairs of the Association, and to transfer the balance in hand to the library fund of the Manchester Chemists and Druggists' Association, to which thanks were tendered for the use of its rooms, etc."

After the election of associates and other business, Mr. John Wallace exhibited a series of gas burners of the Bunsen or atmospheric type, by which he demonstrated that very high temperatures could be obtained from coal gas without the aid of either blowpipe or chimney draught. The chief feature of the Wallace burner is a cylindrical cap of finely perforated metal fitting over the top of the tube, and made adjustable to various heights, so as to regulate by back pressure the quantity of air drawn in by the jet of gas to be mixed with it previous to combustion. As the preforations in the cap are too small to allow the passage of a flame downwards, a much more inflammable mixture of air and gas may be burned than would be possible with another form of burner. The result of this arrangement is that a flame may be obtained which is perfectly solid, containing no hollow conical space within as is usual with all other round flames; it burns with a temperature of over 3000° F., and its peculiarities involve a new theory in the structure of flames. Instead of a dull blue colour within, it presents to the eye a spectrum of the most intensely brilliant green at that part of the flame where combustion commences. Above this the flame is of an amber colour, and combustion is so complete that it makes no stain if played upon a white porcelain plate.

The tubes of the burners exhibited varied in diameter from $\frac{3}{8}$ in. to 2 in., the largest burning 30 to 35 cubic feet of gas per hour in a manner as completely as did the smallest.

One of the $\frac{3}{4}$ in. burners was perforated with half-inch air holes for its whole length, and yet burned gas above the cap with a heat which rendered a twisted mass of platina wire immediately incandescent. A link of $\frac{1}{8}$ in. wire was added to a chain of copper and the joint of the link fused together by simply suspending it over the flame. The gas in all experiments was taken direct from the chandelier of the room. By careful experiments made with the test apparatus of the Newcastle-on-Tyne Gas Company, Mr. Wallace found he could mix previous to combustion 4 $\frac{6}{10}$ volumes of air in his burner with gas whose total combining quantity was 6$\frac{1}{2}$ volumes. The experiments concluded by the exhibition of a singing flame.

A one-inch burner was made to burn within the end of a piece of 3 in. stove pipe 4 feet long. The loud monotonous roar which followed, although it crowned the experiment with success showed that the title was a complete misnomer. A few remarks followed, on the application of gas heat so as to obtain the most effective and economical results.

Mr. Siebold, in proposing a vote of thanks to the lecturer, remarked that Mr. Wallaces improvements in gas burners would be most acceptable to analysts. The motion was seconded by Mr. Slugg and heartily carried.

Parliamentary and Law Proceedings.

Prosecution for the Illegal Sale of Poisons.

At the Chatteris Petty Sessions, on Tuesday, December 12th, before Messrs. J. Fryer and A. S. Ruston, William Crussell, shopkeeper, Benwick, was charged with selling a packet of Battle's vermin killer containing strychnine, without attaching his name to the same; also with selling half-a-pound of arsenic without a label; also with selling the same unadulterated with soot.

A police constable named Green was called to prove the purchase of a packet of Battle's Vermin Killer on the 20th of November last, which he handed to Inspector Mitchell, who took it to Mr. Langman, chemist, Chatteris, for analysis. Witness said he wanted the powder for killing crickets, and afterwards told Mrs. Crussell it did not destroy the beetles so well as he thought it would. He was not directed by anyone to obtain the poison, and got it for killing crickets. He had heard that Crussell sold arsenic, and on the 28th witness asked him if he could have some for the same purpose, and Crussell replied, "No, Mr. Green, I do not keep such a thing." Witness then went to a public-house opposite and asked the landlady, Mrs. Shaw, to get him some. Witness stood in her house and watched defendant fetch the arsenic from a warehouse and saw him doing it up in paper as he returned to the shop. Mrs. Shaw brought witness the arsenic; it was not labelled; but was sent just as witness now produced it. He took the arsenic to his house and gave it to Superintendent Collins, who was there at that time. As soon as he delivered the arsenic into Mr. Collins' hand, Mr. Crussell came running with the label and said he hoped they would not do anything in the matter. He knew he had no business to sell it, and if they prosecuted, it would ruin him.

Mary Shaw proved purchasing the arsenic.—Cross-examined: She was sure she asked for arsenic, the stuff they dress wheat with. Some call it mercury. Green sent her for it. After she had got it in the house Mr. Crussell came running after her and brought a label to put on.—Cross-examined: Mr. Crussell said at the time that it did not matter about the label, and yet he brought it directly afterwards.

Green in cross-examination stated that he was aware another shopkeeper had a very bad feeling against Crussell.

Mr. Atter for the defence said he should ask the Bench to dismiss the two charges respecting the strychnine, and made a technical objection to the non-production of the *London Gazette*, by the prosecution, such procedure being legally necessary to prove the cases.—The Clerk advised the magistrates to convict in these cases, but the Bench was of a different opinion, and allowed the objection, but fined defendant £5 and costs in the arsenic case.

Prosecution under the Medical Act.

At Marlborough Street, Dr. John Hamilton, of 404, Oxford Street, was recently summoned before Mr. Knox, by Dr. Robert Spencer Carpenter, on behalf of the East London Medical Defence Association, for pretending to be and using the name and title of doctor of medicine. Mr. Pridham appeared for the prosecution; and Mr. Besley defended. On the previous hearing Mr. Besley, for the defendant, stated that his client had undergone the proper examinations, and had obtained a diploma from the Metropolitan College of New York. The diploma from that college was displayed in the window of his house, and he contended that as long as Dr. Hamilton stated what he was there could be no intention to deceive the public. At the time the defendant received his diploma he was qualified to register, but, registration not being imperative, he failed to register, and could not do so now. Mr. Knox said the case would mainly turn on the *bona fides* of the diploma, and he would adjourn the matter for a fortnight.

The case was resumed on December 13, when, after hearing further evidence Mr. Knox said, that according to his judgment, a good deal of misconception appeared to exist as to the Medical Act of 1858. The meaning of that Act for present purposes was, not only that a man should not wilfully and falsely pretend to be what he was not—that was not sufficient; a man must not pretend to have a right to any of the titles and qualifications recited in the 40th section of the Act. He must not pretend to be or take or use the name or title of a physician, doctor of medicine, and so on. Neither must he use any name, title, addition, or description implying that he was registered under the Act, or that he was recognized by law as a physician, surgeon, licentiate in medicine, and so forth. Such pretence apart, any private person might, without peril from the Act, prescribe for and treat any person who might be so unwise as to trust his health and life to such untrained minds and unskillful hands. So far of laymen; but with regard to *bonâ fide* medical men, a surgeon need not be registered. The penalty for non-registration was that a man could not recover his fees and could not hold certain offices. But he must not pretend to be registered if he was not on the Register. So with regard to the title of physician, doctor, and so on. It would be found in the reported case of *Andrews* v. *Stysop* that Baron Martin—the other Judges agreeing with him—laid it down as law that a man must not pretend to be on equal footing with any regularly bred and registered physician in England. The offence here was the assumption of the title of M.D., without mention of the University of Philadelphia, from which the degree proceeded. The words of the 34th section were very express. The words "duly or legally qualified medical practitioner," or any words importing a person "recognised by law"—mark the term, for it was used again in the 40th section, the penal one,—when used in any Act of Parliament, should be taken to mean a person registered under the Medical Act. By the use of this simple test two-thirds of the section were got rid of, for no one surely would argue that a man who wrote M.D. of Berlin, St. Petersburg, etc., after his name assumed to be registered under the Medical Act of 1858. It was only the first part of the 40th section which would give one a moment's pause. Persons must not pretend to be a physician, surgeon, general practitioner, or apothecary if they were not such, or use any name or title implying that they were registered. Surely that must apply to British medical titles? The whole scope and meaning of the 55 sections of the Act were the protection of the medical profession here, and, therefore, the protection of the British public, by distinguishing qualified from unqualified practitioners, and by a carefully-devised system of guarantees, conceived on British forms only. That being so, from the preamble to the schedule only British arrangements are dsscussed. It was hard to think that when a man held himself out as a graduate of a foreign University, and trumpeted the fact forth to the world, he could in reason be said to offend against the 40th section. That brought Mr. Knox to the second point. If there was nothing illegal so far as this was concerned in the use of a foreign medical title, what right had the magistrate to inquire whether it was a genuine one, or whether it had been obtained by the merest trickery and imposture? It might be worn by a man who was an ornament to his noble profession, or by the most pitiful quack whose name was entitled to registration only in the annals of the criminal courts. Such a one might escape free under the Act, but he might be reached by the law of manslaughter or false pretences. That was one of the cases in which he might say he had strained such faculties as he possessed to see his way to a conviction, but he could not. The defendant had called himself a New York doctor, and nothing else. The summons, he regretted to say, must be dismissed.

Counterfeit Chlorodyne.

It having been found that certain frauds were being committed in Japan, both on the revenue of this country and on the proprietors of Dr. J. Collis Browne's Chlorodyne, Sir H. Parkes was instructed to lay the matter before the Japanese Government, with a request that the offenders might be brought to justice and a repetition of the offence prevented. Shortly afterwards he was verbally informed that the guilty parties had been discovered and arrested. Their trial, however, proceeded but slowly, and it was not until the 14th of September that Sir H. Parkes was informed that sentence had that day been pronounced, seventy days' penal servitude having been adjudged to the manufacturers of the spurious medicine, and sixty and fifty days respectively to the engraver and the printer of the forged labels, the profits of the fraud and the stock of counterfeit chlorodyne on hand having also been forfeited as well as the money received for the engraving and printing.

Sir H. Parkes adds that within a month after he had made his complaint, certain "Regulations for the issue of Licences for Medicine" were published by the Japanese authorities, containing provisions for the analysis of all prepared medicines manufactured in Japan, and for the issue of licence stamps to be attached to them, and these regulations, he trusts, coupled with the deterrent effect likely to be produced by the penalties imposed in the present case, will go far to prevent the repetition of offences of this class in the future.

The Sale of Milk of Sulphur.

At the Runcorn Petty Sessions, on Monday, December 18, Mr. George Marshall, Mr. Andrew Brown, and Mr. Isaac Speakman, chemists and druggists, were summoned for selling adulterated milk of sulphur. Mr. Henry Glaisyer, of Birmingham, the legal adviser of the Chemists' Defence Association, defended, and said he intended to call scientific evidence from London and Birmingham to show that the defendants were not guilty. There had been various prosecutions under the Act, with various results; but he thought the height of absurdity was reached when, in a case before the Hyde bench, in which there was a conviction, the chairman, who held a diploma from the Royal College of Surgeons, was fined the week following for selling adulterated milk of sulphur himself. As the circumstances of the present case were somewhat peculiar, he would ask the bench to adjourn it for a week, to enable him to procure the requisite scientific evidence. The cases were then adjourned until the next petty session.—*Liverpool Daily Post.*

Supposed Poisoning by Opium.

Dr. Diplock, coroner, opened an inquest on Wednesday, at the Wellesley Tavern, Chelsea, on the body of Henry Randall, aged 23, potman, who is alleged to have died from poison acidentally administered to him by one of the servants at a women and children's hospital in the King's Road.

Jeannett Outten deposed that she was 18 years of age, and housemaid at the hospital in question. She had known the deceased for a fortnight and he was always trying to be after her. She saw him on Sunday afternoon, when he said that he had a very bad cough, and she gave him some pills the next afternoon. She obtained the pills from a box in a lower room of the hospital. The box produced was the one she took them from. There were several other boxes in the room, but being unable to read the labels upon them she took the small pills. She had had small pills given her for her own cough by the nurse, and therefore took small pills for deceased, not knowing that they were poison.

Mr. John Leonard, of King's Road Chelsea, surgeon, deposed that he saw the deceased on Monday night, and found his pulse slow and laboured, countenance livid, pupils unequally contracted and insensible to light. He died early the next morning. Witness was next day handed the pills produced, and he found they contained opium, and were the same as those deceased had in his pocket.

The inquest was adjourned in order that a *post-mortem* examination might be made.—*Standard.*

Poisoning by Vermin Killer.

On Thursday, December 14, Mr. Humphreys held an inquiry in Banner Street, St. Luke's, respecting the death of Mary Ann Hill, aged 39. Thomas Hill, a tent maker, stated that on the previous Monday morning he left deceased, his wife, in bed, apparently in her usual health. He was afterwards fetched, when he found her dead. On the table and strewed about the floor were several labels of Battle's vermin killer. Deceased drank heavily. Since her death he had found out that she had been pawning many things, and was now of opinion that she had taken her own life for fear that he should discover it. A lodger in the same house deposed that on Monday morning deceased exclaimed, "Will any one fetch my husband?" and then fell to the ground, striking her head against the drawers. A doctor was sent for, who pronounced life extinct. Deceased had swallowed as much strychnine as might kill half-a-dozen people. The jury returned a verdict of "Suicide while in a state of unsound mind."—*Times.*

Poisoning by Chloral Hydrate.

On Tuesday last Dr. Hardwicke held an inquest at the King's Head, Longford Street, Munster Square, as to the death of Randle Jackson Waters, telegraph engineer, who was found dead in bed on Sunday morning by his wife, there being a bottle that had contained hydrate of chloral on the dressing-table. Deceased was very restless at night, and found it necessary to occupy a separate bedroom from his wife and children. The widow believed her husband had taken an overdose of the chloral, which he had been in the habit of using to procure sleep. Dr. Mason, of Osnaburgh Street, said the cause of death was failure of the heart's action, caused by an overdose of chloral. The jury agreed to a verdict of "Death from misadventure."—*Times.*

Attempt to Murder by a Druggist's Assistant.

At Woolwich, on Thursday, December 14, Thomas William Christian, 22, a druggist, was charged on remand before Mr. Balguy with wilfully attempting to administer poison to Mrs. Susannah Bayley, his landlady, of 6, Kingston Terrace, Charlton. The prosecutrix, said that she left the prisoner alone in her kitchen after supper on the night of Monday, the 4th, and met him going to his room as she returned. Her daughter handed her a glass partly full of beer, which she had left at supper, and she was about to drink it when she was alarmed at the overpowering smell, and set it down untasted. She afterwards poured it into a glass pickle dish containing a little vinegar, and then went up to bed. At four o'clock in the morning she was suddenly awakened by the prisoner grasping her throat with one hand and trying to pour something from a bottle into her mouth. She set her lips fast and struggled, causing the contents of the bottle to be spilt over the bed. The prisoner then ran out of the house.

At the adjourned hearing on Tuesday, Mr. G. W. Wigner gave his evidence. He said the beer when he received it contained prussic acid, but an amount insufficient to cause the death of an adult person, though a large quantity must have evaporated by exposure in the pickle dish, into which the liquid was thrown. He had made an experiment to prove this, and found that seven-eighths of the poison would evaporate by exposure for six hours. He had at first suspected the presence of some ingredient other than prussic acid, but had found only some drug, not poison, which he presumed had been used to adulterate the beer. The small phial supposed to have been taken into the bedroom by the prisoner had only two or three drops of prussic acid remaining in it, but there were evident traces of the poison having been spilled over the complainant's night dress. The handkerchiefs found in the bedroom had also prussic acid upon them, and one of them appeared to have been wetted with it all over. All the handkerchiefs were heavily scented with some strong perfume. Mr. Balguy committed the prisoner to Newgate for trial.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

Chrysophanic Acid Ointment.

Sir,—I observe in this week's issue of your Journal, an article by Mr. Balmanno Squire on Chrysophanic Acid Ointment, in which he states that he believes it has not been used before. I therefore write to inform you that I used it in the skin department of this hospital about nine months ago for ringworm. The acid was obtained from araroba powder by Mr. A. W. Gerrard, the dispenser to the hospital, and was employed by me in the form of a saturated solution in benzol, which retains about 10 grs. to the ℥ when cold, and also as ointment made with simple lard, the strength varying from 10 to 40 grs. to the ounce. Twenty grains of Goa powder often creates considerable irritation, as I can testify by my own feelings; for having as an experiment applied a small quantity of the ointment to my own skin on two consecutive nights, much redness was induced, and the irritation was so great that after enduring it for three or four days I had to resort to soothing applications to allay it. The results of my experiments with this substance, which were, however, limited to parasitic diseases, are already in the hands of the Editor of the *Lancet*, and will be published shortly, and it will then be seen that it is by no means deserving of unqualified praise.

H. Radcliffe Crocker, M.D.

University College Hospital,
December 19, 1876.

Sir,—As during the past nine months I have prepared large quantities of ointment, both from araroba powder and chrysophanic acid, the following note may be of value. The araroba used was of two varieties, one, the Goa powder of English commerce, the other known as Poh de Bahia, obtained from the Pharmacia Dias Limas, Bahia, and presented to Dr. Sydney Ringer by Dr. Paterson, of Pernambuco. Soon after they came into my hands I examined them for their percentages of chrysophanic acid, according to the method indicated by Professor Attfield, in the *Pharmaceutical Journal*, March 13, 1875, viz., exhaustion with hot benzol; from the Goa variety I obtained 84 per cent., and from the Bahia variety 82 per cent. of chrysophanic acid, in minute microscopic crystals.

The ointments were prepared (for some experiments which have been carried on by Dr. Radcliffe Crocker) of a variety of strengths, by simple admixture of the fine powder of the different substances with lard. The result was a perfectly smooth application, giving every satisfaction.

In the course of some experiments to obtain a strong cold solution of chrysophanic acid, in which I may say I failed, I observed that it was soluble in boiling fats and oils in almost any proportion, from which on cooling a large portion separated in a very fine state of division. I have since found that vaseline is even a superior solvent of this body than fats; the use, therefore, of benzol in the preparation of chrysophanic acid ointment, as recommended by Mr. Balmanno Squire, is not necessary.

A. W. Gerrard.

Hyoscyamine.

Sir,—I am sorry I made a mis-statement in my paper on the above subject with regard to Mr. Robert Lawson having used crystallized hyoscyamine. I was under the impression that in one part of his paper in the *Practitioner* he called the preparation he used an amorphous powder, which term could not apply to the hyoscyamine until recently generally met with in commerce, and as Mr. Lawson's paper, in which he stated he had used Merck's alkaloid, did not appear in the *Practitioner* till July this year, whereas Mr. Merck was supplying crystallized hyoscyamine as early as the 1st of January, I concluded they must be the same.

But to allay any unnecessary alarm which Mr. Lawson's letter may have caused, I beg to inform your readers that I was quite aware when I read my paper that one-grain doses of crystallized hyoscyamine had been administered in London in cases similar to those of Mr. Lawson, the detailed account of which will shortly be published.

Dr. Ringer now authorizes me to state that he has repeatedly given one-grain doses of crystallized hyoscyamine to different patients at University College Hospital.

Wm. Martindale.

10, New Cavendish Street,
December 20, 1876.

W. R. Smith and J. A. Saunders.—The advertisements have been forwarded to Messrs. Churchill.

H. W.—The leaves of *Chimaphila corymbosa* were official in the London Pharmacopœia, which included a formula for a decoction (1 in 8), but not an infusion.

S. W. F.—The conditions of the solidification of glycerine by cold have not yet been clearly made out. According to Roos, after it has been once crystallized and melted it may be restored to the solid state by exposing to a temperature of 30° F., provided a crystal be placed in the liquid as a nucleus; otherwise, a temperature of 24° F. and vibration of the liquor is necessary.

"Tr. Opii."—See the British Pharmacopœia under Resina Podophylli.

"Glycerinum."—Recipes for glycerine preparations for chapped hands have already been given; but we do not know of one that is also suitable "for all cutaneous eruptions of the skin."

"Tr. Camph. Co."—There is no relation between passing the Minor and Major examinations and becoming a Fellow of the Chemical Society.

"Mist. Tuss."—We do not understand your question. The so-called "patent medicines" do not require to be entered anywhere.

J. M. Fairlie.—We should be happy to correct the statement referred to if furnished with the means of doing so. Would it not be advisable to write to the author of the article, through the journal in which the statement appears, and ask him for a more definite explanation of what he means?

"Pharmaceutist."—The Rotten Stone of Derbyshire is an aluminous silicate, containing a little carbonaceous matter. It is also found in Carmarthenshire and Breconshire. Another "rotten stone," known as "tripoli," having been first imported from that country, consists almost entirely of silica, in the form of skeletons of infusoria. Tripoli is found in Saxony, France, Bohemia, Tuscany, Mauritius, and other places. See Watts's or Ure's 'Dictionary,' for further information. "Bath brick" is made from a calcareous and silicious earth, a deposit of which is found in the estuary at Bridgewater; also at Cumwick and Highbridge.

"Bonus Puer."—A recipe for solution for soap bubbles will be found in vol. v., p. 78, of the present series.

F. Stevens.—The fact has not been lost sight of.

"Inquirer."—Two tablespoonfuls.

A. C. Ekins.—We would suggest that the lecture should be on a subject with which you are yourself well acquainted, and that you should be better able to judge than we are what that might be.

H. S. W.—(1) We cannot tell you. (2) Your request has been handed to the Secretary.

"Nemo."—Sibson's 'Medical Anatomy' is published by Messrs. Churchill, price, in cloth, £2 2s.

Communications, Letters, etc., have been received from Mr. Vawser, Mr. Stephens, Mr. Nottingham, Mr. Shaw, H. M. W.

THE SPECTROSCOPE IN PHARMACY.

BY WILLIAM GILMOUR.

It will, I think, be admitted that the spectroscope has not, so far as pharmacy in general is concerned, as yet occupied the place which might have been expected from it, when we consider its achievements in other and even allied departments of investigation. It has become, for example, indispensable to the chemist; to it the astronomer is indebted for his knowledge of the nature and constitution of the heavenly bodies; the physiologist and pathologist have alike drawn largely on its capabilities, and even the mineralogist and geologist are not without their obligations to its powers. The pharmacist alone, with even, if possible, a wider sphere, seeing it embraces the character, collection, preservation, qualities, preparation, purity, etc., of almost every substance which comes into his hands (and from the very fact of its being thus more comprehensive, coming more we should say under its cognizance than any of the foregoing)—he alone has failed to avail himself duly of its power, and in consequence has let many of the discoveries in this, as in other departments peculiarly his own, slip from his grasp. Without stopping to inquire too minutely into all the various causes which doubtless have tended to produce this indifference on the part of the representatives of pharmacy to the uses and capabilities of the spectroscope in their own immediate sphere, it seems to me that one cause at least should be referred to as probably exerting, more than any other, a pernicious and deterrent influence. I refer to the fact that, whilst in other departments its discoveries have been both primary in their nature and application, here they have been nearly altogether of secondary importance as well as of a subsidiary character entirely. Anything which it has hitherto done for pharmacy has been more interesting than practical, more a matter of curiosity than of direct usefulness. Take any of the known substances yielding absorption spectra and it will be found, first, that the spectra give as a rule no indication whatever of purity; and, second, that they fail to give a more certain indication of the nature of the substance examined than may be obtained, probably, by simpler and readier means at the command of the investigator. The absorption spectra, for example, of some of the potassium, manganese, and didymium salts are extremely interesting and beautiful. They are individually both delicate and distinctive in their reaction, showing bands peculiar to the substance, and capable of being detected in many combinations, and yet they have never hitherto served any higher purpose in pharmacognostics than becoming mere test objects in the hands of the experimentalist. In the same way many solutions and tinctures yield very beautiful and characteristic spectra, though, unfortunately, they also give no better indication of the nature of the substance, nor of its strength and purity, than would in most cases be acquired by a rough and ready examination from general appearance or by taste, smell, and so on. This element of weakness is, moreover, much more apparent still if we take another class of solutions yielding no absorption bands whatever, and whose general characteristics some have in consequence sought to obtain or discover in the amount of absorption at the extremes of the spectrum. Such substances possess an absorptive power on white light when it passes through them similar to a piece of coloured glass, and it is quite apparent that the amount of light transmitted in an individual case will depend principally on these three conditions, namely, the depth of colour, the thickness of the medium, and the intensity of the light infringing on the medium through which it is being transmitted. There are other sources of error still, even were the foregoing conditions adjusted and an attempt made to create a standard. Principally this, however, that in no case is there a hard and fast line of demarcation betwixt the light transmitted and the light absorbed. In other words, in every spectrum there is a greater or less amount of shading which renders it peculiarly difficult, and even in most cases almost impossible, to detect the precise moment at which complete absorption takes place. Under these circumstances, if we would elevate such spectra out of mere test objects or matters of curiosity, and place the spectroscope at the same time on a proper basis towards pharmacy, it is quite apparent the first thing to be done is to cease attempting to put a construction upon them which manifestly they will not bear, or which are, to say the least, open to such grave objections. Keeping this in view it has often struck the writer that there is one important class of pharmaceutical preparations to which the spectroscope may advantageously be applied, if not directly as a test or to detect their strength and purity, at least in the no less important work of revealing something of their constitution, history, and therapeutic value. The class of substances referred to is derived entirely from the vegetable kingdom, and the following, as being possessed of some considerable medicinal activity, may be considered representative, so that to them, together with their officinal preparations, reference will be more immediately confined at present—

Aconite.	Hops.
Belladonna.	Hyoscyamus.
Bearberry.	Lettuce.
Buchu.	Lobelia.
Cannabis Indica.	Matico.
Conium.	Senna.
Digitalis.	etc., etc.

The only officinal preparations of the foregoing which require notice are extracts and tinctures, and they all yield or should yield when placed in the spectroscope a characteristic series of absorption bands which, for convenience, may at present be called the chlorophyll group. This group, as we are to consider it when complete, consists of five bands of various degrees of intensity, and the different preparations may contain one or more of these, according to their nature or other modifying circumstance which exert upon them a decomposing influence. The very fact, however, that they are not permanent is sufficient to excite inquiry into some of the probable causes which operate in producing this variation in the character of the spectra. In doing this we may be enabled, as already stated, to arrive at some definite conclusion both as regards their history and therapeutic value. Chlorophyll, it need scarcely be said, is the green colouring-matter found most abundantly in leaves, but existing also in other parts of plants. Its precise functions in the vegetable economy are not as yet well understood; nor can it be said that very much is known regarding it, either chemically or optically. The chlorophyll, for example, derived from fresh green leaves differs in several important respects from that derived from dried or old leaves, whilst the extreme susceptibility of all the bands of both old as well as fresh chlorophyll to change and decay, with the single exception of band 1, has probably operated in causing some investigators to overlook in several respects their importance. M. J. Chautard,* who has investigated and classified these bands, says, "that as to bands recognized in the other colours of the spectrum (*i.e.*, bands 2, 3 and 4), they are liable to modification by so many different causes that their study would not lead to uniform results. Mr. Stokes, again,† finds that modified chlorophyll—chlorophyll acted on by light—undergoes no further change when precipitated, and again redissolved by ether, on exposure to diffused light; but that chlorophyll thus modified has a somewhat different spectrum from the fresh, the dark band 3 being lighter and displaced towards the more refrangible end of the spectrum, and another band appearing in the spectrum, so that in the modified chlorophyll there are five dark bands, whilst in the fresh there are only four. Gerland, to investigate this change,‡ took an alcoholic solution of chlorophyll obtained from the fresh leaves of *Urtica dioica*, and on exposure to sunshine found it changed colour perceptibly in five minutes; in ten it was olive-green; in fifteen brown, and after the lapse of an hour it had become bright yellow, and no longer showed any signs of fluorescence. During the change the absorption bands gradually became more indistinct, and disappeared in their order, band 1 being most stable. The same change took place in diffused light, but more slowly. Mr. Sorby, again, who probably has investigated more than any other individual the colouring matter existing in leaves, classifies all the numerous colouring principles which he has discovered into five groups, according to their action under certain chemical reagents. These groups he has distinguished by the names—chlorophyll, xanthophyll, erythrophyll, chrysophyll and phaiophyll, and each yield spectra distinct and characteristic. Leaves he finds, generally speaking, contain colours belonging to several groups, and frequently more than one of the same group, so that it will be understood from this and all the foregoing, as a matter of scientific investigation, that both chlorophyll and its spectra are sufficiently complicated. It is not, however, strictly speaking, so much in their scientific aspect which we wish to consider them at present, nor in their relation to each other as convertible spectra (if we may be allowed the use of such an expression), as simply in the relation which certain phenomena, which we may conveniently call chlorophyll spectra, stand to the therapeutic activity of certain medicinal substances and their preparations. It is sufficient for our purpose that certain substances yield, or rather should yield, uniform spectra; that these spectra are very susceptible to change; that the changes are not erratic in their nature, but may be assigned or traced to certain definite causes; and, lastly, that they bear significantly on the medicinal history and activity of the substance.

Leaves.—Take the leaves, for example, of any of the foregoing officinal substances, and it will be found that there are at least three circumstances which primarily exert a very powerful influence upon the chlorophyll absorption bands, namely—1st, the time at which the leaves are collected; 2nd, the mode in which they are dried; and, 3rd, the mode in which they are preserved. Leaves, it is now well known, should only be collected when the flowering stage has somewhat advanced, as they then contain their active principle in greatest quantity; they should next be rapidly dried at a low temperature, in a darkened oven, and afterwards preserved in closely stoppered opaque bottles. On these conditions being strictly observed depends very much the therapeutic activity of the plant, but as they are conditions beyond the sphere, or at least the cognizance of most pharmacists, and as under ordinary circumstances it is impossible to tell whether they have been observed or not, the importance of the chlorophyll spectra will readily be recognized. Not, let it be understood, that any medicinal activity is here ascribed to the chlorophyll itself; but undoubtedly it is of the greatest importance to preserve the colouring matter contained in the leaves as, if it is destroyed, much of their active principle is lost with it. There is the highest authority for asserting that the leaves of all the more active medicinal plants, such as belladonna, digitalis, and others, contain less of their peculiar active principles when badly, than when carefully, dried. The readiness with which chlorophyll fades may be very interestingly shown by removing the epidermis of a leaf of the officinal *Digitalis purpurea*, and exposing the cells to sunlight. In a very short time—in proportion to the intensity of the light as well as the temperature—it will become quite colourless, in which state, so far as its medicinal activity is concerned, the leaf will be found practically inert. On the other hand, as showing their stability when dried and preserved with care, the leaves may be found to exhibit the whole five bands very distinctly, even after being kept for several years, and this, too, contrary to general belief, without impairing their medicinal activity in the least.

Extracts.—The sometime disputed question as to the admission or rejection of the colouring matter into fresh or green extracts, has been finally set at rest by the Pharmacopœia directing the juice obtained from the fresh leaves and young branches to be heated gradually to 130°, and the green colouring matter then separated by means of a calico filter, to be afterwards added at a future stage of the evaporation. This nursing of the chlorophyll necessarily leads us to expect its absorption bands in the spectra of all these extracts, and their presence is, therefore, no indication of the quality of the preparation. But, on the contrary, if their presence thus gives no certain proof of their medicinal activity, their absence, it must be admitted, indicates with double assurance that the preparation has become bad, and is worse than useless. The danger to which they are exposed, and which would affect the chlorophyll spectra are chiefly these—excessive heat on the one hand, or on the other, undue delay in the process of inspissation after the colouring matter has been added, both of which lead to injurious chemical decomposition; or preserving in places exposed to too high a temperature which tends to promote fermentation; or preserving in damp places, promoting the development of fungi and other changes. Probably, however, the greatest source of danger, espe-

* *Pharm. Journ.*, June 21, 1873.
† 'Pogg. Ann. Eng.,' iv., 128.
‡ 'Pogg. Ann.,' CXL., iii., 585.

cially in those extracts whose consumption is limited, is after they have reached the hands of the pharmacist, in the length of time they are frequently kept, and the careless way it is to be feared they are too often protected from atmospheric influence. The best prepared extracts, it is needless to say, under these circumstances, would soon deteriorate, and ultimately become altogether bad.

Tinctures.—Little need be said as regards tinctures, for if in the process of maceration and percolation, by which most of them are prepared, the whole of the active principles be eliminated, and if they afterwards be carefully stored, the only further risk they will run will be from exposure to light. Still it must be confessed that the way in which they are kept by pharmacists in general, namely, in clear glass bottles exposed to the full sunlight from window and door, does not conduce to their preservation. The consequence is that few of the tinctures will be found to present complete chlorophyll spectra, some of them, it may be, having only band 1, others, and more than probably the majority, having no bands whatever. Now, without asserting that in every case the decomposition of the chlorophyll is indicative of a change in the medicinal activity of the tincture, similar to that which has just been indicated as taking place in the leaf as well as in the extract, it is undoubted that certain tinctures, such as conium, belladonna, and others, suffer very materially in their activity by the deposition which accompanies the modification of the chlorophyll, whilst they all suffer from the change which takes place in their appearance, taste, and so on. Without claiming more then, in the meantime, from an examination of the spectra of the various tinctures, than that it gives us some indication of the medicinal value of the plant from which they have been prepared, or that some change, more or less important, has taken place from exposure in the tincture itself, it will be admitted that even this is not unimportant, and the possibility is that further investigation may lead us to still more important results.

With these general observations we will now be prepared to consider the spectra of some of the officinal preparations more in detail.

(*To be continued.*)

COMPARATIVE EXAMINATION OF THE MORE IMPORTANT COMMERCIAL VARIETIES OF GALBANUM AND AMMONIACUM GUMS.*

I. GALBANUM.

BY EDWARD HIRSCHSOHN.

(*Continued from page* 431.)

10. *Treatment with Petroleum Spirit.*—As it was difficult to effect the complete distillation of the oil, especially from the Levant sorts, and as a portion of the oil remained dissolved in the water, exact results could not be obtained in this way. The author, therefore, adopted Dragendorff's method of estimating essential oils, which is based upon the fact that when the finely divided drug is treated with petroleum spirit (boiling point between 30° and 40° C.) nothing of importance except essential oil is extracted.

To facilitate the solvent action and to prevent the gum resin agglutinating, a quantity was rubbed up with pure sand that had been boiled with hydrochloric acid, washed, heated to redness and kept over lime. According as the resin was soft or hard, four to ten times its weight of sand was used. A quantity corresponding with 2 to 4 grams of resin was then put into a well corked bottle with an exactly measured quantity of petroleum spirit (10 to 20 c.c.) sufficient not only to penetrate the mixture but also to slightly cover it. The mixture was allowed to remain in contact, being frequently shaken, for twenty-four hours, this time having been found sufficient for complete solution of the oil. A portion of the solution was then removed and filtered through a funnel covered with a glass plate to prevent loss by evaporation, and a carefully measured quantity of the filtrate (2 to 3 c.c.) was placed in a watch-glass standing in a larger one and left at the ordinary temperature as long as the odour of petroleum spirit was perceptible. It was then weighed between two well closed watch glasses and afterwards again exposed, and the operation was repeated at intervals of 30 seconds until the weighing showed only a difference represented by the fourth decimal place. The author gives some figures obtained by experimenting with known quantities of the essential oil dissolved in petroleum spirit, which show, that operating in this way the loss of oil by evaporation is very slight. The quantities obtained are shown in the following tabular summary.

Results obtained by Treatment of Samples of Galbanum with Petroleum Spirit, Ether, Alcohol and Water successively.

No.	Description of Galbanum.	Proportion Soluble in: Petroleum Spirit.	Ether.	Alcohol.	Water.	Insoluble
1	Persian, from Astrachan.	26·9	45·76	1·91	14·09	8·07
2	,, ,, Kasan	15·04	52·09	2·12	16·04	11·05
3	,, ,, Pharm. Inst.	10·89	54·99	2·41	15·79	13·81
4	,, ,, ,, ,,	8·95	48·57	4·16	11·30	23·18
5	In granis, ,, ,, ,,	6·58	63·41	2·74	14·84	10·34
6	,, ,, Dorp. Pharm.	9·10	51·45	4·22	17·15	16·87
7	,, ,, Pharm. Inst.	4·56	59·34	3·50	15·60	14·36
8	,, ,, Hamburg, 1873	10·00	59·40	1·53	11·93	14·15
9	,, ,, ,, ,,	5·20	58·37	2·28	12·47	19·67
10	In massis, ,, ,, ,,	7·30	58·97	1·97	10·16	17·29
11	,, ,, Trieste	7·46	59·42	1·57	11·55	16·75
12	,, ,, Dorp. Pharm.	10·36	58·42	2·36	8·38	16·89
13	,, ,, Nisch. Nowgd.	7·62	55·18	2·04	10·90	20·32
14	London, 1840	7·63	60·42	1·92	8·72	18·18
15	,, 1850	6·34	55·70	2·77	15·70	15·27
16	,, 1872	7·19	55·84	2·32	10·50	19·74
17	Paris, 1849	5·46	52·08	2·35	12·38	28·82
18	Coblentz, 1851	7·30	58·79	3·19	9·10	16·82
19	Sens	5·56	52·37	2·78	14·91	21·11
20	Lucae	8·44	57·41	1·78	5·90	21·75
21	Lucae	7·29	58·58	2·63	8·16	19·34
22	Artificiale, Lucae	21·01	41·35	1·85	22·10	11·21
23	In granis, Lucae	3·35	59·77	3·13	10·28	20·73
24	Depuratum	9·27	58·21	3·06	15·55	9·74

The petroleum spirit extracts were, with the exception of Nos. 6, 11 and 22, which were more or less yellow, all colourless, and left an oily residue that was either quite colourless or slightly yellow. All these residues possessed a strong odour of galbanum, which, in Nos. 2, 3, 4, 15, 17 and 24, was mixed with that of turpentine, in No. 1 with that of assafœtida, and in No. 23 with that of cumin. When heated to 120° C. these oily residues almost completely disappeared, with the exception of Nos. 6 and 22, from which the author concludes that from galbanums of good quality petroleum takes up almost exclusively the essential oil. From Nos. 6 and 22 resin also was removed. Further experi-

* From a memoir for which the gold "Suworow" medal has been awarded by the Medical Faculty of the University of Dorpat. (*Pharmaceutische Zeitschrift für Russland*, April 15, 1875, p. 225.)

ments showed that the samples from which the resin as extracted were mixed with olibanum and sagapenum.

The small residue, originating in the resinification of essential oil, was in some cases weighed; mostly it amounted to less than 0·47 per cent. of the whole drug. The Hamburg "galbanum in granis," No. 8, was an exception, its residue amounting to 1·04 per cent. These residues did not dissolve in petroleum spirit and were coloured yellowish red or violet by hydrochloric acid, which the freshly distilled oil was not, but an oil kept exposed for some time to the air probably would be. In the adulterated "galbanum in granis," No. 6, the residue amounted to 4·81 per cent.; it dissolved only partially in alcohol, but completely in ether, and when deflagrated with saltpetre gave a clear sulphur reaction (sagapenum). The "galbanum artificiale," No. 22, left behind 16·21 per cent. of a very brittle resin, which was not dissolved by 95 per cent. alcohol, but was completely dissolved by ether and petroleum spirit.

Upon treating the petroleum extracts with some drops of a solution of bromine in double its volume of ether, in the Persian sorts, Nos. 1 to 4, 15 and 24, a red, passing into violet, turbid mixture was produced, from which, after standing, a small quantity of a violet body separated, that gradually became blue, and was soluble in alcohol, ether and chloroform; after this the liquid was perfectly clear. The Levant specimens, Nos. 5 to 14, 16, and 18 to 21 gave no colour, but probably there was a precipitation of a very small quantity of the violet body. The adulterated galbanum gave neither colour nor separation, whilst No. 23 gave no colour, but a yellow precipitate. The author considers that this test furnishes a method of distinguishing between Persian and Levant galbanum.

The residues from the evaporation of the petroleum spirit exposed to bromine vapour was coloured violet, changing into blue very intensely; in Nos. 3, 4, 15 and 24, and in Nos. 1 and 2 less so; whilst in the others only a yellowish green colour was produced. A small quantity of Frohde's reagent, applied carefully with a glass rod, gave a yellow solution which quickly became blue; except in Nos. 5, 6, 7, and 19, where the colour was first a beautiful red, gradually passing to violet and finally to blue.

Upon treatment of the residue with hydrochloric acid (sp. gr. 1·12) Nos. 1 to 4, 15, 17, and 24 gave a yellow red solution, gradually becoming red; Nos. 5 to 9, 12, 13, and 16, a red violet solution; Nos. 11, 14, 18, 20, 21, blue violet; No. 19, blue, No. 10 only after a long time became faintly violet; similarly No. 22 became a faint rose colour. No. 23 showed no change.

When treated with nitric acid (sp. gr. 1·25) the residue from Nos. 1 to 4, 15, 17, and 24 gave a rose colour; Nos. 5 to 9, 11 to 14, 16 and 21, a violet or more or less red violet; Nos. 10, 22, and 23 no change. Some drops of a mixture of chloral and chloral hydrate applied with a glass rod produced after some minutes with the residues from the Persian sorts, Nos. 1 to 4, 15, 17 and 24, a solution of an intense green colour. The residues from the older Levant sorts, Nos. 5, 6, 7 and 19, became rose coloured, gradually passing into violet; whilst with the residues from the Levant sorts at present met with in commerce, Nos. 8 to 18, 20 to 21, there were produced ~~solved. that~~ were of a faint yellowish red, passing into undecided green, and faintly rose-coloured at the edges. In No. 23 scarcely any characteristic colour could be observed. The false galbanum, No. 22 gave a yellow-brown solution.

By deflagration of the residues with saltpetre and reagents for sulphur, the sulphur could be detected only in the adulterated specimen No. 6.

11. *Behaviour with Ether.*—The residue from the exhaustion with petroleum spirit, was treated with ether for the estimation of the resin. After being well shaken with ether, it was allowed to stand and then filtered through a weighed and dried filter; the residue upon the filter was treated with ether until a few drops of the filtrate evaporated upon a glass plate left no resin. The ether was then distilled off from the ethereal extract; as the ether adhered persistently and the last portion was difficult to remove, the residue was allowed to stand five or six days at a temperature of 80° to 100° C. and finally heated at 110° and weighed. The quantities obtained are shown in the table on p. 531.

The resins from No. 1, 2, and 22 were light yellow; these from the other sorts were more or less dark red brown. They were very brittle, and had a conchoidal fracture. The melting point of Nos. 1, 2, 3, 15, 17, 24, was 40° C.; that of Nos. 10 to 14 and 18 to 20 was 42° C.; that of Nos. 4, 21, 24 was 45° C.; and that of No. 22, the false galbanum, 75° C. They dissolved completely in ether, alcohol, chloroform, amylic alcohol, glacial acetic acid; and nearly so in benzine and carbon bisulphide. Solution of ammonia (sp. gr. 0·96) exercised no action, either when cold or hot. Boiling caustic soda solution dissolved them almost completely, as also did warm spirit of turpentine.

Upon boiling the resin with water, in every case, with the exception of that from the false galbanum, No. 22, a faintly acid, strongly fluorescent, colourless solution was obtained, which became turbid upon cooling. This turbidity disappeared upon the addition of a few drops of caustic potash, or soda solution, giving place to a very strong fluorescence, a property characteristic of umbelliferon. It appears therefore that some umbelliferon occurs already formed in galbanum.

Alcoholic solutions of the resins treated with alcoholic solution of lead, zinc, or copper acetate, underwent no change. Upon deflagration of the resins with pure nitre and afterwards testing for sulphuric acid, only negative results were obtained, except in the case of that from the adulterated galbanum, No. 6; in this respect they differ essentially from sagapenum and asafœtida.

Submitted to dry distillation the resins from Nos. 1 to 4 yielded a very small quantity of blue oil, but much more umbelliferon; thus from No. 2, 3 per cent. of umbelliferon was obtained. Nos. 5, 11, and 12 yielded considerably more blue oil, No. 11 yielding 33·3 per cent. Treated under pressure, with alcohol containing hydrochloric acid, they all gave umbelliferon with the exception of that from the artificial galbanum, No. 22.

Three or four grams of the resin from No. 2 were digested with soda ley, and barium chloride added as long as a precipitate was formed; a considerable quantity of a strongly coloured dark yellow precipitate was obtained, which was separated from the yellowish alkaline liquid, washed and dried. Upon boiling the baryta precipitate with 95 per cent. alcohol, the greater part was dissolved, the solution being strongly coloured yellow. Upon cooling this solution a yellow body separated, which under the microscope exhibited no crystals; it was not soluble in cold alcohol, but was dissolved by ether. Treated with concentrated sulphuric acid it formed a yellow solution. A baryta estimation of this body gave only 1·07 per cent. of barium. The portion not dissolved by boiling alcohol was brown, amorphous, and gave with strong sulphuric acid a yellow solution. The quantity was too small to make a barium estimation. This body was insoluble in ether.

Into the liquor separated from the baryta precipitate carbonic acid was passed as long as a precipitate was formed. This precipitate washed and dried, gave up when boiled in 95 per cent. alcohol, a small quantity of a body, which upon adding to the alcohol sufficient water to produce turbidity was deposited upon the glass in an asbestos-like mass, which under the microscope appeared as beautiful acicular crystals. Heated upon platinum foil the crystals melted and took fire and left but a very small residue; they dissolved in alcohol and ether. With concentrated sulphuric acid they formed a yellow solution; they were not changed by concentrated hydrochloric acid. The quantity obtained was too small to allow further experiments to be made.

To the liquor separated from the precipitate obtained with carbonic acid hydrochloric acid was added until it showed an acid reaction, when a considerable quantity of white flocks were deposited. These were washed and dried at a gentle heat (as they were easily melted to a yellow resinous mass), and under the microscope showed no crystals. This body burned without residue, and dissolved in alcohol and ether with a yellow colour. Treated with concentrated sulphuric acid it formed a yellow solution; whilst with concentrated hydrochloric acid, especially when heated, it gave a violet solution, a resinous body being separated. The resin purified by repeated solution in soda ley and precipitation by hydrochloric acid gave no colour with that acid and partially dissolved in ammonia.

After the separation of the body precipitated by hydrochloric acid the liquor gradually assumed a faint rose colour, and when heated and more hydrochloric acid added gave a splendid violet solution, which after a time passed into a dirty grey. Petroleum spirit shaken with the liquid took up a very small quantity of a colourless body, which gave the reaction with hydrochloric acid very intensely. It is therefore apparent that this resin, like most resins, was a mixture of at least four bodies, which might be named α, β, γ, and δ resins. Besides the two barium compounds, as shown, baryta precipitated free resin from the alkaline solution; by treatment of the filtrate with carbonic acid another resinous compound was thrown down; after this had been separated and the filtrate acidulated with hydrochloric acid another precipitate of resin was obtained, which may be considered the principal constituent of the ether extract. The proportion of resin contained in the two drugs not showing any distinctive character the investigation was not carried further.

(*To be continued.*)

A METHOD OF DETECTING AND ESTIMATING CASTOR AND OTHER FIXED OILS IN BALSAM COPAIBA.*

BY DR. MUTER.

This oleo-resin, commonly but wrongly termed a balsam, has been said in books for many years back to be subject to admixture with fixed oils, especially castor oil. The *British Pharmacopœia* furnishes a qualitative method of examination, but the tests are, in practice, totally insufficient, as the exact degree of rectification of the benzol (an important point) is not stated, and the difference between a pure balsam stain and that with a small percentage of oil is very slight, unless the two are observed side by side. The other methods which have been proposed may be summarised as follows:—

1. Pure balsam gives a translucent and not an opaque emulsion, with strong solution of ammonia.

2. Pure balsam, if boiled with water for some hours, leaves a tenacious resin.

3. The specific gravity.

The latter test is entirely fallacious, owing to the great variation in commercial samples, and the others, though possibly characteristic with large admixtures, fail with anything under 20 per cent.

Observing the close affinity between copaivic and pinic acids, it struck me that advantage might be taken of the difference of solubility of the sodium soaps in certain menstrua. A very good solvent for sodium pinate has been discovered by M. Barfoëd to be a mixture of five parts by volume of *absolute* ether, and one part *absolute* alcohol, which, moreover, only dissolves sodium oleate to an exact extent corresponding to 1 in 1000 of oleic acid. I will not occupy space by detailing at length the numerous experiments on a great number of samples of balsam, varying in age and colour from every known commercial scource, but the whole thing ended in the certain conclusion that besides the essential oil (which is dissipated in the process of analysis) good commercial balsam contains only copaivic acid, which forms a sodium salt, instantly soluble in the ether-alcohol mixture, and a little altered resin not so readily saponifiable, forming a salt only slowly soluble. The amount of this second resin I have found to vary slightly, and, in very old samples, especially of Maranham balsam may sometimes amount to five per cent., although usually really less. Going upon the principle that performing any official analysis the lowest commercial standard should be taken, I have adopted six per cent. as the highest possible quantity of the second resin ever existing in any sample of balsam still having a trace of odour remaining. This wide standard may sometimes lead to an under estimation of the oil by two or three per cent., but renders any over estimation impossible.

The actual process I employ is as follows: 3 to 4 grammes of the sample are weighed into a clean dry flask, and saponified on the water bath with 50 c.c. of alcohol and a lump of caustic soda, weighing not less than 5 grammes. When all is dissolved water is added, and the whole washed into a half-pint basin so as to nearly fill it, and evaporated to 100 c.c. over a low gas flame. Dilute sulphuric acid is then added till the whole just becomes permanently turbid, and then solution of caustic soda is dropped in till it *just clears* again. By this means a solution is obtained with the least possible excess of alkali, and with a good amount of sodium sulphate. The whole is now evaporated to *perfect dryness*† on the water bath, stirring towards the end, so that the sulphate may mix with the soaps and produce an easily pulverulent residue. The residue is removed from the basin into a small wide-mouthed stoppered bottle, and treated with 70 c.c. of

* Read before the Society of Public Analyists, November 15th, 1876. From *The Analyst*, November 30, 1876.

† The best way to ensure absolute dryness is to moisten the apparently dry residue with a few drops of absolute alcohol and again dry.

ether-alcohol, and well shaken up. As soon as it is fairly settled the fluid is filtered off through a *quick* filter, and this is repeated with two successive quantities of 70 c.c., making 210 c.c. in all of the solvent used. The residue in the bottle and on the filter now consists of sodium oleate and sulphate if the balsam be impure, and of the latter only if pure, with a little trace of the insoluble resin soap already referred to. The contents of the bottle and filter are then dissolved in warm water, and after heating until all smell of ether is gone, the whole is boiled, freely acidulated with hydrochloric acid, and set to cool. If, when cold, nothing but a few specks of brown resin should rise to the surface, the balsam is pure, but if an oily layer be formed, it is adulterated, and the smell of the separated oleic acid will at once determine whether it is actually castor oil or not. In the case of the presence of oil, two grammes of pure and dry white wax are added, and the whole heated till the wax melts with the oleic acid. On cooling, a solid cake is formed, which is detached from the side of the beaker, and the fluid below passed through a filter. The cake is once more melted in boiling water, cooled, detached, dried by gentle pressure in blotting paper, put into the water oven in a weighed platinum dish till dry, and then weighed, and the weight of the wax used deducted. The beaker, filter and rod, etc., used are, if at all dirty, dried, extracted with ether, and the residue left after evaporation, weighed and added to the total.

The calculation is then performed as follows:—

1. To the weight in grammes found, add ·20 for loss of oleic acid in solvent, and then say as

95 : 100 :: total oleic acid.

2. Calculate to per cent. from the quantity taken, and from the total percentage deduct six per cent. for possible altered resin in the balsam.

Out of the whole number of samples I have done, I have selected the following twelve, as being fair representations of the degree of accuracy obtainable by the process. The error, owing to the correction, of course increases with the amount of oil present, but it is always an error in the direction of under estimation, which is the great point for public analysts.

Nature of Sample.	Calculated.	Found.
Para (pale)	Pure	No oil drops.
Para (pale)	23·60 per cent. castor	23·50
Old Para (dark)	Pure	No oil drops.
Old Para (dark)	51·0 per cent. castor	50·0 per cent.
Carthage (medium)	Pure	No oil drops.
Carthage (medium)	21·5 per cent. castor	21·20
Maranham (pale).	Pure	No oil drops.
Maranham (pale).	26·5 per cent. castor	26·27
Old Maranham (darkish very little odour)	Pure	No oil drops.
Old Maranham (darkish very little odour)	47·3 per cent. castor	46·4
Para (fine pale)	Pure	No oil drops.
Para (fine pale)	21·4 per cent. lard oil.	20·9

In conclusion, I may say, that the process, although it looks formidable, is in practice very simple, and for all ordinary purposes, if the beaker be well scraped out, the weight of the main cake may be taken as sufficient to give an analysis true within 3 per cent. *below* the real amount, which is accurate enough for public purposes, and saves time and the expense of the extra ether. Unless oil actually floats and *remains on cooling in fluid drops*, after adding the hydrochloric acid, the sample may be passed as good.

When working on three to four grammes, with an admixture of not over 25 per cent., the errors due to loss of oleic acid and insoluble resin soap respectively so nearly balance each other, that any correction is unnecessary, and the actual amount of oleic acid found may be taken as correct within a per cent.

FOURTEENTH ANNUAL REPORT OF THE GOVERNMENT CINCHONA PLANTATION IN BRITISH SIKHIM.

BY GEORGE KING, M.B., F.L.S.,

Superintendent of the Royal Botanical Garden, Calcutta, and of Cinchona Cultivation in Bengal.

(*Concluded from page* 513.)

(6 and 7).—With the view of testing at once the results of a shorter rotation than one of eight or nine years, and of the respective merits of coppicing and uprooting as modes of harvesting bark, a six-acre patch of three and a half years old *succirubra* trees, standing four feet apart, was selected on Mungpoo ridge. On three acres of this the whole of the trees were cut over close to the ground (*i.e.*, were entirely coppiced), and on the other three acres all the trees were dug out by their roots. For the sake of comparison, I shall consider the results of these two experiments in the present paragraph.

The yield of dry bark from these two pieces was as follows:—

	Root.	Stem.	Branch.	Total bark.	Total per acre.
Three acres uprooted	1,155·53	1,365·80	1,565·10	4,086·43	1,362·14
Three acres coppiced	...	1,550·07	1,568·65	3,118·72	1,029·60

For plants standing 4 by 4 feet apart and three and a half years old, these figures show a yield at the rate of 389 pounds of dry bark per annum, as against a yield of 302 pounds per annum in the case of the thirty-five acres of nine-year old plants standing 6 by 6 feet apart, and which had undergone three thinnings and prunings prior to uprootal. This evidence therefore is, so far as it goes, in favour of close planting and early cropping. The three-acre uprooted piece has been replanted with red-bark seedlings equal in number to the plants removed, and the new plants have been put down in the spaces between the sites occupied by their predecessors. The three-acre coppiced piece has yielded at the rate of 294 pounds of dry bark per acre per annum. All death vacancies in the latter piece have been filled up by young plants; the stools of the cut trees will receive careful treatment, and both the uprooted and coppiced patches will get an equal amount of care and cultivation. At the end of a given time both patches will be again harvested, and definite comparative results will thus be obtained.

(8) A five-acre patch, similar in every respect to the two three-acre pieces just mentioned and adjoining them, was severely thinned by coppicing and by uprooting a proportion of the trees on it and by pruning the remainder. Dry bark to the extent of about 270 pounds per acre has been thus obtained from it. This five-acre patch will be cultivated like the two adjoining three-acre patches above mentioned, and its future yield will be duly chronicled. The results of these eight operations will be found in a tabular form as an appendix to this report.

3. *Various modes of harvesting compared.*—The past year has thus added considerably to our experience on several matters of importance connected with the bark harvest. Experience has been got for the first time of the results of uprooting the trees—a mode of working suggested by Mr. Gammie in imitation of the well-known practice of the *cascarillados* in the natural cinchona forests of South America. The root-bark of this plantation contains, according to Mr. Wood's analysis, about 8 per cent. of total alkaloids, and is therefore richer than the finest of our stem bark, which rarely yields more than 7 per cent. It has, moreover, all along been found that in the operation of coppicing a certain proportion of the stools fail to shoot—in other words, they die, and as the bark of every part of a dead cinchona tree is perfectly destitute of alkaloid, there is always in coppicing a certain amount of bark lost. It appeared, therefore, well worth while to give a trial to a method which would make sure of the entire bark of every tree touched. From the two experiments in uprooting which have been above recorded

we have learnt that this is by no means a difficult or expensive process, bark so taken having cost for collection about two and a fourth pies per pound when green, as against one and three-fourth pies per pound for green bark taken by coppicing. During the process of uprooting, a very thorough upturning cannot fail to be given to the soil, and I am hopeful that it may be found to answer to replant such ground at once with cinchona, and thus to secure gratuitously the advantage of a very complete kind of digging. With this view a certain proportion of the uprooted area will, during the earliest good planting weather that occurs, be replanted with red-barks, care being taken to avoid as far as possible the exact spots occupied by the uprooted trees. The great objection to immediate replanting with the same species is of course the obvious one that the soil is possibly to some extent exhausted for red-bark. But, after all, the only part of the former trees which has been removed is the bark; the leaves, branches, and (as far as the coolies can be prevented from appropriating it as fuel) the wood also, being allowed to decay on the ground. If experience should show that immediate replanting does not answer, a period of rest can be allowed to the soil. As regards the proportion of root to stem and branch-bark, the uprooted three-acre patch gives for healthy succirubra trees planted 4×4 feet, three and a-half years old, and from which no bark had previously been taken, the following percentages of green bark:—root 26·5, stem 30·2, and branch 43·3 per cent. These percentages are, be it observed, for *green* bark. But in the process of drying these three sorts of bark lose weight in different proportions. The loss of weight in drying varies, moreover, with the season. In wet seasons green bark naturally contains more moisture than in dry seasons. The past cold season having been an exceptionally dry one, the loss of weight by drying was correspondingly small. The actual figures may thus be tabulated:—

	Pounds.
100 pounds green root-bark dried to .	32·94
100 ditto stem-bark ditto . .	34·06
100 ditto branch-bark ditto .	27·30

The thirty-five acres of uprooted nine-year old trees at Rishap yielded an exceptionally large amount of root-bark (nearly 50 per cent.), a result which is accounted for by the very large proportion of coppice-bearing stools to standard trees at the time of uprootal. The brief history of this patch, which has been already given, explains why there were so many coppice stools.

With regard to coppicing as a mode of harvesting bark, some experience has been gained during the year, and the basis has been laid down for a good deal more to be gathered hereafter. The progress during the year of the shoots from the stools of a number of trees coppiced under a variety of circumstances in 1874 confirms my belief that an almost complete coppicing, by which a minimum of standard trees is left (and that means a minimum of shade and of drip), is more likely to yield good results than a partial coppicing, by which only alternate plants or alternate rows of plants are cut. The shoots which follow a complete or nearly complete coppicing are in every case more healthy and vigorous, and in many cases more numerous also, than any which I have seen to rise from stools standing in shade. If the precaution of earthing up the stools be taken, the damage done to the young shoots by wind does not appear to be great. The cost of weeding and cultivating complete, or nearly complete, coppice will be about the same as for seedlings planted from the nursery. Experience alone can show whether coppicing or uprooting will pay best; and it would be premature as yet to form an opinion as to their respective merits as modes of harvesting. With regard to the third method of harvesting which has been proposed, viz., decortication of living trees, former experience having shown that renewal of bark under moss is a failure in Sikhim owing to the attacks of ants, no further experiments have been made by that method. Some trees which were partially stripped of their bark during the year 1874 have partially renewed it without the application of moss or straw or other covering of any kind. The renewed bark, however, although now more than eighteen months old, is still only about half as thick as the original bark. Though not hopeful of very favourable results from this method, I have given instructions that 300 healthy trees be submitted to it during the rainy season.

4. *Expenditure for the year.*—The total expenditure on the plantation for the year (including the item of Rs. 584-4-11 for head office charges) was Rs. 53,469-4-1. Of this, the sum of Rs. 754-4-3, incurred on account on labour for the factory, has to be transferred to the debit of the quinology account, leaving a balance of Rs. 52,714-15-10 as plantation expenditure proper. This sum is made up as follows:—

	Rs.	A.	P.	Rs.	A.	P.
European establishment mallees, chuprassies, carpenters, blacksmiths, etc.	13,097	0	5			
Head office writer, etc. .	584	4	11			
Contingencies	3,055	3	9			
				16,736	9	1
Note.—The above charges are in the proportion to the rest of the expenditure of 46·5 per cent.						
Cultivation of old plantations (Rungbee, Rishap, Mungpoo)				20,466	13	0
Cost of collecting the bark crop				8,840	0	0
Erection of godowns at Mungpoo. . . .				3,050	0	0
Extensions of Mungpoo plantation . . .				1,482	11	9
Spent on new plantation at Sittong . .				2,138	14	0
Total				52,713	15	10

This divides itself into two portions, viz., the sum of Rs. 42,937-6-1, which represents the working expenses of the plantation for the year, and which is therefore to be set against the crop, and the sum of Rs. 9777-9-9, which is debitable to capital account. The composition of the working and capital expenditure is shown in the following table:

Working Expenses.

	Rs.	A.	P.	Rs.	A.	P.
Cultivation of the old plantations of Rungbee, Rishap, and Mungpoo during 1875-6 . .	20,466	13	0			
Proportion of European establishment, head office charges, skilled labour, and contingencies, equal to 46·5 per cent. of the above . .	9,518	9	1			
				29,985	6	1
Cost of collecting bark crop	8,840	0	0			
Add 46·5 per cent. . . .	4,112	0	0			
				12,952	0	0
Total Working Expenses				42,937	6	1

Capital Expenditure.

	Rs.	A.	P.	Rs.	A.	P.
Cost of extensions of plantation at Mungpoo	1,482	11	9			
Add 46·5 per cent. . .	690	0	0			
				2,172	11	9
Erection of bark godowns at Mungpoo	3,050	0	0			
Add 46·5 per cent. . .	1,420	0	0			
				4,470	0	0
Expended on new plantation at Sittong . . .	2,138	14	0			
Add 46·5 per cent. . .	996	0	0			
				3,134	14	0
Total Capital Expenditure				9,777	9	9

5. *Working Expenses.*—The charges against capital will be dealt with in the next paragraph, and the working expenses alone concern us in this one. Of the working charges above shown, Rs. 8840 represent the actual amount spent in labour on the collection of the bark crop from the trees. This charge includes the cost of uprooting coppicing, thinning, pruning, sawing, peeling, and carriage to the temporary drying sheds, and it amounts, as nearly as may be, to eight pies (one penny sterling) for each pound of dry bark. The remainder of the working expenses (viz. Rs. 34,097-7-1) was spent on the cultivation of the Rungbee, Rishap, and Mungpoo plantations, upkeep of roads and buildings, European establishment, head office charges, skilled labour (carpenters and blacksmiths), and on contingencies.

6. *Capital Account.* In accordance with the wishes of Government, the mode of keeping the plantation accounts was recently recast by the Accountant-General, and they are now kept in the form suggested by that officer. One of the changes made is the opening of a capital account. The sum put to the debit of this account at 1st April, 1875, is Rs. 3,50,000. To this has now to be added the expenditure on capital during the year. That expenditure amounts, as has been above shown, to Rs. 9777-9-9. In their letter reviewing the plantation report for the year 1872-3, the Government of India expressed their desire to receive an estimate of the cost at which, with our present experience, a new cinchona plantation could be formed. This estimate was duly furnished, and in accordance with it all extensions which are being made on the slopes of the Sittong spur are being treated as forming a separate plantation, which is called the Sittong plantation. This is under the same European supervision as the older plantations, but separate accounts are kept of all expenditure on it. The sum spent on Sittong during the year, including a proportion of the cost of European establishment, etc., was as above shown Rs. 3,134-14, and this forms the first charge against the Sittong capital account. It is accordingly not debitable to the capital of the old plantation, which includes only Rungbee, Rishap, and Mungpoo. The capital account of the latter, therefore, stands as follows:—

	Rs.	A.	P.
Capital at 1st April, 1875 . .	3,50,000	0	0
Expenditure during 1875-76 .	6,642	11	9
Quinologist's pay for 1875-76 .	10,000	0	0
Total Capital at 31st March, 1876 .	3,66,642	11	9

The Quinologist's pay has been added to capital, as the plantation not being yet in full working the charge can hardly be debited with fairness against the crop.

If interest be calculated at the rate of 4 per cent. on the above capital, an additional item of Rs. 14,664 will be added to the working expenses of the year.

7. *Cost of the bark produced.*—The bark taken during the year amounted, as has already been stated, to 211,931 pounds. From this there have, however, to be deducted 16,640 pounds which were accidentally destroyed by fire, leaving 195,291 pounds, against which the working expenses of the year (Rs. 42,937-6-1) are chargeable. The cost of production, therefore, of each pound of dry bark was 3 annas 6·21 pies, being a fraction over three annas and a half, and as near as may be five pence half penny sterling. If the charge for interest on capital (1 anna 2·23 pies) be added, these figures are raised to within a small fraction of four annas and nine pies, which is equal to seven pence and one-eighth sterling.

8. *Bark account.*—During the year 92,400 pounds of dry bark were made over to the Quinologist for conversion into cinchona febrifuge. The composition of this bark was as follows:—

	Pounds.
Dry *Succirubra* root-bark	4,800
„ stem-bark	42,800
„ branch-bark	44,800
Total .	92,400

To the Presidency Medical Depôt 2000 pounds were also supplied.

The remainder of the crop is stored at Mungpoo, and is being made over to the factory as required. It may be useful to put on record a complete statement of the bark yielded by the plantation since its commencement. The following table shows this at a glance:—

	Pounds.
Dry bark collected by pruning and thinning during 1869-70	2,400
Dry bark collected by pruning and thinning during 1870-71	12,500
Dry bark collected by pruning and thinning during 1871-72	39,000
Dry bark collected by pruning and thinning during 1872-73	Nil.
Dry bark collected by pruning and thinning during 1873-74	16,000
Dry bark collected by pruning and thinning during 1874-75	39,405
Dry Crop of 1875-76	211,931
Total . .	321,236

	Pounds.	
Supplied to Medical Depôt; sent to Her Majesty's Secretary of State, London; used in experiment; made over to Quinologist, etc., prior to 1st April, 1875 .	48,906	
Supplied to Medical Depôt, 1876-77 .	2,000	
Made over to Quinologist, 1876-77 . .	92,400	
Burnt accidentally	16,640	
		159,946
Balance in store, 31st March, 1876 . .		161,290

The total yield up to the end of the year has thus been 321,236 pounds of dry bark.

9. *Accidental burning of part of the crop.*—During the cold season a destructive fire occurred, by which a large shed, containing about 16,640 pounds of dry bark, was burnt to the ground. The fire appears to have originated through the carelessness of the man in charge of the shed. Certain changes were proposed by me in the arrangements to be followed in future in drying and storing bark, by adopting which similar accidents on such a large scale should be averted. Dry bark is, however, a substance which burns readily, and natives are proverbially careless about fire; there will, therefore, under any arrangements whatever, always remain a risk of loss by fire.

10. *Present condition of the plantation.*—The cold season was characterized by a drought unparalleled in Sikhim since meteorological observations began to be recorded in the district. The excessive dryness made any planting during the cold season an impossibility; but beyond killing entirely a few trees in very rocky ground, and injuring the upper shoots of a good many others, it did but little harm to the plantation. Trees standing in some of the wetter pieces of land, so common on the older parts of the plantation, seem even to have been benefited by the lengthened absence of rain. The present condition of the plantation is on the whole encouraging. The younger parts which occupy the Mungpoo ridge continue to be very luxuriant and healthy. A small part, however, of the lower Rishap plantation, which has for some years been rather sickly, still continues so; and as it does not seem probable that it will improve, I have decided to uproot it during next barking season. During the year no additions were made to the permanent plantations. This is chiefly attributable to the unusual drought of the cold weather. The nursery stock of red-barks on the old plantation has, however, been increased by 290,000, and 125,000 young plants have been provided for the new plantation at Sittong. These will be planted out, as far as possible, during the year 1876-77, and ought to add considerably to the area under trees. Of the yellow-bark tree (*C. Calisaya*), 2000 stock plants (kept under glass for purposes of propagation)

have been added during the year. The seedlings of this species, of which 116,000 were returned last year, were not planted out, experience having shown that *Calisaya* seed, however carefully it may have been collected from only the varieties yielding good bark, produces an uncertain and mongrel offspring. These 116,000 have therefore been written off. An addition of 25,000 has been made to the stock of young yellow-barks raised from cuttings. Of the new variety referred to in the former reports as a hybrid, no plants have been put out during the year, but the stock plants of it have been increased from 1000 to 5000. As seedlings of this sort show similar peculiarities to those of *Calisaya*, the seedling stock of 15,000 returned last year was not planted out, and has been written off. *Cinchona pitayensis* is a species allied to *C. officinalis*, which was introduced on this plantation about five years ago. Sixteen plants of it were returned in last report. These all pined away during the year, and none are now left. Regarding the other species in cultivation, I may remark that *officinalis* was long ago discovered to be unsuited to the climate of Sikhim. Of this species, 125,000 appear in the returns, but before another year passes the majority of these will be cut down. The numbers returned of *C. micrantha* and *C. pahudiana* are respectively 50,000 and 5092, and are the same as last year. Both species yield bark which is comparatively worthless, and no effort has for some years been made to multiply either.

11. *Manuring.*—The results of the application of manure to cinchonas, as noted in my last annual report, were not encouraging. I agree, however, with Mr. Wood in thinking it desirable to make a further trial of manuring, and I have accordingly asked Mr. Gammie to do this as soon as practicable. The manured plants reported on last year are now undistinguishable in appearance from their neighbours. It should not be forgotten that all the cinchonas in the plantation are to a certain extent regularly manured, for the weeds cut and uprooted in cleaning the plantation are laid in rows between the trees and the vegetable manure yielded by the decay of these is very considerable.

12. *Survey of the plantation.*—In accordance with the wishes of the Government, the whole plantation was surveyed and mapped last year by an officer of the Revenue Survey Department. Owing, however, to certain official changes which caused, I understand, the breaking up of the party to which this officer belonged, I have, I regret to say, not yet been able to get a copy of the map. The plantation has now arrived at a point in its history when it must begin to be worked on some systematic plan, with reference to the amount of bark to be annually taken from it, and it is high time that an accurate map of it were available. The boundaries of each year's planting should be shown on such a map as well as on the ground. I have impressed on Mr. Gammie the desirability of having, as soon as possible, substantial marks put in the ground which may clearly indicate the limits of the planting of each year.

13. *Distribution of seed.*—During the year twenty-one ounces of seed were given away to two applicants. This shows a great falling off from the former year, when no less than three hundred and fifty-eight ounces were distributed.

14. *Land rent.*—The sum of Rs. 1001-12-10, received for land rent and grazing dues from settlers on parts of the reserve unsuitable for cinchona, was paid into the Darjeeling treasury.

15. *Estimated crop of* 1876-77.—In his report for last year, the Government Quinologist, Mr. C. H. Wood, estimated the yield of the Rungbee, Rishap, and Mungpoo plantations, when in full working, at 366,000 pounds of dry bark per annum. These figures were arrived at as the result of Mr. Wood's own calculations, and were accepted by Government. My calculations lead me to believe that this amount of bark can, advantageously to the plantation, be taken during the year 1876-77, and I beg therefore to submit 366,000 pounds of dry bark as my estimate for the crop of the year now entered upon. Unless, however, arrangements are made for working the alkaloid factory on a larger scale than at present, I would hesitate to advise the whole of this amount being taken, as there would be a difficulty about storing such a bulky crop. I feel convinced, however, that in justice to the plantation this amount should be taken. If taken, I estimate that (including interest on capital, working expenses, and Quinologist's salary) it can be turned out at about the price estimated by Mr. Wood in his report already referred to, viz., three and a half annas, or five pence farthing per pound. Production of the raw material to this amount and at this price would enable Mr. Wood to supply during the year the "cinchona febrifuge"—as he has named his preparation of the mixed red-bark alkaloids—in a quantity vastly exceeding the total Government importations of quinine and the other cinchona alkaloids for the whole of India for the year 1875, and at a cost of less than one rupee per ounce.

16. *General Considerations.*—With regard to the "cinchona febrifuge" issued by the Quinologist, I may observe that, in most ordinary cases of malarious fever, it appears to be an efficient remedy. Powerful testimony to this effect is borne by the four physicians in and near Calcutta, to whom, about eighteen months ago, a quantity was given for trial and report. Coolies on the plantation often get fever by attending markets in the Terai, and they are invariably cured by a dose or two of this mixed alkaloid. In the neighbourhood of the Botanical Garden at Calcutta fever of a bad type is very prevalent, and I have given the cinchona febrifuge to garden coolies and to villagers living near the garden, in the same doses as quinine, and with as unvarying good effect. It is probable that for very severe and critical cases of malarious fever, especially amongst Europeans, sulphate of quinine will long remain in the estimation of the medical profession the best remedy; but everyone who has had much experience of India knows that bad cases of fever are more the exception than the rule, and that there is a simply incalculable amount of fever prevalent amongst the natives of the country which rarely takes the form of a violent or fatal attack, but which expends itself in a succession of attacks, each sufficient to incapacitate the sufferer from work for a time, and a repetition of which too often ultimately induces malarious cachexia and disease of the spleen. There appears to be ample medical evidence for believing that, for malarious fever of this ordinary type, the "cinchona febrifuge" is a most efficient remedy. Everybody who knows much of rural life in this country must also be aware that at present the great majority of such attacks of fever receive no medical treatment whatever, or at least none of an efficient kind, and for the simple reason that no febrifuge is accessible to the sufferers. Quinine is a costly drug, quite beyond the means of a large proportion of the population. Moreover, it is not to be had except at dispensaries and in large bazaars in neighbourhoods where Europeans happen to be settled. It is no exaggeration whatever to say that to three-fourths of the population of India, quinine is simply *unobtainable even by purchase*. Its high price leads, mereover, to its extensive adulteration, and there is too good reason for believing that much of the substance sold in the bazaars as quinine consists partly, and some of it entirely, of other preparations. A febrifuge even less efficient than the cinchona febrifuge would, if accessible to the vast fever-stricken population (and accessibility depends on cheapness), be an immense boon. It appears to be, therefore, a matter for congratulation that Government is now in possession of the means of throwing into the country next year several tons of an efficient febrifuge, and of year by year increasing the supply, and that too at an annually diminishing cost price per ounce.

17. A Manual of Cinchona Cultivation in India, which I prepared at the request of the Government of India, has been printed and published since my last annual report.

ESSENCE OF CUBEBS.*

BY A. OGLIALORO.

Whilst examining a specimen of essence of cubebs the author found that he obtained a hydrocarbon $C_{10}H_{16}$ boiling at 160°, which appears to have been unnoticed by any previous experimenter, although he did not succeed in separating the hydrocarbon of boiling point 230° mentioned by Schmidt. This induced him to prepare some of the essential oil from cubebs by distilling the substance in a current of steam in a copper still; the yield was about 4 per cent., and the product, when submitted to careful rectification after being dried over calcium chloride, yielded a small quantity of a hydrocarbon, $C_{10}H_{16}$, belonging to the terpene series, boiling at 158—163°, and a considerable portion boiling at 250—270°,—evidently a mixture,—but no trace of the hydrocarbon boiling at 230° observed by Schmidt.

The portion boiling at 250—270° was mixed with half its weight of ether and saturated with hydrochloric acid; by this means a crystalline hydrochloride of the composition $C_{15}H_{24}$,HCl, was separated, whilst the mother-liquor, after evaporation of the ether, and separation of a further portion of the hydrochloride which crystallized out, was washed with dilute alkali, dried, and submitted to fractional distillation. The greater portion passed over at 262—263°, and possessed a slight lævorotatory power although it is doubtful whether this is inherent in the hydrocarbon, or is due to the admixture of a small amount of that which forms the crystalline hydrochloride. The hydrochloride crystallizes from boiling alcohol in long colourless needles, which melt at 117—118°, and when heated for some time to 170—180° with water in sealed tubes, is completely decomposed into hydrochloric acid and a hydrocarbon of the formula $C_{15}H_{24}$. This, after purification by rectification from sodium, has a density of 0·9289 at 0°, and boils at 264—265°. It deflects the polarized ray to the left. The hydrochloride also has considerable action on polarized light.

THE AMERICAN LEECH TRADE.†

One of the oldest American leech dealers has been interviewed by the correspondent of a contemporary. His opinions are as follows:

"The American leech I believe to be utterly valueless. I have received fine-looking specimens from Mississippi and Pennsylvania, but I found them wholly worthless. They are far inferior to even some European varieties of the hirudo decora, which cannot easily be induced to bite unless blood be drawn to excite them. I consider six Swedish leeches equal to at least one hundred of any American variety. Those exported to America are generally full of blood, and at Rhode Island there are immense purging ponds in which the newly arrived leeches are placed, and left to digest their last meal. Until it has been perfectly digested they are useless. These ponds belong to Mr. Witte, who does nearly all the importing for American leech doctors, and he charges an extra price for the ponded leech, because the leeches must remain at least a year in the purging pond. It takes a year for them to get rid of one good meal. The leech can live on almost nothing; its vitality is absolutely prodigious. But it is a curious thing that they are constitutionally delicate creatures. If deprived for a considerable time of clay or turf to burrow in, they are liable to disease. They are carried off by epidemics peculiar to leech life, some of which appear to be skin diseases. I have to nurse them pretty carefully, and when I find one leech sick I put him in the leech hospital. A milk diet frequently restores sick leeches to perfect health."

* From the *Journal of the Chemical Society* for December, 1876.

† *Druggists' Circular* for December.

SOUTH LONDON SCHOOL OF PHARMACY.

The fourth annual dinner in connection with the above school was held on Friday, December 22nd, at the Horns Assembly Rooms, Kennington Park, under the presidency of Dr. Muter, Mr. W. Baxter occupying the vice-chair.

The usual loyal toasts having been disposed of—

The Chairman in proposing the toast of the evening, "Success to the South London School of Pharmacy," said he was glad to see around him so many familiar faces. They all knew nothing was more gratifying to him than to know that after the relationship of lecturer and student had ceased, the relation of friend should continue, and the presence of so many old scholars that evening proved that this feeling was reciprocated. The toast needed no recommendation—"Good wine needs no bush"—and those present were living bushes of the South London School of Pharmacy. With regard to the examinations they had been going on in a very quiet manner, and he could honestly say that the examinations at Bloomsbury Square were the most perfect in England, and that the examiners were well up to their work in every respect. There were two points, however, which in his opinion needed a slight revision. The first was that of allowing books and notes at the Major examination. He looked upon a practical examination at which books and notes were allowed as a farce, because if a man knew his business he could do his analysis without the use of such helps. If these were abolished one great incentive towards "cramming" would be abolished. The second point was the too frequent examinations held during the year, tending to bring men up insufficiently prepared. The examination in October was one to which practically few men could go up efficiently prepared, because it took place at a time when no recognized school was open. If the examinations were held every three months, instead of every two months, a great deal of "cramming" and the temptation to do the work in the shortest possible time would be got rid of. In all other respects everything was satisfactory, and he honestly believed that the men turned out at Bloomsbury Square were men who really knew their business, and men to whom the public might trust their lives. In conclusion, he would ask them to drink with bumpers the toast he had the pleasure to propose.

Mr. Charles White (Churchwarden) then presented the prizes to the successful students of the past season. He said that the distribution of these prizes was to him a very great pleasure, and he took that opportunity of heartily congratulating those who had been successful, and at the same time sympathizing with those who had not been so fortunate. Success in after life was not confined only to those who gained a prize at school. The school, he understood, commenced nine years ago with one student, and now it had over one hundred, and its scholars occupied distinguished positions throughout the country. Lambeth might well be proud of having so useful an institution in its midst, and the worthy doctor and his assistants were entitled to the thanks of the community at large. The school had no rival, at all events in the south of London, and every care was taken of the student's welfare. In his opinion chemistry had been a science of wonder and mystery. The old alchemists used what little knowledge they possessed to impose upon their fellow men, but the chemists of the present day were a very different class of people.

The Vice-Chairman then proposed "The Successful Candidates." He did not say that their success was due to the superior educational staff of the school, but he did say without fear of contradiction that no man living had the power of imparting the knowledge he possessed better than Dr. Muter. He might express a hope that at their future meetings some members of the parent institution would honour them with their presence.

Messrs. Hart and Colegrove returned thanks on behalf of the successful students.

Various other toasts were proposed and responded to.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 30, 1876.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

MORE MILK OF SULPHUR PROSECUTIONS.

THREE more chemists and druggists have this week been prosecuted for the sale of milk of sulphur prepared according to the directions of the Pharmacopœia of 1721, and consequently containing hydrated calcium sulphate to the extent of about 60 per cent. The charge brought against them was that of having sold "adulterated" milk of sulphur, and notwithstanding the fact that the cases were defended by the Solicitor of the Chemists and Druggists' Trade Association, the Bench decided to convict and each of the defendants was fined twenty shillings and costs.

It appears to have been tacitly assumed by the magistrates that the term "milk of sulphur" ought to be interpreted as signifying a preparation consisting entirely of sulphur in a fine state of division, in fact the preparation which is comprised in the British Pharmacopœia under the name of sulphur præcipitatum. On no other ground that we can imagine could it have been held that the defendants in these cases did not supply the article asked for. Upon this assumption the decision of the magistrates cannot be objected to; but at the same time it is an assumption which altogether begs the question whether the sale of the familiar and popularly approved preparation containing hydrated calcium sulphate is an offence punishable under the provisions of the Sale of Food and Drugs Act.

This is a question which urgently calls for some authoritative decision, for there is little doubt that among the fourteen thousand chemists and druggists on the register, the great majority, especially in country places, are in the daily habit of selling the preparation of sulphur which contains hydrated calcium sulphate, and any one of them is liable to be brought before a police court upon the charge of selling an adulterated article, if it be admissible to adopt the assumption upon which the Runcorn magistrates appear to have arrived at their decision.

Although the trade in milk of sulphur is comparatively a small matter, since the article is sold in quantities of a few pence worth at a time, the credit of the greater number of chemists and druggists throughout the country is nevertheless at stake and in peril with regard to it.

Regarding the matter from this point of view it is singular that, while the magistrates assumed that the term "milk of sulphur" ought be understood as meaning the precipitated sulphur of the British Pharmacopœia, no attempt seems to have been made by the defence to raise an issue upon this point. Until that is decided one way or the other it is almost futile to attempt a defence in prosecutions for the sale of the preparation made according to the directions of the old Pharmacopœia. So long as that point remains undecided the production of evidence to the effect that there is a very extensive and general use of the old fashioned milk of sulphur, and that wholesale druggists are in the habit of selling thirteen times as much of it as of the preparation of the British Pharmacopœia, is open to the disadvantage of being regarded by the magisterial mind merely as evidence of the extent to which an abuse prevails, and so far from being a sufficient ground for acquittal it would, perhaps, from that point of view, constitute a strong reason for imposing a heavy penalty.

We are by no means unmindful of the fact that this subject is involved in considerable difficulty. There is unquestionably a wide diversity of opinion, even amongst members of the trade, as to what should be understood by the term "milk of sulphur." Many contend that it should only be applied to the preparation of the British Pharmacopœia, and that the older preparation should be regarded as obsolete; this opinion is also practically acted up to by many chemists and druggists, by their keeping only the precipitated sulphur, and systematically supplying that article when asked for milk of sulphur. In this way some confusion has been created, and the application of the old name as a synonym of precipitated sulphur by some writers on materia medica has tended to increase this confusion. On the other hand, it is maintained by many that among the class of persons using milk of sulphur there is not only a decided preference for the older preparation, but a decided objection to the more modern one. It is contended, and we must admit the justice of the statement, that this feeling prevails in some cases to such an extent that chemists and druggists must either supply the old-fashioned "milk of sulphur" or decline to meet the wants of their customers.

Practically, therefore, the case is a very perplexing one, and as it now stands the sale of the article popularly known as "milk of sulphur" must either be abandoned, or if it be continued it will be at the risk of condemnation as dealing in an adulterated article.

We observe that in the cases just tried at Runcorn notice of appeal has been given, and we hope that by bringing the question before a higher court, chemists and druggists may at least be relieved from the uncertainty that now prevails as to whether the sale of an article which is in one part of the country decided to be legitimate, may not in another county be treated as a punishable offence.

MEDICO-PHARMACEUTICAL ALLIANCES IN TURKEY.

According to Professor Landerer, the medical men and the pharmacists in Turkish towns work together in a way not unknown in this country. The physician sees his patients at the pharmacist's establishment, and there gives his orders as to the medicines, etc., they are to receive to the pharmacist, who has been awaiting the arrival of his medical friend sitting cross-legged on a bench and smoking his hookah.

The prices of medicine are not regulated by law, and a simple quinine mixture costs from 30 to 50 piastres (5*s.* to 9*s.*). When such a medical man undertakes a more important case, a fee for the cure, inclusive of medicine, ranging from 1000 to 2000 piastres (£9 to £18) is agreed upon, and one-half is paid in advance. If the unfortunate patient should die the physician loses the other half of the fee, and the pharmacist may send in his reckoning in the Greek kalends.

One of these genuine Turkish pharmacies presents a peculiar appearance. Glass and earthenware vessels of all shapes, round wooden boxes, with labels in all colours, or without any, a handsome pair of brass scales, a spatula, a pill machine, and a marble slab, on which to make pill masses, adorn the prescription counter; whilst for the general ornamentation of the pharmacy, but not for use, some glass retorts are hung against the walls.

The library of such an establishment consists of five or six books, principally Italian. Notwithstanding all this, these pharmacists and physicians are much respected in the interior of the Ottoman empire and they become wealthy men.

EARLIER CLOSING.

With respect to this subject it is gratifying to learn that an agreement to close at an earlier hour, made as far back as 1860, by the chemists and druggists of Bath, has been fairly carried out up to the present time. Of course there have been a few who have refused to be bound by the arrangement, but this has not induced others to fall away from their compact or to regret it. We are informed that it is now the practice of many pharmacists in Bath to put up the shutters, as a rule, at 7 o'clock, and to close the doors as soon after as convenient, and before 8 P.M. We have great pleasure in placing this on record, because the result of the practical experience of sixteen years ought to have considerable influence upon those whose doubts as to the practicability of earlier closing have hitherto hindered them from joining the movement.

The amount of revenue derived from "patent medicines" during the year ending the 31st of March last, was £123,136 9*s.* 10½*d.*, for which the number of stamps issued was 15,873,934.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

December 20, 1876.

Present—Messrs. Ainslie, Borland, Buchanan, Gilmour, Kemp, Kinninmont and Young.

MAJOR EXAMINATION.

One candidate was examined and failed.

MINOR EXAMINATION.

Nine candidates were examined. *Five* failed. The following *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Cowap, John William ....Stockport.
Dick, Robert Gibson ....Edinburgh.
Gardner, Robert ....Dollar.
Gorrie, Daniel ....Perth.

December 21, 1876.

Present, as on the 20th.

Professor Maclagan was also present on behalf of the Privy Council.

MINOR EXAMINATION.

Ten candidates were examined. *Three* failed. The following *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

McAlley, Robert ....Edinburgh.
Mackie, George ....Banff.
Manduell, Thomas ....Hindpool.
Nicholson, John ....Heaton Norris.
Robertson, William ....Peebles.
Simpson, William..................Sheffield.
Smith, Robert Frazer ....Glasgow.

MODIFIED EXAMINATION.

One candidate was examined and declared qualified to be registered as a Chemist and Druggist:—

Anderson, Hugh Mackay ......Leeds.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Thursday, the 7th inst., the members of the above Association assembled at their rooms in Halford Street, to listen to a lecture on the natural order "Umbelliferæ," by Mr. F. T. Mott, F.G.S. In the absence, through illness, of the President, the chair was occupied by the Vice-president, Mr. Hammond.

After a few words from the chairman, the lecturer stated that the ancient Greeks and Romans considered one of the plants of this order, viz., hemlock, as one of their most deadly poisons; and that it was by the juice of this herb that the learned Socrates met his death. The producing power of plants by the expansion and contraction of the stem in the formation of the cyme, raceme, corymb, pannicle, and umbel, together with their true characters and the manner in which the florets expand were fully illustrated by the aid of diagrams. Attention at this stage was drawn to the fact that the umbelliferous flower was not alone sufficient to mark off accurately plants as belonging to the umbelliferæ: but there were other great distinguishing characteristics in the leaves, flowers, fruit, and seeds by which they were able to be separated from other orders, all of which were carefully enunciated and explained by the lecturer. The number of species and genera of this order, together with the numbers of those to be found in Leicestershire, as also the portions of the continents which they inhabit, were all named.

The lecturer next spoke of the composition of the various plants contained in this order; those which are used as drugs, such as assafœtida, ammoniacum, and others contained gum resins, being natives of Asia, and warm climates; others which are used as aromatics found growing principally in Britain, such as anise, cumin, caraway, and others contained volatile oils; some again are rich in starches and sugar, making them valuable as pot herbs, such as fennel, parsley, and celery, although the latter of these three in its wild state is poisonous, nevertheless by cultivation and blanching the poisonous juice does not form, owing to the fact that to do so, the plant must have free access of air and light; whilst some of the plants are poisonous, such as *Conium maculatum*, *Cicuta virosa*, *Œnanthe crocata*, and *Æthusia cynapium*. Full descriptions of these, and the plants for which they may be mistaken, were given and illustrated by the aid of diagrams and dried specimens. The difficulty of distinguishing the different species of this order was also spoken about. With a few remarks as to the probable place this order may take in the future, the lecturer brought his interesting and instructive lecture to a close.

A most hearty vote of thanks was accorded to Mr. Mott, for his great kindness, and the proceedings terminated.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, December 21, 1876. Professor Abel, F.R.S., President, in the chair. After the minutes of the preceding meeting had been read and confirmed, the names of Messrs. A. Gaved Phillips and F. Kopfer were read for the first time. The President read a letter from the Secretary of the Royal Society as to the nature and conditions under which grants would be made from the £4000 given by Government in aid of original research.

The first paper, entitled "A Further Study of Fluid Cavities," was read by Mr. W. N. Hartley, and the results of his examination of a large number of topazes, selected from the magnificent collection in the British Museum, showed that the cavities scarcely ever contained anything but water. If the view be accepted that topaz has been formed by the action of alkaline fluorides or cryolite on kaolin no carbon dioxide would be liberated, so that it might not necessarily be found in the fluid cavities. This is corroborated by the fact that in one and the same topaz, cavities may exist side by side one of which is nearly filled with liquid carbon dioxide, the other one-third with water, one-third with liquid, and one-third with gaseous carbon dioxide, the space occupied by the gaseous CO_2, having been produced by the contraction of the water on cooling. He inferred, moreover, that the critical temperature of water had not been reached, otherwise the contents of the adjacent cavities would have been uniform.

The author had also examined a very large number of rock sections, principally of granite and porphyry, almost all of which contained water cavities, but in none of them was the presence of carbon dioxide distinctly observed. A curious phenomenon in connection with the bubbles in the water cavities of rock crystal was sometimes observed, namely, that when heated the bubble became more dense than the liquid and sank, so that in large deep cavities it went entirely out of focus when observed with a half-inch objective. In one specimen of quartz it was found that the bubble began to sink at 131° C., but not before it had reached this temperature. The cause of this motion appears to be that the bubble consists of a gas so highly compressed that it is nearly of the same density as water at the ordinary temperature; on heating the water expands, thus still further condensing the gas in the cavity, which thus becomes heavier than the liquid, and consequently sinks in it.

It is very remarkable that the cavities are not only frequently arranged symmetrically around the axis of the crystal, but in some cases they take the form of the crystal in which they are enclosed, each side of the cavity being parallel to a face of the crystal. Drawings of sections of crystals were exhibited, in which this was very clearly shown. This is probably caused by the water exerting a resistance to compression comparable to a solid body at the high temperature at which the crystal was formed, but being mobile the shape of the enclosed water was altered so as to conform to the planes of crystallization of the mineral as the silica molecules grouped themselves around it.

The President, in thanking the author, remarked that this investigation in his hands had been prolific in interesting results. He hoped that his ingenious speculations bearing on the formation of these crystalline substances and the cavities contained in them would give rise to a valuable discussion.

In reply to a question put by Dr. Armstrong with reference to the occlusion of hydrogen by trap rocks recently investigated by an American chemist, Mr. Hartley said that in samples of trap from the neighbourhood of Edinburgh, which he had examined, he had noticed cavities, but they contained nothing; cavities containing liquefied carbon dioxide had been observed, however, in trap. He had not considered the question as to whether such cavities contained hydrogen, his attention having been chiefly confined to quartz, granite, porphyry, etc., most likely to have cavities containing liquefied carbon dioxide, the special object of his search.

Dr. H. E. Armstrong then gave a paper "On Thymoquinone." In a recent communication to the Berlin Chemical Society Liebermann pointed out that the "oximidonaphthol," $C_{10}H_5\left\{\begin{matrix}OH\\NH\\NH\end{matrix}\right\}$ of Graebe and Ludwig, prepared by the oxidation of diamidanaphthol, is more propably a compound of the formula $C_{10}H_5\left\{\begin{matrix}O\\NH\\NH_2\end{matrix}\right\}$ and that when it is oxidized to naphthaquinone the NH_2 group is displaced by OH; in other words, the OH group and one of the NH_2 groups in diamidanaphthol are concerned in the formation of the quinone, and not both the NH_2 groups, as Graebe and Ludwig supposed. It is to be presumed, therefore, that in the formation of oxythymoquinone from diamidothymol (recently effected by Carslangen) by oxidation, a similar reaction takes place, namely, that only one of the NH_2 groups and the OH group are concerned in the production of this quinone, the other NH_2 group being merely replaced by hydroxyl. Carslangen has also obtained the same oxythymoquinone by treating the monobromo derivative of thymoquinone with potassic hydrate. Ladenburgh has employed these results as the basis of a speculative theory as to the value of the several hydrogen atoms in benzene, in which he makes the perfectly gratuitous and unsupported assumption that in the first instance the thymol OH group remains unaffected, only the two amido groups taking part in the formation of the quinone, whilst in the second instance the thymol OH group does take part in the formation of the quinone. This Liebermann points out is not only unproved, but is improbable, Dr. Armstrong stated that for a long time he had been engaged in an investigation of thymol and its derivatives, and had already obtained results which show that Ladenburgh's assumption was incorrect, even if it had not been contrary to our knowledge of the law governing the substitution in the phenol derivatives that para and ortho compounds are first formed. The author had found that monamidothymol from nitrosothymol, in which the NH_2 group occupies the para position relatively to the OH group, yielded thymoquinone when distilled with ferric chloride equal in weight to more than half the weight of the thymol employed in the preparation of the nitroso-derivative. He also stated that the formula suggested by Liebermann for "oximidonaphthol," etc., had already been suggested by Mr. C. E. Groves and himself in a foot note in the new edition of Miller's 'Organic Chemistry' they are now preparing, the proof sheet containing the note being handed in to the President.

The President having thanked the author for his communication a paper "On High Melting Points with special reference to those of Metallic Salts," Part II., by Dr. T. Carnelly, was read. The method to be employed depends on the principle that if three salts, A, B, C, whose fusion points are in the order A, B, C, be arranged on a cold block of iron and then introduced into a muffle, kept at a constant high temperature, the ratio $\frac{y}{x}$ is approximately constant for the same three salts, whatever the temperature of the muffle, x being the number of seconds which elapse between the melting of A and B and F that between the melting of B and C. The arrangement of the muffle and iron blocks is shown in an engraving, and the methods of working given in detail. The results of a large number of experiments instituted to prove that the law just enumerated holds good under varying circumstances is given in a series of tables. The author proposes in a future communication to show how this principle may be employed in the actual determination of high melting points.

The Secretary then gave an outline of a paper "On the Estimation of Urea," by Mr. G. Turner, containing the results of his experiments in determining urea by Russell and West's method, the apparatus employed being a modification of that known as "Scheibler's calcimeter."

Dr. G. Bischoff read a short notice "On the Corrosion of Lead by the New River Company's Water," saying that he had observed the formation of a crust of lead carbonate on the exterior of a piece of gas tube which had been employed as a syphon in a cistern supplied by the New River Company, and which was consequently alternately exposed to the action of air and water as the level of the water in the cistern altered. This tube was the so-called "composition" tube usually employed by gasfitters, consisting of lead alloyed with a little antimony. An adjoining cistern of sheet lead with a lead overflow pipe shows nowhere any signs of similar corrosion.

In reference to a remark which the author made as to the protective influence which tin exerted when alloyed with lead, Mr. David Howard said that even when the amount of lead in the tin used for tinning vessels employed for culinary purposes did not exceed 5 or 10 per cent. it was found to be readily attacked by dilute acids, etc., so as to be likely to produce very injurious effects.

The President said that the lead tube lined with tin was made by drawing the two metals at the same time, and when faults occurred to this interior coating the lead was rapidly corroded although, no doubt, the faulty parts must be more or less alloyed with tin.

The meeting was then adjourned until Thursday, 18th January, when Messrs. C. T. Kingzett, and H. W. Hake will give a "Preliminary Account of Some New Reactions in Organic Chemistry, and their Ultimate Bearings;" there will also be papers "On Kekulé's and Ladenburgh's Benzene Symbols," by Dr. H. E. Armstrong, and "On Nitroso-orcin," by Dr. J. Stenhouse and Mr. C. E Groves.

Lectures are announced "On the Theory of the Bunsen Flame," by Professor Thorpe; and "On the Discrimination of Crystals by their Optical Properties," by Professor N. Story Maskelyne, both experimentally illustrated. These will probably take place on March 1 and April 5, respectively.

PHILADELPHIA COLLEGE OF PHARMACY.

The second meeting for the present session of this Society was held on Tuesday, November 21, Mr. Dillwyn Parrish, President, in the chair. The following paper was read:—

Preparations of Malt.

BY R. V. MATTISON, PH.G.

For several years past there seems to have been an observed tendency among physicians towards the use of a class of preparations more or less representing the saccharine and albumoid constituents of malted barley, and a number of medicinal preparations have been gradually introduced, some of which have found considerable favour among the profession as a slightly-tonic and valuable nutrient food, employed in dyspeptic and other stomachic disorders, caused by the non-assimilation of starch food.

Probably the most widely known in the United States is the "Hoff's Malt Extract," which most of the members present may remember particularly, on account of the great difficulty experienced in being able to obtain it during the late Franco-German war, and the notoriety which one of our eminently-respectable houses at that time attained, through being able to supply, as genuine, a preparation put up in the ordinary London Stout bottles, with *facsimile* German labels. The genuine preparation does not seem to the writer to be properly called an extract of malt, since it certainly partakes more of the nature of a malt liquor, the principal difference being that it is of sweeter taste and less spirituous—more sugar and less alcohol than the ordinary malted liquors of commerce. The fact, however, of its containing a notable proportion of alcohol renders it, in the opinion of the writer, an objectionable article; not objectionable as a malt liquor, understand, but as an *extract of malt*, since a large portion of the sugar has been converted by fermentation into alcohol.

The nutrient properties of a good malt extract consist in the amount of malt sugar, diastase, etc., that is obtainable therefrom by the assimilative organs of the human system, and to insure the proper amount of these principles depends upon the proper observance of four rules, viz.:

1. The barley must be malted properly and carefully, to insure the formation of as large a quantity of diastase as possible, that by its action in mashing all the starch may be converted into sugar. The chemical change may be thus represented, the starch taking up the elements of water:

$$\underset{\text{Starch.}}{3C_6H_{10}O_5} + H_2O = \underset{\text{Glucose.}}{C_6H_{12}O_6} + \underset{\text{Dextrin.}}{2C_6H_{10}O_5}$$

2. The ground malt must be *mashed* carefully, with due regard to the temperature, so as to insure the largest amount of sugar being extracted with the smallest amount of water.

3. The evaporation of the extract with a low degree of heat, to avoid charring any of the delicate constituents of the extract.

4. The most scrupulous cleanliness must be observed at all times in and about all mash-tubs, kettles, capsules or other vessels used in its preparation.

A word as to the object of the preparation may not be out of place. It is well known that in the human economy the salivary glands and the pancreas secrete analogous principles, each having for its object the conversion of amylaceous principles into saccharine, that existing in the salivary secretion being known as ptyalin and that of the pancreatic juice as pancreatin. In the malted barley there is found a substance analogous to these, and having just as strong and subtle power of changing starch into sugar as the pepsin in the gastric secretion has the power of converting albuminous substances into peptone. This substance in malted barley is called diastase, and is formed during the process of germination or malting. A small portion of this substance has the power of converting an almost indefinite proportion of starch into sugar.

These facts being known, it is obvious that when the animal system is incapable, through deficiency of the natural secretions, of converting starch food into sugar, we must add some artificial saliva, as it were, to perform the work and make good the deficiency, and hence it is that the heavy feeling in the stomach observed after eating heartily of potatoes, corn-starch and other graminaceous or amylaceous food, is promptly removed by taking a small quantity of a good extract of malt.

Barley grown in high latitudes like Michigan, Canada, and the like, is generally the best, because of its containing more starch, which, in the process of mashing, is converted into sugar, and of course, there being more sugar the yield of extract is larger, thus making the operation more successful, pecuniarily, to the manufacturer.

The process of malting we need not describe, being familiar to us all, and for the purposes of the malt-making pharmacist may be practically ignored, it being better to purchase the malted barley of a professional maltster.

The barley, then, being properly malted, is ground coarsely, and a tub, preferably of cedar, with a false bottom perforated, and of a capacity of say 20 gallons (an old-fashioned upright churn answers very well), is filled with about 14 gallons of water, at a temperature of from 168° to 172° F. Into this tub about half a bushel of malt is added, little by little, until the whole is well stirred in. The tub is then well covered and set away in a warm room, and allowed to remain perfectly at rest for a period of three or four hours, taking care that the temperature does not fall below 150° F.

This is the process of mashing. At the expiration of the allotted time, the stop-cock below the perforated diaphragm is opened, and water of a temperature a little above the extract, which is now being drawn off below, and which we shall now call the wort, is sprinkled by means of a sieve or plant sprinkler, upon the top of the malt until the wort being drawn off below is almost tasteless or of so low a specific gravity that it will not pay the cost of evaporation. In large operations this sprinkling is done by means of a patented revolving instrument called a "sparge," and which much resembles a lawn-sprinkler, that revolves by the pressure of the water being ejected from each side in opposite directions, the water being supplied from a large tank in which it is heated by steam, and the exact temperature being easily controlled by valves commanding abundant supplies of both cold water and steam. This wort that we have drawn off from our mash-tub or percolator, we now place in the capsule or copper kettle, and evaporate by means of a water-bath to the required consistence; the first run should have a high specific gravity, and contain about a pound of malt sugar to the gallon of wort. We present samples of this evaporated wort, which is now our malt extract.

A word now regarding cleanliness. The mash-tub and all other wooden or metal utensils should be washed out at least once a week with dilute solution of caustic potash or soda, and any barrels, tubs, etc., should be kept filled with lime water when not in use, as the tendency of the wort which may be left in them is very great toward fermentation, and a few grains of malt accidentally left in the tub, and which have undergone putrefactive change, may completely spoil the subsequent batch of malt at the next mashing.

Extract of malt with iron is easily prepared by the addition of a syrupy solution of ferric pyrophosphate, in the proportion of four grains to the tablespoonful.

Extract of malt with pepsin has been proposed as a valuable preparation in dyspeptic troubles, since it would certainly have valuable digestive properties, acting upon both amylaceous and albuminous substances.

Extract of malt with cod liver oil is proposed as the acme of all emulsions of cod liver oil. When we reflect on the fact of cod liver oil being simply food and not medicine, and then combine this with a preparation having of itself the property of transforming non-assimilable food into that which may be easily assimilated, beside being a valuable nutrient, we have as an emulsion (and it makes a perfect emulsion without the use of any gum, sugar or other vehicle) a preparation of double the nutrient value of the ordinary emulsions of cod liver oil. A preparation, also, that is very pleasant to the palate as well as the stomach, a fact that, in these days of elegant pharmacy need not be overlooked.

The author exhibited a sample of the product and also an emulsion of cod-liver oil and extract of malt containing 50 per cent. of oil, its odour disguised with almond and wintergreen. It is readily prepared, no gum or other emulsifier being required. It readily mixes with water, but the oil separates as a creamy layer upon standing, and upon again shaking the mixture is restored.

Mr. A. P. Brown stated the same facts were true where an infusion of malt was used in this manner—the oil being emulsified by simply agitating it with the infusion.

Professor Remington exhibited specimens of Russian isinglass obtained from the Russian Commissioners. They comprise various kinds of sturgeon, carp and silure isinglass from Astrachan, consisting of leaves in various thicknesses, circular pieces and long cords tied together; also, so-called "crumbs."

Professor Maisch exhibited Dugong oil, also pure gelatin in sheets, made in Hanau, Germany, by Otto Lindenbauer, and a sample-card of coloured gelatin made by Carl Spatz. The raw material used is the residues from the bone-button works. The gelatin is of the finest quality—the samples exhibited, in addition to the white, were of many beautiful colours.

Parliamentary and Law Proceedings.

PAPERS PRESENTED TO PARLIAMENT.

INDIAN *versus* CHINESE OPIUM.

A blue book of commercial reports by Her Majesty's consuls in China, which has been recently issued, bears unmistakable evidence that the consumption of the native grown opium is largely increasing. In fact during last year its competition was so strong as to materially affect the quantity of Indian-grown opium imported at some of the Chinese ports. A most interesting report has been made by the Consul at Canton, Mr. B. Robertson of Canton, who says:—

"There is no doubt that the importation of Indian opium has not increased in the ratio that might have been expected. On the contrary, it has been stationary, whilst, on the other hand, the native production has so to a very large extent, showing that if the supply from India failed or was cut off entirely, its loss would in time be supplied from native sources. Some years since, Sir Rutherford Alcock, Her Majesty's Minister in China, called attention to the probability of the increase of native production, and the possibility of its superseding that of India. His remarks were received with doubt, but time has proved the soundness of his views, for the breadth of land under poppy cultivation has increased year by year, and the produce has unquestionably checked the increase of the Indian drug. The province of Szechuen is where it is chiefly grown, but in Shantung, Chili, Hupeh, etc., there is an increasing production, notwithstanding the occasional proclamations fulminated against it, and of which little notice is taken. It is a mistake, therefore, to suppose that the stoppage of the Indian supply would affect the consumption of opium in China. It might for a time cause some inconvenience to those who prefer it to the native product, but only for a time, for the habit of smoking the drug is so deeply seated as to have become a necessity with a very large section of the people, and the Government is wise enough not to interfere with it beyond the issue of warnings.

"While on this subject I think it well to quote from the Trade Report of the Port of Newchwang of 1874, furnished by Mr. Man, Commissioner of Customs there, some remarks of his upon native opium. He says:—

"'All over Sheng-king (another name for the province of Liao-tung, of which Newchwang is a port) the poppy may now be seen. Every town in the province is amply supplied from its yield. Mixed in a certain proportion with Indian, the use of the native drug is spreading among the gentry, while a resort to it pure gives the humblest peasant power of obtaining a longed-for and otherwise impossible luxury.

"'Passing northwards to Kirin, a province which has as yet but a thin and mixed population, and with great stretches of forest and mountain isolating, as it were, the light commanderies into which its government is subdivided, in the settled valleys of this territory, the colonization of which is now proceeding with rapid strides, of every ten mow of available soil, an average of eight is devoted to the poppy. An exodus of rather an extensive scale took place some months since of entire families from the lowlands of Liao-tung in the direction of the lately-occupied regions eastward of the lesser palisade. These people hardly made it any mystery that their object in thus seeking a new sphere was to turn to a golden profit the facilities there promised for an enterprise hampered by the nominal taboo at home.

"'Finally into Tsitsihar, a domain until recently scarcely visited by Europeans, ungauged as to capability, and where the hold of Government has ever been light, the advent of the banned plant has wrought a kind of revolution. Three or four years ago some emigrants from China, not having the fear of the law before their eyes, started this venture. Success resulted passing the wildest hopes; friends and relations poured in upon their track, and, notwithstanding a show at the start of great energy in repression, the number of communities obtaining a comfortable livelihood by this means has become so large, and the members thereof are, moreover, so rapidly increasing in wealth and power, that the military magistrates, even those most willing to enforce the law, dare not take measures which would certainly result in disturbance, and very possibly in defeat. Accepting, therefore, the apparently inevitable, and turning the illegality of the culture to a use not unknown to his civil colleagues in the mother-country, the marshal governor has practically enfranchised the trade by fixing a scale of extra fees on produce from the plantations over and above the one sole tax, the land assess, due to the imperial treasury. Speaking roughly, 12 taels per picul is the average exactment,* and it is willingly paid by the hardy settlers, who are shrewd enough to see and grasp the advantage such official recognition confers upon them. Without any interference on the part of their rulers, a growing population is thus allowed to continue in undisturbed possession of this fresh field of industry.

"'The increased demand for home-grown opium can no longer be attributed solely to the low and advantageous price at which it can be laid down. Successful efforts to improve the quality have begun to influence the results.'

"To these remarks of Mr. Man I may add some information obtained lately by me from native sources.

"Opium, which originally came from abroad, had towards the close of Ming dynasty (A.D. 1644), the name of 'Ya Fu-jung' (Cantonese, 'A-fu-yung;' Arabic, 'Afyun'). The 'Botanical Encyclopædia' also gives the name 'Afuyung.' At that time it was not known that the drug could be used for smoking purposes, but its properties were cooling and astringent, and it was used for diarrhœa and fevers, but with what admixture is not known. Subsequently it was made into paste and smoked, hence the present name of opium-smoking, which has also an astringent and antifebrile effect. It is relaxing and reduces the system.

"At first the only sort was Patna, followed afterwards by Malwa, then Benares, and finally Persian, all imported from abroad. Tradition describes Persian as hot and acrid, and liable to cause dysentery. It is all sent to the province of Kwangsi, as the chilly climate there is said to permit of its use.

"Kwantung (Canton) only consumes Patna and occasionally Malwa. Benares is used in the Prefectures of Hui-chow, Chao-chow (Swatow), and Kia-ying-chow, and is sent to other provinces of China. It is cheaper than the other kinds. Malwa is only used by one or two out of ten in Canton, and goes chiefly to the provinces.

"When China first began to cultivate the poppy it was called the 'Yung-su-hwa,' jar-shaped flower or capsule, and when the juice was extracted it was called white smoke or white tobacco. It is grown chiefly in Yünnan, where it covers the whole place; hence the name 'Yünnan white.' It is also grown on the hill-tops of Kansuh, but not to a tenth of the extent grown in Yünnan. It is exported from Yünnan to all the provinces, and is also smoked in Canton, being barely more than two-thirds the price of the foreign, but it is not so rich to the palate as Patna. Eight out of ten in the Prefecture of Canton, smoke Patna and the other two Yünnan. Other provinces use a great deal of Yünnan. Nearly every one in Hunàn, Hupeh, Yünnan, Kweichow, and Western Szechuen smoked Yünnan opium, and only the rich used Patna and Malwa, the reason being that, firstly, the price was cheaper; and secondly, it was easier to purchase than the prepared. Patna had to be bought by the ball and could not be purchased retail. Each ball was 4 lbs. in weight, and cost 8 dollars the catty ($1\frac{1}{3}$ lbs.), that is, 24 dollars the ball, whereas, the native could be bought by the ounce or the drachm if required. Again, native opium is much easier to prepare than foreign.

"Opium is divided by the Chinese into the following kinds or qualities:—

"*Foreign.*—1st termed 'Kung t'u' or Patna, $3\frac{1}{2}$ lbs. to the ball.

"2nd. 'Kung-tze-pai' or Malwa, about $3\frac{1}{3}$ lbs. to the packet of 5 or 3 inch cakes.

"3rd. 'Ku t'u,' or Benares, about $3\frac{1}{3}$ lbs. to the ball.

"4th. 'Chinta,' or golden opium, or Persian, made up like the second quality; this has a fiery flavour, and is little used by the Cantonese, as it causes dysentery.

"The above kinds are sent all over the Province of Kwangtung (Canton) and Kwangshi.

"*Native.*—Native opium is divided as follows:—

"1st. Called Yünnan pai or white opium, produced in the Province of Yünnan. It is made up into flat cakes.

"2nd. Syschuen Province also produces white opium, which comes only in small quantities.

"3rd. Shensi Province also produces white opium in appearance like Patna. It comes occasionally to Canton.

"4th. Kansuh Province also produces white opium, but this seldom appears.

"5th. Kwangsi Province also produces white opium, which goes by the name of 'Nan hing white,' and is consumed in Canton, but only in small quantities.

"6th. The magistracy of Sin hing, in the Prefecture of Shao-ching, Kwangtung (Canton) Province, also produces white opium called 'Paradise white' ('Tien tang pai'). The natives of the four lower Prefectures mix it with other sorts for consumption.

"7th. The inhabitants of the Ho yuan, Hai-feng, and Lien-feng Magistracies under the Huì chow Prefecture, clandestinely cultivate opium, which is made up into balls. They buy Malwa and mix it with the native into a paste, which they alone consume. It does not go elsewhere, not even to Canton.

"*Foreign opium* is distinguished as follows:—

"1st. Patna is chiefly consumed in Canton and Shanghae.

"2nd. Malwa is chiefly used on the North River of Kwangtung (Canton).

* Tael equal to 6s.; picul equal to $133\frac{1}{3}$ lbs.

"3rd. Benares is taken principally by the four lower Prefectures of Kwangtung (Canton).

"*Native.*—4th. Yünnan white circulates everywhere.

"5th. The other sorts of white Chinese opium are not much in circulation, and their distribution cannot be actually defined..

"Although it is impossible to obtain the quantities of opium grown in the various provinces of China, still the above description is sufficient to show that it is very commonly cultivated over the length and breadth of the Empire, and with little or no interference on the part of the Government, and as all the evidence obtainable goes to prove that the native production is increasing, it may fairly be assumed that the taste for it is also on the increase.

"It may be supposed that foreign opium is subjected to no further imposition of duty than that provided by the tariff annexed to the Treaty of Tien-tsin, but this is a mistake. By the regulations opium is excepted from the operation of the transit privilege, by which, on payment of an additional 2½ per cent., foreign goods are freed from the levy of barrier and interior dues. Consequently the intermediate taxation from the time it leaves the importer to the time it reaches the consumer is rather heavy and somewhat arbitrary. The following is a list of the legal dues leviable on a chest of opium:—

	T.	M.	C.
"Tariff duty per chest of 120 catties . .	36	0	0
War tax, called 'likin,' per chest . . .	13	0	3
Tich-hiang, per chest	7	0	0
Sycee premium (36 taels at 7*s.*)	2	5	2
	61	5	2

but the owner has some other little payments to make *in transitu.* The probability is, therefore, that the home-grown stands in a more favourable position than the foreign article as regards the levy of duties."

Mr. Consul Lay, Consul at Chefoo, referring to the decrease in the import of opium to that port during 1875, says:—

"It is becoming more manifest, year by year, that the cultivation of native opium is affecting the market even in this province, though, owing to the illicit character of the trade, it is extremely difficult to obtain reliable statistics. Merchants are either unable or unwilling to give definite information. There is no doubt, however, about this, that in Chefoo, and in every large town in the province, native grown opium can be freely bought in the market. I am informed, on what I believe to be reliable authority, that about 200 peculs, valued at £12,000, have been sold in this town during the past year, and if that is so in a place the most remote from the producing districts, it is easy to see that the consumption for the whole province must, on the lowest calculation, be a very considerable amount. The greater part comes from Shansi, but the cultivation of the poppy has been observed within the last few years in various districts of Shantung. The price is generally from 30 to 50 per cent. below Indian opium, though I am informed that it has lately risen from 200 or 300 to 400 cash a tael weight."

Mr. Consul Alabaster says that at the port of Hankow:—

"The returns of opium show a decrease, not that the habit of smoking is dying out to a very perceptible extent, but the cheaper native product is taking its place with those who merely look for a stimulant; and the more expensive foreign drug is daily becoming more and more surely a luxury for epicures and men of taste. It must be remembered, also, that the Customs returns in no way afford a guide to the actual consumption, the smuggling of opium being so easy that it is impossible to prevent or even to any appreciable extent check it; nor are foreign merchants generally engaged in the trade, which has passed almost, if not entirely, into the hands of natives and one or two Bombay firms."

At Newchang there is a notable decrease in the import of opium, the quantity in 1875 being only 840 piculs against 1265 piculs in 1874. Mr. Consul Adkins says:—

"This condition of the opium trade is of course due to the fact that the native-grown drug is fast taking the place of the Indian. It is almost impossible to ascertain, with any degree of accuracy, the quantity of native opium which is produced, except by noting the increased or diminished consumption of foreign drug. There is no crop; that is to say, the growth of the poppy is not, as yet, a recognized process of agriculture in this district. The man who wants to smoke opium grows his own supply; he has an overplus, perhaps, and that he brings to market. It is hard to say how long the preliminary stage of production—this living from hand to mouth—will continue. No doubt the principal difficulty with which the poppy-grower in this country has now to contend is a want of hands to collect the juice after the incisions have been made in the capsules. In the north-west portions of this district, *i.e.*, in the southern portion of Eastern Mongolia, there is a yearly increase in the area of production. This is the colonized tract of Mongolia, in which the largest quantities of pulse are produced, and which has been a good customer for the foreign imports of this port. In the province of Kirim, too, it is growing in the country on the right bank of the Sungari, which lies in the angle formed by the reaches of that river above and below its junction with the Nonni, east and south-east of Petuna. No doubt the farmers in that part will find it pay better to have their returns in opium, which is of such high value in proportion to its bulk than in millet or pulse, which they cannot always carry with profit to this, the nearest port for exportation. It is highly probable, therefore, that its production will largely increase in that district in future years. I presume, of course, that there is to be no interference from the territorial authorities. Attempts are made in a feeble way to tax the native drug, but the small quantities in which it comes to market render the collection of a revenue from it a matter of great difficulty. During the past year the average price of Malwa opium was 460 to 465 florins per picul, and the price of native opium 280 dollars for the same quantity."

A decline in the imports of foreign opium is also reported from Tamsuy and Tientsin; in the latter district three-fourths of the whole present consumption is Chinese grown. On the other hand, the Ningpo returns show a largely increased importation of Malwa opium. But even in this district the quantity of native-grown opium produced has largely increased, and the larger imports are attributed to certain advantages presented by the port.

The Sale of Milk of Sulphur.

Prosecutions took place on Wednesday at Runcorn against three chemists, named Marshall, Speakman, and Brown, for selling adulterated milk of sulphur.

Mr. Glaisyer, of Birmingham, defended, at the instance of the Chemists and Druggists' Trade Association, and said the present prosecutions would be regarded as test cases.

Dr. Bell, of Manchester, stated that the milk of sulphur purchased contained 58½ per cent., and in one case 65 per cent. of sulphate of lime.

For the defence, Mr. Pemberton, of Birmingham, and Dr. Redwood, of London, were called, who spoke to the general use of milk of sulphur, and said that it was much more beneficial on account of sulphate of lime. Messrs. Evans, wholesale druggists, of Liverpool, said they sold thirteen times as much milk of sulphur than they did of the other preparation. Milk of sulphur was known to contain sulphate of lime, and was extensively used by the medical profession.

The Bench decided to convict, on the ground that the article supplied was not that which was asked for. In each case a fine of £1 and costs was inflicted.

Mr. Glaisyer gave notice of appeal.—*Daily News.*

Attempt to Poison with a Sheep Dipping Powder.

At the Western Winter Assizes, held at Exeter, on Friday, December 22, before Mr. Justice Lush, William Dodd, 13, labourer, was indicted for attempting to administer to James Dimond Moysey, jun., a large quantity of poison, called Cooper's Sheep Dipping Powder, with intent to murder the said James Dimond Moysey, at Dartington, near Totnes, on the 7th September.

Mr. Templeton prosecuted; prisoner was undefended.

The prosecutor, a farmer, resided with his father and mother at Venton Farm, Dartington, and the prisoner was in his employ.

On the 7th September Mrs. Moysey sent one of the female servants to the flour hutch for a bowl of flour. On opening the cover of the hutch the servant saw that the bowl, which was usually kept within it, had been filled with flour, and she took it to her mistress. Proceeding to make the flour into dough, Mrs. Moysey observed some yellow streaks in it, and she inquired if anyone had been putting mustard in the flour. All denied having done so, and Mrs. Moysey, on smelling the dough, discovered that some sheep dipping powder had been mixed with it. On coming in from work, prisoner was acquainted with what had occurred, and on being asked if he knew how the powder came into the flour, he denied that he knew what sheep dipping powder was or where it was kept. The following morning prisoner would eat no breakfast, and this being observed by one of the servants he was asked the reason, and he replied that he was not hungry. Later on the girl asked him a further question respecting the powder, and he then admitted having mixed some with the flour, adding "I was tired of you all." The other servant said, "Did you put it there for me?" and the prisoner replied "No. I put it there for one." Mrs. Moysey afterwards spoke to him on the matter, and asked the prisoner if he had intended to put them out of the world, and he answered "No." These were briefly the facts of the case, and the learned counsel wished to draw the attention of the jury to the fact that as the prisoner was under the age of 14, they would have to be satisfied that the prisoner really knew that at the time he placed the powder in the flour he knew that he was doing wrong, and that he was fully aware of the evil consequences that might follow the act. If they did decide that he knew what he was about, they would then have to determine from the evidence whether or not the prisoner intended to murder anyone.

Mrs. Moysey and the two female servants were called as witnesses.

Prisoner asked no questions, and made no statement in defence.

In summing up the learned Judge pointed out to the jury that as the prisoner was under the age of 14 they were required to be satisfied that there was some affirmative evidence that he knew generally the mischievous nature of what he was doing, and this at the time he had the wicked intention the indictment alleged. It did not matter that no one was injured in the present instance; the guilt lay in the intent. Referring to the evidence his Lordship said he thought it was clear that the powder was not thrown haphazard into the flour, but was intentionally mixed with it.

The jury retired to consider their verdict, and returned into court with one of guilty, and a recommendation to mercy on account of the youth of the prisoner.

Mr. Justice Lush sentenced the prisoner to six weeks' imprisonment, and at the expiration of that time ordered him to be confined in a reformatory for three years.

Alleged Adulteration of Oatmeal.

Mr. Thomas Pearks, a corndealer, of High Street, Kensington, has been summoned at the instance of the Westminster Board of Works, the shop being in the parish of St. Margaret's, Westminster, for selling oatmeal adulterated with an admixture of barley-meal to the extent of 35 per cent.

Thomas Lightfoot, one of the inspectors under the Board, proved purchasing a quart of oatmeal of the defendant, and paying 5*d.* for it. Barley-meal was sold at 2*d.* per quart. He never heard of the analyst for Kensington refusing to give certificates in such cases. It was not a test sample.

Mr. Thomas, who defended, submitted that the Act should be construed strictly, for although a salutary one, it worked a hardship upon some people. He said there was not one sample of oats out of a hundred, out of which oatmeal was made, which did not contain an admixture of barley, and it was impossible to separate them in the manufacture of oatmeal. The defendant, who was in a large way of business, sold it exactly in the same state as he bought it.

Mr. J. B. Edwards, of Mark Lane, stated that since he heard of the summons he had carefully examined almost every sample of oats at Mark Lane, and had found grains of barley in every case in them; that barley was manufactured in Scotland as pearl and Scotch barley, and in London the pearl barley into prepared or flower of barley; that it was quite as expensive as oatmeal in its manufactured state, and was excellent as human food in sickness, and there was no pecuniary advantage in mixing it; that he had received a sworn declaration from the Scotch miller who made the oatmeal, which stated there was no barley in the oatmeal sent to him, and this was handed to and read by the magistrate. He sold it to the defendant in the same state as he received it, being simply the broker or factor in the transaction.

Mr. Bridge suggested that a sample should be sent to Somerset House to be analysed.

Mr. Thomas said an admixture of 35 per cent., was so palpable that an analysis was not necessary.

The defendant strongly wished for Mr. Cleaver, the analyst for the neighbouring parish of Kensington, to be called as a witness, for the benefit of the trade, as he did not believe the sample contained 35 per cent.

Mr. Cleaver, on being sworn, said he had examined samples of oats obtained from various places, and had always found barley in them to the extent of 15 per cent. and under. Knowing that all oats imported contained barley, he refrained from giving certificates. If he found 35 per cent. admixture he should give a certificate. He had examined a sealed sample sent to him by the defendant, and found it contained about 20 per cent of barley, not more. He should not give a certificate in a case of 20 per cent.

Eventually Mr. Bridge adjourned the summons for the sample to be analysed at Somerset House, on the understanding that there would not be a conviction in the event of the admixture being 15 per cent and not more.—*Grocer.*

The following journals have been received:—The 'British Medical Journal,' December 23; the 'Medical Times and Gazette,' December 23; the 'Lancet,' December 23; the 'London Medical Record,' December 23; 'Medical Press and Circular, December 22; 'Nature,' December 27; 'Chemical News,' December 23; 'Gardeners' Chronicle,' December 23; the 'Grocer,' December 23; 'Journal of the Society of Arts,' December 23; 'Grocery News,' December 27; 'Produce Markets Review,' December 27; Practical Magazine,' for December; 'Educational Times,' for December; 'British Journal of Dental Science,' for December; 'Journal of Applied Science, for December; 'American Journal of Pharmacy,' for December: 'Pharmacist,' for December; 'Canadian Pharmaceutical Journal,' for December; 'Moniteur Scientifique,' for December; 'Pharmaceutische Zeitung,' for December 23; Sanitary Record,' for December 23; 'Medical Examiner,' for December 28.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

Milk of Sulphur.

Sir,—I, for one, am glad to see that the Defence Association is about to justify its existence by taking up the great "Milk of Sulphur question," which, if necessary, no doubt will now be carried to the highest court; and for this reason I shall be almost glad to see that the Runcorn Magistrates are as ignorant and opinionated as some of their colleagues, and will decide that milk of sulphur is poison.

I would suggest that "Doctor" Newton and Captain Arrowsmith be subpœnaed, so that it may be ascertained on what authority this doctor asserts that if "one drachm of milk of sulphur be given to a child it will become hard, cause congestion, etc.," and that this public officer whose official position places the reputation and well being of chemists and other tradesmen to a great extent at the mercy of his discretion may inform us how and where he learnt that milk of sulphur "destroys more human lives than half a dozen plagues." The Chairman of the Dukinfield magistrates should also be asked on what authority he speaks of milk of sulphur as a "poisonous drug," or he should be taught that such epithets should not be used thoughtlessly when he is occupying a public and responsible position.

Would it be out of the way to request the prosecutors in this case to bring forward, if they can, positive evidence of the deleterious nature of the popular mixture known as milk of sulphur? Of course they will be able to command any amount of *à priori* assertion, but this is not what is wanted.

W. Symons, F.C.S.

Barnstaple, December 23, 1876.

Chemists and Druggists and the Medical Acts.

Sir,—The Leeds chemists in their discussion on the above subject seem to have made short work of it. They have formed themselves into a superior court, and Baron Bramwell is overruled. I wish to draw their further attention to the Acts.

Section 14, Act 1815, "It shall not be lawful for any person or persons to practise as an apothecary, etc., unless he or they shall have been examined," etc.

Section 20, "If any person shall, after the first day of August (1815), act or practise as an apothecary, without having obtained such certificate as aforesaid, every person so offending shall for any such offence forfeit and pay the sum of twenty pounds."

Now, what is an apothecary? The President (Mr. Yewdall) jumps to the conclusion that because an apothecary prepares and dispenses medicines, therefore, that is the whole duty of the man.

In the Act of 1815, section 14, the Court of Examiners are not only authorized but "required to examine all persons applying to them for the purpose of ascertaining the skill and abilities of such person or persons in the science and practice of medicine."

In section 40 of the Medical Act, 1858, a general practitioner and apothecary are mentioned as being one and the same. What, then, becomes of the assertion that "an apothecary was a tradesman dependent upon the physician for his occupation?" Surely the Act must have been read in the dark.

It is quite true that the 28th section of the Act states that "nothing in this Act contained shall extend or be construed to extend to prejudice or in any way affect the trade or business of a chemist and druggist," but then the Act explains itself by stating what is meant by the trade or business of a chemist and druggist, viz., "the buying, preparing, compounding, dispensing, and vending drugs, medicines, and medicinal compounds, etc." And so in the 55th section of the Medical Act, 1858, "the lawful occupation, trade, or business of chemists and druggists, etc., so far as the same extends to selling, compounding, or dispensing medicines." Is it necessary to make any further comment? To my mind the Act is clear enough. I think if the Leeds chemists reopen the discussion they may come to a different conclusion.

If a chemist act as an apothecary I can see no difference in the practice itself whether he does so in his own shop or in the sick man's house.

J. Fryer.

Batley Carr, Dewsbury, December 27, 1876.

The Hygienic Influences of the Pine and Eucalyptus.

Sir,—In the Journal for the 16th inst. Dr. F. T. Bond has made some remarks on my paper relating to the above subject which was printed in your Journal of the 2nd inst. He has charged me with all omission of mention of his "terebene," and expresses himself unable to understand this omission I will with pleasure explain, and in doing so shall be perfectly honest; I did and do not consider his product worth mention.

He has referred to the fact that in relation to this subject I made some observations at the meeting of the Pharmaceutical Conference at Bristol in 1875, but he has not at any time since disputed the truth of my statement,* which I now reproduce as expressing my unaltered convictions.

"Mr. Kingzett remarked that terebene was the name of turpentine that had been subjected to the action of sulphuric acid. He was somewhat amused to find an article on sale under the title of "Terebene, the new Antiseptic." He had purchased a pint bottle for two shillings, and had examined it with some interest. That turpentine has an antiseptic value is knowledge almost as old as the hills, but that this so-called terebene had a greater or even equal value he was not prepared to admit. It might be regarded as turpentine which had undergone some treatment which robbed it of its most important character as an antiseptic, viz., its power to produce peroxide of hydrogen. Moreover, such an antiseptic had several great objections to its use; thus its oily nature, its odour, and, above all things, its inflammable character, would militate against its employment."

Dr. Bond, in his letter, professes to abstain from any discussion regarding the nature of the active principle engendered by the atmospheric oxidation of turpentine and other aromatic hydrocarbons of the same class, but admits their hygienic influences to be due to this cause. I venture to think, as I also state decidedly, that the matter is beyond discussion. Whatever he may imagine, and other men have written, I have proved in the most absolute way, the fact that in this process peroxide of hydrogen is produced, and never ozone. I have further proved how this peroxide of hydrogen is produced, and by what other substances it is accompanied. Dr. Bond has, therefore, either not read my published researches, or if he has done so, he has failed to understand them.

Dr. Bond imagines that because his terebene smells like pine wood, it is the source of the sanitary influences I have alluded to. We know that the odour of ammonia is decidedly ammoniacal, but we are not aware that the constitution of ammonia was ascertained by reason of its smell; and as I have already pointed out, terebene has none but an initial value as either an antiseptic or a disinfectant.

I am sure your readers will agree with me, that no scientific weight is to be attached to so imponderable a thing as an odour.

Further, I should be indebted to Dr. Bond if he will have the goodness to point out to me where I can find his published researches; they are not within the compass of my reading.

I deny emphatically the statement that the value of terebene as a disinfectant and deodorizer has been amply established by its use in any way.

Referring to my antiseptic and disinfectant solution Dr. Bond writes "I shall be somewhat surprised to find it anything else than terebene under a new name." This statement is as unfair as it is unmeaning. Dr. Bond never saw nor dreamt of the existence of my product, except he has obtained it, since my publications regarding it, by

* *Pharm. Journ.*, September 18, 1875.

imitating my discoveries. Moreover, it is difficult to reconcile his statement with a previous one in which he expresses himself doubtful whether peroxide of hydrogen is produced by the atmospheric oxidation of turpentine, for my solution is one of peroxide of hydrogen and camphoric acid. I therefore hope that his discovery of the fact of my contradiction of any value alleged to appertain to terebene, and the further fact that my solution is not identical with the terebene to which he lays claim, may fill him with the surprise he anticipates.

CHARLES T. KINGZETT.

CHRYSOPHANIC ACID OINTMENT.

Sir,—Since sending you my second paper on Chrysophanic Acid Ointment,* I have had forwarded to me a copy of the Journal containing the letters written to you by Dr. Crocker and Mr. Gerrard. I was not till then aware that anyone else had made use of chrysophanic acid ointment, otherwise I should gladly have left the task of introducing it in their hands. However, Dr. Crocker states that "his experiments with Goa powder were limited to the parasitic diseases of the skin," whereas the chief object of my paper was to recommend the remedy (already long known in the tropics as an application for parasitic diseases of the skin) as one which I had found to be capable of a different, and far wider, use, namely as a valuable remedy in the more numerously occurring non-parasitic diseases of the skin. It is in this latter capacity, chiefly, that I have made use of it. I have also, but more recently, made trial of it in cases of ringworm, but I have not as yet proved it sufficiently from this point of view to enable me to contravert Dr. Crocker's statement that when thus used "it is by no means deserving of unqualified praise." It is quite possible, for all that I can at present say to the contrary, that I may come to agree perfectly with that statement. As to Dr. Crocker's views as to the proper strength of Goa powder ointment I quite concede his personal experience of having caused himself considerable irritation by two applications of ointment containing twenty grains of the powder to the ounce of lard, but on the other hand, I may refer him to my paper in the *British Medical Journal* of December 23rd, 1876, by which he will see that it is quite possible to rub in ointment containing half an ounce of the powder to an ounce and a half of lard, every morning and evening for six consecutive days, before any irritation whatever is produced, and that even in the case of a woman. Now women, have as a rule, skins which are more tender to the action of irritants than is the case with men. However, the sensitiveness of the skin to the action of any given irritant is a thing which varies very greatly in different individuals, as one who has had to apply only mustard poultices to different persons may very well know. I perfectly agree that in persons with very tender skins twenty grains to the ounce may quite suffice to produce considerable irritation even after only a couple of applications, since I have occasionally found it so.

With regard to Mr. Gerrard's comments, I think the question has been set at rest as to whether there are properly "two varieties" of so-called Goa powder by the tracing of Goa powder to the same place of origin as the Poh di Bahia, namely, to Bahia in Brazil, so that there is in fact but one variety. I am glad to find that so able a pharmaceutist confirms the observations that I made before I was aware of his experiments, namely, as to the solubility of chrysophanic acid in hot fats and oils and in vaseline, but I am unable as yet to agree unreservedly with him that "the use of benzol in the preparation of chrysophanic acid ointment as recommended by Mr. Balmanno Squire," is not necessary. In my second paper I have indeed expressed an opinion that it is not absolutely necessary, but I still think it to be at all events expedient. Mr. Gerrard states that "chrysophanic acid is soluble in boiling fats and oils in almost any proportion." Now my own observations have by no means led me to a conclusion of that kind; at the same time I have not made any exact quantitative experiments. However, I hope that Mr. Gerrard or some one else who may have the leisure will do so. What I have gone by is the depth of colour of the solution as viewed through test tubes of equal diameter, and as the pale-yellow chrysophanic acid powder forms a deep brownish-yellow solution, the depth of colour forms a pretty fair comparative test of the strength of various solutions in the absence of an exact quantitative analysis or synthesis of them. Now I find that a concentrated solution of the acid in benzol is of a much deeper colour than a concentrated solution of the acid in melted lard or in oil, the solutions being made at the same temperature (about 160° Fahr.), and that is the ground on which I still advocate the addition of a moderate proportion of benzol. However, I must freely admit that I am not prepared to say that boiling fat or boiling oil will not take up a larger proportion than boiling benzol since the boiling point of fat or of oil is of an infinitely higher degree of temperature, of course, than that of boiling benzol. However, I do not gather from Mr. Gerrard's letter that he has made any definite experiment of the kind with a view to settling that particular question. Neither, indeed, have I; but I think an investigation of that point to be a very desirable one. I trust also that Dr. Crocker will think it worth while to try the remedy in the treatment of some of the non-parasitic diseases of the skin because I think that by doing so he may probably be led to form a better opinion of it.

BALMANNO SQUIRE.

December 23, 1876.

* This paper has been received. It refers to the fact that chrysophanic acid is soluble in boiling fats; which has already been pointed out by Mr. Gerrard. Mr. Squire, however, still recommends the use of a small quantity of benzol.

EASILY PREPARED GALVANIC CELLS.

Sir,—Among the abstracts in the September number of the *Journal of the Chemical Society* is one on "Easily Prepared Galvanic Cells," by Onimus, from *Compt. Rend.* Will you allow me to draw attention to the fact, that in October, 1874, you published a detailed account of a similar battery in a paper of mine read at the Belfast meeting of the British Association? It is also noticed in the British Association report for 1874.

The only difference is that I used fustian or any stout cotton cloth, in place of vegetable parchment, which I still think preferable; but, in fact, ordinary stout paper could be used as well.

W. SYMONS, F.C.S.

Barnstaple, Dec. 23, 1876.

THE MILD SEASON.

Sir,—It may be of interest to your readers, and show the mildness of the weather, to know that in a walk I took in our neighbourhood on Christmas Day, I found twenty-three varieties of wild flowers in bloom, comprising:—

Buttercup, red-robin, groundsel, common daisy, great white ox eye, dandelion, scabius (*S. succisa*), ivy, wild mustard, rough chervil, common annual sow thistle, holly, sea campion, red dead nettle, furze, hawkbill, wild carrot, common grass, etc., and have no doubt that if I had extended my walk in different directions I could have found other varieties.

J. S. HICKS.

Looe, Cornwall, Dec. 27, 1876.

"*Gwalia.*"—See Mr. Scheffer's article on "Pepsin," vol. ii. of the present series, p. 761.

"*Justitia.*"—If we published your letter we should require an indemnification for the possible consequences.

"*Didaktos.*"—(1) The degree is granted by various bodies, each making its own conditions for conferring it. (2) Apply to the Secretary of the Chemical Society, Burlington House.

G. W. Stephens.—Hoffmann's 'Manual of Analysis as applied to the examination of Medicinal Chemicals,' published by Appleton and Co., of New York.

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly over the Editorial columns will prevent delay, and the consequent annoyance.

COMMUNICATIONS, LETTERS, ETC., have been received from Mr. Langdon, Mr. Pooley, Mr. Stenhouse, Apprentice.

NOTES ON INDIAN DRUGS.

BY W. DYMOCK.

(*Continued from page* 493.)

CLERODENDRON SERRATUM.—*Local name*, BHARANGI MUL.

The root is found in the shops cut into pieces about three inches long; they vary in size, the largest being seldom as much as one inch in diameter, often very crooked and twisted; the woody portion shows well marked concentric rings and conspicuous medullary rays; it is very white and tough. The bark has a light brown epidermis; both wood and bark abound in starch. Bharangi is feebly bitter; it is said to be tonic and antiperiodic, but I have no experience of its properties. It grows in the Concan.

SYMPLOCOS RACEMOSA.—*Local name*, LODHRA.

The bark of this tree is of a light fawn colour: external surface corky and much fissured transversely; internal of a lighter colour and fibrous texture. On making a transverse section a central layer of a red colour is seen between the corky and fibrous portions. Microscopic examination shows that the coloured layer is chiefly composed of oblong cells containing red colouring matter; the inner layer of the bark consists almost entirely of woody fibre. Lodhra bark is very soft and friable; it has a faint balsamic flavour with slight astringency, and is considered by the natives to be heating and to promote maturation of the humours of the body; it is also used externally made into a paste with some adhesive substance much in the same manner as we use a pitch plaster. I have not seen any account of its trial by Europeans. It is in general use in native practice, and is kept in all the shops.

ACHYRANTHES ASPERA.—*Local name*, AGHARA.

A common weed with an erect striated pubescent stem, generally about two feet high, but sometimes much more. Side branches in pairs, spreading. Leaves pubescent from the presence of a thick coat of long simple hairs; obovate, undulated, very obtuse, acuminated; base attenuated; petiole short. Spikes long, lax; flowers green; bracts rigid, prickly. Sections of the stem of the plant do not show any crystalline deposit in the parenchyma. Aghara is a well-known simple amongst the natives in this part of India; it is used in decoction as a diuretic, and the juice as an application to scorpion stings and to relieve toothache.

COIX LACHRYMA.—*Local name*, KASSAI BIJ.

The silicious involucre of this grass containing the seed is sold in the drug shops. It is about the size, and has much the appearance, of a small cowrie shell, shining, white, and very hard. At the base is a scar marking the attachment of the peduncle; at the apex an opening, from which, even in the dry state, a portion of the female flower may be seen protruding. In the fresh state a spike of male flowers from one to two inches long rises from it. Kassai Bij is used as a diuretic.

WRIGHTIA TINCTORIA.—*Local name*, KALA-KOORA.

The drug generally consists of pieces of the root of the tree from three to four inches long, and from one inch to half an inch in diameter. The bark is of a dark brown colour externally, and is studded with numerous little warty projections; the wood is white. Sections of the bark show that the parenchyma contains many cells filled with red colouring-matter, as well as much starch; towards the inner part of the bark there are numerous large liber cells arranged in two continuous rings. Kala-Koora, when chewed, is moderately bitter; it reddens the saliva. These characters are sufficient to distinguish it from Pandhra Koora, or Conessi bark, the produce of *Holarrhena antidysenterica*, the bark of which has the following characters:—Very thick, much twisted and quilled, of a dirty white or dull buff colour, external surface marked by numerous transverse ridges, internal surface longitudinally striated, taste very bitter, does not colour the saliva when chewed. The bark of the stem of *Wrightia tinctoria* is also met with in the shops; it is smoother than the root-bark, and of a paler colour; it cannot be mistaken for Conessi bark, as it contains much colouring-matter. A full account of the botanical history of these trees will be found in the 'Pharmacopœia of India,' p. 455. The seeds of *Holarrhena* (bitter inderjow) and of *Wrightia* (sweet inderjow) are always obtainable in the shops. *Holarrhena* contains an alkaloid which has been named Wrightia.

EUPATORIUM AYAPANA.—*Local name*, AYAPANA.

A small shrubby plant, 5—6 feet high; branches straight, reddish, with a few simple scattered hairs; young shoots have a somewhat mealy appearance, due to the presence of small particles of a white balsamic exudation; leaves opposite, in pairs, their bases uniting round the stem, about four inches long and three-quarters of an inch broad, fleshy, smooth, lanceolate, attenuated at the base; midrib thick and reddish; flowers bluish. The odour of the plant is aromatic, somewhat like ivy, but more agreeable, the taste also reminds one of that plant. Ayapana is cultivated in some of the Bombay gardens. Its medicinal properties are mentioned in the 'Pharmacopœia of India.' In this part of the country it is chiefly in repute as a stimulant, expectorant, and bitter tonic.

PRUNUS Sp.?—*Local name*, HUB-UL-KILKIL.
" " " " GAVALA.
" " " " PUDMA KASTA.

These three articles evidently belong to the cherry tribe, and are imported into Bombay from Northern India, or from Arabia or Persia. The first resembles ordinary cherry stones; the almond has a brown skin and a strong prussic acid flavour. The second consists of the almonds of some kind of cherry, amongst which a few entire stones are found; these have very fragile shells of a pointed oval shape, about $\frac{4}{10}$ths of an inch long and $\frac{3}{10}$ths broad; the almonds are of a pale buff colour, the skin thin and marked with longitudinal veins; they have a strong prussic acid flavour. The third consists of the smaller branches of a kind of cherry, three-quarters of an inch, or less, in diameter; the bark evidently contains amygdalin. All three are commonly met with in the shops, and serve as substitutes for prussic acid in native practice.

DATURA Sp.?—*Local name*, GHARBHULI.

The immature capsules of a kind of thorn-apple threaded upon a string, said to be imported from Arabia. The capsules are light brown and thickly set with longish prickles; they are about three-quarters of an inch long; sometimes the peduncle remains attached; they do not correspond with the immature fruit of the Indian varieties which grow in this part of the country. The native name, which means forgetfulness of home, indicates their physiological action. Mr. Moideen Sherriff states that in Madras the flowers or buds of *D. alba* and *D. fastuosa* are sold under this name. See Appendix to the 'Pharmacopœia of India.'

TETRANTHERA ROXBURGHII.—*Local name*, MAIDA LAKRI.

The bark of this tree is the part met with in Bombay; some native works on materia medica also describe the root, but I have never seen it in the shops. The bark varies in thickness from $\frac{1}{10}$th to $\frac{3}{10}$ths of an inch; externally it has several layers of whitish, scabrous, corky tissue, the remaining portion is of a chocolate brown colour. A microscopic examination shows abundance of reddish-brown colouring matter in the parenchyma, and numerous liber and stony cells; there are no distinctive characteristics. The odour of the bark is feebly balsamic; its most remarkable property is the large quantity of mucilage which it affords when moistened; this has a bland taste, with a faint, agreeable aroma. If the bark has been long kept the aroma disappears, but the mucilaginous qualities remain unimpaired. Maida Lakri is a well-known drug, and is to be found in every shop. Its chief use is as a demulcent and astringent in affections of the bowels—such as dysentery.

TAXUS BACCIFERA.—*Local name*, BIRMEE.

The young shoots and branches of the common yew, with the leaves chopped up in short lengths of an inch, or less, are met with in the shops under this name. The tree grows in the Himalayas. Its properties are too well known to require notice here.

FLACOURTIA CATAPHRACTA.—*Local name of tree*, JUGGUM, *of the drug (leaves)* TALISPUTREE.

This tree is found in some of the Bombay gardens; it grows wild in the southern part of the presidency. The leaves are almost exactly like yew leaves, but have a highly aromatic rhubarb-like odour; they are valued as a stomachic in diarrhœa and dyspepsia.

BRYONIA LACINIOSA.—*Local name*, KAWALE CHE DOLE.

The vine is climbing. Stem smooth. Leaves palmately five-lobed, more or less deeply divided; segments oblong, lanceolate, acuminated, serrated; petioles muricated, upper surface of the leaf thickly studded with white jointed calcareous hairs rising from a calcareous areola; male and female flowers in the same axils, the peduncles of the male flowers, which are numerous, remaining until the fruit ripens; fruit round, smooth, red, with white streaks, the size of a marble. The whole plant is used medicinally; it is bitter and aperient, and is considered to have tonic properties.

(*To be continued.*)

CONTRIBUTIONS TO THE CHEMICAL KNOWLEDGE OF CULINARY PLANTS.*

BY DAHLEN.

The following analytical results are taken from Dahlen's investigations on pot-herbs (*Landwirthschaftliche Jahrbücher*, 1875, pp. 613–723).

Sprouts.—The young suckers of sprouts and of asparagus can be regarded only as luxuries.

Culinary and Potage Herbs.—The various kinds of cabbages form an excellent nutrient rich in albumin and phosphoric acid. The most proteinaceous are the small heads of the rose cabbage, which approach most nearly to the undeveloped heads of cauliflowers. The leaves of white cabbages also form an excellent nutriment. The same may be said of the leaves of spinach, which contain much albumin and mineral nutrients.

Salad Herbs.—These, like the various kinds of cabbage, are very rich in nitrogen, ash, and phosphoric acid. In the fresh state they contain about 94 per cent. of water and 2 per cent. of nitrogenous bodies.

Roots, Tubers, and Tuberous Root-stocks are generally characterized by their small amount of nitrogen and phosphoric acid. They contain, with but little crude fibre, a large quantity of extractives free from nitrogen; also about 84—94 per cent. of water.

Onions contain a sulphurized, readily volatile, strongly smelling oil.

Fruits and Seeds are the most valuable part of the vegetable nutrients, as they contain a large quantity of protein substances. Cucurbitaceous plants form two classes, one comparatively rich, the other comparatively poor in protein. The cucumbers belong to the former class of plants, and form in a certain stage of development a nutrient very rich in albumin, phosphoric acid, and potash. Proportion of nutrient, 1 : 1·5 They also contain much grape-sugar.

Melons contain phosphoric acid, also 1·3 per cent. of a liquid orange-coloured fat, and in the fresh state about 95 per cent. of water.

Gourds are poor in protein and phosphoric acid. Proportion of nutrient 1 : 6 to 1 : 8.

The fruits of the tomato (a solanaceous plant) rich in fat and grape-sugar, contain much protein.

Legumes contain the largest quantities of protein, starch, potash and phosphoric acid. The legumin forms the main ingredient of the albuminous bodies contained therein. The increase of seeds also increases the contents of nutrients. As the seeds ripen the sugar is replaced by starch, and the quantities of fat, woody fibre and water are decreased.

Juicy Fruits and Berries form non-albuminous eatables, which are valued only on account of their agreeable taste.

---

* From the *Journal of the Chemical Society* for December, 1876.

The Pharmaceutical Journal.

SATURDAY, JANUARY 6, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*
Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*
Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W.*
Envelopes indorsed "Pharm. Journ."

1876.

PHARMACY has not yet attained the pitch of happiness indicated by being without a history, and therefore it falls to our lot, now that eighteen hundred and seventy-six is "added to the mass of buried ages," to recount to the best of our ability the principal events recorded in these pages during the past twelve months.

As usual we shall deal first with the business that has occupied the attention of what is at present, at any rate—and seems likely to remain—the body most representative of the pharmacists of Great Britain, the Council of the Pharmaceutical Society. Very little alteration has taken place in the constitution of the Council, the only new members being Messrs. ATKINS and STACEY, chosen to fill the places of two members, Messrs. SUTTON and BAYNES, who voluntarily retired, the former after six years' and the latter after four years' valuable services. Mr. THOMAS HYDE HILLS, who for three years had presided successfully over the Society, has made way for Mr. JOHN WILLIAMS, the former Treasurer, as President; Mr. ALEXANDER BOTTLE, his valued coadjutor, has handed over the Vice-Presidency to Mr. WILLIAM DAWSON SAVAGE; and Mr. CORNELIUS HANBURY has been chosen to be Treasurer.

The subject of the examinations must always be a primary one in a review of the year, as in connection with it the best estimate can be made of the progress towards the object of the Society's charter, "of advancing Chemistry and Pharmacy and promoting a uniform system of education of those who should practise the same." It is therefore gratifying to find that although the gross number of examinations greatly exceeded that of the preceding year, being 1639 against 1166, and notwithstanding the increased stringency of the examinations, the contemplation of which almost caused a temporary panic in some quarters, the percentage of failures has been comparatively low, being on the average only 43·3 per cent. Thus there have been 1054 Preliminary candidates, with 447 failures, or 42·4 per cent., against 824 with 50 per cent. of failures in 1875. There have also been 44 certificates of other examining bodies received. The Minor candidates have numbered 482, with 200 failures, or 46·3 per cent., against 285, with 50 per cent. of failures in 1875. The Major candidates have numbered 101 with 39 failures, or 38·6 per cent., against 82 with 34·1 per cent. of failures in 1875; in this case only there has been a slight increase in the proportion of failures, but there has been an increase of 8 in the number actually passed. The decreasing number of persons entitled to claim the Modified examination has been further diminished by 27 who have passed during the year.

The questions for the Preliminary examinations of the past year have been set, and the answers valued, by the College of Preceptors, the College making its report to the Board of Examiners, and the Board reporting to the Council. To judge from an examiner's memorandum, forwarded to the Council, the acquirements of the candidates in the subjects of examination are considered by the College to be but moderate. It had been arranged that for conducting the other examinations the Board should meet only six times during the year, but to meet the wishes of some students who pleaded inconvenience by the alteration, a seventh meeting was arranged. It has been recently urged, however, that the number of meetings might be advantageously reduced to four, the meeting in October being especially objected to as occurring when no "recognized school" is open, and therefore at a time when few could go up "efficiently prepared." It seems possible that the statement may fail in convincing the Council that it is its duty to arrange the meetings of the Board to suit the "preparation" of the candidates.

At the February meeting of the Council, Mr. WILLIAMS, then Treasurer, with a view to improve the finances of the Society and lessen the pecuniary interval between the Major and the Minor, revived a proposition that the fee for the Minor examination should be raised from three to five guineas, and that for the Major lowered from five to three guineas. The total of the fees payable before attaining the title of Pharmaceutical Chemist would therefore have remained the same, but a larger proportion would have been payable for the examination qualifying to follow the calling of a chemist and druggist. He also proposed to alter the practice of returning a portion of the fee in the case of failure, in order to discourage candidates from coming up prematurely. The motion was opposed by Mr. FRAZER, and there was a general feeling that it would be inexpedient then to change the amounts of the fees, which would have required an alteration of the bye-laws. But it was agreed that after the 1st of January, 1877, no part of the fee should be returned to an unsuccessful candidate, but that he should be allowed to present himself for examination within twelve months upon payment of two guineas for the Major or Minor examination, or of one guinea for the Preliminary or Modified; after that interval the full fee will again become payable. It will not be out of place to recall here that on the same date the provision, enacted by a General Meeting of the Society in May, 1873, came into force, that a candidate for the Minor or Major examination must satisfy the examiners that he has for three years been practically engaged in the translation and dispensing of prescriptions. For that purpose a form of declaration has been prepared, which every Candidate will be required to make before being permitted to enter for examination.

At the first meeting of the Council in 1876 the subject of the prizes given annually in connection with the Society's examinations was brought forward in a report from a Committee, and it has given rise since to much discussion. It will be remembered that the competitions for the Pereira medal and the Prize of Books were formerly confined to candidates who had passed in the first divisions of the Major and Minor examinations respectively; therefore when this distinction was abolished, and the lists of names were published alphabetically, it became necessary to make a fresh arrangement. In January it was decided that the interest on the Pereira fund and the sum given annually by the Council should be expended in providing three medals,—being a silver Pereira medal, a Pharmaceutical Society's medal of silver, and one of bronze,—to be competed for by men who had passed the Major examination during the session and were at the time of passing Associates of the Society. These medals were to be supplemented by presents of books from Mr. THOMAS HYDE HILLS. The examination was to be a written one, conducted simultaneously in London and Edinburgh, and the questions were to be set by the London Board of Examiners. The prize previously offered for competition among those who passed the Minor examination was thus discontinued. Mr. GREENISH incidentally pointed out that the intention of the originators of the Pereira medal was that it should be a reward for original research and not for proficiency as evidenced by the result of an examination.

The above arrangement was not long left in peace. At the February meeting Mr. MACKAY objected that it did not put the examiners in London and in Edinburgh upon an equal footing; whilst Mr. SCHACHT saw in the necessity for men to go to London or Edinburgh for examination a disadvantage to those who lived at a distance from either city, and considered the prize examinations might be held at any of the local centres. A motion, however, to have the questions set by one member of each board was negatived. In March Mr. SCHACHT again brought forward the subject, and a resolution to refer the matter to a Committee to consider the advisability of adopting Mr. MACKAY's proposition and also of increasing the number of examination centres was adopted. In April the Committee reported recommending that the Council itself should appoint from time to time two Members of the Boards of Examiners to conduct the examinations, and against the number of examination centres being increased; this report was adopted, and the regulation then made is that now in force.

The prizes given by the Council to successful students in the School of Pharmacy have also been under discussion, upon a suggestion made by Mr. GREENISH that the silver medal given at the end of a session in the Chemistry and Pharmacy and Botany and Materia Medica classes should be competed for by students of that session only, as in the Practical Chemistry class. The subject was remitted to the Library, Museum, and Laboratory Committee, which sought the opinions of the Professors on the subject. The Professors were unanimously against the limitation, unless—a course which they would prefer—a gold medal were offered for competition between all the students, without limit to the time they may have been in the School, except that they should have attended not less than one session in each department, and at the time of competition be actually students in the School. The Committee did not report in favour of the gold medal, but recommended that a student of more than one course should only be capable of taking a prize of higher value than any he had before taken in the same class, and also that certificates of merit as well as medals should be given at the end of the short courses, and that no student should be allowed to compete for any of the School of Pharmacy prizes unless he be an Apprentice or an Associate of the Pharmaceutical Society. The Council agreed to these recommendations. By the kindness of Mr. THOMAS HANBURY the Council will be able, for some time to come, to hand to the first prizeman in each class a copy of the 'Science Papers' and 'Pharmacographia' of the late DANIEL HANBURY.

In January a lady's name again appeared on the list of candidates for election as Pharmaceutical Chemist Members of the Society. Mr. SANDFORD moved for its omission, and after some discussion, in which it was argued that the Council was bound by the vote of the Society in 1873, the motion was carried by a majority of one. In July a similar occurrence took place, but this time the new Council refused to elect the lady by an increased majority of twelve to eight.

The spasmodic activity of some so-called "medical defence associations" has forced the subject of counter prescribing upon the attention of the Council. A long discussion at the meeting in March and again in October, resulted in the passing of a resolution to the effect that the Council is prepared to consider the case of any chemist and druggist threatened with vexatious proceedings, and if the circumstances warrant to provide for his defence. This resolution seems to be sufficiently inclusive, and to imply that the Council will not stand by and see members of the trade placed in a worse position than their fellow citizens with respect to giving advice, but also that it is not prepared to countenance the improper poaching on medical preserves that is too prevalent in some quarters. Indeed we are not sure that the fussiness and fright on this point have been altogether warranted. It does not follow that because an irate practitioner, or even an "association," threatens to prosecute a few score chemists and druggists living in its locality that it will obtain the sanction of the Apothecaries' Company to do so, for that body has not yet evinced any unfair tendency in such a direction. Moreover, although Baron BRAMWELL in the case before him construed the Apothecaries Act very strictly, he gave a significant warning as to the absurdity of carrying the point too far; whilst a more recent decision shows that if the chemist and druggist keeps within reasonable bounds he has little to fear under the Medical Act.

The legality of co-operative societies selling and dispensing poisons came before the Council in August, in connection with a resolution asking that it might be tested in a law court, passed after the reading of a paper by Mr. HAMPSON at a conference of chemists and druggists held at Birmingham in the previous month. On the motion of Mr. ATKINS, seconded by Mr. BETTY, it was referred to the Parliamentary Committee. This Committee recommended that a deputation from the executive of the Chemists and Druggists' Trade Association should be invited to meet the Parliamentary Committee to hear an exposition of its views upon the subject. The interview took place, and it may be presumed that the exposition was convincing, if not satisfactory, as little has been heard of the subject since.

In August Mr. HAMPSON brought to the notice of the Council an order issued by the Board of Inland Revenue prohibiting the use of methylated spirit in pharmaceutical preparations for external use, with the exception of compound camphor and soap liniments, thus excluding aconite and belladonna liniment which were largely prepared with it for hospital use. It is not quite clear upon what law this order was based, as by the Act 29 & 30 Vict. the use of methylated spirit is prohibited only in the preparation of articles "capable of being used wholly or partially as a beverage or internally as a medicine." A deputation was appointed, which submitted a memorial to the Commissioners pointing this out and the hardship that would result to hospitals and other charitable institutions from the prohibition, and the Commissioners, "in deference to the wishes of the Council," waived their objection to the use of methylated spirit in the preparation of aconite and belladonna liniments.

In order to carry out the design of the Pharmacy Act in the protection of the public the Council has on several occasions been compelled to take legal proceedings against offenders; these, with one exception, in which the transfer of the business to a medical practitioner was undisclosed until the hearing of the case, have always been successful either in securing a conviction or else an engagement to discontinue the objectionable practices. Some correspondence that appeared in this Journal having, in the opinion of the Vice-President, Mr. BOTTLE, implied that the Council had been remiss in carrying out the Act in respect to Glasgow, he, in March, moved for an inquiry on the subject; but Mr. FRAZER disclaimed any such intention, and therefore the motion was not pressed.

The policy of the late Council with respect to the Benevolent Fund has been amply justified by a large increase not only in the number of subscribers, but also in the total value of the subscriptions. They have amounted during the past year to about £1360, being an increase of about £160 over the amount last year. Four annuitants of £30 each were elected in October, bringing their number up to 24, of whom one has since died. Besides the annuities, amounting to £620, the Council has disbursed £470 in the relief of necessitous and deserving applicants, making a total of £1090. Mr. SHAW has again attempted to persuade the Council to prohibit the use of canvassing cards and circulars by the candidates, but apparently the Council does not see its way to enforce such a prohibition when issued.

The Annual Meeting of the Pharmaceutical Society was held as usual in May, when the business was almost entirely confined to the adoption of the Report of the Council. The same evening a large number of the members and their friends dined together at the London Tavern, and the following evening the usual Conversazione was held in the South Kensington Museum, and was well attended.

The reports of the Professors respecting the School of Pharmacy have again been favourable both as to the number of students attending the Lecture Room and the Laboratory, and their diligence and conduct. The Students' Association in connection with the School is progressing well: it holds fortnightly meetings during the session, and now numbers about eighty members.

The Registrar's reports presented to the Council at the commencement of the year showed a slight decrease in the number of chemists and druggists on the Register, but a considerable increase in the number connected with the Pharmaceutical Society. It has been wrongly assumed on many occasions, for purposes of argument, that the Society represents only the "fringe" of the trade, and it has been spoken of as one-fifth, one-sixth, and even one-tenth. The fact is, that of the 13,296 on the last Register, 4383, or one-third, were connected with the Society, and 3500, or more than one-fourth, were entitled to take part in its government. Doubtless it would have been preferable to have the proportions reversed, but in the presence of still increasing numbers, perhaps there is something even in this result to be envied. The Registrar has again found it necessary to exercise the powers vested in him under the Act, and recently published a notice that the names of 283 persons, whose correct addresses were unknown to him, would be removed from the Register unless they communicated with him before the 31st of December. The result has been that 204 names have been erased.

The Library during the year has received many additions. In the list which is issued as a supplement to the present number may be observed some important works, notably some purchased from the Hanbury Fund, and several German periodicals of which the sets are being made complete. The attendance of readers has been in excess of the numbers in 1875, and the circulation of books has also increased. The shelf accommodation having gradually become too limited, it was decided to enlarge some of the bookcases. This work has just been completed, and it is estimated that shelf-room for nearly a thousand additional volumes has been provided.

The Museum has been enriched by several valuable donations. Chief of all must be placed the materia medica collection and herbarium of the late DANIEL HANBURY, presented by his executors. The herbarium will be ready for reference by the end of the present month; but the materia medica collection, which illustrates the "Pharmacographia," and also contains many rare products, has, by the terms of the gift, to form a separate collection, and still requires much labour to be spent upon its arrangement. Amongst other things Professor DYMOCK, of Bombay, has presented specimens illustrating his "Notes on Indian Drugs," and Professor DRAGENDORFF illustrations of his paper on "Ergot," both published in this Journal. The collection of crystals illustrating crystallography has also been improved. The Professors have now been supplied with specimens for lecture purposes, so that the Museum specimens may be kept intact. This arrangement cannot fail to work beneficially, as donors will have some guarantee that their specimens will be kept for Museum purposes only. The attendance both during the day and in the evening has been about the same as in the previous year.

The Evening Meetings have been moderately well attended and the supply of papers has been well kept up. To some of these reference will be again made; it will suffice here to give their titles:—"The Best Form of Blistering Liquid," by Mr. JAMES DEANE; "The Composition of Pilula Hydrargyri," by Mr. H. SENIER; "Vaseline," by Mr. JOHN MOSS; "Vaseline, and its Application to Suppository Making," by Mr. A. W. GERRARD; "The Antimalarial Properties of the Eucalyptus," by Mr. R. D. GLOVER; "Preparation of the 'Ferrous Phosphate' of the British Pharmacopœia," by Mr. REES PRICE; "Structure and Development of Pareira Stem," by Mr. JOHN MOSS; "Cosmoline," by Mr. W. A. H. NAYLOR; "Note on an Ointment containing Calomel, Hydrocyanic Acid, and Acetate of Lead," by Messrs. T. H. POWELL and J. BAYNE; "Linimentum Saponis of the British Pharmacopœia," by Mr. W. WILLMOTT; "Suggestions for a New Method of Making Mistura Guaiaci and other Similar Mixtures," by Mr. T. GREENISH; "New Mode of making Grey Powder," by Mr. A. BOTTLE; "Oleate of Bismuth," by Mr. S. C. BETTY; "Some Reactions of the Glycerole of Nitrate of Bismuth," by Mr. J. WILLIAMS; "Crystallized Hyoscyamine," by Mr. W. MARTINDALE; "Note on Impure Glycerine" and a "Note on a Crystalline Deposit from Tincture of Galls," by Mr. A. W. GERRARD; "Note on Capsaicin," by Mr. J. C. THRESH. Besides these many other subjects have been introduced informally, and the discussions have been always full of interest. The October meeting was, as usual, devoted to the Professors' reports and the distribution of prizes to the successful students of the previous session, the proceedings being brought to a close by an admirable address to the students from Mr. BARNARD S. PROCTOR, of Newcastle.

The Council of the North British Branch has been able to report favourably of its progress. The rooms have been fairly tested, and prove to afford every convenience; whilst the library and museum, to which numerous donations have been made, have been well used. At the annual meeting, Mr. WILLIAM GILMOUR was re-elected as President, and Mr. ALEXANDER KINNINMONT as Vice-President; Mr. JOHN MACKAY, also, still gives his valuable services as Honorary Secretary. The scientific meetings have been occupied in the reading of several interesting papers by Drs. CRAIG and MACADAM, Messrs. HOWIE, CLARK, BAILDON, and others. In October an experiment was commenced, with fair promise of success, in the delivery of courses of lectures on chemistry, materia medica, and botany, and demonstrations on practical chemistry, especially in connection with the Branch.

Of the usual annual gatherings the British Pharmaceutical Conference stands first in relative importance. It was held at Glasgow in September, and was ably presided over by Professor REDWOOD. Whether for the number and quality of the papers, or the arrangements of the local committee, it must be esteemed one of the most successful yet held. On this occasion it was announced that fresh grants had been made in aid of pharmaceutical research to the amount of £95. The British Association met in the same city under the presidency of Professor ANDREWS. The British Medical Association met at Sheffield in the early part of August, under the presidency of Dr. DE BARTOLOMÉ. The American Pharmaceutical Association met in Philadelphia in September, in connection with the Centennial Exhibition held there. The French Association for the Advancement of Science and the French Pharmaceutical Congress were held at Clermont-Ferrand in August. The German Apothecaries' Union met in Stuttgart in September. Though of a different nature, the Chemists' Ball, which was held in January—and which, by the way, is again due on the 17th inst.—was as popular and successful as any of them.

In July an important conference of chemists and druggists was held in Birmingham, which resulted in the formation of a Chemists and Druggists' Trade Association. It was hoped that this Association, by gathering into its membership nearly all the chemists and druggists of the kingdom, would become a powerful and permanent influence for good on behalf of the trade. How far there is a prospect of this hope being fulfilled we are not at present in a position to judge.

A suggestion made by Mr. GREENISH as to the institution of a "Hanbury Gold Medal," as a reward for original research in materia medica or pharmacy, has advanced considerably towards maturation during the year. In January Professor DRAGENDORFF, of Dorpat, communicated to this Journal some definite proposals in relation to it, and in February the Council decided that a Committee should be formed to carry out the movement; it has since received the adhesion of the presidents of several of the learned societies and many other scientific gentlemen. The subscription was limited to one guinea, and a sum amounting to about £400 has been subscribed, which will be at the disposal of the General Committee for the purpose.

The reports from the provincial associations do not evidence any marked improvement in the disposition of apprentices and assistants to utilize the means of pharmaceutical education provided for them. Many of these associations appear to be stationary, but the societies at Manchester, Nottingham and Liverpool report an advance, Manchester thus justifying a grant of £25 from the funds of the Pharmaceutical Society. On the other hand the reports from Northampton and Hull speak despondingly, whilst the Norwich association has ceased to exist. At Plymouth and Dover new societies have been started.

Turning to some events in connection with the promotion of science and scientific education it may be stated that those who are advocates of what is now generally termed "the endowment of research" have been gratified by the Government increasing the sum of money at the disposal of the Royal Society for grants to scientific men from £1000 to £4000. The success of the Yorkshire College of Science has fully equalled the hopes of its promoters; whilst the new College at Bristol has made a start. An attempt is also being made under favourable auspices to found an institute of Professional Chemists. Nor may we omit to mention the interesting display of scientific instruments that has been made at South Kensington.

The session of Parliament was not nearly so prolific of special interest to pharmacists as that of the preceding year. Sir J. D. ASTLEY's Bill, shorn, through the influence of the Pharmaceutical Society, of all its objectionable features relating to the sale of poisons, and remaining only a Bill against their administration to horses and cattle, passed into law. Legislation as to juries in Great Britain was not attempted. It may be useful here however, to correct some false impressions that have gained currency in respect to the question of the exemption of chemists and druggists from jury service. As far as this battle can be fought up to the present time, it has been fought and gained by the Council of the Pharmaceutical Society. The whole question of jury service is now waiting for legislation, and several Bills dealing with it have been introduced, more or less under Government sanction, during the last few years. In the latest of these, in 1874, owing to the exertions of the Council, provision was made to exempt all registered chemists and druggists from service. In March, the unrestricted sale of "patent medicines," was brought before the House of Commons by Colonel LEIGH, but the Government then refused to pledge itself to deal with it. Recently the Lord Advocate promised to use his influence for its suppression, but also raised some doubts whether he knew what a patent medicine was. A memorial asking that the sale of poisons under the Patent Medicine Act may be assimilated to their sale under the Pharmacy Act, 1868, has been drawn up in Exeter; the advisability of this course has also been frequently urged in the correspondence columns of this Journal, but the subject has often been encumbered there with propositions to confine the sale of patent medicines, as such, to chemists and druggists, an object that is not at all likely to be attained. Sir WILLIAM FRAZER has given notice that he will introduce a poisons bill next session, but has shown no sign as to what its nature will be. Sir THOMAS CHAMBERS again brought forward the subject of civil service trading and was met by a count out. The regulations for carrying out the Registration of Trade Marks Act were issued at the commencement of the year. In consequence of the great number of existing trade marks it was found impracticable to register them all by the time fixed, July 1, after which proceedings could not be taken for the protection of an unregistered trade mark. A short Act was therefore passed prolonging the time until the 1st of July, 1877. The Registrar of Trade Marks has been sustained by the High Court of Justice in an objection to register as a trade mark a word which was not so used before the passing of the Act; it has also been decided that the word "registered" cannot be considered as a part of a trade mark.

Several prosecutions instituted in Glasgow by the Excise for the sale of an article called "Liebig's Liquid Extract of Meat" without a wine license caused some sensation, which was heightened by a confusion of that preparation in the newspapers with the ordinary extract of meat; a modified penalty was imposed in each case. Several persons who had failed to ensure that their "finish" contained the proper quantity of resin have also been fined. Further, it has been demonstrated by the Excise that in Glasgow methylated spirit is sometimes used as a beverage, and that it is probably sometimes sold for that purpose. From Ireland, too, the practice of ether tippling has been again reported, and one death has resulted from it. Lastly, the Excise has been successful in a prosecution for the sale of "corn solvent" without a stamp, a result that necessarily led to the reversal of a decision of the Board itself that a very similar preparation could be sold without one.

During the year 80 cases of fatal poisoning have been recorded in this Journal; the poisonous agents and the number of deaths due to each being as follows:—aconite, 2; annatto, 1; antimony, 1; carbolic acid, 6; chloral hydrate, 8; chlorodyne (Towle's), 1; cordials for children, 5; cyanide of potassium, 6; "fly oil," 1; hydrochloric acid, 3; laudanum, 11; liniments, 3; liquor potassæ, 1; lotion, 1; mixtures, 5; morphia, 2; œnanthe crocata, 2; opium, 3; oxalic acid, 2; paraffin, 1; phosphorus, 1; prussic acid, 6; strychnia, 2; vermin killer, 4; white hellebore, 1; yew leaves, 1. This list shows a considerable increase upon those recorded in the previous two years, in each of which the number of cases was only 46. But how far this is due to an actual increase in the number of cases of poisoning in this country or to the increased vigilance of our friends in keeping us informed of the inquests we are unable to say; we are inclined to attribute it chiefly to the latter cause. Still in considering what may be termed the more notable cases of last year, such as have probably been recorded almost without exception in other years, there is much that is very suggestive. Five deaths have resulted from mistakes in connection with the dispensing counter: two of them (one in a surgery and one in a chemist's shop) arose from confusion of the bottles upon the counter after making up; two (one in a surgery and one in a dispensary) were mistakes in dispensing, and one the selling by a chemist of a poisonous for a non-poisonous substance, apparently part of unexamined old stock. Of the eight deaths from chloral hydrate seven were the results of overdose taken by persons in the habit of using this compound as a narcotic. The comparative frequency of similar occurrences has led the medical press almost without exception to suggest that chloral hydrate should be included in the schedule of poisons, and the same recommendation has been made by the juries at three inquests held during the year. Similar recommendations have been made with respect to narcotic cordials for infants, which have caused five deaths. Of the eleven deaths from laudanum at least eight have been suicides. The four recorded deaths from vermin killer were all suicides. A singular fatality has attended the use of carbolic acid: twice it has been mistaken for wine (once in a hospital), once for a cough mixture, and once (in a prison infirmary) for a diarrhœa mixture. Hydrochloric acid also was drunk for whiskey! On one occasion a jury attributed a death to the size of a spoon used for measuring the medicine, an incident that lends weight to a discussion that has been going on as to the variations in this household measure. Besides the foregoing it is worth mentioning that cases of poisoning by tincture of pellitory and Virginia creeper, in which the patients recovered, have been recorded.

The year has not passed without revealing that great ignorance of the law with respect to poisons still exists where it might least be expected. Only a few weeks since a learned lecturer on chemistry was reported to have made before a learned judge the novel suggestion that some restrictions ought to be placed on the sale of vermin killers, both of them being apparently unaware that restrictions already exist under which the number of deaths from vermin killer have, as shown again this year, notably decreased. In September, too, the trade was a little surprised to learn, upon respectable legal authority, that the regulations as to entry of sale, etc., applied to all the poisons in the schedule, instead of being limited to those in Part 1. This absurdity, however, was "no sooner blown but blasted."

The Sale of Food and Drugs Act of 1875 has on the whole passed through the crucial test of a first year's history creditably; the most objectionable occurences in connection with it hitherto having been defects in its administration rather than necessary results from faulty construction of the Act. Thus the Act cannot fairly be held responsible because a public analyst preferred to depend upon his sense of smell for the detection of methylated spirit in whiskey, or because a medical education did not appear to help a chairman of petty sessions to distinguish between "hydrated sulphate of lime" and plaster of paris, or prevent him from propounding an extraordinary theory respecting infant mortality that only a subordinate official would be *gobemouches* enough to adopt. But there is a Nemesis to avenge the perpetration of such absurdities. In the one case a public society declined to admit the orthodoxy of the olfactory school, and excommunicated its professor; in the other, it has been since stated, on respectable authority, that the magistrate was by his servants himself doing—unwittingly, it is to be hoped—what he had denounced as almost a deadly crime when done by others. Another extra legal inconvenience arose in January from the premature publication of certain statements included in a report of the Sheffield Borough Analyst to the Town Council. Not only was such discredit as would properly attach to persons convicted of an offence under the Act thus scattered broadcast amongst the whole of the pharmacists of Sheffield, heightened by sensational "leaders" in the public press, but the means specially provided in the Act for testing whether any offence at all had been committed were not available to those who suffered from the effects of the vague imputation. The public analyst disclaimed being held responsible for the publication of the report; the Town Council refused to carry the cases into court; and the Sheffield pharmacists had to be content with the knowledge that—

"Some one had blundered."

A similar injustice, but on a larger scale, nearly resulted from the somewhat incautious announcement of a paper for an evening meeting of the Pharmaceutical Society. Upon the reception of the paper itself, however, it became evident that it would be impolitic to favour the usurpation of the duties of the responsible public analyst by an irresponsible candidate for such an appointment, or to substitute the lecture theatre at Bloomsbury Square for the police court in the hearing of cases of alleged adulteration. The paper therefore was declined and although it was afterwards read before a provincial philosophical society it soon sunk into the oblivion which it merited.

The provision for referring disputed cases to the chemical staff of the Inland Revenue laboratory seems to work satisfactorily, the decisions, with a notable exception in some butter cases, having generally received acquiescence. During the year the penalty for refusing to sell has been several times imposed, and a written warranty has been the means of transfering the responsibility from the retail to the wholesale dealer. A difficulty in the construction of the Act at one time occurred to a London magistrate, who seemed inclined to hold that the sale of an adulterated article to an inspector was not to his prejudice, as it was not for consumption; but this objection appears to have been quietly dropped. Also, it has been held that when a mixed article is sold, such as mustard condiment, it is not sufficient for a statement of its nature to appear on the package in bulk, but it is required to be placed on every portion sold.

Of the prosecutions for offences against the Act, those relating to the sale of milk of sulphur are doubtless of the greatest interest to our readers. It has been decided in different localities that it is, and that it is not, legal to sell the "lac sulphuris" of the London Pharmacopœia, 1721, as "milk of sulphur," and one magistrate has taken the opportunity of deciding both ways. However much opinions may differ as to the advisability of abandoning the old preparation, it is at least unfair that those who wish to see the question as to the legality of its sale cleared up should be charged with favouring adulteration, especially as it cannot be denied that when it is supplied for milk of sulphur in many districts it would be of the "nature, substance and quality of the article demanded" by the purchaser. The possibility of the settlement of the question in connection with cases now under adjudication is therefore a subject for congratulation. There has been a conviction for the sale of sulphuretted antimony for precipitated sulphur, and the same person was fined for putting 50 per cent. more iodide of potassium in a mixture than was ordered in the prescription. In a prosecution for the sale of pepper contaminated with bean meal, the plea that the pepper was unavoidably mixed with extraneous matter during the preparation—the stones used for grinding it having been previously used for bean meal—was disallowed, the Bench considering the admixture could have been avoided. A prosecution for the sale of "ginger ale," on the ground that it was not ale, was unsuccessful.

As in former years scientific literature has gained by the increased attention that has been paid to the detection of sophistications in food. Butter has taken the chief place. A return made to the House of Commons, by the Principal of the Inland Revenue Chemical Laboratory, gave the results of the examination of a very large number of samples of butter. From these Mr. Bell inferred that the determination of the specific gravity of butter fat in the liquid condition at 100° F. could be used as a test of its genuineness, since the specific gravity of ordinary animal fats was found to vary at that temperature between 902·8 and 904·5, whilst that of butter fat rarely fell below 910·0. It was also noticed that when a sample of inferior butter was kept in small quantities in glass or earthenware vessels, it showed a tendency to lose the characteristic principles of butter, and to become assimilated to ordinary animal fat. The sufficiency of the specific gravity test alone has, however, been challenged by Messrs. Angell and Hehner and Dr. Dupré. The latter chemist considers that whilst a reputed butter, showing a specific gravity below 911, might safely be pronounced adulterated, a higher specific gravity would not necessarily indicate purity, since by heating mutton dripping for some time at 300° C., its specific gravity was raised from 904·8 to 914·4, whilst one sample of mutton dripping reached 917·3. Mr. Pinchon has described an instrument for taking simultaneously the specific gravities of oils and their temperatures, and using them as indications of purity. Professor Redwood has described an arrangement for the determination of the melting points of butter and other fats. Further, Dr. Dupré's researches have shown that the deficiency in the proportion of insoluble fatty acids in butter compared with other fats is partly made up by the presence of 5 or 6 per cent. of fatty acids soluble in water. The sensational talk, too, about the adulteration of whiskey with methylated spirit and fusel oil led Dr. Dupré, whilst disclaiming belief in the prevalence of such adulterations, to publish a method for their detection, based upon the different products obtained by oxidation of the various alcohols.

Amongst other papers on analogous subjects, may be mentioned Dr. Wittstein's on the testing of coffee, one on the examination of spurious beeswax, Mr. Clark's on the use of the microscope in the detection of seed constituents in colocynth powder, and Mr. Greenish's on how to use the microscope in the detection of an adulteration of maranta with cassava starch. And whilst speaking of microscopical work we must mention Mr. Moss's thorough histological investigation of pareira stem. Dr. MUTER has published a method for the detection of castor and other fixed oils in balsam of copaiba, based on the different solubilities of the sodium salts of oleic and copaivic acids. The presence of gurgun balsam, or "wood oil," in balsam of copaiba can be detected, according to Professor FLUCKIGER, by the splendid violet colour produced when it is dissolved in carbon bisulphide and a mixture of sulphuric and nitric acids added; fish oil and oil of valerian, under the same treatment, give a more transient violet colour. Professor DYMOCK has shown that sulphuric acid may be used as a test for the genuineness of chaulmogra oil. Further, Mr. GILMOUR says, that the amount of cetin liberated from sperm oil by the action of sulphuric acid may be taken as an index of its purity. He has also suggested that the chlorophyll bands given in the spectroscope by olive oil, and other vegetable oils, might be used for a similar purpose. M. BRETET has stated that genuine dragons' blood may be distinguished from false by its giving off red fumes when heated, the imitation not doing so. While searching, too, for suspected lead colouring in sweets, Mr. STODDART lighted on a delicate test for saffron. Some progress has been made, also, towards converting a popular belief as to the application of coculus indicus into a popular fallacy, the Inland Revenue authorities reporting that although special efforts have been made to discover any use of this drug as an adulterant of beer they have been unsuccessful, whilst inquiries have shown that the quantity retained in this country is used mainly in poisoning fish and making cattle ointment.

In the literature of the pharmaceutical sciences for 1876 salicylic acid has undoubtedly taken the lion's share. Professor KOLBE has continued his investigation into its power of arresting fermentation. This appears to be especially great in the case of beer yeast and similar ferments, 140 parts of yeast failing to cause fermentation in the presence of 1 of salicylic acid. The amount of sugar present has no influence, within certain limits, upon the result. Neither can yeast resume its functional activity after being checked by contact with the acid, but the amount of yeast rendered inert varies with the degree of its dilution by the fermentescible liquor. The action of salicylic acid on emulsin is not nearly so powerful as on yeast, but emulsin is coagulated to a certain extent, after which it is without action on amygdalin. Benzoic acid was found to act similarly, but in a less degree. Mr. HUNTER reports partially confirmative results, but his experiments did not prove that salicylic acid is a preventive of fermentation in sugar solutions containing much vegetable matter. NEBAUER'S statement, however, was confirmed that it prevents the fermentation of grape juice in a marked degree and for an indefinite time; it also prevents the decomposition of lime juice. But, all things being considered, Mr. HUNTER thinks salicylic acid is not so well adapted as alcohol for the preservation of the Pharmacopœia infusions. Many industrial applications have already been suggested for salicylic acid: for instance, in the preservation of meat, butter, milk, wine, vinegar, size and other readily decomposable substances; in the manufacture of glue and gelatine, as it appears to facilitate the conversion of the tissues into gelatine; in tanning, where it not only favours the action of the tanning materials, but it prevents the formation of gallic acid; and in the manufacture of writing inks and perfumery. But it has found, also, a most important use in medicine from the power possessed by it and its salts, in common with salicin, to reduce the temperature of the body in febrile cases, and their almost specific action in rheumatic fever; it has also been used for antiseptic dressings. As it had been shown that some of the antiseptic properties of the acid were modified when it ceased to exist in the free state, doubts arose as to the efficacy of the salts, when used in medicine. Professor BINZ, however, considers that the carbonic acid continually liberated in the animal tissue has the property of setting free the salicylic acid from the soda salt; nevertheless some experiments by Mr. BENGER went to show that when salicylic acid is administered it is not excreted in an active state. This use of salicylic acid in medicine and its relative insolubility have exercised the ingenuity of pharmacists. Glycerine, borax, sodium phosphate, ammonium citrate and acetate, and potassium citrate have been recommended for use to increase its solubility, but it is not clear what compounds are the result. Mr. WHITE recommends a pill mass of the acid with borax, glycerine and tragacanth. Dr. HAGER has called attention to the fact that much impure sodium salicylate is now met with, and the difficulties attending its preparation in the pure state led Mr. WILLIAMS, at the Pharmaceutical Conference, to describe the sodium sulphosalicylate, a salt in which the salicylic radical appears to exist intact, and which presents the advantage of crystalling readily and being very soluble in water. Salicylate of iron has been recommended as a substitute for perchloride of iron. Cresotic acid and sodium cresotate have been ascertained to possess properties similar to those of salicylic acid.

Cinchona bark and its alkaloids have naturally also occupied much attention. The startling statement that the Dutch have produced in Java a calisaya bark that yielded 13·25 per cent. of quinine, equal to 17·86 of the sulphate, has shed fresh light upon what the result of the cinchona acclimatization experiment may be. From some cause, probably climatic, plants from the same lot of calisaya seeds have not prospered in India, where the best average bark seems to be obtained from *C. officinalis*, yielding about 6 or 7 per cent. of quinine. The harvest of bark from the Sikkim plantations has this year amounted to upwards of 200,000 lbs., or more than twice the total previous yield. As most of this is succirubra bark, in which cinchonidine and cinchonine predominate, a mixture of the alkaloids has been manufactured from it, and supplied to medical men to experiment with as a febrifuge. At present the result is not quite clear, since some reports quoted from the *Neilgherry Courier* a few weeks since were decidedly unfavourable, whilst those quoted in Dr. King's manual, since received, are all favourable. In Sikkim the method of harvesting by decortication and "mossing" has failed owing to the predilection of ants for the young bark, and it is doubtful whether rooting up of the plants will not prove more profitable than coppicing, the root bark being comparatively rich in alkaloids. The results of special manuring have not been encouraging. The Japanese are now attempting the acclimatization of cinchona, having been supplied with seeds from Java. An unfavourable report has been received of a similar experiment in New Caledonia, and in St. Helena the attempt has been abandoned. The determination of quinine in various mixtures has been dealt with in several papers. Mr. ALLEN concentrates the solution, adds ammonia, and extracts with ether, obtaining the quinine upon evaporation as a monohydrate. Mr. PALMER, besides preferring chloroform to work with, says when ammonium citrate is present, as in ferri et quinæ citras, ether does not always remove all the quinine, but that chloroform does. Such a result, however, Mr. COWNLEY would attribute to imperfect manipulation and points out that it is necessary to shake with ether a second time. Mr. COWNLEY also finds that freshly prepared quinine sulphate probably contains 7½ molecules of water, which quantity upon exposure to the air is rapidly reduced to 2 molecules; at 100° C. the salt becomes anhydrous, but upon exposure reabsorbs 2 molecules of water. Dr. HESSE has referred aricine, cinchovatine, and the lævo-rotatory base obtained by Dr. DE VRIJ from Jamaica bark, to more or less impure states of cinchonidine. A phenol sulphate and a phenol hydrochlorate of quinine have been described by Messrs. JOBST and HESSE, and the arabinate of quinine has been recommended for hypodermic injection. Mr. CATILLON has pointed out that glycerine prevents the reaction between preparations of cinchona and salts of iron; also that its solvent action on cinchona bark is very great. The latter point has been confirmed by Mr. ANDREWS, who proposes a Glycerinum Cinchonæ.

Although Dr. BILLINGER has carried the history of opium far back into antiquity, the whole of its tale is not yet told. Dr. WRIGHT has discovered in it yet another alkaloid, oxynarcotine, and Mr. BROWN has found in it free acetic acid. An elaborate criticism of the methods of assaying its morphia value, by Mr. CLEAVER, and a note by Mr. PROCTOR, show that probably no one method will ever be applicable to the infinite variety of conditions in which opium is met with. And yet how important this point is has been shown by Mr. DOTT in the varying proportions of active principle found by him in galenical preparations of the crude drug. Consular reports show that China has become a serious competitor with India in the production of opium, although the Chinese product is not relished so much by the smoker. Neither is Persian opium, which after a relapse is again being produced in considerable quantity, so well liked by the epicures, its oiliness being objected to. Adulteration of the Persian opium, too, has already injured its character, and its variability is evidenced by Mr. D. HOWARD obtaining 10·4 per cent. of morphia from one specimen, while another yielded Mr. PROCTOR only 0·25 per cent. With respect to morphia Mr. MERCK has pointed out that the acetate becomes gradually less soluble when kept, through the elimination of acetic acid.

In describing *Rheum officinale*, which he still considers to be one source of true rhubarb, Professor FLUCKIGER gave an interesting sketch of the history of that drug, a service that he has also performed for several others. One of the principles of rhubarb, chrysophanic acid, has recently been employed by Mr. SQUIRE in place of the crude "Goa powder," of which it is the chief constituent. Mr. SQUIRE used an ointment prepared by dissolving the acid together with lard in hot benzol; but Mr. GERRARD says that the benzol is unnecessary, chrysophanic acid being soluble in hot fats. Emodin, another constituent of rhubarb, has lately been asserted to be identical with the so-called frangulin or frangulic acid, present in *Rhamnus frangula* bark. This lead to the remark that black alder bark should not be used until it is a year or two old. Gelsiminic acid has been similarly found to be identical with æsculin.

Ergot and rye are generally spoken of in association; but Mr. WILSON, in an interesting paper describing the conditions favourable to the growth of ergot, says that in Aberdeen and Kincardine shires it is rarely found on rye, although it occurs freely on twenty different grasses. Its active principle is still fertile of disputes. Mr. TANRET reported that he had obtained from it a new alkaloid, which he called ergotinine. Professor DRAGENDORFF, however, in describing several definite compounds obtained from ergot, one named sclerotic acid being claimed to be the active principle, stigmatized ergotinine as an indefinite substance. This has since been denied by Mr. TANRET, and there the matter rests. The aconite principles also remain in a similar state of haze. By using tartaric acid and avoiding a high temperature, as recommended by Mr. DUQUESNEL, Dr. WRIGHT has obtained a crystalline alkaloid sufficiently pure, he considers, to warrant him in attributing to it the formula $C_{33}H_{43}NO_{12}$, but whether Mr. GROVES'S "inert alkaloid" is a product of decomposition or not, he now seems to think doubtful.

From jaborandi, which in the previous year caused so much sensation, Mr. KINGZETT has obtained an alkaloid to which he attributes the formula $C_{23}H_{34}N_4O_4,4H_2O$, but appears to doubt whether this is identical with the substance called "pilocarpine" by Mr. GERRARD. Mr. HARDY finds that his alkaloidal substance is present in the bark as well as in the leaves, but not in the wood; he has also isolated a hydrocarbon which he has named "pilocarpene." From coto bark Mr. JOBST obtained cotoin, a crystalline principle said to be a specific for diarrhœa; succeeding parcels of bark did not yield this principle, but another, paracotoin, which also has antidiarrhœic properties. Sicopira, another Brazilian tree, is also reported by Dr. PECKHOLT to yield a crystalline principle effective against diarrhœa. Hyoscyamine in the crystalline form is now in the market, and the preparation of crystalline hydrobromate of conia has been described. Sassy bark has yielded a crystalline poisonous alkaloid, erythrophleine, and *Sium latifolum* another, together with a poisonous neutral principle. Walnut leaves have yielded juglandine, also an alkaloid; and Mr. BULLOCK has arrived at the conclusion that jervia is the only alkaloid present in *Veratrum viride*. Mr. DELLESME attributes to an alkaloid the toxic action of pyrethrum flowers, whilst Mr. ROTHER considers it to be due to persicin, one of three acid principles obtained by him from Persian insect powder. From capsicum fruit Mr. THRESH has isolated a powerfully pungent principle that he has named "capsaicin," to which Dr. BURI attributes the formula $C_9H_{14}O_2$. Normal beer proves sometimes to contain a substance resembling colchicine. Mr. COWNLEY has thrown doubts upon Professor SONNENSCHEIN'S reported conversion of bromine into strychnine. Lastly, Dr. SCHMIDT has confirmed Dr. TILDEN'S formula of $C_{16}H_{18}O_7$ for the anhydrous aloins, whilst some experiments led Mr. DOBSON to the conclusion that although the aloins are not inert they are not very active, barbaloin being perhaps most active. All this shows that there is much more to do before the time for using definite chemical principles only, as shadowed forth by the Belgian congress, will arrive.

Although no vegetable substance has been brought forward this year with very imposing claims for a place in the materia medica, several have been mentioned that may be classed as new or little known remedies. Thus *Grindelia robusta* has been recommended for use in asthma, and as an antidote to the poison of the poison oak; princewood bark as a stomachic tonic; kava kava, the root of *Piper methysticum*, in gonorrhœa; watercress as an antiscorbutic; *Asarum canadensis* as an aromatic; *Ailanthus glandulosa* in dysentery; *Megarrhiza californica* as a cathartic, though rather a drastic one; *Xanthium spinosum* as a specific against hydrophobia, though it is reported to have failed to sustain the claim; *Eriodictyon californicum* for pneumonia and chronic lung disease; and the "quinine flower" of Florida for purposes to which quinine is usually applied. Professor DYMOCK has indicated several Indian drugs worthy of closer investigation. Sir ROBERT CHRISTISON has reported his personal experience of the property of coca leaves to prevent fatigue; but different results were obtained by Mr. DOWDESWELL. *Eucalyptus globulus* has maintained its antimalarial reputation, and has been recommended as an insectifuge. Mr. HOLMES has referred the American remedy damiana to species of *Turnera* and *Haplopappus discoideus*. Dr. MILLER has compared the behaviour of mesquité gum with that of gum arabic, for which he thinks it may be substituted in many purposes of the pharmacy. Mr. PELTZ has described a new variety of liquorice extract.

At one of the evening meetings Mr. REES PRICE alluded to the fact that phosphate of iron is not so insoluble in acetic acid as is generally assumed, and gave some details as to the loss occurring in working the B. P. process for ferri phosphas. To avoid this he proposed to substitute for the acetate of soda ordered an excess of phosphate of soda. In an exhaustive paper read before the North British Branch Mr. HOWIE described the various precipitates that trouble makers of "syrup of the phosphates," and discussed their causes; he also stated that the syrups of some makers do not contain the amount of phosphates represented on the label to be present. At the Pharmaceutical Conference Mr. HOWIE again brought the latter point forward and suggested that an attempt should be made to fix what should be considered the standard strength of compound syrup of the phosphates (Parrish). Dr. JEHL has given a formula for syrup of chlorhydrophosphate of iron and lime. Mr. ROTHER has described "ferric citrophosphate," and pointed out that free orthophosphoric acid is incompatible with the stability of citrophosphoric compounds. Mr. ROTHER has also described an ammonio-citrate of iron and bismuth. Two other new preparations of bismuth have been brought forward, the oleate, by Mr. BETTY, and the glycerole, by Mr. B. SQUIRE. Mr. SQUIRE has also proposed to substitute a glycerole of subacetate of lead for the official solution, and also to use it in the preparation of the ointment.

"Blue pill" has been the subject of an investigation by Mr. HAROLD SENIER, his results seeming to indicate that the proportion of mercurous and mercuric oxides in it increases with age. Mr. BOTTLE has described a ready way of making "grey powder" by shaking the ingredients together in a bottle, and Mr. GOODALL has stated his experience that a moderate trituration is more effective in extinguishing the mercury than a more vigorous one. A soluble mercurial albuminate for use in hypodermic injection is due to Professor BAMBERGER. Mr. DEANE has given a formula for blistering solution, substituting acetic ether for acetic acid. The darkening which takes place when hydrocyanic acid comes into contact with calomel has been shown by Messrs. POWELL and BAYNE to cease when a certain quantity of hydrochloric acid has been liberated, and to be prevented altogether by the presence of sufficient free hydrochloric acid in the first place. Professors SCHWARZENBACH and FLUCKIGER have studied the curious reaction between iodine and white precipitate in the presence of alcohol, with the formation of iodide of nitrogen; and Mr. RICE has noticed that iodoform is another of the products of the decomposition, and that the iodide of nitrogen is not formed when carbolic acid is added. Mr. DARLING has noticed, also, the formation of iodoform in the so-called colourless tincture of iodine. A method for the volumetric estimation of carbolic acid with titrated bromine water has been given by Dr. KOPPESCHAAR. Mr. SIEBOLD has pointed out that in preparing precipitated sulphur the partial precipitation resulting from an insufficiency of hydrochloric acid is purer than when the whole is thrown down. Messrs. KRAMER and PINNER have shown that the substance known as "croton chloral" is really butyl chloral, as it contains two more atoms of hydrogen than was supposed. Mr. SAUNDERS is of opinion that in the liquefaction that takes place when chloral hydrate and camphor are triturated together, camphor acts the part of solvent. The action of chloral hydrate as a disinfectant has been pointed out by Dr. CRAIG. Dr. DAVY has found molybdic acid to be a very delicate test for alcohol, and, *pace* Dr. RICHARDSON, methyl alcohol has been ascertained by Mr. BEAUMETZ to be more poisonous than ethyl alcohol. In his important contribution to the history of essential oils Professor DRAGENDORFF has, in the light of innumerable experiments, discussed how far their solubility in alcohol can be used as evidence of their genuineness, the effect of age on essential oils, the restoration of resinified oils by distillation, and the colour reactions of essential oils with various substances. Mr. KINGZETT has continued his researches on essential oils, and by the atmospheric oxidation of turpentine obtained a solution containing peroxide of hydrogen and camphoric acid, which he claims to possess considerable antiseptic and disinfecting properties.

We must now be content with the simple enumeration of a few other subjects of interest in the pharmacy. As vermifuges there have been described compounds of santonin and soda,—santonin, soda and albumen,—and santonin and carbolic acid. The conversion of a portion of cane sugar into grape sugar in the early part of the preparation of syrup of ferrous iodide is said to prevent subsequent change; citric acid has been found to be without preservative influence on the syrup, and hypophosphorous acid to restore it when altered. Storax has been recommended for the preservation of lard, and mustard oil as a substitute for it. Vaseline has obtained considerable acceptance as a basis for ointments. Soap, guaiacum, glycerine and liquorice powder,—mucilage and powdered sugar,—and yellow resin,—have been recommended as excipients for phosphorus pills. A chloral cream and a chloral plaster have been described; also a compound of cod-liver oil and ferrous iodide, and the making of nitrate of zinc pencils. Ice has been recommended as a vehicle for the administration of medicines. Pancreatin has been found to have therapeutic activity, but to be inert in the presence of pepsin; peptone and peptone chocolate have also been referred to. Perhaps the latest novelty is "serum sanguinis exsiccatum." Last, but not least, pharmacists are indebted to Mr. CORDER for the drawings and description of his pharmaceutical apparatus.

Besides these papers pertaining to more or less pharmaceutical matters, we have been enabled to reproduce during the year many of a wider and lasting interest. Amongst these were Professor TYNDALL's lecture on the optical deportment of the atmosphere in reference to the phenomena of putrefaction and infection; Mr. WILLS on the relation of the atmosphere to plant life; Mr. PROCTOR on the effect of flexibility on the working of chemical balances; the Warden of the Standards on the ancient standard weights of Babylon and Assyria, and on MENDELEEF's New Balance; Professor EBER's translation of an ancient Egyptian medical papyrus; Mr. SORBY on the size of molecules; Mr. WALLACE on surface biology; Mr. KINGZETT on the chemistry of the brain; Professor DE CANDOLLE on a dominant language for science; Mr. PERKINS on the tar colours; Mr. CROOKES on the radiometer; Dr. C. W. SIEMENS on the action of light on selenium.

Of new books on subjects allied to pharmacy, there have been no lack. Dr. TILDEN has given us an Introduction to the Study of Chemical Philosophy; Professor DITTMAR a Manual of Qualitative Chemical Analysis; the veteran Mr. SMITH a History of Ferns; Mr. HOWARD the conclusion of his splendid work on the Quinology of the East Indian Plantations; Dr. M. C. COOKE a Catalogue of Indian Oils; the executors of the late Dr. CRACE-CALVERT his work on Dyeing and Calico Printing; and the executors of DANIEL HANBURY his Science Papers; Dr. HOOKER a Science Manual of Botany; Dr. MOREL a French Translation of DRAGENDORFF's

Chemical Analysis of Active Drugs. There have also been the Year-Book of the British Pharmaceutical Conference for 1875, and the Transactions of the American Association for the same year. The regular issue of the Medicinal Plants of BENTLEY and TRIMEN has also been continued. There have also been new editions of ATTFIELD'S Chemistry, TAYLOR'S Poisons, ROYLE'S Materia Medica, and HASSALL'S Food Adulterations, and a fresh reprint of the British Pharmacopœia.

We cannot close this record without a tribute to the dead. WILLIAM TAIT, a valued examiner, and his partner, JOHN SIMPSON, have been lost to the Pharmaceutical Society and to the North British Branch especially. THOMAS ARCHER DORVILLE BREW, a former member of the Council, and JOHN PALMER TYLEE, WILLIAM WOODS, and MATTHEW HUSBAND, after doing good service as local secretaries, have passed away. These have been the riper fruit; but it is sad also to record that two of the silver medallists of the previous year, GEORGE GREEN and HENRY ELLIS, did not live to wear their honours a short twelvemonth. In HENRY LETHEBY England has lost a well known chemist. MICHAEL DONOVAN is gone from Ireland but leaves his mark upon the Pharmacopœia. THOMAS DRYDEN MOFFAT, lecturer in materia medica and formerly president of the local association, is regretted by the chemists and druggists of Glasgow. In France, ANTOINE JEROME BALARD, the pharmacist who discovered bromine, and CHARLES SAINTE-CLAIRE DEVILLE, the discoverer of anhydrous nitric acid and the amorphous form of sulphur, are no more, and the Paris School of Pharmacy has lost Professors BUIGNET and GOBLER. HLASIWETZ is mourned in Germany. Lastly MC IVOR no longer watches the cinchona plantations of Southern India.

And now our task is ended! Not that the materials are exhausted, but sufficient has been said to show the multiplicity and variety of topics that are brought before the pharmaceutical world in these pages in the course of one year. *Quot homines, tot sententiæ,* is a true saying, but in the diversity here shadowed forth we think it may be assumed that there is matter of interest to every pharmacist who chooses to look for it, and that the complimentary remark recently made respecting this Journal, that it is a dozen years in advance of its readers, must be taken *cum grano salis.* However that may be, we shall in the future, as in the past, do our best to justify the honourable trust confided to us. We conclude by wishing all our readers a fair measure of prosperity in the year upon which we have now entered.

"As half in shade and half in sun
This world along its path advances,
May that side the sun's upon
Be all that e'er shall meet their glances!"

THE SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of the above Association will be held on Thursday Evening next, January 11, at 17, Bloomsbury Square, at eight o'clock, when a paper will be read by Mr. J. H. HUGILL, on "The Hieroglyphics or Signs, as used to decorate the Show Bottles of the Pharmacist."

MANCHESTER CHEMISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

A COURSE of fifteen lectures on Botany, by Mr. LEO H. GRINDON, will be delivered at 225, Oxford Street, on Friday evenings, at 9 P.M., commencing on January 12th; fee 15*s*. Tickets and further particulars may be obtained of Mr. F. BADEN BENGER, Honorary Secretary, 7, Exchange Street, Manchester.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, January 3, 1877.

MR. JOHN WILLIAMS, PRESIDENT.

MR. WILLIAM DAWSON SAVAGE, VICE-PRESIDENT.

Present—Messrs. Atkins, Betty, Cracknell, Greenish, Hampson, Hanbury, Hills, Owen, Robbins, Sandford Shaw and Stacey.

The minutes of the previous meeting were read and confirmed.

Mr. HILLS said he had received a note from Messrs. Macmillan saying that the copies of the 'Pharmacographia' and 'Science Papers' presented by Mr. Thomas Hanbury were ready for delivery, and the Secretary was requested to arrange for their reception immediately.

The following being duly registered as Pharmaceutical Chemists were respectively granted a diploma stamped with the seal of the Society:—

Andrews, William Leatham.
Davidson, Alexander.
Frank, John.
Gostling, William Ayton.
Hart, Philip.
Hatch, James Oliver.
Robinson, Thomas Dexter.
Wilkinson-Newsholme, George Thomas.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

Andrews, William Leatham	Aldborough.
Frank, John	Whitby.
Gostling, William Ayton	Diss.
Hart, Philip	Bolton.
Hatch, James Oliver	Lancaster.
Helmore, William Holloway	Horsham.
Hicks, William Thomas	Bury St. Edmunds.
Jones, William Ellis	London.

Chemists and Druggists.

Dunkerley, James	London.
Probyn, Clifford	London.
Sinclair, James	Llandudno.
Thomas, Edwin Richard	Dowlais.

ASSOCIATES IN BUSINESS.

The following having passed their respective examinations, and being in business on their own account, were elected "Associates in Business" of the Society:—

Minor.

Bell, John Armour ....Greenock.
Blackbourn, Arthur..............Birmingham.
Dester, Joseph..................Bingham.
Frost, John ....Birmingham.
Gimblett, Washington............Ryde.
Hogg, James Edmund..............Worcester.
Jenkins, Thomas ....Aberystwith.
Loadman, James ....Southport.
Peel, Alfred ....Herne Hill.
Willan, William ....Preston.
Windle, John Thomas.............Chesterfield.

Modified.

Parker, William George ....Newcastle-on-Tyne.
Steward, John Alfred ....Worcester.
Wilkinson, William..............Chesterfield.
Williams, John..................Ruabon.

ASSOCIATES.

The following having passed their respective examinations, and having severally tendered the subscription for the current year, were elected "Associates" of the Society:—

Minor.

Alcock, Henry ....Coventry.
Anderson, James Johnstone ...Epworth.
Armistead, Hugh Baldwin ......Liverpool.
Asher, James ....Derby.
Barrow, Frank Arthur ....Newmarket.
Blaine, Thomas James Stewart..Hawick.
Cæsar, Julius...................Cosham.
Cooley, Walter Bromley ....Wolverhampton.
Curtis, Frederick George.........Dorchester.
Fraser, Alexander................Liverpool.
Glover, William Kensit ....Aberdeen.
Greenish, Henry George..........London.
Halhead, John Armstead ......Kirkby Lonsdale.
Hill, Francis ....Horncastle.
Hughes, Benjamin Longmore...Chichester.
Lincoln, William ....Ely.
McAlley, Robert ....Edinburgh.
Manduell, Thomas ....Hindpool.
Oldham, William ....Peterborough.
Piper, Walter George ....Norwich.
Presslie, Robert Dowell ....Aberdeen.
Tharle, Charles Albert...........Ventnor.
Thornber, William ....Preston.
Webb, William James.............Melbourn.

Modified.

Coates, George ....York.
Inkley, Jesse.....................Holbeach.
Johnstone, Robert ....Langholm.
Macewan, William Morrison ...London.
Morton, Samuel Edward.........Newington.
Ritchie, A. Wemyss..............Glasgow.
Sutton, William Denny ....Norwich.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary Examination, and severally tendered the subscription for the current year, were elected "Apprentices or Students" of the Society:—

Akers, John ....Leighton Buzzard.
Atkins, William Ralph ....Salisbury.
Austin, Alfred ....Birmingham.
Berrill, Robert Andrew ....Doncaster.
Bloodworth, Thomas ....Bourne.
Bousfield, William ....Hull.
Brawn, James Ward ....Birmingham.
Carter, Henry Ayling............Winchester.
Cook, James ....South Molton.
Crowther, William Charles......Tickhill.
Dady, William ....Holt.
Dyer, Sydney Reginald ....Chiswick.
Eaton, Edward Jarrett ....Diss.
Evans, Richard....................Dinas Mawddwy.
Fentiman, Charles Henry ......London.
Firman, John William. ....Boston.
France, James Mead ....London.
Fraser, Alexander ....Edinburgh.
Graham, Andrew Ward .. ..Brighton.
Herbert, Henry Seaton ....Thorparch.
Hill, Arthur ....Cheltenham.
Homes, Joseph Peter ....Dudley.
Hughes, Edward ....Sarn.
Laing, James......................Brechin.
Lane, Thomas Jesse..............Barnstaple.
McCrindel, Thomas ... .Northampton.
Mantell, Charles, jun. ....Birmingham.
Matthews, Charles William ...London.
Pattinson, William ....Hexham.
Pearson, Henry ....Banbury.
Power, William ....Greenwich.
Ramsey, David R. ....Dundee.
Rees, Samuel......................Llandyssul.
Shacklock, James Harvey ......South Cave.
Skelton, John Hardy ....Gainsborough.
Stableforth, John William ..... London.
Stevens, Robert ....Bristol.
Stott, Walter Henry ....Wednesbury.
Swindells, Thomas ... .Manchester.
Tatam, Saml. Blackmore Chas...Ottery St. Mary.
Taylor, Solomon ....Stafford.
Trezise, William Augustus.... Sheffield.
Turnell, Tom ....Portland.
Tyndall, Francis ....Newcastle.
Tyson, Thomas Balmforth ......London.
Underwood, Charles Joseph ...Chatham.
Watts, John Manning............London.
Whigham, Robert Laing.. ......Cardigan.
Wilson, Samuel ....Hanley.
Woolliscroft, Henry..............Wrexham.

Several individuals were restored to their former status in the Society upon payment of the current year's subscription and a fine.

THE PHARMACY ACT.

Mr. HAMPSON, in accordance with notice, moved as follows:—

"In anticipation of an opportunity that may arise during the next session of Parliament of amending the Pharmacy Act of 1868, in any particular or particulars that the experience of its working may have proved necessary, it is desirable that a small Committee shall give the subject its best consideration, and report in due course to the Law and Parliamentary Committee, suggesting the amendment or amendments it deems important."

He said he considered it very important to take some such step, for the following reasons: An opportunity might arise in the ensuing session which could be utilized for an amendment of the Act of 1868, and it was very desirable that the Council should be prepared with such amendments as it might think necessary; another consideration, of still greater importance, was that the Act of 1868 in one or two important respects had proved a failure, and the Council had hesitated to test its strength, fearing it might prove too feeble to bear the tension of a trial at law. The Act was really a dead letter so far as it affected the action of public companies, who had ridden rough shod through its most important provisions. Hence the law could only be put in operation when it affected individuals, and the result was that such action appeared both tyrannical and unjust.

Mr. HILLS suggested that the Council should go into committee to discuss this question.

Mr. HAMPSON said he saw no necessity for so doing, and he should object to the deliberations on this subject being withheld from the knowledge of the members at large. He was not casting any reflections on the Council, but a duty and responsibility rested on it, it being the administrative body selected by the State to carry out the law. For several years past certain conditions had arisen by which the spirit of the Act was totally ignored, and great and growing injury resulted to those who felt bound to adhere faithfully to its provisions. The Council ought, therefore, to look about to see the best way of getting out of this difficulty. If the motion were carried it would be possible to utilize any opportunity which might arise in Parliament, but if not, he thought the Council ought itself to make an opportunity, and after laying the grave statement of their position before the Government, ask its assistance in amending the law. If the spirit of the Act of 1868 were the right one it seemed to him there was no other course to pursue except one of negligence and disregard of what was believed to be right and equitable. The Council should not act as if the law had given chemists and druggists privileges which would not bear the light of public discussion, and if need be controversy too, and the course he proposed seemed to him only consistent with common courage and a determination to maintain the privileges given by the Act. Besides these main considerations there were others worthy of attention, such as the difficulty frequently experienced in finding the real owner of a business, and there were no doubt other minor improvements which a Committee could suggest. He believed the Society had arrived at a crisis in its history, but if the Council acted with firmness and determination it would get rid of the besetting difficulties and give great satisfaction to its members and to the trade.

Mr. GREENISH seconded the motion.

Mr. ATKINS asked if the intention was to go to the House of Commons for a new Act of Parliament.

The PRESIDENT said he understood that was the desire of Mr. Hampson, if an opportunity did not arise of obtaining the alterations desired in connection with some other Act.

Mr. ATKINS thought such a step required very careful consideration. It would open up the whole question of pharmaceutical legislation again, and lead to warm discussions which might not be at all advantageous. He was rather astonished to find Mr. Hampson bringing this forward, seeing that another movement had recently been set on foot, to which he had lent his influence, the object of which was to supplement what was done at the Council Board. Surely that body need not exist if it were necessary to come back to the Council for what was required. Did he understand Mr. Hampson to say that the Council had neglected its duties?

Mr. HAMPSON said he had remarked that such a charge might be made if it did not take some action.

Mr. ATKINS said he had come to the Council under the impression that it had endeavoured to do its very utmost with regard to the question to which Mr. Hampson had alluded, and which might as well be openly named—co-operative stores; and he still remained of the same opinion, that the Council had done its very best to deal with that important matter in the best interests of pharmacy generally. He was very glad, therefore, to hear from Mr. Hampson that he did not charge the Council with any neglect of duty in the past; but he still thought the matter should be carefully considered before going to Parliament for another Act.

Mr. SANDFORD thought Mr. Hampson must have forgotten that there was a Parliamentary Committee which was always ready to take advantage of any opportunity that arose for promoting the interests of the Society, and that Committee could be put in action at any moment. There were also a President and Vice-President who were never found lacking, and a Secretary who was always on the watch for anything which affected the interests of the Society. It therefore seemed like casting a slur on that Committee to appoint another one for this specific purpose. The Committee could be summoned at any time, and whenever any active business was going on a section of the Committee was able to meet and do what this smaller proposed committee was intended to do. Mr. Hampson said the Act was a failure with regard to public companies, and spoke of the spirit of the Act not being carried out, but he must say that the spirit of it was first and foremost that the public should be protected against the mistakes made by unqualified persons, and so far as public companies and co-operative stores were concerned, it might be said that so long as they employed qualified and registered men, the public safety was not endangered. He did not uphold co-operative stores, which he thought were doing an immense deal of mischief, but they should be opposed on broader grounds than this. The Pharmacy Act was passed to secure the public safety, and from that sprang certain advantages to chemists and druggists in Great Britain; but if it were attempted to put the interests of chemists and druggists before those of the public, discredit would be thrown upon the Act, and if the Council went to Parliament on that ground it would not receive much support. Co-operative stores had taken a great hold of public opinion, and even of the members of the House of Commons, and if an attempt were made to prevent public companies trading as chemists and druggists, Parliament would say, "You are only thinking of your own private interests, and we will rather pass an Act to enable companies to carry on business." With regard to the ownership of businesses that was a separate question; there had been more than one attempt to pass a measure for the registration of all firms, and the Council should try to assist any such general measure rather than seek a special Act, affecting only one business. He had certainly understood Mr. Hampson to say that the Council had neglected its duty in not prosecuting co-operative stores, but it had taken the best legal advice upon the question, and had decided over and over again not to take any action in the matter. He was also surprised to hear it said that the Council had acted tyrannically in putting the Act in force against individuals, and he should like Mr. Hampson to bring forward a single instance in which it had acted tyrannically. It appeared to him that the appointment of such a committee as was proposed was utterly needless, and he should therefore oppose the motion.

Mr. SHAW supported the motion. He did not understand it as expressing an intention to go to Parliament for a special Act, but that if fresh legislation were attempted the Council must be in a position to suggest such amendments as might seem desirable. It was stated some months ago that Lord Sandon intended to bring in a Bill with regard to patent medicines, which was a matter of great importance to the whole trade. It seemed most anomalous that an Act of Parliament should be passed to secure the lives and health of the community by requiring all chemists and druggists to pass an examination before they could sell a pennyworth of certain poisonous articles, and yet any of these scheduled poisons might be sold with impunity if they bore a patent medicine stamp. Then there was the question of making addition to the schedule of poisons, and it was said that Sir William Frazer intended to bring in a measure on the subject. If he did it would be quite as well that the Council should be prepared for it, and not have to decide in a hurry upon any points which must be raised. The resolution could do no harm, and might be of material service.

Mr. OWEN suggested that the Parliamentary Committee might be instructed to do what was required.

The PRESIDENT remarked that the Parliamentary Committee had power to appoint a sub-committee for the purpose, if necessary, but the Council required no fresh Act of Parliament or increased powers, to add to the Schedule of Poisons; it was simply a question of expedience.

Mr. OWEN said there did not seem anything to be done. He thought the Council should wait and see what was proposed, unless it was prepared to apply for a new Act.

Mr. HILLS could not see that a new act was required. It was better to "bear those ills we have than fly to others that we know not of." He would much rather wait and watch events than bring in a new bill.

Mr. CRACKNELL agreed in this view. The proposition seemed to him an aimless one.

Mr. ATKINS thought the only ground on which the motion could be supported was that the Parliamentary Committee had seriously failed in its duties. The attitude of the Council in his view ought to be one of strict supervision of what was being done in Parliament, but that was very different to proposing amendments.

Mr. BETTY could not agree with those who thought there was nothing to be done but follow the old routine manner of conducting the Society's business. He was not surprised that the motion did not receive much present support from Mr. Sandford, because those who had taken an active part in passing a great public measure were very often disposed to rest on their laurels, and feel that nothing more remained to be done; but at the same time he felt sure that when the Society did come to measure its strength with public opinion, or with existing interests, Mr. Sandford would give the Council his valuable aid and advice, whether it went for a new act or simply to amend one introduced independently. For his own part he saw no reason why the Society should fear the result of public discussion on the nature of their duties and their consequent position. Looking to the high examinations which chemists and druggists were now compelled to pass, it must be acknowledged that they really deserved a professional status, and he believed the public would view it in that light, and willingly accord them the same privileges which were given to other professional bodies. Unless there were some tangible grounds for going to Parliament it would be reckless to challenge public opinion, however confident that it would be pronounced in their favour; but the Society had now had eight years' experience of the working of the Act, and that might be considered a fair average of the life of an unamended Act of Parliament, which they were fully conscious was to some extent incomplete in its original scope, and as affected by subsequent legislation. If a Committee were given time to make a report, every defect might be brought forward. He hoped that any idea of a slur on the Parliamentary Committee would be removed by Mr. Hampson modifying the motion and asking that Committee to take the matter into consideration. In the opinion of many one very important point was the introduction of the word "pharmaceutical chemist" into the Irish Act, as a result of which Irish pharmacists might come to England and assume that title, and the Society would thus lose the exclusive right to it. It was said that if the Act were meddled with no one could tell what might be the end of it, but he did not believe that the privileges of the trade, small as they were, hung by so fragile a thread that a mere breath would blow them away. If the Council could not go to Parliament resting on the justice of its cause, it was in a false position altogether and the sooner the Board of Examiners was abolished and chemists and druggists returned to the position of ordinary shopkeepers the better. As it was the general wish of the pharmaceutical body to amend the Pharmacy Act of 1868, the opinion of Parliament should be taken, and if they were beaten on some points they would know their position, and bear it like men. He should therefore support the motion of Mr. Hampson.

Mr. HAMPSON said he moved this simply as a preliminary step.

Mr. ATKINS thought every purpose would be answered if the Parliamentary Committee were instructed to be strictly watchful with regard to future legislation.

The PRESIDENT remarked that when the Parliamentary Committee met its time was pretty well occupied with questions of detail, and no time remained for discussing general principles, therefore it might be as well if a sub-committee were appointed.

Mr. SANDFORD said he believed such matters as had been now brought forward had always been carefully considered when necessary. The question of co-operative stores had been discussed by the Committee again and again.

Mr. ROBBINS said the Council seemed to be discussing a question not raised in the motion, viz., whether it should go to Parliament at all.

Mr. STACEY said he could not understand the motion. On the face of it, it was simply a vote of censure on the Parliamentary Committee; but, from Mr. Hampson's opening remarks, he found that there was something much deeper in it than anyone could discover at first sight. It was, in fact, a stepping-stone to an amendment of the present Act, and for introducing fresh powers; and he regretted that this object had not been brought plainly and openly before the Council. The Council had wandered off into proposed amendments of the Pharmacy Act, a subject which was not before it, and which would come before it much better in the form of a report from the Committee. The Committee was a very efficient one, and was competent at any time to appoint a sub-committee to look into any particular subject which might arise. Such a sub-committee might be appointed, if necessary, to go through the Act carefully, and submit any amendment which might be deemed desirable to the Committee, which would then report to the Council. That would be a straightforward course; but he thought the passing of the present motion would be derogatory to the Council. He would not go *seriatim* through Mr. Hampson's remarks, some of which he regretted; but he must say, from his short experience at the Council and on Committees, that he was convinced no men could be found who had more at heart the interests of the whole body of chemists and druggists throughout Great Britain.

Mr. HAMPSON in reply said he had listened very carefully to the remarks of his friends, some of whom supposed that he had intended to cast a censure upon them; but that was entirely foreign to his intention. He did not think the step he had taken was an injudicious one in any way. His view was that the Committee proposed, after deliberate and careful discussion of the Pharmacy Act and its working, would be better prepared to go into the whole question and do justice to it than a large Committee. He wished the Council to be fully possessed of all the facts, and be prepared to utilize any attempt at fresh legislation. That was his primary object, but he did maintain that if the Council did not take the requisite steps to amend the Pharmacy Act it would, nevertheless, have to be amended in a very short time. He had been obliged to allude to various defects in the Act, and naturally he had referred to the question of public companies usurping the functions of registered chemists and druggists, and he was astonished to hear Mr. Sandford say that the Act was not in any way a failure, and that the spirit of it was not infringed. What he referred to when he said that they had been carrying out the Act in an apparently tyrannical manner, was that it had been administered partially, and not impartially. He looked first to the public good, and had that mainly in view, and he maintained still that the Council would be neglecting its duty if the Pharmacy Act were not carried out according to its spirit and intention; and this was not now done in certain cases. The Act was a failure in this respect that it punished a man who opened a shop without a qualification, but permitted a public company to do the same without a qualification. To remedy this, together with other defects, he proposed the appointment of this Committee, not from any disrespect to the Parliamentary Committee, but as an assistance to it.

Mr. ATKINS moved and Mr. OWEN seconded the following amendment:—

"That the Parliamentary Committee be requested to appoint a small sub-committee to consider the provisions of the Pharmacy Act, 1868, with a view of preparing or suggesting any alterations which it may deem expedient, and to report to the Law and Parliamentary Committee thereon."

Mr. HAMPSON said he was quite willing to accept the amendment and would withdraw his motion.

Mr. SANDFORD said this carried the thing much further than the original motion, because it assumed that there were certain amendments required in the Act. He had never said that the Pharmacy Act was perfect or could not be amended, but he did not think it worth while to pass such a motion as an abstract principle.

After some further conversation, Mr. SANDFORD moved an amendment in the following form :—

"That the Parliamentary Committee be requested to appoint a sub-committee to watch any opportunities that may arise during the next session of Parliament of amending the Pharmacy Act, 1868, in any particular or particulars that the experience of its working may have proved necessary, or of supplying any deficiency therein through other proposed acts, and to report in due course to the Parliamentary Committee."

The VICE-PRESIDENT seconded this amendment, and upon a division being taken, the following voted :—

For.—Cracknell, Hills, Sandford, Savage.

Against.—Atkins, Betty, Greenish, Hampson, Owen, Robbins, Shaw, Stacey.

The President was present but did not vote.

Mr. Hanbury was not present at the division.

The motion proposed by Mr. Atkins was then put, and carried by the same majority.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was read and adopted, and various accounts ordered to be paid.

It was also unanimously resolved that the salary of the Curator be raised to £200 per annum.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grant:—

Twenty guineas to the widow of a former member (to the date of his death), having three children dependent upon her. The money to be placed in Mr. Owen's hands for the purpose of assisting to secure the election of one of the children into the British Orphan Asylum, if he saw there was an opportunity of doing so.

A letter had been received from the Treasurer of the late Norwich Chemists' Association, inclosing a cheque for £10 17*s*., being the balance left in his hands on winding up the affairs of the association, which amount it had been resolved should be handed to the Benevolent Fund of the Pharmaceutical Society.

The report and recommendation of the Committee were received and adopted.

Mr. GREENISH said he was very glad as a member of the Benevolent Fund Committee to receive the £10 17*s*. from Norwich, but he could not help expressing his regret that the means of education afforded in Norwich had not been appreciated by the young men there. To see such a collapse was to his mind more grievous than any pleasure he derived from the receipt of the money.

The PRESIDENT was very glad that Mr. Greenish had called attentiou to this circumstance, for this money must be received with mingled feelings. It was certainly a great misfortune that local associations, like that at Norwich, were not better supported.

The Secretary reported that a registered chemist and druggist who had received two grants from the Fund, having just been elected into the Charterhouse, had called on him, and from the first money received from that institution, had given half-a-guinea as an annual subscription to the Fund.

HOUSE.

The Committee had considered several matters connected with the museum, lecture, and laboratory arrangements, including the fitting up of the octagon laboratory, for examination purposes, the consideration of which was adjourned.

The PRESIDENT said he had been looking into this matter, and, with the consent of the Council, was willing to superintend the rearrangement of the octagon laboratory, so as to fit it properly for the chemical examinations.

The report was received, and the President was requested to carry out the desired alterations.

Mr. GREENISH spoke to the need for such rearrangements, which he had frequently noticed.

LIBRARY, MUSEUM AND LABORATORY.

This report stated that communications had taken place with the printers with regard to defects in cutting the edges of the Journal, and the steps which were recommended to prevent this in future.

The Librarian had reported that the average attendance during the preceding month had been during the day 24 ; evening 8. The circulation of books had been 175 in town, 37 in the country. Several duplicate sets of periodicals being found in the Library, it was suggested that, if acceptable, they should be sent to the library of the North British Branch.

The following books were recommended for purchase:—

'Indexes to the Annales de Chimie et de Physique 1836 to 1850.'

Baillon's 'Dictionnaire de Botanique.'

Cooke's 'Mycographia.'

A case of foreign periodicals had been received from Messrs. Friedlander, of Berlin.

A letter had been received from Professor Balfour, of Edinburgh, stating that there were certain deficiencies in the sets of the *Pharmaceutical Journal* in the Government Library attached to the Botanic Gardens, and asking if they could be supplied. It was recommended that the missing copies should be sent, as it had been ascertained this could be done.

The Curator had reported the attendance in the museum as being on the average, morning 17, evening 3. He also reported the progress which had been made in the preparation of the catalogue and in the arrangement of the Hanbury collection. An application had been received for the loan of some specimens from the museum to exhibit at a soirée at St. Thomas's Hospital, which the Committee had granted. Professor Attfield reported that he had 52 entries since the commencement of the session, 45 being now at work, also that the attendance of the Bell Scholars during the month had been regular.

The report and recommendations were received and adopted.

Mr. GREENISH drew attention to the pleasing fact that the circulation of books in the country was constantly increasing.

LAW AND PARLIAMENTARY.

The report of this Committee included details of the steps taken in connection with several cases of alleged breaches of the Pharmacy Act. The report was adopted.

THE EXAMINATIONS.

The PRESIDENT drew attention to the practice, which was on the increase, of young men sending in their names and paying fees for examination at a certain date, and withdrawing at the last moment. This was not fair to the Society or to the Examiners, and it was, therefore proposed that in future, a portion of the fee should be forfeited, as in the case of an unsuccessful candidate, except in the case of sudden illness.

Mr. Greenish thought every consideration should be shown to the young men coming up for the Minor Examination, and that only a small sum at any rate should be forfeited in case of withdrawal.

The Vice-President suggested that the matter should be adjourned till next month, in order to give time for further consideration. In some cases the fault might not be at all in the young men themselves, but in their employers.

The matter was ultimately referred to the Library, Museum, and Laboratory Committee.

Report of Examinations in December, 1876.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major, 13th	7	4	3
„ 14th	6	2	4
„ 20th	6	2	4
	— 19	— 8	— 11
Minor, 13th	16	8	8
„ 14th	18	9	9
„ 15th	23	12	11
„ 20th	9	2	
„ 21st	22	11	11
	— 88	— 42	— 46
Modified	7	7	0
Total	114	57	57

Eight certificates received in lieu of the Preliminary examination:—

1 College of Preceptors.
1 Royal College of Surgeons of England.
1 Society of Apothecaries, London.
2 University of Cambridge.
3 „ „ Oxford.

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major	1	0	1
Minor, 20th	9	4	5
„ 21st	10	7	3
	— 19	— 11	— 8
Modified	1	1	0
Total	21	12	9

Mr. Hampson asked if the Secretary could give any information with regard to the statement contained in the following paragraph, which appeared in the *Echo* of the previous day.

"Miss Wren Hoskyns has very recently offered to place at the disposal of the Pharmaceutical Society or the Apothecaries' Hall a scholarship for young ladies qualifying for the profession of practical chemist and the general dispensing of medicines. The Society has declined the trusteeship, though there are yet hopes that the scholarship may be recognized."

The Secretary said he had heard nothing of any such application.

Parliamentary and Law Proceedings.

Poisoning by Opium Pills.

On Friday, December 30, Dr. Diplock, the coroner for West Middlesex, resumed the adjourned inquiry into the circumstances attending the death of Henry Randall, barman, at Chelsea, who is alleged to have died from the effects of opium poisoning. The deceased man was on intimate terms with Jeanette Dutten, one of the nurses at the Hospital for Women and Children in the King's Road, Chelsea, who gave him some pills containing opium, which she admitted having abstracted from a box in the surgery at the hospital. Deceased swallowed four of the pills to cure a cough, and in a couple of hours died. At the opening of the inquiry the girl was called, and, after being cautioned by the coroner, elected to be sworn, and admitted having stolen the pills and given them to the deceased, but strongly denied any criminal intent. She declared, also, that she could not read or write, and therefore did not notice the label "Opium" upon the box from which she abstracted the pills.

Dr. John Leonard stated that he had made a *post-mortem* examination of the body of deceased, and found that there were no external marks of violence. The body was well nourished, the head and neck were congested, and the substance of the brain and the pia mater were intensely engorged with blood. The brain itself was softened, and there was slight effusion at the base and into the ventricles of the brain. The stomach was healthy, and contained about 6 ozs. of a thick fluid, in which a suitable test indicated the presence of morphia.

Miss Myddleton, barmaid, said that she remembered seeing the deceased take some pills on Monday, the 18th instant. He offered some of them to witness and another person, saying they had been given to him. He did not say what they were for. Saw him put four of them into his mouth, but whether he swallowed them she could not say. That was about nine o'clock on the Monday night, shortly before he had his supper. He gave some of them to witness, who threw them over the bar. Did not know if anyone else took any of the pills. He said that one of the girls at the hospital had given them to him.

Clara Handsley, a nurse at the Hospital for Women and Children, deposed that she gave Jeanette Dutten some pills for a cough some time back. They were the ordinary cough pills, and were ordered to be given by the matron.

The Coroner: Were those pills the same size as those now produced? (the opium pills found on the deceased and in the box labelled "Opium" taken from the surgery).

Witness: No; they were larger, but not much larger.

Coroner: Could Dutten write?—Witness: I can't say. I never saw her do so, but the cook may have written for her. I never did.

By Mr. Abrams: Dutten saw where I took the pills from. The dispensary was open to any one to go there and take the poisons, etc., but the servants were not supposed to go into the dispensary without orders. We keep all sorts of pills in small quantities in our cupboards to give to the patients when ordered. The pills are kept in bottles, which are labelled. I know that the opium pills are given to the patients to soothe them, one pill being a dose.

Dr. Leonard, in answer to a juror, said that his experience had shown him that all poisons were kept under lock and key in the majority of London hospitals, so that an accident of this kind could hardly happen. The overdose of opium pills had no doubt caused the death.

The Coroner, in summing up the case to the jury, said it was well known that any person might administer a potion to another, provided that potion was a harmless one, without offending the law; but the case in question was very different. Lord Lyndhurst had laid down the law that if any person were killed through the negligence, carelessnes, recklessness, or heedlessness of another party, the latter was guilty of manslaughter, and it would be the duty of the jury to return a verdict of manslaughter against Jeannette Dutten, and leave a higher court to settle the matter.

The jury deliberated and returned the following verdict: "That the deceased died on the 19th inst. from the effects of poisoning by opium given to him by one Jeannette Dutten; that the said Jeannette Dutten has been guilty of great indiscretion and negligence, and that the hospital authorities had also been guilty of great negligence in leaving the poisons, etc., in a room accessible to any ignorant person who chose to go there and steal the deadly drugs lying in the room."—The girl was then called before the jury and severely reprimanded by the coroner who said that if the jury had acted up to the strict letter of the law they would have sent her to take her trial for the manslaughter of the deceased.

Poisoning by Cyanide of Potassium.

Dr. Danford Thomas held an inquest on Saturday, December 31, in St. Pancras, as to the death of Henry Boulter, aged 23. The evidence showed that deceased, in his wife's presence, took a bottle from his pocket containing cyanide of potassium, and placing it to his mouth took a dose. He never spoke again, and died in ten minutes afterwards. Deceased purchased the cyanide of potassium in Seven Dials on the previous evening, and showing it to one of his friends, said they would never meet more, as the stuff in the bottle was poison. A relative of deceased said there was a suicidal tendency in the family, two of his brothers having attempted to commit suicide. She believed the insanity was brought on by drink, both father and sons being much given to intemperance.—Verdict, Suicide whilst in a state of unsound mind, brought on by excessive drinking.

Obituary.

Notice has been received of the deaths of the following:—

On the 2nd October, 1876, Mr. George Garmeson Bradbury, Chemist and Druggist, Shavington, Nantwich. Aged 62 years.

On the 24th of October, 1876, Mr. Thomas Haugh, Chemist and Druggist, Brampton, Cumberland. Aged 83 years.

On the 2nd of December, 1876, Mr. Alfred Harris, Chemist and Druggist, South Norwood. Aged 42 years.

On the 13th December, 1876, Mr. William Hartley, Pharmaceutical Chemist, St. Stephen's Crescent, Kennington. Mr. Hartley had been a Member of the Pharmaceutical Society since 1863.

On the 16th of December, 1876, Mr. Philip Bright, Chemist and Druggist, Brecon.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

Chrysophanic Acid Ointment.

Sir,—Remembering the old saying "better late than never," I thought, as I have had a good deal to do with this chrysophanic acid business, that a word or two from me, might not be altogether out of place. Especially so since I had the pleasure of manufacturing the chrysophanic acid which afterwards formed the subject of Mr. Balmanno Squire's very interesting and excellent paper, according to the process devised by Professor Attfield.

I am sorry I cannot concur in the recommendation expressed by Mr. Squire, that benzole should be used in its preparation pharmaceutically to form an ointment; moreover I am quite of the opinion expressed by Mr. Gerrard, that a very excellent ointment may be prepared by dissolving the acid in hot fat, and then transferring it to a mortar and rubbing it down until cold.

If to an ointment so prepared three or four drops per ounce of otto of roses is added a most beautiful preparation results, possessing in an eminent degree all the active properties of the acid with the delicate and attractive odour of the rose.

In conclusion, I would take this opportunity of stating, with regard to the investigation of Goa powder therapeutically, that Dr. Ashburton Thompson has pushed the matter even further, and has been giving to his patients Goa powder and chrysophanic acid to take internally, as well as for use externally, and his research forms the subject of a paper to be read before the Harveian Society on the 18th proximo, when it is hoped an increased amount of information will be brought out and contributed.

The last link for investigation on this subject appears to depend upon the growth of a plant in the Royal Botanic Gardens, Edinburgh, from which it is believed the whole thing emanates. I had the pleasure of making the acquaintance of this little plant in the summer of 1875, through the kindness of Mr. M'Nab—and it was then about 16 inches in height, in a flower pot, and kept in the house containing tropical plants. I am glad to learn from a paper in the *Medical Times and Gazette*, that it is still growing on, as it will be an interesting question for botanists ultimately to determine.

A. W. Postans.

35, Baker Street, W.

Chemists and Druggists and the Medical Acts.

Sir,—The thanks of your readers are due to Mr. Fryer, for his letter in the *Pharmaceutical Journal* last week, as indicating a want of more light upon the subject, which probably arises from the fact that many of the sections of the various Acts were read at the meeting referred to, and for the sake of brevity not included in the report. For the guidance of those interested, I will explain a little more fully my views of the meaning of the Acts, and in doing so, I presume your correspondent will admit that in reading an Act of Parliament the words therein used must be interpreted according to their literal meaning at the time the Act was written.

The 5th section of the Apothecaries' Act, 1815, reads thus:—"And whereas it is the duty of every person using or exercising the art and mystery of an apothecary, to prepare with exactness and to dispense such medicines as may be directed for the sick by any physician lawfully licensed to practise physic by the President and Commonalty of the Faculty of Physic in London, or by either of the two Universities of Oxford and Cambridge: Therefore, for the further pretection, security, and benefit of His Majesty's subjects, and for the better regulation of the practice of physic throughout England and Wales be it enacted, That if any person using or exercising the art and mystery of an apothecary shall at any time knowingly, wilfully, and contumaciously refuse to make, mix, compound, prepare, give, apply, or administer, or in any way to sell, set on sale, put forth, or put to sale, to any person or persons whatever, any medicines, compound medicines or medicinable," etc.

It seems evident that when this Act was written the only person properly qualified to treat sick people was the physician who was lawfully licensed to carry on the practice of physic. Had it been otherwise we should, in some section of the Act, have discovered the duty of the apothecary, other than that of keeping a shop for the supply of the medicines ordered by the physician; and although the words "science and practice of medicine" do occur in the 14th section, yet if these words are taken in conjunction with the words which precede and follow after, they do not give the apothecary the right to practise medicine—to do so would have raised him at once to the position of the physician,—but merely show that one of the qualifications necessary for a person to have who wished to be registered as an apothecary was a knowledge of medicine, so far as it applied to his business, such, for instance, as pharmacology, and I am inclined to the belief that the word "medicine" in this section, should be read (according to modern language) "pharmacy." There is no definition of the business or profession of an apothecary, except that given in the 5th section previously referred to.

Your correspondent will be surprised to find that in the case of the *Apothecaries' Society* v. *Nottingham*, the decision of Baron Bramwell is considered good. Why? Because the chemist and druggist assumed the title of a properly registered medical practitioner.

E. Yewdall.

Leeds, Jan. 1877.

Communications, Letters, etc., have been received from Mr. Dyson, Dr. Brown, Mr. Crow, Mr. Yewdall, Mr. Benger, Mr. Bennett, Dr. Bond, Dr. Griffiths.

THE SPECTROSCOPE IN PHARMACY.

BY WILLIAM GILMOUR.

(*Continued from page* 531.)

In examining the various officinal extracts and tinctures for the chlorophyll spectrum, the consideration of the general form and appearance in which the solutions will be presented to us is not unimportant. A tincture for example, or the solution of an extract (in every instance a spirituous or watery solution, as the case may be), contains more colouring matter, it will be kept in mind, than that imparted by the mere presence of the chlorophyll. This tends to mask the spectra very materially; indeed, so much so that few, if any, of the tinctures can be examined even in very minute volume in their natural state, whilst in the case of the extracts the dilution requires to be carried to such an extent as altogether to fatally injure the nature of the spectra. This, it will at once be understood, prevents not only a proper observation of individual solutions where the chlorophyll may happen to be present only in minute quantity, but probably what is equally, if not more important still, it prevents a proper comparison being made between spectra of different solutions. In other words, the solution containing the largest percentage of foreign colouring-matter may contain the smallest percentage of chlorophyll, so that there would necessarily be, on the one hand, unequal degrees of dilution, or on the other unequal depths of colour in making any comparison. Uniform results would, therefore, be unattainable under either condition. In these circumstances if the chlorophyll can be extracted from the preparation and presented to the spectroscope as a pure solution, without the addition of any foreign colouring-matter, investigation will be much facilitated and many other important results gained. There are several substances which may be employed to effect this purpose, but probably none possess all the advantages of benzole. It may be mixed, for example, with almost every Pharmacopœia tincture containing chlorophyll, and in a short time it will be found again to separate, containing nearly all the chlorophyll in solution. Comparison may thus very readily be made between spectra of different samples of the same tincture as well as of tinctures from other substances. In cases where the relative intensities of different spectra are to be compared, a very good plan is to take given volumes of the tinctures to be examined and place them in different test tubes of similar diameter and add to them equal quantities of benzole. An examination made in this way gives a very good approximation of the amount of chlorophyll held in solution by the respective tinctures. If the tincture examined, say, be digitalis, the benzole chlorophyll solution will be of a beautiful dark olive-green, which will contain, if it be recently made from leaves carefully collected, dried, and preserved as previously explained, five bands of the appearance and situated as follows: namely, I., a band very dark and of considerable breadth, immediately behind B; II., a second between C and D, dark, but of no great breadth; III., a third behind D, very delicate and only appearing in very recent preparations;* IV., a fourth a little further behind D., and V., a fifth before E. These last two are of some considerable breadth, but are also very delicate and are therefore frequently not met with, having undergone decomposition from some of the causes already referred to. Various circumstances may modify individual spectra, but as a rule the appearance of these different bands give a very good indication of the history, condition, and, to some extent, therapeutic value of the preparation examined. It very rarely happens that band I. is of very marked intensity and breadth without one or more of the other bands also being present, and more seldom still that it is to any degree attenuated without being to some extent of therapeutic significance.

The extracts require to be manipulated in a way slightly different from the foregoing to suit their special peculiarities. Chlorophyll being only sparingly soluble in water (it is generally believed to be insoluble, but this is not the case as a watery infusion of any of the leaves mentioned will give a decided spectrum), a tincture may be made by adding spirit to the extract previously dissolved in water, and afterwards allowing to stand for some time. This solution being filtered may be treated with benzole, as in the case of the tinctures, the chlorophyll dissolving out from the different extracts in various shades, from a light to a very dark emerald green. The only objections to this plan are that the process of maceration occupies some little time, and that some of the extracts do not readily yield up their chlorophyll under these circumstances to the spirit. Twenty-four hours' maceration gave very good results with some of the extracts, but lettuce failed to give any indication whatever of an absorption band when treated in the same way and for the same length of time, although the chlorophyll was afterwards proved to be present in considerable abundance. The better plan is, therefore, probably to make a solution of the extract in spirit and water, to which at once add the benzole and mix thoroughly. Owing to the coagulation of the gum present in the extract the benzole will separate again with some difficulty, but the application of a little heat will facilitate the separation, and sufficient may thus be obtained to yield a characteristic spectrum. Treated in this way, if the extracts are fresh and good, the benzole chlorophyll solution, unless unduly diluted will be of a beautiful dark olive green, but the appearance will vary as well as the spectra, especially of those extracts less commonly in use. I have come repeatedly across extracts without a vestige of an absorption band and many others very much attenuated, but the following have been picked out, not only from the spectra yielded by them being characteristic, but also from the fact that they were otherways known to be the best extracts out of many examined.

Extract. Aconiti.—Solution very light yellowish green; band I. dark but not broad; band II. faint; no other bands visible; a considerable amount of shading at violet end and spectrum not all absorbed until beyond the green. This extract, like most of the other extracts of aconite examined, was in several respects unsatisfactory. It was somewhat dry and tough, cutting, or rather breaking, with a brown fracture, and giving a brown mixture with water without any trace of green whatever. One hundred grains of the extract mixed with water and washed

* This band is sometimes classified as band V. It is here always referred to as band III., the order of its rotation.

till the filtrate ceased to give any colour yielded on drying over a vapour bath, 8 grains of a chlorophyllic residue which, on treating with benzole, gave a dark green solution whose spectrum corresponded in every respect with the foregoing, with the exception that there was less shading and the spectrum was all absorbed a little beyond the middle of the green.

Extract. Belladonnæ.—Solution very dark green; bands I. and II. united forming one dark very broad band with a faint trace of red shining through at a point intermediate betwixt the two bands; band III. faint; band IV. of some breadth but not very dark. All the spectrum was abruptly absorbed immediately beyond this so that band V. was not visible. On diluting the solution, bands I. and II. separated, band III. disappeared and band IV. decidedly thinned, whilst the spectrum became elongated, band V. being still invisible. This extract was of a good pilular consistence and on mixing with water gave the dark green hue characteristic of a fresh extract. One hundred grains mixed with water and washed till the filtrate passed through colourless yielded, on drying over a vapour bath, 20 grains of a dark green chlorophyllic residue which, on treating with benzole, gave a very dark olive-green solution with a spectrum even more decided than the original solution, with the exception that band III. was not visible and the absorption in the middle of the green was even more abrupt.

Extract. Conii.—Solution deep green; bands I. and II. united, with a shade of red intermediate betwixt the two bands; band III. very faint; band IV. quite distinct but of no great depth: all the spectrum absorbed immediately beyond this. On diluting the solution the same action took place as in the belladonna extract, which extract it also closely resembled in consistence and in general appearance, both in the dry state and mixed with water. One hundred grains of the extract washed and dried as in the previous extracts yielded 17½ grains of a dark green chlorophyllic residue, which treated with benzole gave a very dark yellowish green solution, the spectrum of which differed in several respects from the foregoing. The extreme red, for example, beyond the first dark band was the only part of the spectrum unchanged. Bands I. and II. were united in one very dark broad band. The orange of the spectrum was changed to a dirty green, and bands III. and IV., though not of themselves very decided, were united by a dark shading. On diluting the solution the action was the same as in previous instances, bands III. and IV., however, disappearing altogether: the shading in the orange changing and the colour of the spectrum gradually assuming its normal appearance.

Extract. Hyoscyami.—Solution deep green; band I. broad and dark, but not shading into band II. as in the conium. Band II. dark, but of no great breadth; band III. not present; band IV. distinct but not broad, and all absorbed towards extreme of green. One hundred grains treated as in the previous extracts yielded 24 grains of a light green chlorophyllic residue which with benzole gave a deep green solution resembling in every respect the first solution with the exception that band IV. was not present in the spectrum and complete absorption took place in the middle of the green.

Extract. Lactucæ.—Light green solution; band I. dark, but of no great breadth; band II. faint. No other bands present, but a considerable amount of shading at violet end of spectrum, and complete absorption only took place towards the middle of the blue. Treated as the other extracts one hundred grains yielded twenty-one grains of a light green chlorophyllic residue, which with benzole gave a dark green solution, the spectrum of which was much more decided than in its original solution. Bands I. and II., for example, were now united by a dark shading, and band IV. was visible though not very decided, whilst complete absorption took place in middle of the green. With all the foregoing extracts it should be noticed that when the respective solutions from the fresh extract, and from the washed and dried chlorophyllic residue of the same extract were of nearly equal density of shade, the spectra very closely approximated. In one respect only could there be said to be any marked difference betwixt them, namely, that in several instances band I. of the dried chlorophyll solution was more refracted than in the case of the simple solution. This alteration in the position of the band had no effect on its susceptibility to change, either on exposure or, so far as could be ascertained, on subjecting it to chemical action, and therefore we may conclude that, whatever its cause, it had less a therapeutic than a scientific interest and bearing.

Extract. Cannabis Indicæ.—This and the following extract differ from the foregoing in respect that they are to a certain extent alcoholic preparations, but as they both yield decided spectra, and as moreover, the cannabis indica at least is an important and powerful therapeutic agent, frequently subject to adulteration as well as alteration in its constituents, it is but proper to refer to them here. The cannabis indica will yield the same spectrum, either with alcohol or benzole, and four or five grains extract to the ounce will give a solution strong enough to show the different absorption bands present in it. If the solution be a deep green it will generally show band I., not very dark, but of some breadth, with a considerable shading towards the violet end; no other band probably being distinctly visible. Increasing the strength of the solution until the green deepens with transmitted light into a peculiar lurid brown, band I. will intensify somewhat, and a shading will at the same time take place towards band II., which is very faint, having only the appearance of a continuation of the shading. Band IV. will also show very faintly, and complete absorption will take place towards the end of the green.

Extract. Lupuli.—An aqueous solution of this extract, to which spirit had been added, gave with benzole (same as in the green extracts) a very light green solution, which showed band I. very faint. No other band visible, and all absorbed with a considerable amount of shading towards middle of blue. A fresh portion of extract washed and dried gave a dark resinous residue, which dissolved in benzole, yielded a dark greenish brown solution, which showed band I. dark, but of no great breadth; band II. faint, with complete absorption towards end of green.

It will be noticed that in none of the extracts were all the five bands present, and further, that there was a certain order in which the various bands were acted upon, whether by dilution or exposure of the solution, or by some change in the extract itself. Bands III., V., IV. and II. were every susceptible, and quickly disappeared in their order, whilst band I., though very persistent, narrowed and became less dense. It is almost impossible to show without unnecessarily lengthening the paper the close relationship existing between the spectra of the different extracts and their age and quality. The age and therapeutic activity of some of the extracts examined happened to be known, so that this is spoken to with some confidence; but even were this not the case the following summation is very suggestive:—Extracts belladonna, hyoscyamus, and cannabis Indica in every case gave from four bands down to one in their order, but were never without band I. at least; extracts aconite and conium in the majority of cases only gave band I., whilst in some cases they gave none; and extracts lettuce and hop, with a single exception or two, never yielded any band whatever.

COMPARATIVE EXAMINATION OF THE MORE IMPORTANT COMMERCIAL VARIETIES OF GALBANUM AND AMMONIACUM GUMS.*

I. GALBANUM.

BY EDWARD HIRSCHSOHN.

(*Continued from page* 533.)

12. *Treatment with Alcohol.*—The residue from the treatment with ether was then treated with 85 per cent. alcohol as long as any went into solution. The alcohol was distilled off and the extract dried at 110° C. and weighed. The quantities of alcoholic residue obtained are shown in the comparative table on p. 531.

The residues were of a dark yellow colour, and dissolved to the extent of about one half. These aqueous solutions were of a full yellow colour, reddened litmus paper, and behaved towards reagents as follows:—

Ferric chloride produced in Nos. 1 to 14, 15 and 24 a darker colour; in the others either a green colour or a green precipitate. Subnitrate of mercury produced turbidity or a slight precipitate. Acetate of lead produced a slight turbidity; subacetate of lead a strong precipitate; gelatine solution no change. Ammoniacal silver solution was reduced in the cold; Fehling's copper solution, only after long standing, but when boiled a strong reduction took place. In contact with washed yeast fermentation took place and a quantity of carbonic acid was evolved.

A larger quantity of alcoholic extract from No. 2 was treated with subacetate of lead as long as a precipitate was formed, and filtered. The filtrate after sulphuretted hydrogen had been passed into it, and the sulphide of lead separated, was colourless, and gave no reaction with perchloride of iron; but it reduced Fehling's solution and gave off carbonic acid with yeast.

This would indicate the presence of sugar, and a body analogous to gallic acid.

13. *Treatment with Water.*—The residue left by the alcohol was treated with water at the ordinary temperature as long as anything was taken up. The extract obtained tasted somewhat bitter, was of a more or less full yellow colour, and had a faintly acid reaction. Evaporated and dried at 110° C., it gave the results shown in the table on p. 531.

The extract from Nos. 1, 2, 5 to 10, 12 to 16, 18 and 20 to 23, were light yellow; those from Nos. 3, 4, 11, 17, 19 and 24 were dark yellow to dark brown; they no longer gave a clear solution in water. Incinerated with soda-lime, they all gave off more or less ammonia. Dissolved in sufficient water to form a thin syrup and twice its volume of 80 per cent. alcohol added, a viscous mucus separated, which when dried gave a more or less yellow vitreous mass, that left, upon combustion, 5·82 to 6·33 per cent. of ash.

The precipitate obtained from all the sorts corresponded perfectly in their behaviour with reagents. All the experiments were made with solutions of equal strengths (1 in 10) and were compared with solutions of gum arabic of the same strength.

Reagent.	Mucus from Galbanum.	Gum Arabic.
Neut. Acet. Lead	Slight turbidity after long standing	No change
Hydrochloric Acid and Alcohol	Precipitate	Precipitate
Perchloride of Iron	Gelatinous mass	No change
Silicate of Soda	In equal volumes a clear solution, but becoming thick	Turbid, becoming thick
Oxalate of Ammonia	Turbidity	Turbidity
Caustic Potash and Fehling's Solution	No action in the cold, strong reduction by heating	Gelatinous mixture; no reduction by boiling
White of Egg, clarified by an acid	White precipitate, not dissolved in excess	Plentiful precipitate, perfectly soluble in exces

A solution containing 10 per cent. of mucus examined in a tube 50 mm. long was without action upon polarized light, whilst an equally strong solution of gum arabic rotated it 1°12′ to the right. Upon boiling a 10 per cent. solution of galbanum mucus and gum arabic for some time with sulphuric acid, and examining the resulting sugars, that from the mucus was almost inactive, whilst that from the gum rotated the polarized ray 10° to the right.

It was not improbable that the precipitate produced by alcohol in the aqueous extract represented a mixture of gum with dextrin. In order to remove the dextrin-like body from the mucus it was again dissolved in water, and precipitated with dilute alcohol until it gave only a very slight reaction with Fehling's solution in the cold. But the mucus thus purified behaved exactly the same as before. An attempt to obtain, by Scheibler's method, a crystalline body similar to arabin sugar from the mucus was unsuccessful, only an amorphous mass resulting. It is, however, very interesting that the mucus from galbanum is optically inactive, and yields an inactive sugar as a decomposition product.

14. *Insoluble Residue.*—The residues not taken up by water were dried at 110° C. and weighed; the results are shown in the table on p. 531. In most cases the residue consisted of fragments of root, stalk, etc., and in the Persian sorts of fruit in various stages of development. The Levant galbanums contained varying quantities of a substance analogous to bassorin, which could not be found in Nos. 1 to 4, 15, 17, and 24 (Persian sorts). Starch was found only in the sorts containing large slices of roots.

* From a memoir for which the gold "Suworow" medal has been awarded by the Medical Faculty of the University of Dorpat. (*Pharmaceutische Zeitschrift für Russland*, April 15, 1875, p. 225.)

15. *Résumé.*—A consideration of the results obtained shows that according to their physical characteristics galbanums may be divided into three classes, one Persian and two Levant. In the fresh condition the Persian kinds are of a very soft consistence; they always contain fragments of stalk and fruit, and have an odour recalling turpentine and galbanum (Nos. 1 to 4, 15, 17 and 24). The Levant sorts have a pure galbanum odour, are either brittle or soft, and may be divided into those which contain stalk fragments and fruit and those which contain only slices of root. The first of these (those which contain fruit and stalk fragments and possess a brittle property) are not now met with in commerce.

According to their behaviour towards reagents the galbanums can be divided into four sorts,—one Persian and three Levant. The Persian and Levant kinds can be easily distinguished from each other, either in the crude condition or as a petroleum extract, by means of sulphuric or hydrochloric acid, the solution of gum resin in sulphuric acid with three or four volumes of alcohol added being with the Persian sorts (Nos. 1 to 4, 15, 17 and 24) a clear yellow brown solution; with the Levant sorts either a red violet colour (Nos. 8 to 10, 13 to 16, 18, 20, 21) or (Nos. 5, 6, 7, 11, 12, 19) a blue violet. Hydrochloric acid gives with the gum resin or the petroleum extract in the Persian sorts a reddish yellow and in the Levant a blue violet or red violet, or no colour at all (No. 23).

A mixture of chloral and chloral hydrate gives with the petroleum extracts of the Persian sorts (Nos. 1 to 4, 15, 17 and 24) an intensely green solution; with the petroleum extracts of the older Levant sorts (containing stalks, Nos. 5 to 7 and 19) a rosecoloured solution, passing through blue into green; with those of the Levant at present in commerce (containing slices of root, Nos. 8 to 18, 20 and 21) at first a yellowish red solution gradually passing into a dirty green, faintly rosecoloured at the edges; lastly with No. 23 no colour.

Frohde's reagent added to the petroleum extracts coloured the Persian sorts, Nos. 1 to 4, 15 and 17, as well as the Levant sorts, Nos. 8 to 18, and 20 to 24, yellow, while the older Levant sorts, Nos. 5, 6, 7 and 19 were coloured red.

Petroleum spirit removed from good sorts of galbanum hardly any thing but volatile oil, the small residues left upon heating to 120° C. were probably the result of oxidation as they no longer dissolve in petroleum spirit. This behaviour of petroleum with galbanum might very well be used in estimating the quality and genuineness of the drugs.

The volatile oil is dextrogyre or levogyre, according to the sort from which it is obtained; its specific gravity also varies. The oil freshly distilled gives none of the characteristic reactions of galbanum; but does so after long exposure to the air. From this it would appear that the body giving the reaction is formed through the oxidation of the volatile oil.

The resin (*i. e.*, the part soluble in ether) appears to consist of at least four different bodies, and yields umbelliferon either by dry distillation or treatment with sulphuric acid and alcohol. This would appear to exist to some extent ready formed, as a portion can be extracted from the resin with boiling water.

It is also worth mentioning that the Persian sorts yield by dry distillation a large quantity of umbelliferon and a very small quantity of blue oil, whilst in the Levant sorts, these proportions are exactly reversed. The melting point of galbanum resin varies between 40 and 45° C., which property may be used to distinguish it from olibanum and similar resins, olibanum melting at 75° C. After galbanum has been exhausted with petroleum spirit and ether, 95 per cent. alcohol removes at the most 4 per cent. more. The residue consists of a resinous body insoluble in ether, and a portion soluble in water. The latter contains fermentescible sugar and a body resembling gallic acid.

Lastly after treatment of galbanum with petroleum spirit, ether and alcohol, it yields to water an inactive mucus from which may be obtained an inactive sugar and a body resembling dextrin.

DOMESTIC PHARMACY IN THE SEVENTEENTH CENTURY.

BY F. BADEN BENGER.

An old manuscript receipt book, dated 1670, lately come into my possession, has interested me by exhibiting the pharmaceutical turn of an ancestor in the time of Charles II. A few of the formulæ may possibly amuse the readers of this Journal, and are perhaps sufficiently curious to be worth preserving.

"*An aproved good watter for the jandies, or the collick, or consumption.*—Take a peck of garden snails and wash them in a great pan of beare, then make your chimney very cleane and power out half a peck of charcole and set them on fire, and when they are throughly kindled then with a fire shovele make a greate hole and power in the snailes and scater some of the fire amongst them, and then lett them roste as long as you hear them make a noyse; then take them out, and with a knife and corse cloth picke them and wipe all the greene froth of them very cleane; then put them in a stone morter and bruis them, shells and all. Take, alsoe, a quart of earth worms, slit them with salt, then wash and beate them in a stone morter, and the pot being made very cleane upon wich you sett your limbeck, put them into it and about 2 handfulls of angellicoe layed in the pot, and 2 handfulls of sullendine upon that, then put in 2 quarts of rosmary flowers; also, if you please, you may put in egremony, barsfoote, dock roots, the barke of a barberry tree, wood sorrell, bittany, rew, and fennell, half a handfull; of fengreeke and turmereck of each an ounce; of saffron well dried and beaten to powder the weaight of a sixpence; then power in 3 gallons of the strongest ale you can gett, greate mesure, cover your pott, let it stand soe all night in the place where you meane to put your fire in the morning, then put to them 3 ounces of cloues in powder before you put fire to it, put thereto six ounces of hartshorne grated to powder—before you put it in weigh it—you must not stir it after you have put in the heartshorn, lett it goe to the bottom, then set on the limbeck and set it fast with rye paste, soe receve the water in a pinte glase; the first is the best, and must be cept by itselfe; the last is the worst, the smalest, and may be mended by mingling them together. This water must be given in the morning to the patient, who must fast 2 hours after it; it may be given betwixt meals. You must take spoonfulls of the strongest with 4 spoonfulls of ale or white wine, and when you give the smalest you may give as much of that as of ale. You may draw six quart of watter from this proportion of things."

"*A pupye watter.*—Take a white pupye of 3 weeks a month old, skin her and take out all her inwards, then wipe it very well within with a cleane cloth, then quarter her in 4 and take a quarter of her with a handfull of femitary, as much wilde tansy, a quarter of a pinte of ants eggs, halfe a pound of fresh beefe thinly sliced; then strow good store of beane blossoms in the bottom of your still, then the forenamed things, then some more beane flowers on the top, then a quarter of an ounce of camphor, soe still it lesurely. The rest of your whelp, with new ingredience, will make 3 stillfulls more."

"*For any acke or pain, or siaticke.*—Take a red ox-gall and half a pint of double brandy, put them into a new pipkin and stop it close; let it simer on some embers 6 hours till it comes to an oyle, and till half be wasted; anoint the place grieved before a good fire, and hold a red hot fire showel to the part most pained. Rub the oyl in very well, then wrap it up in new flannell; soe doe night and morning till the pain is dispersed."

"*To make aqua mirabilis water.*—Take gallingall, quibilis, mellilot, cloves, nutmegs, mace, ginger—of each one drachm and a halfe—beate them to powder; then take 8 ounces of yᵉ iuce of sullendine, one pint of aqua vite, one pott of good white wine, and put them all together, and let them stand close stoped in a earthen pott or glass all night. Then draw through the limbeck aboute a pinte, for the furst tapp is the best, the second stand untell it drop whiter, and the last soe long as it will runne.

"*The vertues of this water.*—Of all water this is the best, for as the name is soe the nature is, miraculous. For it clenseth the lounges without any greuance, and being wounded it healeth them; it sufereth not the blood to putrify, but multiplyeth it in great quantity; it depresseth melancholy miraculously; it ingendreth a good choler; it helpeth the memory and destroyeth the palsy. It must be used continually—one spoonfull a week in sumer and two in winter."

"*A most excellent balsom.*—Take wormwood 3 handfulls, mugworth, rue, rosemary, sage of vertue, leaves and flowers, of each 2 handfulls, boyle them with a sufficient quantity of oyle of nutts, and when the hearbes are boyle enough they will be black. Then take out all the hearbes, leaving the oyle, put them into a strong cloth, and press them very hard, and put this oyle to the other oyle; then put to it a pound of rosen finely beaten, new wax half a pound, Venice turpintine 2 drames, oyle of lavender 2 ounces, sturing it all the time; and when it is all well melted straine it, then put it into a pot well varnished, and stop it well and put it to deggest in a dunghill for six weekes. If you would have it liqued put in but half a pound of rosen. This balsom cures in 24 hours all sortes of green wounds, the wound being furst wash't with white wine. It cures all paines in the head, being apply'd to the temples. It cures deafness, black wool being dip't in it and put hot into the ear. It cures the pain of the stomack, and stopps a vomitting by rubing the stomack with it. It is excellent for yᵉ sciatica. It cures all sorts of collick apply'd upon the stomack or belly. It cures the palsie and all cold pains well bathed in, covered well to make the party sweat. It cures srunken sinues well bath'd in. It cures yᵉ biting of a mad dog, serpents, or other venmous beaste, having first made the wound bleed, then wash it with white wine and lint, then apply the balsom—when you use the balsom put a hot cloth on it."

"*The best watter for the face, may be given to the queen for the pretiousnes of it.*—Take whits of 8 new laide eggs and beate them till they come to a perfect watter, then straine them and take almonds, endiff, boras, camphor, zuchanimum, which is made with alum that is relented, of each of these a quarter of an ounce, and soe mingle all these with as much white rose water as the whits of eggs, and make it up like a suger lofe. Then take of whit wine vinegar 8 ounces, watter of beane blossoms 2 ounces. Let all these things be beaten in a morter very fine, and put them all together into a glase, the which being well covered you shall set in the sun 15 dayes, shaking the saide watter three times a day. This being done put it into another viol glase, and soe keep it for your use, and wash your face when you will, and let the watter dry in, then rub your face with a piece of scarlett. The ladyes that will use it and wash theire face and brest with it, it will make her looke very beautifull and fair, and where she is old it will make her looke yong, for it is well experienced upon a great person whom doth much commend it, which by triall you shall finde far better than I have set downe. The Duchess of Mellin, the French king's sister, use'd it till her dying day, who was four score years old before she dyed, and those that did use to the court said that all straingers hearing she was soe old would not beleeve it, but thought her not to be above 30 or 40, it did so apeare."

"*For heate in the face.*—Take a pint of creame, a quart of strawberries, put in the bottom of your still some vine leaves and still them together, soe wash your face with the watter."

"*For an ague.*—Take chickweed, grounsell and wormwood of each a handfull, do not wash them but shred them small, put them in a fine bagg and with a string hang the bagg to the pit of your stomach an hour before the fit comes on and so repeat it the next; if they be thirsty give them cardus posset is best."

"*An oynment for a burn.*—Take 3 peneworth of letherge of gold, put to it a pint of white wine vineger, set it on a soft fire till it be warm, then let it stand 24 hours, then take one spoonfull of that vinegar and one spoonfull of sallett oyle, put it in a peuter dish, stir it till it come to a white oyntment, then take another spoonfull of each and soe till all be done; put it up in gallie pots and keep it for your use."

"*Cock ale*" is directed to be made from "an old red cock boyl'd indifferent well and pounded flesh and bones in a stone morter," to this is added various spices, "raisins of the sun," and "8 gallons of strong ale." For "yᵉ stone," parsley seeds and "lillie roots" are strongly recommended, as is also "the inward skin of the gisard of a hen or capon dryed and beaten to powder." For "chop'd nippels" "the inner bark of the elm." In "a drinke for sore throate" "album grecum" figures as the active ingredient.

The formula for "*plague water*" enumerates 60 ingredients. The menstruum being three gallons of brandy its potency cannot be questioned. "To draw out a thorn never so deep in 24 hours, lay a piece of the gall of a hog to the place." "What Mr. Tomlinson took" consisted for the most part of garden snails and milk, with "harts tongs, brucklime and maiden heir." "Aqua mellis" is prescribed to "make the hair grow long and curl'd" and emulsion of almonds in sack is much vaunted as a complexion "watter."

I will conclude my extracts with—

"*An excellent receipt to cure any carnal distemper.*—In a sunshiny morning walk in the garden of your heart, then take the pruning hooke or weeding knife of godlie sorrow to cut up the weedes, idlenes, negligence and sloth, then goe to God's garden, take one drachme of time, one drachme of the herbe of grace and an heartfull of bible worth, mix them carefull with one quarter of an houre of the powder of prayer, boile it with the fire of zeale, then put it in the gally pott of conscience and let there be a leather cover of constancy tied fast with a twisted threade of charitie and humility; the time to take it is in your youth, especially on holie days; when you take it get a liquorish stick of meditation, then it will goe downe pleasantly, take the spoone of conference and let them tast it; this medicine, *probatum est*, your doctor is an old greate phisitian called heavenly wisdome, hee dwelleth in Gracious Street, at the sign of humilitie, hee will send you to an apothecary called Godlines, hee dweleth in Love Lane, at the sign of the lamb; hee hath an apprentice called Diligence to make your ingredients."

LIBERIAN COFFEE.*

From the great interest which has attached to Liberian coffee, as much in a commercial as in a scientific point of view, owing to its reputation as to quality and prolific bearing—and, not least, its reputed power of being disease-proof—the replies to a series of questions regarding the cultivation and production of coffee in Liberia will be of especial interest to many readers of the *Journal*. The plant producing Liberian coffee is distinguished from the ordinary coffee (*Coffea arabica*) by its more robust habit, its larger leaves, and much larger berries and seeds. It is now considered to be a distinct species, and has been described as *Coffea liberica*. The questions referred to above were drawn up by Dr. Thwaites, the Director of the Royal Botanic Gardens, Peradeniya, Ceylon, and the replies have been obtained by Messrs. Irvine and Co., of Liverpool. From these replies it seems that the Liberian coffee grows equally well in the immediate neighbourhood of the sea and at considerable distances from it. Under like conditions of soil and cultivation, trees near the seashore in Mourovia are about the same as those at Careysburg and other places thirty miles distant. The wild coffee, from which the cultivated comes, is found at even still greater distances in the interior. At Bassa and Sinon the coffee-trees are said to grow within a hundred yards of the sea. The general temperature at which coffee thrives best ranges from 72° to 87° Fahr. in the shade. In the country, at the furthest point at which coffee is cultivated by the settlers, there is a difference of one or two degrees lower, owing principally to the rise in the land. The lowest temperature observed at Mourovia near the sea was 62°, at seven o'clock, a.m., in the month of January, during the prevalence of the Harmattan winds, the highest temperature being 91°; but these are exceptional cases. Along the coast the coffee-tree thrives at only a few feet (about ten) above sea-level. At Careysburg, and at Mount Coffee, it succeeds as well at an elevation of 550 feet. It grows equally well on level ground as on slopes. In the former situation, however, care should be taken not to allow water to stand; and in the latter the rich mould, or surface-soil, should not be washed away. "While the leaves of the coffee-tree delight in frequent refreshing showers, the roots are averse to standing water." With regard to soil, that of virgin forest is recommended as best for coffee culture, simply because it contains sufficient plant-food, and saves the expense of manuring for several years; ordinary soil, however, will answer, provided it contains sufficient plant-food, or otherwise can get a sufficiency of manure. A loose soil is most suitable. The tree will not thrive in stiff clay. Distinct varieties of the plant are known, one of which produces fruit at an earlier age than the other; the berry, also, is smaller. The large variety, however, is preferred, as yielding a superior quality of coffee and a larger crop. This larger variety, again, varies in itself under changed conditions of soil. In the moist lowlands the berry is very large, while in the dry rocky hills, or uplands, it becomes somewhat smaller, but of a finer flavour. The trees on a single plantation produce berries varying in size to some extent. It does not appear to what extent high cultivation would produce a crop of more equable size. It has been proved that planting a nursery with seeds of a uniform size does not produce uniform plants.

Under shade both the quality and quantity of the coffee crop is much diminished. "When the trees are not large enough to shade the ground with their branches and fallen leaves, they should be mulched in the dry season; that is, their roots should be covered with dried grass, straw, shavings, or anything capable of shading them. But the leaves and branches should have the influence of the sun, to elaborate a due proportion of sap into fruit-buds." The species being indigenous to Liberia, it does not, of course, when once established, suffer from the tropical suns of the country. Mulching in the dry season is generally required, for very young trees on dry, hilly slopes.

The distance at which trees are planted from each other varies; sometimes they are placed at a distance of 6 to 8 feet, and others 10 to 12 feet. If planted sufficiently close that their branches meet, provided that these leaves and branches have the influence of the sun, they thrive and bear well. The shade they cast upon the ground also prevents the growth of grass and weeds, and so the expense of weeding is saved. When planted so close, however, some inconvenience is felt in passing among the trees for manuring, pruning, or gathering the crop. When planted even at the distance of 12 feet, if the trees are topped and kept down, they will eventually meet. The small variety before referred to begins to bear at eighteen months, the larger form in the third year; this variety has, however, been known to bear sooner. The first crop is usually only a few berries, but the tree goes on increasing until it becomes capable of yielding twenty pounds, and some very old trees have been known to give twenty-four pounds each, but more generally depends upon cultivation than upon age. The tree, if left alone, grows to a height of 20 feet or more. In some plantations they are allowed to grow up without being touched, while in others they are topped, perhaps at a height of five feet. By topping the crops are more conveniently gathered, and, others things being equal, give a larger crop. When the trees grow up tall, moreover, they are frequently injured by climbing with ladders, and pulling down the limbs, etc., and as the tree ripens its crop and blossoms for the next year at the same time, much of the blossom and young fruit is rubbed off the tree, whereas the low trees are picked by standing on the ground.

Owing chiefly to the fact the most of the Liberian plantations are young, manuring is not practised to any extent, but when needed the coffee pulp is used mixed with cattle manure, also decomposed vegetable matter, wood ashes, the "compost heap," the earth from the hills made by white ants, etc. The coffee-tree delights in nitrogenous manures; surface manuring is considered best on account of the fibrous roots, or feeders, always keeping near the surface.

Though there are no very old plantations in Liberia, it is believed that they can be kept up permanently, or at least, for a great number of years. It is pointed out that the coffee plant is not a shrub but a forest tree. There are trees in the country forty years old, flourishing in all the vigour and verdure of youth, and bending down under the weight of berries. Some of these old trees, when cut down, shoot up more rapidly and more vigorously than when first planted from seed.

A most important point is touched upon in the matter of the liability of the Liberian coffee to disease. On this subject the writer says:—"Last year some of the trees on different plantations were affected with what was said to be the disease *Hemileia vastatrix*. The leaves of the trees turned yellow (although want of cultivation will cause the same phenomenon); there was a tendency in some of the upper branches to decay and dry up the berries before they could ripen. This may have happened before; but it was observed only last year. Occasionally the bark of a tree will decay, partially or wholly; when wholly it causes the death of the tree. Occasionally, a borer will attack a tree. Nothing as yet has been observed that would cause serious losses of coffee growing in Liberia." The author of the replies thinks "that the yellow appearance in some trees was owing to the want of cultivation. Some of the trees supposed to be diseased were as full of berries as the other trees."

It is further pointed out, in the circular from which the foregoing are abstracts, that it is very desirable that small branches of the trees on which are leaves affected with the disease should be rapidly and carefully dried for transmission to Kew, and to Peradeniya, for comparison with specimens of Ceylon coffee affected with *Hemileia vastatrix*.

* From the *Journal of the Society of Arts*, Dec. 22, 1876.

The Pharmaceutical Journal

SATURDAY, JANUARY 13, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

TRADE INTERESTS AND THEIR DEFENCE.

IN the present number of the Journal we place before our readers a report—somewhat after date it is true—of the case tried before the Runcorn magistrates, on the 27th of December last. Without raising any question as to the good intentions and zeal of the Chemists and Druggists' Trade Association, which we believe to be all that could be desired, we cannot refrain from expressing a hope that in future the proceedings undertaken by this body for the protection of the trade will be more adequately adapted to secure the object for which they are designed than we are able to admit they have been in this instance.

Much unnecessary trouble seems to have been taken in the cross examination of the inspector of weights and measures, who purchased the sample of milk of sulphur, and of the analyst who certified that it contained hydrated sulphate of lime to the extent of 58 per cent. In neither case was any other result produced than that of wasting time, wearying the magistrate, and confusing the real question at issue by miserable sensational assertions about plaster of paris and its elements, of which any one pretending to a competent knowledge of chemistry ought to be ashamed, and of which any one possessing an average acquaintance with the application of chemistry to pharmacy would not venture to be the exponent.

We regret that the directing authorities of the Chemists and Druggists' Trade Association, in their laudable endeavour to exercise, in behalf of trade interest, the protective function which is supposed to be in abeyance, should not have manifested a better appreciation of the merits of the question they undertook to contest, and a more judicious sense of the means by which it was to be decided, than to enter upon a kind of discussion with the public analyst which in itself gave some apparent weight to the opinions he thus gained an opportunity of expressing. Whether or not MR. CARTER BELL considers that milk of sulphur ought to be pure sulphur is a matter of little moment in itself, but when he, as a public official, comes to be cross-examined on the point in such a case as that tried at Runcorn, the view which he expresses acquires practical value altogether disproportionate to its possible intrinsic value. The value of MR. BELL'S opinion in its application to the custom of the public and of the trade by which the wants of the public are supplied, we consider to be *nil* in this particular case, and further that he was altogether exceeding his functions as public analyst when he ventured to assert that "milk of sulphur" ought to be all sulphur, and not to contain any hydrated calcium sulphate. In doing this he places himself in direct antagonism to the best pharmaceutical opinion of the day, and to the popular opinion which has prevailed for more than a century, on the basis recognized, if not furnished originally, by no less an authority than the College of Physicians. Upon what pretext MR. CARTER BELL, who admits that he knows nothing whatever of the trade, presumes to override these justifications of the use of milk of sulphur, we are at a loss to conceive, and we can only express our admiration, in one sense of the word, of the uncompromising self-satisfaction with which he has delivered himself of opinions which were as destitute of any tangible foundation as most of his hearers were of the capability of appreciating their value.

We have here another flagrant instance of the misuse of a public office which might be a means of rendering good service to the public, but as used for the most part hitherto has been more a means of persecution of one section of the public than a source of general benefit. We were hopeful when the office of public analyst was instituted that this step would conduce not only to the advancement and recognition of chemistry as a practically useful branch of knowledge, but also to the benefit of the public at large and are still of opinion that these might have been the results of the establishment of public analysts throughout the country. As it is, however, the energies of these officials seem to be in many instances exercised in such a manner as to make them to be regarded as public nuisances, rather than as useful public servants, and in the proceeding of certain public analysts with regard to milk of sulphur there is especial reason for this conclusion.

It is, however, satisfactory to know that the Trade Association intends to carry this case to appeal, and we trust that in doing so there may be a more clear recognition of the extremely simple question at issue, for if that course be followed and delusive sentimentalism be excluded, there can be, in our judgment, no question that it will be decided that the sale of a well-known article under a well-known name that has been authoritatively sanctioned for a century and a half is not any more a breach of public morality now than it was when this particular article was comprised in the materia medica of the Pharmacopœia. In regard to this point we have great pleasure in placing before our readers the comments of the *Lancet*, which are to the following effect:—

"When shall we have the last of the wrangles about milk of sulphur? Everyone knows that the article commonly sold as milk of sulphur always contains, and must, from the way in which it is prepared, contain sulphate of lime. It appears to be commonly preferred to the pure precipitated sulphur, and we confess we do not see any reason why it should not be sold if not misrepresented. Milk of sulphur does not mean pure sulphur, but a particular preparation, and we think the Runcorn magistrates were in error in deciding that a purchaser who went to a certain shop for milk of sulphur did not get what he asked for. If he wanted pure sulphur he asked for the wrong article, which was not the fault of the tradesman. The man who wants bread and asks for cake cannot reasonably abuse his baker. Notice of appeal has been given in the Runcorn case, and we trust that a final decision in this not very important question will ere long be obtained."

HOSPITAL OUT-PATIENT REFORM.

WE have pleasure in notifying that the authorities of King's College Hospital have inaugurated a system which acquires increased importance from the numerous cases of poisoning by misadventure which we have to record in the pages of this Journal. In the out-patient department of this hospital all liquid medicines intended for external use are now supplied *in blue glass poison bottles only*. Patients not having these bottles are required to pay for them, cost price being charged for all the sizes which are most frequently in use. The system has now had a fair trial, and has been found to work successfully. It is thought that by "educating" the hospital patient to the use of a special bottle for all remedies not intended to be taken internally, a means of safety will be promoted which will be far from ending in negative results. The plan, we are informed, originated with the King's College Hospital Dispensary Committee, which is composed of practical men of high standing in pharmaceutical circles, and we hope the example thus auspiciously commenced will be followed by all similar institutions throughout the country. It may be stated that the bottle to which preference has been given is the "Fluted poison" introduced by Mr. TOOGOOD as specially applicable to external remedies, and now very generally in use amongst pharmaceutists for the purpose.

In the case of the hospital in question, we learn that much attention has been given, and no expense spared, to introduce into the out-patient department all needful reforms. The gratifying results of the system now firmly established, will, we believe, be fully dealt with in the annual report to be issued in March next.

LIVERPOOL CHEMISTS' ASSOCIATION.

ON Thursday next the above Association will hold its Thirteenth Conversazione at the Royal Institution, Colquitt Street, Liverpool. After the reception of members by the President there will be a musical entertainment and an exhibition of various objects of scientific interest. At nine o'clock Mr. W. E. BICKERDIKE is to deliver a lecture, illustrated with experiments, on "The Atmosphere."

THE PARIS PHARMACEUTICAL SOCIETY.

DR. MÉHU, whose name will be familiar to the readers of this Journal, has been elected to the office of Vice-President of the Société de Pharmacie, Paris, for the present year. M. PETIT has also been named Secretary. At the same meeting, the widow of the late M. GOBLEY, acting upon a wish of her deceased husband, presented to the Society a sum of 3000 francs. This event led to a decision of the Society that steps should be taken to have it recognized as an "établissement d'utilité publique," so that it might be competent to receive legacies bequeathed by members or others.

IRISH PHARMACEUTICAL DEFENCE ASSOCIATION.

A SHORT time since the Council of the Irish Pharmaceutical Society, having been asked as to its intention of protecting the rights of those who might pass its examinations, replied that it did not intend to act as a prosecuting body. A meeting has therefore been held in Dublin, at which it was resolved that a Defence Association should be organized for the purpose of preventing any infringement on the rights of Irish pharmaceutical chemists. The subscription is fixed at ten shillings, and Mr. J. T. HOLMES, of Dublin, has been chosen as Secretary.

PATENT MEDICINES IN ALSACE-LORRAINE.

A DECREE has recently been issued regulating the sale of *spécialités* and secret remedies in Alsace-Lorraine. According to it all the preparations that had received the approval of the French Academy of Medicine previous to the annexation of those provinces to the German Empire are still allowed to be sold. But those that had not been so sanctioned, as well as new medicines, must first receive the authorization of a commission sitting at the University of Strassburg, and consisting of M. GUSSEROW, the dean of the faculty, and Professors KUSSMAUL, SCHMIEDEBERG and FLUCKIGER.

THE CHEMISTS' BALL.

WE have great pleasure in calling the attention of our readers to the announcement in the advertisement sheet respecting the Eleventh Annual Chemists' Ball, which is to be held at Willis's Rooms, King Street, St. James's, on Wednesday next, the 17th inst. Tickets may still be obtained from the Honorary Secretary to the Ball, Mr. WALTER HILLS, 338, Oxford Street, or from the members of the Committee, a list of whom will be found in the advertisement. We understand that Mr. JOHN WILLIAMS, President of the Pharmaceutical Society, has been invited to take the chair at the supper.

THE METRIC SYSTEM.

AT a recent meeting of the Medical Society of New York, a resolution was passed unanimously, recommending to its members the adoption of the metric system in writing prescriptions.

Provincial Transactions.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.*

A general meeting of the chemists and druggists of Manchester and district was held in the Memorial Hall, Manchester, on Friday, December 15, at 8·30 p.m.

A deputation from the Chemists and Druggists' Trade Association, consisting of Mr. Thomas Barclay, of Birmingham (the Vice-President), and Mr. Haydon, the Secretary, at the request of the Manchester Chemists and Druggists' Association and School of Pharmacy, attended.

Mr. H. Scott Brown, the President of the Local Association, was unable through indisposition to attend the meeting; he explained that had this not been the case he would have taken the chair.

It was moved by Mr. E. G. Hughes and seconded by Mr. Barclay that the chair be taken by Mr. Slugg.

Mr. Slugg on taking the chair said he had thrown himself into this matter very readily as soon as he thoroughly understood its aims and purposes. He believed the organization to be a sound one and he might say first of all that it was not an organization brought into competition or antagonism with the Pharmaceutical Society. He said that because he believed there had been a feeling on the part of some members of the Council that the Association would work in opposition to them. Now he would assure them there was nothing of the kind, but they came as co-workers and not as opponents. He was, however, very glad when he went to Birmingham to find some members of the Pharmaceutical Council, besides Mr. Richard Reynolds and other eminent pharmacists, who readily supported the Association. They were organizing a society for trade defence, and they might take it for granted that most assuredly they would not defend any dishonest traders, but protect honest men who might be placed inadvertently and through force of circumstances in a position of perplexity and trouble. When such a thing took place it was certainly better to fight the battle by means of a society than individually.

Mr. Haydon explained the origin, aims and objects of the Association.

The Chairman then introduced the Vice-President of the Society, Mr. Barclay, of Birmingham, who said he was glad to meet such a number of his friends, and he thanked Mr. Slugg for his kind introduction. He was obliged to the officers and committee of the local Association for the opportunity they had offered of placing before the chemists of the Manchester district the advantage of the Chemists' Trade Association. In the few remarks he would address to them he would speak of the necessity for such an association as the "trade association," and then he intended replying to some objections which had been made against it, and, in conclusion, offer some suggestions for promoting its success. The necessity for the Pharmacy Act of 1868 was variously viewed by chemists and druggists. There were not a few who thought that it was wrong policy to introduce legislation into the drug trade; they argued that the restrictions imposed upon chemists by the bill for registering the sale of poisons and the responsibility involved by that Act were not at all met by the advantages which were obtained under it. They argued that by the examinations which were necessary to qualify the men to go into the trade they were thereby unfitted for their work. He had heard it said that good assistants could not be obtained now. It was also said that apprentices were becoming more and more scarce. So it was argued that the Pharmacy Act had worked disadvantageously to chemists. He, personally, did not hold with these views; he believed that the Pharmacy Act would eventually be productive of a great amount of good to the chemists of the country. For the fact that assistants were so scarce proved that fewer apprentices were coming into the trade, and notwithstanding the number who passed the examination the Register was year by year becoming less. It was thus evident that by and bye those who were in the trade would reap the benefit. But, however men might disagree about the policy of the Act one and all must agree that they should endeavour to get all the advantages they could under it. Chemists were suffering in many ways from illegal trading, by men who wore not on the Register openly practising as chemists, by grocers and others selling scheduled poisons, and by civil service and co-operative traders. They could really have no conception of the amount of injury from the latter in the South of England. These civil service stores were not only doing a great injury in this country but were doing an injury abroad. He would read to them an extract from a letter he had received from India. The writer believed "that an association for advancing trade interests has long been urgently needed and now more than ever, for the civil service and co-operative stores affected them even in Calcutta. It was not uncommon for those in high pay under Government to send home to the stores for their prescriptions, having them made up in a concentrated form, and he thought their efforts would be supported by every man in the business and by every assistant, for it was in their interest as much as chemists'." As to the question of juries the House of Commons had decided that pharmaceutical chemists should be exempt altogether from serving on juries, and there should be little difficulty in adding chemists, if the matter were taken up by a strong association, such as they hoped to have. The sale of patent medicines was an important question, and they would be glad to have some suggestions as to the best means of dealing with it. They knew that in some parts of the country laudanum, and opium even, were put up as patent medicines. Mr. W. Scott Brown had suggested that the best plan was to do away with the stamp, for if the stamp was unnecessary no one could sell anything containing schedule poisons excepting registered chemists. Speaking of the Adulteration Act he condemned strongly the appointment of gentlemen as analysts who were incompetent to carry out their duties, and who were placed in such a position that the reputation of those who had carried on their business legitimately and never defrauded any one was at their mercy, and they might thus drag honourable men into the mire. He had known instances where men had been placed in such positions, and he thought it was time that some association should take up this question, and he and others thought that as there was not in existence an association of that kind, capable of defending chemists, it was high time such a one was formed. Magistrates were ignorant of technical matters, and, however anxious to do justice, they were misled by blind advisers, and so the blind leading the blind all fell together into the ditch. Mr. Haydon had spoken about the prosecution at Runcorn; he was sorry that their friends at Ashton were not members of the Association, or they would have been defended by it. When the Runcorn cases came before the Law Committee, it was decided to defend them, and the Secretary was immediately instructed to go to Runcorn and obtain the full facts. It had been decided to bring down Professor Redwood, of London, and Mr. Pemberton, a medical practitioner who held a very high position in Birmingham. Mr. Pemberton would tell the Runcorn magistrates that he had for many years prescribed lac sulphuris and he meant it, he preferred it to sulph. præcip. He hoped they would be able to convince the Runcorn magistrates that they ought to acquit their members, and if they failed, they were determined to go to quarter sessions, and contest the legality of the prosecution. Now in Manchester they were happily situated in having professional gentlemen like Mr. Siebold. If all analysts were equal to their friend Mr. Siebold, whom he was glad to see present, they would not find it necessary to complain of the working

* Our apology for publishing this report so late is that it only reached us this week.—ED. PH. J.

of the Adulteration Act. They could also have trained lawyers who could defend them in the police court, and so selfishly they might say, "We need not join your Association—we can defend ourselves." But they would find it both difficult and costly, even in large towns like that, to obtain proper professional help. He would, however, say, that supposing they were able to do this, surely for five shillings a year they would not deprive those in less favoured localities of the protection which would be afforded by joining with Manchester and other large towns. In country districts they had clerical magistrates and analysts who were appointed by them. A chemist prosecuted in those places found it very difficult to obtain the means of defence. It was to be expected when they learned that by a subscription of five shillings a year they would obtain the services of gentlemen like Professor Redwood they would all throw themselves into the Association. Under the Medical Act there might yet be a great amount of trouble. There were not a few medical men, but he thought they were a small minority, who desired to prosecute chemists for prescribing simple remedies over the counter. Such prosecutions would never be sustained if brought before a proper tribunal and fairly defended. The public would demand that the chemist should be allowed to carry on his business as usual. He would next speak of the social advantages. The number of chemists' associations in the country were but few, but eventually the country would be divided into districts, which would be brought together to talk over trade matters, to choose their representatives to the general committee, etc.; local jealousies would thus be overcome and much practical good result. There was a small class of chemists which had a lucrative business with plenty of money at their bankers, who said that they did not wish any society to defend them for they were able to defend themselves; that was a most selfish policy. Though however, these gentlemen would so readily defend themselves in ordinary cases, there might arise some typical case which it would be necessary for the benefit of the whole trade that it should be defended to the utmost and an appeal made to the Queen's Bench; in such a position these gentlemen would probably be disposed to let the case slide—to the injury of the trade, whilst if members of the Association, they would have no hesitation in applying to it to have the case properly defended. He would offer a few remarks in reply to Mr. Frazer, who was a member of the Pharmaceutical Council and the President of the Glasgow Chemists and Druggists' Association. Mr. Frazer had lately given his presidential address at Glasgow, and alluded to the Trade Association. Mr. Fairlie, the Secretary of the Glasgow Association, and a member of the executive of the Trade Association, had challenged Mr. Frazer to prove in debate that he was right in his objections to the formation of a trade association. On Wednesday last there was a meeting, and the subject for discussion was, "Is the Pharmaceutical Society capable of protecting the interests of the entire trade or is the existence of a special Association necessary?" and it was stated that the Secretary would open the discussion, so that, as the President was to be answered by the Secretary, he need not so fully criticize his address as he would otherwise have done. Mr. Frazer was a short time since summoned for selling Liebig's Liquid Extract of Meat, and the result was the exaction of a nominal fine of fifty shillings by the authorities. He was defended by professional gentlemen of Glasgow, and he asked in his address would any Society have done better? His reply was, that if that Society had been then in existence and Mr. Frazer a member he would have been informed that it had been decided in the Bradford Police Court that Liebig's Liquid Extract of Meat was not an article which could be sold with impunity by chemists and druggists except under certain conditions. This information would have been circulated among the members of the Association; the resul would have been a clear saving of forty-five shillings, an amount which would, he thought, be patent to the understanding of any Scotchman. Mr. Frazer said "If we restrict others from selling drugs and patents we must in all fairness begin by ourselves giving up the sale of the thousand and one articles other than drugs now sold by druggists all over the kingdom. This, I suspect, would be giving 'two rich Rolands for one poor Oliver.'" Mr. Frazer here forgot that chemists and druggists were not in the position of ordinary traders and it was not proposed to restrict the entire sale of drugs to chemists and druggists. The object of the Association was to prevent illegal trading in poisons by civil service stores or by other vendors who illegally supply them. It was claimed that chemists and druggists have passed examinations and submitted themselves to the various restrictions of an Act of Parliament, and that these poisons should only be sold by chemists and druggists. Therefore, Mr. Frazer did not put the matter fairly when he said that chemists and druggists must not interfere with these illegal traders if they themselves continued to carry on business as usual. All that was asked was simply that the law should be enforced. Mr. Frazer said that "these troubles of druggists only begun when we got tied neck and heel by the Act of 1868." That was strange language for a gentleman to use who was a member of the Council charged by Government to administer the Act; his place one would think should be outside endeavouring to obtain its repeal. Then he went on to defend the keeping of "open shops" by surgeons. Amongst the letters he (Mr. Barclay) had received at the time the Association was commenced were many from Scotland, one from a small town in the north of Scotland. The writer said he was the only chemist, and there were besides three "open shops" all kept by qualified medical men. The surgeons each kept a boy who attended to the retail counter and dispensed the prescriptions. The result was that the chemist, although a Major and honours man, was prevented from exercising his proper calling, and had to sell all sorts of things to obtain a living, and never saw a prescription, except it might be a "foreigner." He would say this state of things could never be right, for the medical men were not content with the dispensing, but they endeavoured to do all the retailing of medicines as well. Mr. Frazer said further, "Indeed in many villages and towns a surgeon pure or a druggist pure cannot be maintained, and I hold it is for the advantage of the public that the surgeon should keep open shop; the doctor can do the whole work of the druggist, but the druggist cannot do the whole work of the surgeon. But while I say so much on one side, I go as far as anyone here in condemning as unwarranted, the wholesale rush on our business by medical men in towns such as our own, where there is ample scope for the display of their energies in their own proper field, and where there is certainly no lack of efficient druggists; they ought to aim at taking a higher social position than is compatible with their continuing to keep open shop." Mr. Frazer then went on to recommend present "outsiders" to join the Pharmaceutical Society. He admitted, however, that it is said that many of these chemists cannot afford to pay the "guinea" a year to enable them to do so, and said he feared this might be true of too many. He (Mr. Barclay) would reply by saying that another member of the Council, and by no means a warm supporter of the Association, stated that the subscription fee of five shillings to the Association was too high, and that unless it were made half-a-crown the trade would never be got to come in. Mr. Frazer, again, went on to say, "Of course I am aware that the origin of the Society is due to the existence of these very troubles," and he gave credit for singleness of eye to the promoters of the Association. Although he criticized Mr. Frazer's address, yet he gave him equal credit for a desire to do what was best to promote the best interests of the trade, and in making these criticisms he hoped Mr. Frazer would take them in that light. He (Mr. Frazer) also said the remedy was worse than the disease it was intended to alleviate, if not to cure. It appeared, to him to be not overstating the case to say it was equivalent to the swinging of a huge sledge-hammer by a brawny blacksmith to exterminate a fly that had settled on the brow of a fellow-workman. No doubt the fly would be exterminated, but what of the unhappy victim of his affection? Mr. Frazer, with the instinct of an apothecary, introduced the fly—the historic fly—into his address, whether with the usual effect he would ask his hearers to judge. Mr. Frazer spoke of the brawny blacksmith, he (Mr. Barclay) for one thought there had been in the past too much tinkering, and a brawny blacksmith with a sledge-hammer was very useful, especially if the workman were skilful. He challenged Mr. Frazer to deny that the Association was not managed by those who were careful and capable of conducting it properly; he need only mention the names of men like Reynolds, Hampson, Rimmington, Greenish, Savage, their friend Johnson there, and others who were its supporters, to show that it demanded respect and confidence. Many chemists said they ought to get all that this Association proposed to accomplish done by the Pharmaceutical Society. If that were possible he would retire from the trade association to-morrow. The Pharmaceutical Society spent in 1875 a few hundred pounds, and at the end of the year he knew there was a feeling amongst some of the Council that they had spent more than they could afford. He said, how was it possible in such a state of things that they could undertake to put down the co-operative trading in poisons, or protect chemists who were unfairly charged under the Adulteration Act, and other work of the kind? There were only two or three thousand men in the Society, and it was unfair to expect three thousand men to defend the whole of the trade. It would be most unwise to take the Pharmaceutical Society into the law courts of the country, it would place the Society, which was now an educational body and had the charge of administering the Act, in a false position; it would never do to "run the risk of a rebuff and failure" in these matters; it would do the Society great injury. He held that the men who were opposed to the formation of this Association were doing much to damage the position and influence of the Pharmaceutical Society, for they would necessitate its doing the work which only a trade society could properly discharge. In any proposed legislation what help might not the Pharmaceutical Society derive from the co-operation of this Association? for at present it could not speak with confidence, representing as it did a minority of the trade. If the Trade Association represented some 8000 members then it could go to Parliament if necessary as a powerful organization and do some good. What help would an association of that kind have been when the Adulteration Act was before the House of Commons! But it was not then in existence. The pharmaceutical chemist would, he believed, have secured a much better position than he now held and the title of Pharmaceutical Chemist would never have been allowed to be taken as it was under the Irish Pharmacy Act. After referring to Mr. Sandford in eulogistic terms as the author of the Pharmacy Act and alluding with pleasure to his manly avowal of his belief in the usefulness of the Association, although he had been at the outset one of its strongest opponents, Mr. Barclay said that they must have 8000 members and an income of £2000 a year. Mr. Haydon told him there were 8000 chemists and druggists in business in England. He hoped every chemist throughout the country would join the Association and rally to the standard, and they would then have a real and a powerful organization, and when any attempt at legislation was made an organization like theirs would prevent any mischief being done. An organization not powerful to sustain adulteration, not powerful in doing any illegal act, but, powerful in securing the just rights of every chemist in Great Britain.

Mr. T. G. Gibbons then moved "That this meeting having heard the aims and objects of the Chemists and Druggists' Trade Association as described by the Vice-President and Secretary, heartily approves of the same, and pledges itself to support the Association by every means in its power." He said the Secretary and Vice-President had so far exhausted the subject that there was little more for any one to say. There was one matter, however, that of finance, which must not be neglected; they could not get on without money. The only way they could succeed would be for every member to endeavour to bring in others, and as far as his means permitted subscribe to the funds. He had looked at this question from the commencement. He knew if they went to a court of law or to Parliament, it meant money, and if they obtained 8000 members at five shillings each, it would only amount to £2000 per annum, and he did not think that was too much. If everyone did his best he had no doubt the Association would succeed.

Mr. Bostock, of Ashton-under-Lyne, seconded the resolution. He said he was glad to see so many Manchester chemists take an interest in the Association. It was necessary that there should be some united action, and he thought this could not be better attained than by supporting the Association. He had very great pleasure in seconding the resolution.

Mr. Siebold said he was sorry the Ashton chemists did not offer a better defence in the recent milk of sulphur prosecutions in that town; he felt sure had they done so they would have obtained assistance which would have utterly defeated the objects of the prosecution. He would have been willing to have given any amount of time and to have appeared as a witness and declare before the magistrates in a most emphatic manner, as a scientific man, that the prosecution was in the wrong. He should like to see more *esprit-de-corps* amongst members of the trade. He most certainly thought the Association should be taken up by all, and he was prepared to give the cause his utmost support. He thought the recent prosecutions taking place in their vicinity should give a great impetus to the movement.

Mr. Gibson said he went heart and soul into the objects of the Association and he should be very glad to become a member and do all he could to forward its aims. He could not, however, quite agree with all the remarks made by Mr. Barclay; they should remember that they lived in glass houses and if chemists wished to restrict the sale of drugs to members of the trade they should on their side give up selling groceries, etc.; he believed in free trade. Again he thought the remark made by Mr. Frazer at Glasgow, which Mr. Barclay disagreed with, to the effect that in many small villages the doctor could act as both doctor and chemist, whereas the chemist could not act as chemist and doctor, was a very sensible remark and that Mr. Frazer was quite justified in making that remark.

The resolution was then carried unanimously.

The Secretary announced that already about 120 Manchester chemists had joined the Association.

A vote of thanks to Mr. Slugg for presiding terminated the proceedings.

Parliamentary and Law Proceedings.

The Sale of Milk of Sulphur.

At the Runcorn Petty Sessions, on Wednesday, December 27, 1876, Mr. George Marshall, chemist and druggist, was charged for that on the 1st December instant, at Runcorn, he did unlawfully sell to one James Steen, an inspector of weights and measures, a certain article or drug, to wit, two ounces of milk of sulphur, the same not being of the nature, substance and quality of the article demanded by the said James Steen.

Mr. Glaisyer, Solicitor to the Chemists and Druggists' Association, appeared for the defendant.

James Steen deposed to the purchase of two ounces of milk of sulphur, the transmission of the sample to the analyst, Mr. Bell, and the receipt of his certificate. [Certificate handed in, and read: "The said sample is adulterated with 58 per cent. of hydrated sulphate of lime, or the elements of plaster of paris.—Signed J. CARTER BELL. 4th December, 1876."]

What body are you appointed by?—The magistrates of the county.

You say you asked for milk of sulphur?—I did.

Do you know an article called "precipitated sulphur?"—No, I do not.

You made no mention of such substance?—No.

Had you been supplied with the article milk of sulphur on previous occasions?—On this day in question I obtained three samples, and that is the first time I asked for milk of sulphur.

Was this the first of those three occasions?—No, it was not.

Was it the second?—No, it was the third.

In each of the preceding cases did you receive a similar article?—Yes. I asked for milk of sulphur at the three places, and I received it as such, and after I had obtained it I sealed it, and sent it to the analyst.

Did the defendant say anything to you about precipitated sulphur?—I don't remember what he said about precipitated sulphur. Since then I have heard him say a good deal.

Did he say the article supplied was not pure sulphur, but a preparation sold as milk of sulphur?—That was after I got it, if he did say so.

Was it previous to your saying that you were going to have it analysed?—No. I will swear that.

The Clerk: Nothing was said up to that time; in fact, the article was supplied to you without any observation at all?—Yes, sir.

You informed him of your intention to have it analysed, and offered to divide it into three parts?—Yes, sir. I offered to divide it into three parts in all cases. That was my instruction.

What did he reply?—That it was not necessary.

What did you do with the sample when you received it?—I brought it down to the station, sealed it up, and sent it away to the analyst, in a box, nailed up securely.

What day was that?—It was sent away on the same day. I received it back again with the certificate on the 5th of December.

Did the analyst return any part of the sample?—Yes, it's here.

May I just ask whether the sample, when you purchased it, was sealed in the presence of the seller, or at the station?—Not in his presence. It might have been if he had required it.

Joseph Carter Bell, of 12, Radford Street, Manchester, examined by Mr. Day (magistrates' clerk), deposed to the receipt of the sample, which on analysis he found to contain 58 per cent. of hydrated sulphate of lime.

Do you call that milk of sulphur?—Impure milk of sulphur.

In what respect is it impure?—Because milk of sulphur ought to be all sulphur.

What did you do with the sample after you had analysed it?—Sealed it in an envelope and sent it back to Superintendent Steen.

Cross-examined by Mr. Glaisyer: By your certificate you say the sample is adulterated with 58 per cent. of hydrated sulphate of lime, or the elements of plaster of paris. What hydrated sulphate of lime is that which you found present?—Well, it is the ordinary sulphate of lime with a water constituent.

That you call hydrated sulphate of lime?—That is the true term for it.

Is that plaster of paris?—I say it contains the elements of plaster of paris. Plaster of paris is nothing more than sulphate of lime and water, your worships. If you wish to make a plaster of paris image, all you want is a little water to it, and you get the same thing again. Sulphate of lime mixed with this milk of sulphur is nothing more than sulphate of lime watered.

Mr. Glaisyer: That is to say there are not in the sample the usual constitutents of milk of sulphur?—Not! all pure milk of sulphur.

Is milk of sulphur mentioned in the last Pharmacopœia—No.

The Clerk: That is 1867. There is no mention of it in this book. [Produced.]

Do you find sulphur præcipitatum?—It is the same thing.

Were they at any time distinct preparations?—Distinct? No.

Do you know a work—I can't say, a hundred years ago?—In 1746 the Pharmacopœia ordered it to be prepared in a slightly different way by adding sulphuric acid instead of hydrochloric acid.

Do you know a work published by Mr. Gray in 1836 called 'A Supplement to the Pharmacopœia and a Treatise on Pharmacology'?—No. I don't.

Will you read what it says of milk of sulphur?—Your worships, you must understand that this book is for manufacturing and for practical purposes, and of course it is to the interest of the manufacturer to make as much out of his products as he can.

I would rather you read it first.—I want to explain (after looking at the book). This has nothing to do with the case at all. There are several ways of making it. One man may make 3 lbs. of milk of sulphur of 1 lb. of sulphur, and make a poor article, whereas another may make only 1 lb. of milk of sulphur out of 1 lb. of sulphur. Any tradesman may make 3 lbs. of sulphur out of 1 lb.

[Book put in and read.] That is a preparation for milk of sulphur, is it not?—In the course of preparation the lime would be precipitated; sulphate of lime adds to the bulk of the article and increases its weight.

What would be the distinction between these two preparations?—One would be pure sulphur and the other would contain about 60 per cent. of sulphate of lime.

That would be the first preparation under the head of milk of sulphur?—Yes, and it would be a great advantage to the man who makes it.

Would it produce an article similar to what you have examined in this case?—It would.

Would the second produce an article known as precipitated sulphur?—It would, and milk of sulphur too.

Mr. Glaisyer: That I contest.

Is not the same preparation mentioned by the same name "precipitated sulphur" in the last edition of the Pharmacopœia?—I have not looked at it. [Book handed in.]

Precipitated sulphur?—Yes [reading receipt]. That is precipitated sulphur or milk of sulphur.

Is it the same mentioned as the second preparation?—Yes, that's right.

Is the name "milk of sulphur" mentioned in the last Pharmacopœia at all?—It is not.

The Clerk: It is mentioned here in one book forty years old, but not in the one nine years old.

Witness: That is so.

Sulphur præcipitatum is manufactured at the present time according to the formula mentioned by Mr. Gray in 1836, is it?—I don't say so.

You said it was identified with the same preparation. [No answer.]

[Question repeated.] That is the same that is right under the head of sulphur præcipitatum.

Is milk of sulphur now made according to the first preparation named by Mr. Gray?—Milk of sulphur ought to be made rather; but it is not called milk of sulphur but precipitated sulphur.

The Clerk: Now milk of sulphur is synonymous with sulph. præcip?—Yes.

You say the name "milk of sulphur" is not there at all, and yet they were distinct according to Mr. Gray in 1836. Now, is it mentioned as a synonym in the present Pharmacopœia?—No, it is not.

Are both preparations mentioned by Mr. Gray still made?—I should think so.

Are they sold as distinct substances?—Not to my knowledge.

Are they used as distinct substances?—I believe not.

Can you go into a shop and ask for sulphur præcipitatum, or for milk of sulphur?—Well, I daresay you can.

Do not chemists keep both?—As an instance, I may say we have sent for nine samples in Salford; eight of them are perfectly pure and one is adulterated.

So you get both in fact?—We asked for milk of sulphur at the nine shops we visited.

I must press you for a direct answer. Can you go into a shop and ask for precipitated sulphur and milk of sulphur and get either article. You say both are prepared?—I don't know, I have not been asked for it.

How are you engaged, Dr. Bell?—I am the public analyst for the county.

Engaged in business as a chemist?—No.

Nor a dispenser?—No, nothing of the sort. I have nothing to do with buying samples. I simply analyse what is sent to me.

Is it the custom of the trade to provide two distinct substances?—I know nothing whatever about the trade.

Does milk of sulphur mean pure sulphur?—It ought to.

Then it does according to your theory?—I should say decidedly so.

How do you come by that?—Because a hundred years ago there was only one adulterated article prepared with sulphate of lime sold; now, since the Adulteration Act has been put into force, the pure article is sold.

Do you know what the original preparation was in the Pharmacopœia of 1721?—I don't know. I have not read it. One about 150 years ago directs sulphuric acid to be used, and I believe since then, in all the editions of the Pharmacopœia it has been discontinued. In 1746; I don't think there is one after that.

Is not the preparation of milk of sulphur well known to contain sulphate of lime?—Impure milk of sulphur; yes, it is well known.

You say it is quite an alien preparation. Has it ever been officially forbidden?—I can't say.

Are you prepared to say that milk of sulphur prepared so as to contain sulphate of lime is an adulterated article?—Yes.

On what grounds?—Simply because it contains a foreign ingredient which is not pure sulphur.

But is it prepared according to the formula?—It is not.

Which formula?

This formula.—It is not called so, because precipitated sulphur and milk of sulphur are synonymous.

You can't prove that. I have shown they are distinct. You say it is not mentioned as a synonym?—Would you allow me to read from the various works?

I would rather have the works themselves.—They are perfectly correct what I am going to read.

The Clerk: You are fully entitled to go on.

The witness then read extracts from the *Analyst*, page 65, of June 30th, 1876.

Then, as I understand it, you base your grounds on other people's opinions?—Exactly; the same as you do.

Yes, I don't think I need trouble you to read anything further, but I will ask you, does milk of sulphur, prepared in the way Mr. Gray recommends, mix readily with water?—Yes.

That is when it contains sulphate of lime?—Yes.

Does precipitated sulphur mix with water?—No, not quite so readily.

Does the presence of sulphate of lime aid in dissolving the milk of sulphur?—Well, I can't say, because I have not made any experiments upon it. I don't think it does; I don't think so.

Does milk of sulphur, when dissolved in water, produce a liquid of milky appearance?—Milk of sulphur would not dissolve in water.

You have just said it would?—It forms a mixture, but does not dissolve.

Does it cause a milky appearance?—It does.

Is the milky appearance caused by the presence of sulphate of lime?—Oh, dear, no.

Is there considerable difference of opinion amongst medical men whether milk of sulphur, prepared with sulphate of lime, or sulph. præcipitatum, is better for use as a medicine?—All whom I have consulted say pure milk of sulphur ought to be used, and they are surprised when a mixture of sulphate of lime and milk of sulphur is used.

Is not the taste of milk of sulphur less nauseous than that of precipitated sulphur?—I don't remember.

Is not its smell less unpleasant?—I don't think there is any difference.

Is it taken more readily?—I don't see there can be any difference. Milk of sulphur is often made up with confections, such as jam, and is easily mixed up. One containing sulphate of lime might perhaps mix a little more easily, but I have never tried it.

Does the presence of sulphate of lime tend to increase the efficacy of the sulphur?—It tends to decrease it.

In other words, it decreases the laxative properties of the medicine?—Yes, it must do so.

Does not sulphate of lime in this preparation act as an aperient in the same way as cream of tartar would?—I don't think it would. It has rather the opposite effect.

The Clerk: Is not really the question before the Bench whether or not Mr. Steen had supplied to him the article he asked for? and then the question comes whether now, according to the new Pharmacopœia, milk of sulphur is not pure sulphur? and if so, the question is, has he been supplied with a pure article? It does not state "injurious to health" in the summons, it only states that he has not been supplied with the article he applied for. Do you contend that it contains lime or not?

Mr. Glaisyer: I contend that milk of sulphur and sulph. præcipitatum are distinct preparations.

The Clerk: Look at the Pharmacopœia. Why is the name of milk of sulphur left out?—Because they will not acknowledge an adulterated article.

Mr. Glaisyer: That is not so at all. I am informed there are a number of instances——

The Clerk: Are you going to controvert that milk of sulphur is pure sulphur?

Mr. Glaisyer: Most distinctly.

The Clerk: That is the point. The question of it being wholesome or unwholesome does not arise before the Bench.

Mr. Glaisyer: Well, then, I will ask no further questions.

Mr. Glaisyer then addressed the Bench as follows: I appear here on behalf of the defendant, Mr. George Marshall, and at the same time I represent the Chemists and Druggists' Trade Association for Great Britain; and I may here remark that the Association, whilst it will endeavour to assist the authorities in bringing to justice any persons who infringe the law, will also defend its members against being unjustly harassed by what they regard as groundless prosecutions. The defendant is Mr. George Marshall, a gentleman well known to the Bench, and who has for many years been a resident in the town; he holds several public appointments, has been here for fifteen years, and up to the present time there has been no imputation of any fraud being committed by him on the public, nor any charge of unskilfulness in his trade. The present case is similar to those which have occupied a good deal of attention throughout the country, and the Association is desirous of making this a test case, that it may form a precedent for the future, and settle, if possible, the vexed question whether milk of sulphur containing sulphate of lime should be sold as an article of commerce. They have given me instructions to raise no legal objections which might throw the case for the prosecution over on technical grounds, but to rest my case entirely upon the main issue. The prosecution, to uphold their case, must prove to your satisfaction that the article sold by the defendant is a drug that is not of the nature, substance, and quality of the article demanded by the purchaser. This they have attempted to do chiefly by the evidence of Dr. Bell, and I must ask your attention to his evidence for a few minutes. Dr. Bell in his examination has asserted that sulphur præcipitatum and milk of sulphur are synonymous, and that they should be used to indicate a preparation of pure sulphur, so that the demand of the purchaser for milk of sulphur or lac sulphuris should have obtained the same article as if he had asked for sulphur præcipitatum or pure sulphur. He says that the article supplied by the defendant contains a preparation of hydrated sulphate of lime, and that therefore it comes within these words "that it is not a drug of the nature, quality, and substance of the article demanded." Upon this point I shall argue and produce evidence which I consider almost incontestible that sulphur præcipitatum is a drug prepared according to one formula, and milk of sulphur is another drug prepared according to a distinct formula. Dr. Bell admitted in cross-examination that the terms are to some extent distinct in their meaning, but you must recollect he is here to uphold the prosecution based on his own certificate, and he would hardly admit that which would immediately close the case against the defendant, that these two drugs are as distinct as their names imply. If he did the Bench would have scarcely any discretion but to dismiss the case. I shall presently prove, at least, I hope so, to the satisfaction of the Bench, that these two drugs are entirely distinct, and upon that ground I shall ask the Bench to dismiss the summons. If, however, after I have finished my defence, and you have heard the evidence I shall produce, you are of opinion that the defendant has been guilty of a technical infringement of this Act, I must ask you to inflict only a nominal penalty without costs, because I understand that the object of the prosecution in bringing this case before you is not to inflict punishment on the defendant, but merely to try the case. I think I ought, in addition to that, to ask you to state publicly, if you do inflict a nominal penalty on the defendant, that you do not regard his character as in any degree tainted by having sold this article, which is a well known commodity, and was at all events supplied by every person who was asked for it in this town. In order to enable the Bench to decide whether the drugs are or are not distinct, it is necessary I should draw your attention in the first place to the Pharmacopœia of 1721. By this we learn that milk of sulphur may be prepared in either of two ways, one of which would produce a preparation containing sulphate of lime, and the other would produce a preparation which does not contain sulphate of lime. We may fairly surmise that it was found that the former preparation was more favoured amongst medical men, because the latter, which would be made to contain no sulphate of lime, was dropped out entirely from the Pharmacopœia which was next published—that of 1746—and that the other preparation which the public used was that which contained sulphate of lime. Then we come to a later time, and I have put in the book published by Mr. Gray as a supplement to the Pharmacopœia, in which mention is made of the names and modes of preparation of these two drugs, which are certainly quite distinct. I have read the modes of preparation; in the one case Dr. Bell has admitted that the substance produced would be a similar article to that which he has examined; in the other case he has again admitted it would be that which is at present known as precipitated sulphur. He has also admitted that in the last Pharmacopœia the word milk of sulphur does not appear even as a synonym, and therefore no case can be grounded on the fact that precipitated sulphur and milk of sulphur are synonymous or controvertible terms. The greatest argument the prosecution can find is this—that the drug known as milk of sulphur has ceased to be recognized in the Pharmacopœia. Professor Redwood, whom I shall call as a witness for the defence, will give you instances in which other drugs formerly prepared according to the old Pharmacopœia are omitted from the present Pharmacopœia, and upon this I shall argue that milk of sulphur is not tabooed by the profession, but that it is a well-known preparation and constantly used. And further that the preparation known as milk of sulphur should contain sulphate of lime, and the preparation known as precipitated sulphur should not contain sulphate of lime. If the Bench should not be able upon this evidence to decide to dismiss the case against the defendant then I shall have to call your attention to the exceptions which are mentioned by the 6th section of the Act,--and to the first exception I shall confine my remarks—which says "Where any matter or ingredient not injurious to health has been added to the food or drug because the same is required for the production or preparation thereof as an article of commerce, and not fraudulently to increase the bulk or measure or weight of the food or drug so as to conceal the inferior quality thereof," etc. I shall contend that the presence of the sulphate of lime with the sulphur is required in order to make it an article of commerce, and, further, that the sulphate of lime is not injurious to health. On the question of health I consider my evidence ought to be quite conclusive, for I have here two members of the medical profession of the highest distinction and greatest skill. One is Professor Redwood, Doctor of Philosophy and Professor of Chemistry of the Pharmaceutical Society of Great Britain, an office which he has held for thirty years; he is public analyst for three large metropolitan districts, and also for the county of Middlesex; lately President of the Society of Public Analysts, the author of a work on 'Materia Medica' and a 'Supplement to the Pharmacopœia,' and he has been recently appointed by the Medical Council as editor of the 'British Pharmacopœia.' The other is Mr. Pemberton, a medical man of very high standing in the town of Birmingham, where he has a large practice. He is Professor of Surgery in the Queen's College there, and also one of the surgeons to the General Hospital, and he speaks with an experience of thirty years of medical practice. These two gentleman well agree in the opinion that far from being injurious to health, the presence of the sulphate of lime in the milk of sulphur is really an advantage; they will tell you that the sulphate of lime renders the sulphur more active, not only by its stimulating action on the intestines, but by mechanically dividing the particles of sulphur. Mr. Pemberton will tell you the presence of sulphate of lime makes the sulphur more effective, whilst the other preparation causes disagreeable eructations. He will further say that he never but once in the whole course of his professional practice prescribed precipitated sulphur, and that he has always prescribed milk of sulphur, the article sold by the defendant. That milk of sulphur is required as an article of commerce I shall endeavour to prove, and the defendant himself will tell you that for a short time he kept precipitated sulphur; that his customers continually complained of it, and that it was with great difficulty indeed he persuaded them to use it; and that with the exception of a few months he has uniformly kept the article which he has supplied in the present case. No one has ever complained to him of injury received from the administration of the drug which he has supplied in this case. Then, again, I shall call before you Mr. Edward Evans, of the firm of Evans, Son, and Co., of Liverpool, wholesale druggists, and Mr. Matthew Bell, the manager for Messrs. Raimes and Company, wholesale druggists, of Liverpool, who will tell you that they supply milk of sulphur containing sulphate of lime, in quantities far exceeding that in which they supply the other article—precipitated sulphur. Professor Redwood will tell you that it is a necessary article of commerce, and that it possesses a substantial advantage over sulphur præcipitatum, and that it is less disagreeable in taste and smell. Professor Redwood will tell you that it is more readily taken, and mixes more easily with water. That the other (sulph. præcip.) clings about the mouth, that it won't mix with water and the Bench will see that these are not desirable qualities in medicine frequently given to children. Mr. Pemberton will show you that the manufacture of lac sulphuris is absolutely necessary in order that it may be prescribed for patients, and in this way I shall prove all the requirements of the first exception, and upon that I shall ask the Bench to dismiss the summons. I believe, I shall take the case even further than this, and prove that there is no necessity to rely on the exception at all, because I shall prove that milk of sulphur is one thing and sulphur præcipitatum is another thing; and that when the purchaser asked for milk of sulphur he was supplied with a drug which was of the nature, quality, and substance of the article demanded.

The defendant, Mr. George Marshall, was then sworn, and examined by Mr. Glaisyer. He deposed to the sale of the milk of sulphur to Superintendent Steen.

What did he say when you supplied him with the article?—After I had supplied him with it he said, "I want this for the analyst," holding the article out.

And hearing that did you make any reply, and if so what was it?—I told him that it was not precipitated sulphur, it was the milk of sulphur that had been sold for a hundred years. I distinctly told him it was not sulphur præcipitatum.

Did he say anything in reply?—He said he was ordered to ask for milk of sulphur.

Did he offer to divide it in three parts?—Not that I remember.

Was any portion of the sample sold left with you?—No.

Where did you buy the article you sold?—From Messrs. Raimes and Co., of Liverpool.

Have you ever ordered sulphur præcipitatum?—Never but once.

Where did you buy that?—From Evans, Sons and Co.

Do you remember the year?—It was some time in 1872.

Did you supply it to your customers?—Yes, and they returned it more than once, and complained that it was nauseous, and not what I had been accustomed to supply them with. I had great difficulty in disposing of it, but as I had only a small quantity I did not send it back again.

With that exception have you always kept milk of sulphur which contains sulphate of lime?—Yes.

Have you ever received complaints of that article?—Never.

Have you ordered the same article by the same name from other houses?—Always, whenever I have wanted it, as lac sulphuris.

Has there ever been a mistake in sending it?—No.

Have they always sent you the article containing sulphate of lime, with the exception of that once?—Yes.

What is your knowledge of the drug called milk of sulphur?—That it is precipitated with sulphuric acid, and, of course, contains what has been stated. It contains hydrated sulphate of lime, and more readily mixes with water or milk, and these it is often taken with. It is never taken with jams, and that it is more saleable, and is a most useful article.

Is it the article you have always supplied as milk of sulphur?—Yes.

Cross-examined by Mr. Day (the Magistrates' Clerk):

On this packet, which you sold Mr. Steen, did you put a label on "This contains sulphate of lime?"—I put no label at all on.

How much did you charge him for these two ounces?—Twopence.

How much would you have charged for pure sulphur?—I don't keep it, because I have no call for it.

What was your usual charge for the other?—The same price. And very much annoyed I was that I had it, because I did not want it.

Suppose you had been asked for precipitated sulphur, what would you have sold?—I should have sold nothing, because I do not keep it.

You make up doctors' prescriptions?—Yes.

Suppose in a prescription there had been the words, "sulph. præcip.," how would you have made that up?—Decidedly, I must either have sent the prescription back again, or sent to Liverpool, or some other house, to obtain it. I would not think of putting in an adulterated article.

Mr. Matthew Bell sworn, and examined by Mr. Glaisyer.

How are you engaged, Mr. Bell?—As manager for Messrs. Raimes and Co., of Liverpool.

How long have you been connected with the chemist and druggist business?—Thirty-three years.

Is that your trade sheet? [Trade sheet put in.]—It is.

On that trade sheet what do you find under the head of sulphur?—Sulph. sodium, sulph. lotum, sulph. lac, sulph. præcip. pur., and sulph. sublim.

Do you sell those articles as distinct preparations?—We do.

Has that always been done?—Always.

You mention the article on your trade sheet "lac sulphuris." Would that article contain sulphate of lime?—It would.

Is that inevitable from its preparation?—Yes.

You mention sulph. præcipitatum. How is that prepared?—It is prepared by using hydrochloric acid instead of sulphuric acid.

What would the product be from such a preparation?—By the use of hydrochloric acid it would be sulph. præcip. pur.; by the use of sulphuric acid it would be milk of sulphur.

And what would "lac sulphuris," prepared in that way, contain?—Sulphate of lime.

And the preparation with hydrochloric acid, what would that contain?—Pure sulphur.

In your trade do you sell the same quantities of each?—No; we sell much more of the milk of sulphur; very much more.

Can you give us the comparison at all?—I can't say exactly, but from eight to ten times as much milk of sulphur as of sulph. præcip.

The Clerk: Did you supply Mr. Marshall with this article that has been complained of?—Yes.

By the Clerk: Now milk of sulphur is cheaper than sulph. præcip.?—Yes, it is.

What is the price of milk of sulphur?—The wholesale price is 5*d.* per lb. and the other is 8*d.* per lb.

Mr. Edward Evans sworn, and examined by Mr. Glaisyer.

What is your firm?—Evans, Sons and Co., of 56, Henry Street, Liverpool.

How long have you been connected with the business?—Ten years.

What drugs do you sell under the name of sulphur?—The same as the last witness has mentioned.

Do you sell two distinct preparations, one called "lac sulphuris" and the other called "sulph. præcip.?"—Yes, each.

Has that always been so?—Always, ever since I have been in the trade.

What does milk of sulphur, as sold by you, contain?—Sulphate of lime.

How does it get there?—In the process of manufacture.

Is the article known as sulph. præcip. prepared in a different way?—It is.

What does that article contain?—Pure precipitated sulphur.

In what proportion do you sell these two articles?—About four or five times as much of lac sulphuris as pure precipitated sulphur.

Can you give the quantity?—I have looked at our book for 1874, and we sold then about four tons of the milk of sulphur, and six hundredweight of the pure sulphur.

That is about thirteen times as much. What part do you take in the business?—The commercial part more than the chemical part, and I occasionally travel.

Can you tell the Bench of anything that has come under your notice while travelling?—I remember that a woman brought back what she had been served with while I was standing in the shop. She asked for milk of sulphur, and the chemist had given her the pure article. She brought it back, and said it was not the article she required.

The Clerk: How much per pound is pure sulphur?—Witness: Eightpence for pure, and the other preparation fivepence.

Mr. Oliver Pemberton, sworn and examined by Mr. Glaisyer.

Will you tell the Bench how you are engaged?—I am a consulting surgeon, residing at Birmingham. I have been in the practice of my profession for nearly thirty years, and am Professor of Surgery to the college there, and also Surgeon to the General Hospital.

Have you heard anything on this subject lately?—My attention has been called to it simply through perusing the public prints.

And from them what have you learned?—That the question has arisen as to the use of so-called milk of sulphur and so-called precipitated sulphur.

You have heard that the name "milk of sulphur" is omitted from the present Pharmacopœia?—I have.

And that precipitated sulphur is supposed to have taken its place?—I have.

What do you know about the article "milk of sulphur?"—It is a part of my knowledge that milk of sulphur contains sulphate of lime, and also part of my knowledge that precipitated sulphur does not contain sulphate of lime; in other words, is so-called "pure sulphur."

Do you of your knowledge know how the milk of sulphur contains sulphate of lime?—I am aware it does contain sulphate of lime on account of its being prepared with sulphuric acid instead of hydrochloric.

As to the remedial qualities of these two medicines can you give the Bench an opinion?—I would state before coming to that, I regard the two preparations to which I have referred as two distinct drugs, and that I have always so regarded them. The preparation to which I am referring, "milk of sulphur," has been in use especially by surgeons, and is in use for a variety of distinct surgical maladies, in which its special action is supposed to be of peculiar advantage. These diseases are mainly restricted to the lower bowels, stricture of the lower bowel, and disease of the neck of the bladder and enlarged prostate. In these cases it is desirable to obtain a laxative of a reliable character, that would not be likely to produce irritating diarrhœa, which in such diseases would be most injurious, therefore it has been regarded by surgeons, and amongst these by myself, most desirable to make use of this very preparation called "milk of sulphur," because the presence of the sulphate of lime in it moderates its laxative properties.

In your opinion would the same result follow from the use of the other drug?—The use of the other drug would be calculated to produce irritative diarrhœa. I have never myself ordered precipitated sulphur in making up a prescription but once, and that was at the commencement of the present year, when I wanted to write a prescription that was to be dispensed in Paris, and thinking that a popular remedy like lac sulphuris would not be known to the French chemist, I prescribed sulph. præcipitatum, B.P., meaning "British Pharmacopœia." To prove the truth of my general conviction on this subject, I refer to a prescription that is dated November 20th in this present year, which was written before I had the remotest notion of any question arising here or anywhere else on this matter, and it will be evident to those who can read it, there are the words "lac sulphuris," because I knew it was to be dispensed in England and I wished to obtain that which during thirty years I had desired to obtain, and which it was my experience a chemist would use. I felt satisfied he would dispense the lac sulphuris, containing what we have heard of, sulphate of lime. The gentlemen for whom this prescription was written visited me again some week or two since, and I obtained it from him. I have known this preparation of milk of sulphur taken for months and years, and I never knew myself nor heard of any injurious effect following its use. So far, therefore, as my own knowledge of the matter stands, I shall continue to use it. I hope I shall be able still to obtain it as an article sold in the shops, and I should advise those who have to practise the surgical part of my profession to make use of the same article as I have done.

Cross-examined by the Clerk: I understand you to say that the benefit from milk of sulphur is that it reduces its laxative properties?—It moderates or tempers the laxative properties.

Might you not suggest giving a much less quantity for a dose?—By including the particles of sulphate of lime, we don't get a rapid purgative action, and this lac sulphuris softens the motion that has to come away without pain to the patient. In fact, this is a surgical matter. Sulphate of lime tempers the action of the sulphur, and makes the evacuations remaining of the soft consistency of cream, as it were, and so they pass without pain to the patient.

Professor Redwood, sworn, and examined by Mr. Glaisyer.

Will you tell us what offices you hold?—I am Professor of Chemistry and Pharmacy to the Pharmaceutical Society, and have been so for more than thirty years. I occupy some prominent positions, such as public analyst for the county of Middlesex, and three large metropolitan districts. I have been until quite recently President of the Society of Public Analysts, and I have been employed for several ten years by the Medical Council as editor of the 'British Pharmacopœia.' The Pharmacopœia which has been put before you has been prepared by me, under the instructions of the Medical Council. I am author of two or three works on materia medica, and one of the editors of a work that has been referred to, viz., that by Dr. Pereira on materia medica.

Have you given a good deal of thought to the subject now before the Bench?—I have, for many years. I have been practically acquainted with pharmacy for something like fifty years, and during the last thirty-three or thirty-four years I have occupied, as I have said, a prominent position as a teacher in one of the largest pharmaceutical schools in England.

You have heard the evidence of Dr. Bell. Do you agree with him?—No, I do not.

On what grounds do you differ from him as to the terms milk of sulphur and precipitated sulphur?—I consider that the term milk of sulphur has been and still is sometimes used as synonymous with the term precipitated sulphur, but I do not consider that it is so necessarily used, and in the great majority of cases, where the terms are used by the non-medical public, two distinct articles are referred to by those two names. I may further state that milk of sulphur is principally employed by the non-medical public, and by that term they refer to sulphur containing sulphate of lime.

What is the mode of taking it?—The usual mode of taking milk of sulphur—that is the preparation containing sulphate of lime—is by mixing it with water, and the great advantage which milk of sulphur presents, when it contains sulphate of lime, is that it readily mixes with water, whereas that which contains no sulphate of lime will not mix in the same way. This [illustrating the argument by mixing the two drugs] mixes readily with water (lac sulphuris), and forms a milky mixture, in which the whole of the material remains suspended for some length of time, and it can be administered to children and others with facility mixed in this way. Whereas the other, that is precipitated sulphur containing no sulphate of lime, cannot be so mixed. It sticks about the glass and refuses to diffuse itself with water, and if an attempt were made to administer it in this simple manner [as illustrated] it either adheres to the glass or adheres to the mouth and throat of the patient. It is not therefore an available mode of administering it, and it becomes necessary in administering that preparation to resort to the use of something like treacle or syrup. Flowers of sulphur would comport itself exactly in the same way. If we put that into water it will not mix any more than precipitated sulphur will; it floats about and sticks about the glass and does not at all diffuse itself through the water, and consequently in administering either of these to children the method of administration has been to mix it with treacle, and the old brimstone and treacle was the method adopted. These are the peculiar advantages which have led to the public giving preference to the lac sulphuris, the old milk of sulphur, over the more modern precipitated sulphur.

To which is it applied?—The term precipitated sulphur is applied in the last Pharmacopœia to the one that refuses to mix with water.

What processes are comprised under the term milk of sulphur?—In the Pharmacopœia of 1721, under the name lac sulphuris, the process, described in Latin, is to the effect that it is to be made with sulphur and lime, or sulphur and salt of tartar, boiled with water, and then sulphuric acid added.

The Clerk: It is admitted in the old process, but hadn't we better confine ourselves to those of recent date.

Witness: Up to 1788 it contained sulphate of lime. From 1721 to 1746 there were two processes given. There was an alternative mode of making it, so that it either contained sulphate of lime or not. It was then called lac sulphuris, milk of sulphur. Then from 1746 until 1788 there was only one method of making it ordered by the London College of Physicians, and that was the method which yielded sulphur with sulphate of lime. The alternative method had then been omitted. In the paper produced by Dr. Bell (*The Analyst*, June 30, 1876) there are several statements that are erroneous; but if you will turn a page or two over, you will find my statement, which I can vouch for as to its correctness; and I have the books which will substantiate what I say. As a proof that the presence of sulphate of lime received the sanction of the College of Physicians during a period of sixty-seven years, it was ordered in the London Pharmacopœia, and it had during that period passed before a scientific committee. The committee in 1746 was the first scientific committee that had the revision of the Pharmacopœia, and they then omitted the mode previously intended as an alternative method of making it without sulphate of lime, and adopted the method of making it, in which it was produced with sulphate of lime, precisely analogous to the article now before the Court.

You have heard it mentioned once or twice in the course of Dr. Bell's examination that this milk of sulphur is not mentioned in the last edition of the British Pharmacopœia. Can you give any explanation of that?—Milk of sulphur has not been mentioned in any of our Pharmacopœias under that name for more than a hundred years.

Can you give examples of other drugs which are not mentioned in the last Pharmacopœia, but which are still well known?—I can.

The Clerk: That does not bear on the point at all.

Mr. Glaisyer: I understand you were going to make a point of it not being in the last edition of the Pharmacopœia.

The Clerk: Oh no; it does not bear on the question.

Cross-examined by the Clerk: Is the precipitated sulphur you refer to an impure article? Is it so or not?—Precipitated sulphur is not pure sulphur.

Does it contain sulphate of lime?—No. Under the name precipitated sulphur an article which contains sulphate of lime ought not to be sold, certainly.

And you say some parties of eminence, if milk of sulphur is asked for, would expect to receive precipitated sulphur?—There are some, but that I conceive is a mistake.

They consider that when milk of sulphur is asked for they should be supplied with precipitated sulphur, which is the modern representative of milk of sulphur, and does not contain sulphate of lime?—Yes. But I can show you cases where similar changes in the names and composition of medicines have taken place, and where the old preparations, under the old names, have continued to be used.

I don't think the Bench can go into that; we will take it that generally it is so, that is as far as we can expect to go into this matter.

Mr. Glaisyer: Very well, that is so.

The Clerk: Perhaps as that question has been given and you had something to do with the making of the Pharmacopœia, I may ask you is the term lac sulphuris, comprised in the last Pharmacopœia under the term sulphur præcipitatum.?—Certainly not.

Why is it not mentioned?—For the same reason that many other medicines of which I was going to give you instances have been omitted.

If lac sulph. is manufactured, and precipitated sulphur also manufactured and acknowledged in the Pharmacopœia would it not be included in the precipitate sulphur if it was an acknowledged drug?—No certainly not.

Why would it be left out?—The Pharmacopœia does not include all medicines that are used.

If it is a general medicine in consumption is it not rather extraordinary it should be left out?—Not at all. There are other medicines quite as extensively used which are not mentioned in the Pharmacopœia.

You have had instances of it being supplied as thirteen to one, and you say it is not named?—The Pharmacopœia orders those medicines which are intended for use by physicians in their prescriptions. Lac sulphuris is employed by the non-medical public as a domestic remedy.

Suppose a prescription was brought to you, and it said lac sulph., what would you put in?—If it were put in a prescription it would present some difficulty. I should ascertain from the medical man what he intended.

What would it be your duty to put in to make up that prescription? Now, would you not put in sulph. præcip.?—No, I should not. The proper mode of interpreting an expression of that character used by medical men would be to refer to the Pharmacopœia in which that term is used, and if lac sulphuris was the term employed I should refer back to the Pharmacopœia 1721.

But we are in 1876 now, that is rather a long way to go back?—Nevertheless if the name is employed in the prescription it is to be interpreted by the Pharmacopœia.

But, if you looked at your Pharmacopœia, and saw in it the term sulph. præcip., you might supply it, although lac sulph. was used in the prescription?—No, I would not.

You say that milk of sulphur is only used by certain classes as a favourite medicine. Would you not say, if a prescription were ordered containing it, that you might supply sulph. præcip.?—No, I should think not. I would have a strong reason for not putting that, because in the Pharmacopœia, as it stands at present, sulph. præcipitatum is the name employed, and which every medical man in writing his prescriptions ought to be acquainted with and use, and if he used another term—lac sulphuris—I would conclude he did not intend the preparation ordered now, under the name of precipitated sulphur, to be used, but that which was originally named in the Pharmacopœia, as containing sulphate of lime, and which is still used.

Do you not hold that there are many eminent men who might consider that sulph. præcip.?—Not in prescriptions. There are some eminent men and writers on materia medica, who have, as I conceive, not studied the subject to make themselves thoroughly acquainted with it, who hold that the presence of sulphate of lime in lac sulphuris is an adulteration.

These eminent men would use pure sulphur if lac sulphuris is put in a prescription?—No, I don't think they ought to. The preparation containing sulphate of lime possesses advantages over the other, first, that it mixes with water, whereas, the other does not; secondly, that it is more free from taste than the other; and thirdly, that in my opinion it is more efficacious as a remedy; this last, however, is a mere matter of opinion.

Mr. Glaisyer: Are there not other advantages in addition to those?

Professor Redwood then by experimental illustrations showed the Bench the advantages of lac sulphuris over sulph. præcipitatum. The latter breaks up in the stomach, evolving sulphuretted hydrogen, causing offensive eructations, and that is one of the objections urged by the non-medical public when they have been forced to take precipitated sulphur instead of their old familiar lac sulphuris, or milk of sulphur. Precipitated sulphur contains sulphur in an impure state and the other contains it pure.

By the Clerk: But there is lime used in the manufacture of sulph. præcip.?—Yes.

Then would not the term milk of sulphur be included in the term sulph. præcip.?—No.

Chalk would have the same effect to make that milky colour?—Oh, yes, if chalk were put in, but chalk never is put in.

Mr. Glaisyer: In your opinion, is milk of sulphur a proper drug to be kept and sold by chemists?—I prefer it myself, and I consider I have a right to apply for it and use it, and so has the public at large.

By what name?—I know no better name than milk of sulphur by which to describe the preparation containing sulphate of lime, and to distinguish it from the other preparation which contains no sulphate of lime.

The Clerk: Would you not put a label on it, to show what it consists of?—No; I see no reason for doing so. The public well understand it by the name milk of sulphur.

Mr. Glaisyer: It rests on the prosecution to prove that it is injurious to health if it is labelled. That is my case, and I simply request the Bench, on the evidence I have put before them, to dismiss the summons.

The Court then adjourned, and after an absence of three-quarters of an hour the magistrates returned, when the decision was delivered as follows:—

Mr. Bankes said (addressing the defendant): Mr. Marshall, the Bench have very carefully considered the weight of the evidence placed before them this morning, and have decided in this case to convict, on the grounds that you did not supply the article that was asked and demanded. The penalty is £1, and the costs follow as a matter of course.

Mr. Glaisyer: In the other cases I am instructed to consent to the same decision.

Isaac Speakman and Andrew Brown were then fined £1 and costs, for selling milk of sulphur adulterated with sulphate of lime, one 58½ per cent., and the other 65 per cent.

Mr. Glaisyer: I may be allowed to mention that these decisions will be reviewed at the Quarter Sessions.

Conviction for the Use of Methylated Spirit.

At the Newport Borough Police Court on Monday Abraham Clarkson, of Chapel Street, herbalist, was summoned on the information of Mr. James Robinson, supervisor, for having on the 20th of October used methylated spirits and derivatives of methylated spirits in the preparation of an article capable of being used as a beverage, whereby he had rendered himself liable to a penalty of £100.

Mr. Thomas Fell, collector of Excise, Southampton, prosecuted.

Mr. H. R. Hooper, who appeared for the defendant, said he would not put the prosecution to the trouble of producing evidence. No doubt, in total ignorance of the law, the defendant had to some small extent violated the actual letter of it. For a considerable number of years he had been the proprietor of a patent medicine known as "Clarkson's embrocation." Some time since it was found that the preparation was occasionally valued when taken internally, and methylated spirits being used in it, the defendant had thus brought himself within the purview of the statute, but he repeated that he had offended in utter ignorance of the law. Mr. Clarkson was well and favourably known to them as an inhabitant of Newport. He had paid a considerable amount to the revenue, and this was the first time it had been brought to his knowledge that the tinctures could not be used in this way. In future it would be necessary for him to use duty-paid spirits. He need only add that the defendant was an old man of over 70 years, and while the sale of this medicine had kept him above actual want, he had not been able to accumulate any savings, and he trusted such a recommendation would be made to the authorities as would lead to a reduction of the penalty beyond the minimum amount to which the magistrates could mitigate it.

Mr. Fell said the magistrates could mitigate the penalty to one-fourth, and he did not wish to press for a higher fine. There could be no doubt that by the use of methylated spirits there was a considerable loss to the revenue, and the Excise wished to make an example. The Excise authorities could make a still further mitigation, and if the Bench wished it, he would convey a recommensation of that kind.

In reply to a question, a chemist from Somerset House said the greater portion of the tincture would be methylated spirits.

Defendant stated that during the ten years he had been selling this embrocation he calculated that he had not sold more than four gross as drops to be taken internally. He solemnly promised to use nothing in future but duty-paid spirits.

The Mayor said the Bench had no other alternative but to convict, and they fined the defendant in the mitigated penalty of £25. At the same time they were unanimously of opinion that an application should be made to the authorities for a further reduction of the penalty, as they believed the offence had been committed in entire ignorance of the law.

Mr. Fell said he would convey their worships' recommendation to the authorities.

Suicide of an Assistant.

On Monday last at the Marlborough Street Police Court, Mrs. Louisa Murray, the wife of a publisher in Great Tichfield Street, was charged with attempting her life under the following circumstances.—On Saturday night Alexander Lewington, her husband's nephew, about 22 years of age, a chemist's assistant, came to the house where the prisoner lodged and producing a bottle proposed that they should poison themselves. After some time the prisoner consented; she took some of the poison and the nephew, Lewington, took some also. The nephew went away to his lodgings in Cleveland Street and took some more of the contents of the bottle, from the effects of which he died. The prisoner was affected by the poison, but having had medical treatment with sufficient rapidity she so far recovered as shortly afterwards to be able to be brought in custody to this court.—After the evidence of Police-serjeant Jones, E division, Mr. Newton directed the prisoner to be remanded.

The Selling of Poisons.

On Wednesday, January 2, Mr. Alfred Boyce, chemist, of Haywards Heath, was charged at the Cuckfield Police Court with having sold cyanide of potassium to Edward Whitehead, police officer, of Wivelsfield (who committed suicide by its means), and with not having entered Whitehead's name in his books, according to Act of Parliament.

Mr. Boyce pleaded guilty, but explained that he had exercised all the caution he could when serving the poison, and even refused to supply it a week previous, and would not prepare it as the deceased man wished him to. He said that Whitehead represented to him that he was sent by his superintendent, and that he wanted the cyanide to clean his numbers.

The Chairman said that his brother magistrates agreed with him in thinking it was merely an omission, and he would be fined 5*s*. and costs.—*Sussex Advertiser.*

The Attempt to Murder by a Chemists' Assistant.

At the Central Criminal Court, on Wednesday last, before Mr. Justice Hawkins, Thomas William Christison, said to be a chemists' assistant, was indicted for attempting to murder his landlady by administering poison to her, under the circumstances recorded in this Journal before, p. 527.

The jury found the prisoner guilty, and sentence was deferred.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

Appeal to the Benevolent.

Sir,—I must appeal to your kindness to give publicity to the following case of exceptional distress. For six years prior to 1872, a registered chemist and druggist was in business on his own account in Weymouth Street, Portland Place, when in getting out of a train at a station on the Great Northern Railway he and several other passengers were thrown down on the platform by a movement of the train after it had stopped. The immediate result of this accident was that his intellect became impaired and the business had to be given up. His wife, anxious to retain him at home, and hopeful of improvement, struggled on, having the best medical advice; the case, however, proved hopeless, and the poor wife's means having become exhausted, he was three years since sent to Hanwell Lunatic Asylum, where he now is. The only means of subsistence which his wife (now 55 years old) has is derived from letting lodgings, and 15*s*. a week for the board of her son who is assistant to a medical man. The case came before the Benevolent Fund Committee, at a meeting at which I was present, and it is from this source I derive my information. The Committee expressed great interest and sympathy in the case, and recommended the Council to make a grant to alleviate temporary pressing wants, but the means at its disposal would not allow of the grant of a sufficiently large sum of money to enable the poor woman to go into a court of law to recover from the Great Northern Railway Company compensation for her husband's injuries. Soon after the accident a claim was made on the Company, and Mr. (now Baron) Hawkins was retained to conduct the case, upon whose advice the damages were laid at £6000. The negotiation with the Railway Company, after extending over a considerable period, has now been brought to a close by a refusal to recognize the claim. The elevation of Mr. Hawkins to the Bench renders it necessary to engage fresh Counsel, and the payment of the necessary fees to bring the case into Court would require about £70. It is believed that if the necessary funds were forthcoming substantial damages might be obtained; and it is for the purpose of appealing to the benevolent, that I am induced to place the circumstance before the readers of the Journal. The wife has a most excellent character, and Mr. Holmes, of 158, Fenchurch Street, solicitor, has all the necessary papers and is ready to proceed with the case. Mr. Bremridge or myself would gladly receive any subscription forwarded for this object.

W. D. Savage,
Vice-President of the Pharmaceutical Society.
Brighton, Jan. 5, 1877.

The Hygienic Influence of the Pine and Eucalyptus.

Sir,—I have no intention of using your correspondence columns to discuss with Mr. Kingzett the results of the spontaneous decomposition of the aromatic hydrocarbons, still less of entering into a disquisition on the merits of Terebene as a deodorant and disinfectant. Those of your readers who may feel an interest in the matter may satisfy themselves whether Mr. Kingzett's depreciationy estimate of it is borne out by the experience of others by referring to your advertisement columns, where they will find abundant evidence as to its valuable properties. I think that I may fairly reply to Mr. Kingzett in the language of Shylock, that, "till he can rail that seal from off my bond he but offends his lungs," in "denying emphatically that its value as a disinfectant and deodorant has been established in any way."

Mr. Kingzett writes very dogmatically as to what he has "proved in the most absolute way," and as to his conclusions being "beyond discussion." Dogmatism of this kind is not an unfamiliar characteristic of discoverers, and may be pardoned on the score of their not unnatural enthusiasm for their own bantlings. It is evident that Mr. Kingzett is so wrapped up in the astounding novelty of his own "discoveries," that he is quite unaware that his inferences are by no means altogether in harmony with the conclusions of inquirers in other parts of the world who have established at least as good a reputation in science as he has.

I am not going to set my assertions as to the results of the oxidation of Terebene against his, as that would be a mere waste of your space, but will simply invite those of your readers, who have time to investigate the subject, to do so for themselves, when they will, I think, find that despite Mr. Kingzett's assertions to the contrary, there is evidence of the evolution of ozone which it is very difficult to gainsay. I will only add that if Mr. Kingzett's acquaintance with the properties of Terebene is to be inferred from the objection which he raises to it on the score of its inflammability, it must be of a very limited character. Terebene is inflammable, it is true, and so is coal, if it be thrown on the fire; but short of this it is scarcely possible to ignite either it or its vapour.

I am, possibly, not so ignorant on the subject of Mr. Kingzett's "discoveries" as he may think, and have my own opinion as to the merits as a disinfectant of the solution of camphoric acid in water, which, under the somewhat ambitious name of *Sanitas* he proposes to introduce to the public, and for which he has taken out a patent. If he had been speaking as a disinterested witness in the paper which has originated this correspondence I might have thought that his omission of all reference to Terebene was a mere oversight, and have taken no notice of it, but, as it was, I felt that I was justified, both in my own interests and those of your readers, in reminding him of his omission, and making my modest reclamation.

Francis T. Bond, M.D.

Milk of Sulphur.

Sir,—Much discussion has arisen upon the question, "What is Milk of Sulphur?" and, with your permission, I shall attempt to prove precipitated sulphur is really what the compilers of the old London Pharmacopœia meant, and not a mixture of calcium sulphate and sulphur.

I shall first quote from an old dispensatory printed in the first half of last century.

London formula.—"Boil flowers of sulphur in water with thrice their weight of quick-lime till the sulphur is dissolved; filter the solution and drop into it some of the weak spirit of vitriol: this will throw down a precipitate, which is to be washed in fresh parcels of water till it becomes insipid."

Edinburgh formula.—"Boil the hepar sulphuris, reduced to powder, in four times its quantity of water for three hours, adding more water if there is occasion; then filter the solution whilst hot, and drop into it spirit of vitriol till effervescence ceases; a powder will be precipitated to the bottom, which is to be washed with water and afterwards dried for use."

The method of making the lac sulphuris, we are told, from hepar is more expeditious, but the quicklime method, or London formula, gives the preparation a more saleable whiteness.

We are also informed that the whiteness does not proceed from the sulphur having lost any of its parts in the operation or from "any new matter superadded."

In regard to the Edinburgh method a suggestion is made to perform the ablution with warm water so as more easily to wash away the potassium sulphate lest it be added to the sulphur.

It will thus be seen that more than a century ago apothecaries were aware of the fact of contamination, and used the term "parcels of water" so as to get rid of acid and any other soluble matter.

Now, calcium sulphate is one of those salts which is as soluble in cold as in hot water, one part dissolving in about 460; and we can easily imagine the diligence with which such washings were practised, and the purity of the lac sulphuris of bygone days.

We are instructed that the medicine is nearly the same in both cases, *i.e.*, whether made according to the London or Edinburgh formula, and no one will affirm, I think, that the lac sulphuris prepared according to the instructions laid down in the Edinburgh form could by any possibility contain calcium sulphate.

This granted, we are told, concerning the lac made according to the London form, that it differed only in whiteness, and was on that account more saleable.

Again, "if the lac be melted with a gentle fire it returns into yellow sulphur again." Here we have the most positive proof that the lac was pure sulphur, and the sublimation of it was used as a test of its purity.

Calcium sulphate and potassium sulphate were not to be found in the well made lac, for if our forefathers were not acquainted with symbols, they evidently had good observation and exercised common sense.

We are told "if common sulphur be ground with alkaline salts and set to sublime, it arises of a like white colour (to lac) the whole quantity of the alkali remaining unchanged." This alone is sufficient to prove that if lac sulphuris made in 1720 contained any admixture some note or record would be given, and, if they experimented with common sulphur are we to shut our eyes and veil our senses to the fact that lac sulphuris was, like a spoiled child, petted and caressed, and remained a stranger to sublimation?

I opine, from the evidence produced, the universal answer will be "No."

Sir Robert Christison, in speaking of precipitated sulphur, says, "It has a pale greyish white colour, and contains some adhering water, but in other respects is identical with flowers of sulphur."

Dr. A. T. Thomson says, "Sulphur præcipitatum of the London College is stated to be that which is precipitated from the sulphuret of calcium by means of hydrochloric acid." . . . "It used to be called milk of sulphur, or lac sulphuris." . . . "It is very often adulterated; generally with sulphate of lime."

I think, Mr. Editor, I have proved that more than a century ago (1720) apothecaries were able to make and used a pure milk of sulphur, since the whiteness was not due to any new superadded matter, and the sulphur had not lost any of its parts. We are also told that it was not different in quality from pure sulphur, but was preferred in unguents, etc.

Coming down to recent periods, I have not been able to find any author who looks upon calcium sulphate otherwise than as something added. It is evidently an impurity, and was never intended to form 50 or 60 per cent. of milk of sulphur.

In regard to the sale of selenited sulphur I must leave you, Mr. Editor, to fight that battle; but, as a medical man, I should prefer the genuine precipitated sulphur.

I have examined a specimen of selenited sulphur, and the crystals are well formed, but no better drawings could be obtained than those, in 'Pereira,' 3rd ed., p. 345, of genuine and selenited lac sulphuris. The crystals are laminated to some extent, but many beautiful prisms are to be seen. In a specimen of genuine lac sulphuris no crystals are to be found.

A little of the lac may be moistened with water, and microscopically examined under a power of 50 or 320 diameters.

Geber, who lived in the 8th century, is supposed to have been acquainted with lac sulphuris, but how he prepared it I am at a loss to tell. One thing, I think, is certain, that sulphuric acid was not used in its preparation.

An interesting article may be seen in Dr. Thomas Thomson's 'Chemistry,' 6th ed., p. 287 (copied from Nicholson's Journal), "If common sulphur be sublimed into a vessel filled with the vapour of water, we obtain lac sulphuris of the usual whiteness, instead of the common flowers of sulphur."

As ordered to be prepared by the British Pharmacopœia, lac sulphuris should not be contaminated with calcium sulphate.

Pereira, Thompson, Royle, Neligan, and all our recent writers on materia medica, look upon the admixture of the lime salt as an adulteration.

I can see no advantage to the public in continuing to make an article according to an old form and not carrying out the instructions given, since in every respect the lac sulphuris of 1720, if properly washed, was precipitated sulphur, and equivalent to that of the B. P., 1867.

In the discussion of this subject there are many points left untouched, such as the various opinions as to the whiteness and therapeutic action of lac sulphuris.

I think, sir, I have touched widely enough this subject, and given so many authorities that the misty cloud of diversity of opinion amongst members of the trade as to what should be understood by the term "milk of sulphur," should now vanish.

Sulphate of lime is evidently an adulteration, and should not be found in milk of sulphur.

HY. BROWN, L.R.C.P., etc.

Northallerton.

[*** We think our correspondent is beside the question in discussing from a speculative point of view what should be understood by the term milk of sulphur. We have no doubt that precipitated sulphur is to be obtained, by those who desire it, of any chemist and druggist in the kingdom. But it is unquestionably the fact that very many persons refuse to accept the sulphur of the British Pharmacopœia as "milk of sulphur," but desire to have the preparation containing calcium sulphate, which is popularly known by that name. The only practical question, therefore, is whether a tradesman who supplies this article is to be treated as an offender against the law which prescribes a penalty for selling to the prejudice of the purchaser, an article that is not of the nature substance, and quality demanded by him.—ED. PHARM. JOURN.]

J. F. Williams.—We know of no standard by which to decide the knotty question propounded by you.

G. J. Gostling.—Four of the members are examined Pharmaceutical Chemists; the number of "Founders" would depend upon the meaning attached to the word and may be ascertained by referring to the Register. Notice of the nomination of a Member for election as a Member of the Council must be given in writing, disclosing whether such nominee be or not a Pharmaceutical Chemist, to the Secretary on or before the 24th of March. No form is provided. For details, see Calendar.

G. Dobson.—We are not aware that the chemistry that is the subject of the Cambridge University or other examinations differs in any respect from that science as taught in any of the numerous works on the subject.

"Acetum."—A recipe for toilet vinegar will be found in the number for May 6 last, p. 899.

COMMUNICATIONS, LETTERS, ETC., have been received from Mr. Lea, Mr. Porter, Mr. Abraham, Mr. Threadgale, Mr. Birkett, Mr. Williams, Mr. Fryer, Mr. Leay, Sirius, W. B.

NOTE ON DIKAMALI RESIN.

BY PROFESSOR FLUCKIGER.

The resinous exudation of *Gardenia lucida*, Roxb., a tree of the Rubiaceous order, is largely used in India, both externally and internally, as may be learnt in the Pharmacopœia of India, p. 118, as well as from the recent statements of Professor Dymock in the *Pharmaceutical Journal* for December 16, 1876, p. 491. This resin is well known throughout at least the southern and north-western parts of India under its Hindustani name, Dikamali.

Dr. Stenhouse* pointed out that it contains a crystallizable resin, gardenin—certainly, says he, one of the most beautiful substances of that kind. Dr. Stenhouse had apparently but a very old sample of dikamali at his command, which did not enable him to examine it so exactly as many interesting Indian products which that chemist has submitted to careful investigation. Nor am I aware that dikamali has ever been since noticed by any other chemist, with the exception of a strange confusion with crocin (or polychroit), the colouring matter of saffron. A similar, probably the same, matter has been proved to exist in the pods of the Chinese *Gardenia grandiflora*, Loureiro, as may be seen in Hanbury's 'Science Papers,' pp. 241 and 242. Curiously enough this colouring matter has been referred to the above crystals of gardenin isolated from dikamali, with which it certainly has not the least affinity.†

Having been supplied some years ago by my late friend D. Hanbury with a good sample of dikamali as met with in the bazaars of Bombay, I devoted the larger part of the small provision to ultimate analysis, and may be excused for communicating the results in this periodical, supposing that it might be of some use to any future observer. It would be well worth while to examine more exactly especially the fine yellow crystals of gardenin.

Dikamali, as before me, has a well marked peculiar strong odour, somewhat recalling that of rue, and at the same time of aloes; it is of a crystalline appearance and yellowish hue, the powdered drug displaying a decidedly fine yellow colour. By gently warming the drug with alcohol (0·830 sp. gr.) a large amount of adherent bark and wood remains undissolved; the solution of the resin is of a fine yellow colour, with a well marked greenish hue. It does not alter litmus paper, and assumes an intensely greenish brown colour on addition of perchloride of iron; on addition of a little soda it turns brown.

If dikamali resin is melted with caustic potash or soda an offensive odour, no doubt due to some volatile fatty acid, is evolved. I dissolved the melted mass in water, neutralized it with sulphuric acid, and caused the larger part of the sulphate of potassium to crystallize. The mother-liquor was shaken with ether, which by evaporation yielded a crop of crystals which I think are *protocatechuic acid.* They produced a fine greenish blue coloration with a dilute solution of perchloride of iron, turning red when bicarbonate of sodium was added.

* 'Proceedings of the Royal Society,' VII. (1856), 542.

† Gmelin, 'Chemistry,' English edition, vol., vi., p. 508, where Professor Kraut had already expressed that he doubted the identity of gardenin and crocin.

Dikamali resin consequently belongs to the *aromatic* class of organic substances.

I exhausted the resin with hot alcohol, about 0·830 sp. gr., which on cooling afforded a good crop of crystals of gardenin; a very small amount of them was further yielded by the mother-ley, which chiefly contained the amorphous part of the crude resin. The crystals were shown by the microscope to be still mixed with a little amorphous resin, from which I succeeded in purifying them by repeated recrystallization of the gardenin from hot alcohol. It finally consisted of yellowish acicular crystals, melting at about 155°C. Submitted to ultimate analysis by means of oxide of copper and chlorate of potassium, gardenin dried at 100°C. furnished the following results:—

I. 0·1968 of gardenin yielded 0·1158 of water and 0·4278 of carbonic acid.

II. 0·2006 of gardenin yielded 0·1232 of water and 0·4384 of carbonic acid.

III. 0·1255 of gardenin yielded 0·0768 of water and 0·2740 of carbonic acid.

Or, in percentages—

	I.	II.	III.	Average.
C	59·28	59·60	59·54	59·47
H	6·53	6·82	6·79	6·71
O				33·82

These figures would answer to the formula—$C_{23}H_{30}O_{10}$, viz.:—

23 C	276	59·23
30 H	30	6·43
10 O	160	34·34
	466	100·00

It was ascertained that the amorphous portion of dikamali dissolved readily in warm alcohol, and on cooling deposited but a few crystals of gardenin, accompanied by a very small amount of a flocculent matter, which was not further examined. The solution was filtered and mixed with an alcoholic solution of acetate of lead as long as it formed a yellow precipitate, P, which was separated from the liquid S, and washed with cold alcohol. P, decomposed by a current of sulphuretted hydrogen in a phial containing alcohol, afforded a solution which on evaporation yielded very little of an amorphous resin, too little for further examination. The solution S, after treatment with sulphuretted hydrogen, was filtered and evaporated. The residue consisted of a brownish soft resin, melting below 100° C. It was dried over sulphuric acid at ordinary temperature, then at 100°, and lastly at 112° C. By ultimate analysis the following numbers were obtained:—

I. 0·3606 afforded 0·2928 of water and 0·9700 of carbonic acid.

II. 0·2935 afforded 0·2451 of water and 0·7877 of carbonic acid.

Or, in percentages—

	I.	II.	Average.
C	73·36	73·19	73·27
H	9·01	9·27	9·14
O			17·59

From these results the formula $C_{23}H_{34}O_4$ may be calculated, although it does not answer very satisfactorily—

23 C	276	73·79
34 H	34	9·09
4 O	64	17·78
	374	100·00

It would appear from these results that the crystallized neutral resin called *gardenin* may be derived from the amorphous part of dikamali resin by action of oxygen, 4 atoms of hydrogen being removed from, and 6 of oxygen added to, the amorphous portion.

THE SPECTROSCOPE IN PHARMACY.

BY WILLIAM GILMOUR.

(*Continued from page* 571.)

The danger to which tinctures are subjected from exposure to sunlight has already been touched upon, but it may be necessary here to refer to it again for the purpose of pointing out one or two errors into which this very susceptibility to change on the part of the tincture may unwittingly lead us. In the first place, it need scarcely be pointed out that tinctures are unlike green extracts and dried leaves in respect that the source from which the latter are derived is only available once a year, and consequently age must always form an element more or less important, so far as the condition in which they may be presented to us is concerned. Age should not thus enter as an element, for consideration, into the case of the tinctures, for they may be obtained fresh and new at any time, so that if the leaves or other parts from which they are prepared have been carefully dried and preserved, the spectrum which they respectively yield should always be nearly uniform.

With this, however, should be taken the further important fact, namely, that unlike extracts and dried leaves, which are opaque and which, from the manner in which they are generally kept, probably suffer less from exposure to sunlight than from other causes already mentioned, tinctures suffer most from this cause. They are transparent and are frequently exposed to strong light if not to direct sunshine, so that they often change very quickly. In short, a tincture if new should yield an almost uniform spectrum, but if old, and especially if it has undergone some little exposure, it will most certainly have changed in nature to a greater or less degree. These facts have been forced upon my attention from having lately again read an interesting paper from the pen of Mr. Stoddart of Bristol, which appeared in the *Pharmaceutical Journal* (2 series, vol. xi., p. 132), on this same subject, and with more immediate reference also to these same absorption bands. My first impression on reading the paper referred to, was that Mr. Stoddart had been experimenting on tinctures which had undergone some exposure and which had in consequence changed in nature, for Mr. Stoddart not only failed to observe bands in tinctures yielding very characteristic spectra, but he also failed to note all the bands in other tinctures still which he examined. Probably, however, the dilution required by most of the tinctures to render them sufficiently transparent to admit of a proper spectral examination, examined as they apparently were with all their other colouring matters present, accounted also to a considerable extent for the missing bands. This will perhaps be more strikingly brought out if we make a classification of the different tinctures, not for any purpose of theorizing, but to admit of a ready means of illustrating the points contained in the foregoing remarks. Of the tinctures examined by Mr. Stoddart, and in which all the bands are not noted, may be mentioned, cannabis indica, digitalis, hyoscyamus, lobelia (æth.); and of those in which no bands were discovered, but which should have given characteristic spectra, lobelia, hop, senna. To this last class may be added, as closely resembling them optically in several respects, tinctures such as belladonna, buchu, conium, which Mr. Stoddart does not refer to in his paper. Taking then this rough classification, for it is nothing more, it will be noticed that the tinctures belonging to the first class are all of the kind more commonly used in pharmacy, and therefore not likely to be kept sufficiently long in stock to undergo great changes from exposure.

Moreover they are all deep-coloured tinctures, which, while requiring most dilution, if the other colouring matters are retained previous to examination, are at the same time least susceptible to active influence. In these circumstances it is not improbable that all the bands might be present in the tinctures and yet the more delicate be missed or removed entirely by the dilution. But whether removed or not no dilution can take place without altering the appearance of the bands and their relation to the age and general condition in which the tincture is presented to us. The advantage of separating and examining the chlorophyll apart from the other colouring matters present in the tinctures as already described will therefore be apparent. It not only avoids all uncertainty in the matter of their presence or absence, but what is equally important, it enables us to observe the precise condition in which they are present in the spectrum. Of the tinctures in the other class, the majority, it will be noticed, are of the kind not only less commonly used in pharmacy, and therefore for this very reason more likely to have undergone some considerable exposure, but they are also in most instances much more delicate in their actinic action. Senna probably is the only exception, but, strange to say, the majority of the commercial samples of this tincture which I have examined have exhibited no absorption bands whatever. It is certainly a tincture not used to any considerable extent, and therefore it is just possible that all the samples may have been of some age, but if it is kept in mind that the fresh tincture exhibits a very decided spectrum in which all the five bands are well defined and broad and moreover being very dark—darker than most of the other tinctures named—is not likely to be affected very actively by exposure, it must be considered more than probable that something else than mere age or exposure have to do with the change. The saccharine principle, or the acids of the raisins which enter into the tincture, both suggest themselves as elements predisposing to change, but the matter requires and should receive further investigation. In the case of the other tinctures of this class, of which belladonna, exhibiting as it does a very fine spectrum containing five well defined bands, may be taken as representative, exposure alone very soon changes entirely their appearance.

The decomposition of all the tinctures, it need scarcely be said, is in proportion to the intensity of the sunlight on the one hand, and the nature of the tincture itself on the other, but in the case of belladonna a few hours' exposure to direct sunshine will remove every trace of bands III. and

IV., reduce bands V. and II. to a mere shadow and considerably thin and narrow band I. itself, while the spectrum will probably elongate from about the beginning of the blue to the middle of it. At first this change is not observable by the naked eye, but by and bye the tincture will probably assume a cloudy appearance, which again clears on depositing more or less of a sediment. The tincture will then be found to have changed very perceptibly in colour, the peculiar dark olive green having paled and turned to a more or less bright rusty brown, and if the exposure be continued it is not difficult to recognize, in a short time, in some of the tinctures a marked change in both taste and smell. In this state many of the more delicate as well as powerful tinctures suffer much in therapeutic activity, and the probability is that all suffer in proportion to the susceptibility of the fresh plant itself to decomposition under similar exposure. In other words it is more than questionable if the spirit, though an extracting, be also a preserving agent of the active principle of the plant.

These details are dwelt upon, although to many they may appear somewhat insignificant, principally because so little is as yet known regarding those changes which take place from exposure in many of the tinctures, as also from the conviction that the sphere of the spectroscope, so far as they are concerned, will be less in the way of distinguishing individual tinctures thus in detecting the various stages of certain decompositions both interesting and important from a therapeutic aspect. As already stated the spectra of the different samples of tinctures examined, like those of the extracts, presented very great contrasts. So much was this the case that it was deemed prudent to prepare fresh tinctures in every instance for the purpose of examination, and the following may therefore be accepted as fairly representative:—

Tincture Belladonna.—Benzole solution, light olive green, all the bands visible; band I. broad and dark, band II. distinct but not very marked, band III. faint trace, band IV. resembling band II., and band V. broad and of some density, and all the spectrum absorbed beginning of blue. This tincture exposed for about a month during summer to diffused light of no great actinic power showed spectrum as follows: benzole solution very light olive green, band I. narrow and not very dark, bands II. and V. mere traces, bands III. and IV. wanting, and all spectrum absorbed towards middle of blue. Exposed for a month during winter the action was much less decided, band III. alone having disappeared, the others only thinning a little. In this and the other tinctures yielding any marked spectra, the solutions remaining after the chlorophyll had been extracted generally showed band I., but of no great intensity, and the addition of further benzole did not remove it. No other bands in any case were shown, and the solution itself was generally more or less of a rusty brown without any shade of green. Where the spectrum of the tincture was not very decided, as in the next instance, the solution showed no trace of band I. whatever.

Tincture Buchu.—Benzole solution light green, four bands only visible of which band I. was neither very broad nor dark; bands II., IV., and V. faint and none well defined, band III. being wanting. Buchu is a very good instance of a tincture in which the bands are rarely present in commercial samples.

Tincture Cannabis Indica.—Same as extract.

Tincture Conia.—Benzole solution very light bluish green, band I. only visible, which, though very decided, is of no great breadth; all spectrum absorbed towards end of blue. This tincture, prepared as it is from the fruit, is entirely exceptional, and the presence of undecomposed chlorophyll in the fruit may be taken as indicative of the condition in which it has been collected, dried, and preserved.

Tincture Digitalis.—Benzole solution very dark olive green, showing one of the finest chlorophyll spectra which it is possible to get. Band I. is very dark and broad, band II. very decided though narrow, band III. very distinct, band IV. broad and dark, and band V. of greater breadth and depth still, with a light shading previous to complete absorption of the spectrum. The whole of the bands stand out boldly, with considerable sharpness at the edges, so that a very good opportunity is afforded of noticing the effect of dilution and exposure, not only upon the individual bands, but upon the spectrum in general.

Tincture Hyoscyamus.—Benzole solution dark olive green. All the bands visible, band I. being broad and dark, band II. distinct but not broad, band III. faint, band IV. not very dark or broad, band V. of considerable breadth and well defined. All the spectrum absorbed towards end of green.

Tincture Lobelia.—Benzole solution light olive green showing four bands. Band I. dark and of some breadth, bands II., IV., and V. quite distinct but not presenting any special characteristics; band III. wanting, and all spectrum absorbed towards middle of blue. This spectrum was quite distinct from, and could not be mistaken for, the spectrum of the next tincture prepared from the same lobelia.

Tincture Lobelia (eth.).—Tincture full strength showed band I. broad and very dark, band II. of some breadth and quite decided, band III. faint, band IV. very decided, and band V. very broad and dark. The green and yellow of spectrum were somewhat changed in colour, and all was absorbed towards end of green. On diluting one half with ether the bands were very much thinned, III. being wanting; the spectrum was elongated and all the colours were much brightened.

Tincture Lupulus.—Benzole solution very light yellowish green, showing only band I. quite decided, but of no great breadth. All the spectrum absorbed towards end of blue with a considerable amount of shading.

Tincture Senna.—Benzole solution dark olive green, showing beautiful spectrum, containing all the five bands. This spectrum closely resembled digitalis, with probably the green of the spectrum a dirtier shade.

Such are a few of the preparations which advantageously may be subjected to an examination by the spectroscope. They are only a few out of many more which might profitably be brought under the scope of its investigation. Its application to fixed oils, for example, has quite recently been touched upon in the pages of the Journal, so that it need not again be referred to here, but probably a no less interesting and important sphere will be found in the examination of essential oils, than which no subject is more needful of investigation.

NOTE ON POTALIA AMARA.*

BY E. HECKEL AND A. HALLER.

Among the interesting plants growing abundantly in French Guiana, the *Potalia amara*, Aublet, notwithstanding the singularity of the properties attributed to it, has attracted but little attention from pharmacologists. The authors having had some well-preserved specimens in fruit placed at their disposal made some researches, of which they have published a preliminary report.

Aublet says of the plant that it is found only in the larger forests. All the parts are bitter. The young stems are sometimes charged with granules of a transparent yellow resin, which catches fire upon being exposed to a flame, and gives off an odour resembling that of benzoin. The leaves and young stalks are employed in tisanes as a remedy in venereal affections. The drink in a large dose is emetic, and some inhabitants told Aublet that it had been successfully used to empty the stomach in cases of suspected poisoning.

The authors, however, did not find that all the parts of the plant were bitter, having chewed both old and young leaves without perceiving any sensation of bitterness, however prolonged the mastication. On the contrary, the leaves possessed a very aromatic odour and taste, which were intensified in the stem bark and slightly attenuated in the root bark. The wood was aromatic, or but slightly bitter. From these observations the authors inferred that the emetic and bitter properties which Aublet thought were diffused throughout the plant were really located in different organs, and this inference was confirmed by the chemical examination.

De Candolle has remarked of these properties that this plant has the bitterness of the Gentianaceæ and the emetic action of the Apocynaceæ, and that, in fact, the genus *Potalia* is intermediate between the two families. This is an additional proof of the importance the natural affinities of plants have in the direction of pharmacological and therapeutic researches.

Fifty grams of dried and powdered leaves were boiled for fifteen minutes in three successive quantities of water, acidulated with sulphuric acid, strained, and the united liquors evaporated in a water-bath to a syrupy consistence; this residue was treated three times with 200 grams of hot 90° alcohol, the alcohol distilled off and the residue acidulated with a few drops of dilute sulphuric acid, and then treated several times with pure benzine to remove fatty matters. Finally, the residue, after being neutralized with magnesia, was exhausted with chloroform. The chloroform liquors when distilled yielded an amber coloured extract, which was excessively bitter, burning to the tongue, emetic in a small dose, soluble in ether, left no residue upon combustion, and gave with nitric acid a red colour passing to orange. The last reaction led the authors to suspect the presence of brucine, but they failed to get the characteristic violet reaction of that alkaloid with nitric acid and protochloride of tin, and the tests for strychnine were alike negative. From these first researches, therefore, it would appear that the leaves contain neither strychnine nor brucine, and that their emetic properties are due to a peculiar principle; this the authors hope to isolate when they obtain a larger supply of the plant.

Thirty grams of stem bark treated in the same way yielded a bluish-brown resinous extract, very bitter, partially soluble in acidulated water, and coloured red by nitric acid, but this colour was less intense than with the resin from the leaves. This product did not appear to possess emetic properties, even in largish doses, compared with the extract from the leaves. Of the latter a few milligrams applied to the tongue of a man quickly caused nausea, accompanied by a peculiar sense of strangulation. In further experiments the authors propose to modify the process so as to avoid the possibility of any alkaloid present becoming altered by the acidulated water.

* *Journal de Pharmacie et de Chimie* [4], xxiv. 247.

CULTIVATION OF THE CASTOR-OIL BEAN.*

The plant is a native of tropical countries, although it will grow almost anywhere in the United States. In northern latitudes it is an annual plant; but in the East Indies it becomes a tree, growing on from year to year, and attaining a height of thirty or forty feet. The same, to a greater or less extent, is true of the plant in Texas; but we are not informed how matters stand in Florida; it would depend, we presume, on the locality itself. The following is the mode of culture resorted to in southern Illinois: The soil is prepared first in the same manner as for corn, the ground being laid off both ways, seven feet apart each way. The planting is done in April, or as soon as the frost is out of the ground. Before planting, the beans are to be soaked from twelve to twenty-four hours in water about as warm as the hand will bear, when the seeds are first placed in the liquid. They are planted and covered like corn, two beans being dropped in each hill. They require about a week longer than corn to come up, and the sprouts, when they first appear, are of a red colour. Plough the land when the plants stand about three or four inches high, going close to the plants, leaving the middle of the row until you have gone both ways of the rows, and the beans have fresh loose earth around them. Then go through and clean the middle with a cultivator or a plough. When seven to ten inches high, the plants are to be thinned out so as to leave only one in a hill. When the plants average twelve to eighteen inches, they can take care of themselves, if the weeds are kept from the middle space between the rows. The fruits begin to ripen in August; a fair crop is from sixteen to twenty bushels to the acre. In California and in Texas, from thirty to fifty bushels. The beans weigh forty-six pounds to the bushel. As we have said before, the foregoing applies to the plant grown in southern Illinois; therefore allowance must be made for the difference of the climate of Florida, where it is proposed to cultivate it. The plants growing larger in warmer latitudes, will need to be set further apart; the crops will mature sooner and be more abundant, etc. In fine, various modifications will suggest themselves.

Gathering and Shelling the Beans.—The fruit is borne on spikes growing in the axils of the leaves and branches, and the seeds are enclosed in burs resembling those of small horse-chestnuts. They should be gathered as soon as they begin to turn from a red to a greenish-brown colour; for, on becoming ripe, the pods burst of themselves, scattering the beans ten or twelve feet in all directions. The best way to gather them is to draw a waggon along through each of the passage-ways between the rows, while pickers look over the plants on either side, gather all the clusters which are of the proper colour, and deposit them in the waggon, to be transported to a drying yard. The same operation has to be repeated every other day during the season. Each cluster contains from fifty to one hundred pods, and each pod three beans. The drying yard is prepared by levelling and rolling hard a piece of ground with a good southern exposure, and fencing it with boards to guard against the loss of beans when they "pop." The pods are spread thin, and occasionally turned. In case of rain, the spikes are raked up and covered, and the beans swept up. Sometimes it is found more advantageous to build a kiln or drying house, where artificial heat is applied. In these, the drying floor is about six feet above the ground floor, and is made of slats a quarter of an inch apart, so that on stirring the spikes the beans drop through the apertures and accumulate below. Whatever may be the process used for shelling the beans, they must finally be thoroughly dried and run through a fanning mill, or by some other means divested of all adhering dust or chaff. They are then ready for the mill or the market.

Expression of the Oil.—The oil is obtained in various

* From *The Druggists' Circular and Chemical Gazette*, December, 1876.

ways; but the process which gives the finest product is the following: The seeds are first shelled, then immediately crushed and pressed in hemp bags by a hydraulic press. The pressure must be gradually applied, as the oil is slow in running; but the shelling, crushing and submitting to pressure must be done as rapidly as possible, to avoid exposure to the air, which has the effect of colouring the product. The expressed oil is then heated with water in tinned vessels until the water boils, and the albumen and gum separate as a scum; this is carefully removed, and the oil, as soon as it has become cold, is filtered through canton flannel, and put into canisters. One bushel of good castor beans yields five or six quarts of oil.

REACTIONS FOR BENZOIC ACID.

The following list of reactions for benzoic acid is quoted in *New Remedies*, from a lengthy article, by Dr. Richard Godeffroy on the "Modes of Formation, Methods of Preparation, Properties and Reactions of Carbolic, Benzoic, Salicylic, Oxybenzoic and Parabenzoic Acids," which has appeared in the *Zeitschrift* of the Austrian Apothecaries' Society:—

1. On passing the vapour of benzoic acid over faintly ignited zinc powder, *essential oil of bitter almonds* is formed (Baeyer).

2. Benzoic acid, heated in a retort with coarsely ground pumice stone, splits into *benzol* and carbonic acid. If overheated, carbon is separated and naphthalin and pyrogenic oils are formed (Barreswil and Boudault).

3. On heating benzoic acid with a mixture of acid sodium sulphate and sodium chloride to 200° C., there are formed *benzoyl chloride*, hydrochloric acid, and normal sodium sulphate (Beketoff).

4. Benzoic acid is soluble in solution of sodium phosphates, which give up to it 1 or 2 atoms of sodium, producing thereby *sodium benzoate*. The solutions have an acid reaction, but give up benzoic acid on evaporation or to ether (J. Donath).

5. On mixing 3 mol. of benzoic acid with 1 mol. of glucose, and heating with a large excess of strong sulphuric acid, the liquid assumes a fine *blood-red* colour, which disappears after a while; finally the mass turns brown and black.

6. Aqueous chromic acid or potassium chromate and sulphuric acid do not alter benzoic acid, no odour of oil of bitter almonds is developed, and the chromic acid is not reduced (distinction from cinnamic acid).

7. A neutral solution of ferric chloride produces in neutral solutions of benzoates a flesh-coloured precipitate of *ferric benzoate* insoluble in water and acetic acid, but decomposed by hydrochloric acid, which produces free benzoic acid and ferric chloride.

8. Silver nitrate produces no precipitate in a solution of benzoic acid; but on saturating the free acid with ammonia a white crystalline precipitate of *silver benzoate* is immediately produced. This is soluble in ammonia, acetic acid and hot water.

9. Mercurous nitrate produces in a solution of bezonic acid a white crystalline precipitate of *mercurous benzoate*, very difficultly soluble in water. Alkaline benzoates produce a voluminous non-crystalline precipitate.

THE DETECTION OF ROSOLIC ACID IN PRESENCE OF MAGENTA.*

BY MM. P. GUYOT AND R. BIDAUX.

Rosolic acid, which dissolves in water with the colour of onion peel, possesses the property of communicating to wines the characteristic shade of old claret, We think it useful to make known at the present time the reactions which serve to detect it, either alone, or in presence of magenta. Some time ago we remarked that magenta is decolourized in presence of ammonia, and that ether removes from the mixture the colouring base, which may be reconstituted by the addition of an acid. In these conditions rosolic acid yields a characteristic rose tint and gives up nothing to ether. If we pour an acid into the rosolic solution, the shade of old claret is destroyed and gives place to a yellowish tint. If heated with gun-cotton, the rosolic liquor is fixed on the nitrogenized fibre, which, well washed and dried, takes a beautiful rose tint in presence of ammonia. This reaction may present itself in the course of the manipulations of an expert instructed to examine wines adulterated with magenta, and therefore it is well to mention it, for we must call attention to the fact it is the very opposite to what ought to be produced. We easily understand the embarrassment of the expert who, after having obtained gun-cotton or nitrogenized paper slightly coloured, expects to see the colour disappear on contact with ammonia, but perceives, on the contrary, a very vivid rose shade, which, instead of brightening under the influence of acetic acid, becomes yellow.

Into a flask containing ammoniacal rosolic acid, we poured sulphuric ether and then strongly agitated the liquid. After the complete separation of the two layers, the ethereal liquid was decanted and poured into another bottle. It was then limpid and colourless; we added to it pure acetic acid, which produced no change; the two layers separated and remained perfectly white. There was therefore no coloration, which shows that, in presence of ammonia, the ether does not remove rosolic acid. The inverse reaction is significant; rosolic acid, having become yellow under the influence of an acid, was treated as above with ether; the upper yellowish layer having been decanted, was submitted to the action of ammonia, which took a rose colour. If, in a flask, we put magenta with acetic acid, the rose tint does not change; ether added to this flask is coloured a violet rose. When decanted and treated with ammonia, there are formed at first two distinct layers, the lower one white and the upper ethereal, containing magenta. An excess of ammonia destroys immediately the coloration, and gives two layers perfectly colourless. It is important to remark that, whilst with magenta the ammonia renders the colouring matter white, with rosolic acid, on the contrary, the same alkali develops a rose shade, *which floats on the colourless ether*. Here, it is the *aqueous liquid* which is coloured, whilst if we acidify ammoniacal ether containing magenta, it is the ether, if in sufficient quantity, which takes the characteristic rose tint. There are then, in these comparative experiments, two very distinct reactions which can be made use of for the examination of liquids containing the two colouring matters. These reactions are shown in the table.

These reactions being well known, it is easy to separate from a single solution the two colouring matters. We pour into a flask the liquid to be examined; we add ammonia to it; we agitate with ether and then decant. In presence of acetic acid, the ether becomes coloured. This experiment can be checked by means of gun-cotton. In fact, if we saturate this nitrogenous matter with the decanted ether, it is changed into a gelatinous rose-coloured matter, with which we can obtain the reactions of magenta. As for the aqueous liquid, it may serve for a counter-test. The ammonia which it contains is driven off in the water-bath and we add acetic acid, which communicates the yellow tint mentioned above. If treated then with ether and ammonia, it is found in the desired conditions to furnish one of the reactions mentioned above.

It remains for us to know if, on submitting the mixed liquid to the action of acetic acid and treating with ether, we can separate the two colouring matters. They are both removed by ether, poured into an acetic liquid, which contains then yellow rosolic acid and rose-coloured magenta. When separated from the aqueous liquid, this

* From the *Comptes Rendus*, reprinted from the *Chemical News*, January 5, 1877.

coloured ether furnishes a very distinct reaction. A few drops of ammonia decolourize the ether and tinge the lower stratum rose colour, magenta disappears, and rosolic acid passes into ammoniacal solution. This process, as may be seen, differs very slightly from the former. The original treatment with acetic acid has for its object to render soluble in ether the two colouring matters, and remove them from the water in a more concentrated form. It requires only two manipulations, which, in certain cases of rapid determination is very important.

Gun-cotton	1. Ammonia	Decoloration	Magenta.
		Red coloration	Rosolic acid.
	2. Acetic Acid	Red coloration	Magenta.
		Decoloration	Rosolic acid.
Ether and Ammoniacal Solution	1. Ammonia	No action with either of these colouring matters.	
	2. Acetic Acid	Red coloration	Magenta.
		No action	Rosolic acid.
Ether and Acetic Solution	1. Ammonia	Ether, at first of a rose colour, becomes decolourized	Magenta.
		Red colouration of the upper layer	Rosolic acid.
	2. Acetic Acid	Ether coloured rose	Magenta.
		No action	Rosolic acid.

POISONOUS MATERIAL IN HAIR-DYES.*

It is right that the medical profession and the public should understand the poisonous nature of many of the preparations commonly sold as hair-dyes and hair-restorers. In spite of the Pharmacy Act, the sale of many active poisons is still, in this country, entirely unrestricted. It is true that arsenic, and a certain number of other common poisons, are under legislative control, and may not be sold retail unless properly described, and then only under certain conditions. But these provisions do not extend beyond a comparatively small number of well-known substances. Other poisons may be, and are, openly sold for domestic purposes without any warning of the risks attendant upon their misuse.

Such sale we hold to be dangerous, and morally wrong. Almost every day affords some example of the serious accidents which occur in households from the use of poisons, even when those poisons are properly described. When no printed warning is given, and particularly when the printed description is of such a nature as to lead to the inference that no poison is present, the danger is increased tenfold. Everyone knows the carelessness with which bottles are often treated in houses, and how apt ignorant persons and children, not to speak of those who ought to know better, are to make use of the wrong bottle. Even the word "poison," printed in large type, and the use of a peculiarly shaped bottle, are not found sufficient to prevent accidents altogether, and the sale of poisonous substances without any such warning ought, we think, to be prohibited in every case by law.

Many of the hair-restorers, or more properly hair-dyes, so extensively advertised and used, both in England and America, afford flagrant examples of the danger to which we allude. We have lately purchased and submitted to the independent analysis of two well-known chemists twenty-one samples of the preparations of this kind now in use in England, including, we believe, nearly all those which are best known, because most extensively advertised. The results of these analyses abundantly justify the remarks we have made, and we therefore present their main features to our readers. We of course take no notice of constituents, such as scent and glycerine, which have no significance in our present inquiry.

Out of the twenty-one examples examined, no less than fourteen were practically identical in their nature. They contained sulphur in suspension, and also lead in varying, but always in very considerable quantity. Three of these preparations bore American labels, the rest were English. The descriptions varied a good deal. Only one was plainly described on the label as poisonous if taken internally, while many were described as "perfectly harmless," "free from injurious substances," and so on. The prices varied from 1*s.* to 6*s.* per bottle.

Two more samples, one of them American, were found to contain lead and sulphur, but in a different form. The sulphur was present as hyposulphite, and, in fact, these preparations may be substantially imitated by adding hyposulphite of soda to a solution of a lead salt. A white precipitate first appears, which dissolves in excess, and the solution so obtained *does not give a precipitate with iodide of potasssium.* This is noteworthy, because in the handbill which accompanies one of the samples purchasers are warned against the dangerous hair preparations which contain lead as likely to lead to paralysis of the brain and insanity, and are directed to test all preparation with *iodide of potassium.*

In another sample, an American one, no free or loosely combined sulphur was found, but only lead in considerable quantity.

Another of the preparations was contained in two bottles, in one of which ammonio-nitrate of silver, and in the other pyrogallic acid, was detected. This, therefore, belongs to an entirely different class from the preceding.

The remaining three preparations analysed were intended for lightening, instead of darkening, the colour of the hair. No substantial difference between these samples was detected. Each was found to contain a tolerably concentrated and slightly acidulated solution of peroxide of hydrogen. It is well-known that this is the active agent in preparations of this kind. It can hardly be considered as poisonous, but its action on the hair is said to be injurious. The silly fashion which prompted its use is, we believe, dying out.

It will be seen that, out of the twenty-one samples examined, no less than seventeen contained lead. This lead was present, it must be remembered, not as a mere trace, but in most cases in large and deleterious quantity. In one sample, and that not the worst, we found five grains and a half of lead, equivalent to about ten grains of crystallized sugar of lead in each fluid ounce of the liquid.

A subsidiary question arises out of this inquiry which deserves the most careful consideration of the medical profession. Is it not possible that lead-poisoning may sometimes be produced by the incautious use of these preparations? Evidence upon the point is conflicting, and many physiologists hold that such an absorption through the scalp cannot take place unless the skin is broken. Taylor quotes a case to the contrary which came within his own observation, and many others of the same kind have been brought to our notice. But few, if any, of these cases are definitive, and real proof appears still to be lacking. It is, perhaps not likely that such poisoning very commonly occurs, if it ever does. In the majority of instances the liquid would probably be used with a certain amount of discretion, and would be applied mainly to the hair rather than to the head. But if the preparation were used incautiously, if the lead solution were rubbed frequently and in considerable quantity into the skin of the head, we are inclined to think that danger would exist. It would almost certainly exist if the skin were broken.

Many recorded cases show that very minute quantities

* From the *Lancet*, January, 13, 1877.

of lead may after a time produce symptoms of poisoning. Certain circumstances, moreover, induce us to think that incipient lead-poisoning is more common than is generally supposed. In all chemical laboratories the testing for lead in drinking-water is a common experience. The number of samples of water sent for this purpose is surprising. Now, in a great many instances no lead is found, and it is worthy of consideration whether in some of these cases the symptoms which threw suspicion unjustly on the water may not have been caused by the use of lead cosmetics.

The subject is a highly interesting one, and we shall be glad to receive evidence upon it from any of our readers.

NOTE ON SYRUP OF IODIDE OF IRON.*

BY H. F. MEIER.

Having formerly experienced some difficulty in preserving syrup of ferrous iodide from change, particularly when stored in bulk or in bottles only partly filled, I present below a method by means of which I believe I have overcome this trouble, at least to a very great extent. In deciding on the preservative employed, I was guided by a desire to avoid the introduction of any foreign elements—such as hyposulphites, phosphoric or citric acids or other materials—that would modify either the composition or its therapeutic action. In brief, the agent is iodhydric acid in a dilute form; and I find that an exceedingly small quantity is sufficient to prevent deposition of the iron contained in the preparation (generally as ferric oxide), and also the objectionable change of colour which occurs when the syrup is exposed to the action of the air, in consequence of the package being only partly filled, the latter change being due to the formation of ferric iodide.

The quantity I have used is equivalent to adding two grains of anhydrous acid to the pint of finished syrup, prepared according to the U. S. Pharmacopœia. I have a sample of syrup which has been standing for over three months protected in this manner, and it has suffered no change in colour, while being perfectly clear and free from sediment. As the medicinal effects of the preservative are the same as those of iodine, I can see no objection to it on this ground, while its other merits will, I believe, be substantiated by further and more extended trial.

As the usual way of preparing dilute iodhydric acid, by the decomposition of sulphuretted hydrogen with iodine suspended in water, is a very disagreeable one, I submit also a method by which it can be prepared, on the small scale, much more conveniently and equally as good for the purpose intended.

Dissolve 166 grains of potassium iodide in 2 fluid ounces of water, and 153 grains of crystallized tartaric acid in 4 fluid ounces of alcohol; mix the solutions, and when the precipitate (of potassium bitartrate) has subsided, filter, and wash the filter with a small quantity of 66°/$_{0}$ alcohol, and evaporate the filtrate to two fluid ounces. Each fluid drachm contains 8 grains of anhydrous acid, and this quantity should be sufficient to preserve at least 4 lbs. of syrup. This solution can also be used to redissolve the sediment in syrup that has decomposed in the usual manner—the above quantity being generally sufficient if time be allowed for the solution.

The best remedy for removing the colour after decomposition is without doubt the old method of immersing pieces of clean bright iron wire in the syrup, and agitating occasionally, as in this case the ferric is reduced to ferrous iodide; while in the case of exposure to sunlight, although this is an efficient bleaching agent, the probability is that the process is attended with the formation of ferric iodate.

The introduction of alcohol in the above formula for the dilute acid has for its object the complete separation of the potassium bitartrate, as I find that a fluid ounce of acid of the above strength is capable of dissolving about 35 grains of the bitartrate; consequently were water used in place of alcohol to dissolve the tartaric acid, the above proportion of salt would remain in solution and contaminate the product. In this respect the method which I propose differs from that of Dr. Buchanan.

A point very necessary to be observed is a prompt evaporation of the alcoholic filtrate to the required measure, for in presence of alcohol the acid decomposes more rapidly than in a merely watery solution.

On testing with hyposulphite of soda one sample that had been thus exposed for a day or two, I found 2 grains of free iodine in a fluid ounce, or about 3 per cent. of the anhydrous acid present. The acid, if preserved for any length of time, should be kept in bottles, quite full and well stoppered to exclude air.

My experience with this agent has not, so far, justified the supposition of Mr. E. D. Wayne, that free hydriodic acid would cause a deposit of grape sugar (see his remarks in the U. S. Dispensatory); and should any reader try this method, I shall be glad to hear a confirmation of the satisfactory results obtained.

* From *The Druggists' Circular and Chemical Gazette*, December, 1876.

THE USE OF SALICYLIC ACID IN THE HOUSEHOLD.*

BY DR. VON HEYDEN.

1. *Raw meat.*—It frequently happens, especially in warm weather, that meat, particularly such as contains easily decomposable fat and blood (tongues, etc.,) although otherwise irreproachable, upon closer examination or upon boiling gives off a disagreeable smell. This may easily be removed either by laying the meat before cooking in lukewarm water containing ½ to 1 gram of salicylic acid to the litre, or by throwing some small crystals of acid into the water during the boiling.

When it is desired to preserve meat for some days, it is recommended to lay it in a solution of salicylic acid in water, ½ to 1 gram to the litre; or to rub lightly salicylic acid into the meat, especially the bones and fat parts. The preservation, as well as the cleaning for the dressing, is done in the usual way.

Although meat treated with salicylic acid loses its red colour on the exterior, it undergoes no change internally. Moreover, it becomes tender with less boiling.

2. *Milk.*—Pure cow's milk, to which dry salicylic acid (not in aqueous solution) has been added in the proportion of ½ to 1 gram to the litre, curdles at the ordinary temperature after about thirty-six hours, retaining its properties, the cream separating and yielding butter perfectly.

3. *Butter* kneaded with water containing ½ to 1 grams of salicylic acid to the litre, or packed in cloths saturated in such a solution, remains good longer than usual. Butter that has already become rancid can be improved by careful washing with aqueous solution of salicylic acid (2 to 3 grams to the litre) and afterwards rinsing with pure water.

4. *Preserved fruits* (cherries, currants, raspberries, plums, apricots, peaches) may be prepared advantageously, by placing layers of fruit and sugar alternately, without water, in a not very wide-mouthed pickle bottle, strewing over them a pinch of crystallized salicylic acid (about ½ gram to a kilo of contents), closing the jar with parchment paper that has been steeped in solution of salicylic acid, and boiling the bottles in the ordinary way in a water-bath. Bilberries are best boiled without sugar, allowed to cool, filled into a narrow-mouthed flask, some crystallized salicylic acid strewn over, corked, etc. Fruit thus preserved has been kept in excellent condition during two seasons. Another method is to lay over the

* From the 'Handelsberichte' of Gehe and Co.

surface of fruit preserved in bottles, a closely fitting piece of blotting paper that has been steeped in a strong solution of salicylic acid in rum. Preserved gherkins may be similarly treated. For those preserved in vinegar and sugar (*Essiggurken*) the salicylic acid is boiled with the vinegar, and when boiled poured over the gherkins. For salt gherkins (*sauer gurken*) the acid, ½ to 1 gram to the litre, is added during the boiling; in other respects the preparation is as usual.

5. *Preserved Vegetables* and similar articles may also have a small quantity of crystallized salicylic acid added.

6. *Fumigations.*—Dry salicylic acid, volatilized from a hot plate, purifies the air and perfectly disinfects the walls of a closed room.

7. *Vessels, Corks,* etc., to which a disagreeable smell or taste attaches, are thoroughly purified, by washing in solution of salicylic acid.

The solutions of salicylic acid for the above purpose are best prepared by rapidly boiling the acid in water, in the proportion of from 1 to 3 grams to the litre, and leaving to cool. Any excess that then separates is fit for fresh use; or if stirred up and used in suspension causes a corresponding increase in the action of the solution.

THE FLUORESCENT MATTER IN ATROPA BELLADONNA.*

BY R. FASSBENDER.

The author publishes some further information respecing the blue colouring matter discovered by Richter. It is found in all parts of *Atropa Belladonna*, and is distinguished by its great permanence and the strong fluorescence which can be recognized even when extremely diluted. The author found it in all the commercial extracts of belladonna he examined; whether commercial specimens of atropa and its salts are free from this substance he is not in a position to say.

In order to show how extremely small a quantity of this substance can be distinctly recognized, the author crushed two unripe belladonna berries in some water, evaporated the liquor in a water-bath, treated the residue with alcohol, filtered, evaporated the solution and again dissolved the residue in water. The filtered solution, which perceptibly reddened blue litmus paper, was digested with animal black, which absorbed the colouring matter; the charcoal was treated with alcohol at a gentle heat, a few drops of ammonia added, the liquor filtered, and the charcoal again washed with alcohol. The filtrate was clearly fluorescent, and when diluted with 200 c.c. of alcohol, the characteristic blue colour was still distinctly perceptible if looked at from above. The great permanence of this substance may be shown with a few drops of a less dilute solution mixed with a drop of ammonia in a watch glass; after the rapid drying up of this liquid upon a warm day the reaction is reproduced by the addition of more ammonia. Besides the colouring stuff there is obtained by the above method of preparation a yellow resinous body extremely insoluble in water and very soluble in alcohol.

THE DIGESTIVE FERMENT OF NEPENTHES

The viscid secretion of *Drosera, Nepenthes, Sarracenia*, and other carnivorous plants, by means of which a function analogous to that of digestion by the gastric juice of animals is apparently performed, has already been made the subject of investigation by Mr. Lawson Tait, of Birmingham, Riess and Will, of Erlangen, and others. Mr. S. H. Vinnes, of Christ's College, Cambridge, has recently published† an account of an exhaustive series of experiments as to the nature of the secretion of *Nepenthes*, conducted at the Royal Gardens, Kew. The species experimented on were *N. hybrida* and *gracilis*. The pitchers of these plants, Mr. Vines treated just as though they had been the gastric mucous membrane of an animal, first with absolute alcohol, and then with glycerine. Taking three test tubes, he placed in the first a little of the extract and a few drops of dilute hydrochloric acid (0·2 per cent.), in the second, a little of the extract only, and in the third, some of the diluted acid; to each he then added a small piece of swollen-up fibrin, and exposed them all to a temperature of 40° C. At the end of eight hours he found that the fibrin in the first tube showed signs of the digestive action of the fluid, and the filtrate gave a distinct peptone reaction. The fibrin in the two other tubes was unaffected, and their filtrates gave no reaction with caustic potash and copper sulphate. This experiment appears to prove that the glands of the pitchers contain a digestive ferment which is soluble in glycerine, and which can exert its digestive action only in the presence of an acid; that, in fact, the solution of proteids by insectivorous plants is effected by a true digestive process, which resembles in every particular the process of solution of proteids which takes place in the digestive cavity of an animal.

The most recent researches on the digestive process in animals, appear to show that the secreting cells of the stomach do not directly secrete the digestive ferment, but that they give rise to a neutral substance, which has been termed zymogen, consisting of a combination of the ferment with (probably) an albuminoid. It is only when this zymogen is decomposed by the action of various agents (dilute acids, moisture, warmth, etc.), that the ferment is set free in the active state, in the gastric juice as pepsin, in the pancreatic secretion as pancreatin.

In order to obtain a more active glycerine extract than the one previously employed, Mr. Vines next treated pitchers of the two above-named species of *Nepenthes* with dilute acetic acid (1 per cent.), for twenty-four hours previously to the preparation of the glycerine extract, and instituted comparative experiments between the glycerine extract so obtained and that prepared in the ordinary way from pitchers gathered at the same time from the same plants. In every case he found that the digestive power of the former was much greater than that of the latter. For instance, he placed a pellet of swollen-up fibrin in a tube containing a small quantity of the acid extract, and a similar pellet in a tube containing the same quantity of the neutral extract. To each he added two cubic centimetres of dilute hydrochloric acid (0·2 per cent.), and exposed them both to a temperature of 40° C. At the end of six hours the fibrin in the first tube had undergone complete solution, while that in the latter had been but slightly attacked. The filtrates of both tubes gave the peptone reaction. These experiments seem to indicate that in the gland-cells of the pitchers of *Nepenthes*, as in the secreting cells of the stomach and of the pancreas, the digestive ferment exists at first in combination with some other body as zymogen; and that in plants, as in animals, this zymogen can be split up by the action of dilute acids, the free ferment making its appearance as a result of this decomposition. The experiments are, in fact, precisely parallel to those made by the most recent observers on the processes of digestion in the stomach and the pancreas.

Mr. Vines' results are in complete harmony with, and tend to confirm the accuracy of, those made by Riess and Will on the secretion of the leaf-glands of *Drosera rotundifolia*, and by Van Gorup Besanez on that of the pitchers of *Nepenthes phyllamphora* and *gracilis*. The latter experimenter found that shreds of fibrin placed in the secretion (which had an acid reaction) were more or less completely dissolved within an hour when exposed to a temperature of 40° C., and that the filtered liquid gave the characteristic peptone reaction with caustic potash and dilute copper sulphate. The digestive process was very much accelerated by the addition of a few drops of dilute hydrochloric acid (0·2 per cent.). The experiments on the secretion of *Drosera* gave precisely analogous results

* *Zeitschrift des allgemeinen österreichischen Apotheker-Vereines*, vol. xi., p. 556.

† *Journal of Anatomy and Physiology*, October, 1876, and Journal of Linnean Society, Botany, vol. xv., p. 427.

The Pharmaceutical Journal.

SATURDAY, JANUARY 20, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, *17, Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE CONSTRUCTION OF A PHARMACOPŒIA.

A SHORT time since, we referred to the fact that the question of Pharmacopœia revision, and especially that part bearing upon the qualifications of the persons who should be entrusted with carrying it out, was exciting considerable interest among medical men and pharmacists in the United States. On that occasion we quoted from some remarks made by Dr. SQUIBB before the Medical Society of the State of New York, and as he has since further developed his views at a "conversational meeting" of the New York College of Pharmacy, we take the opportunity of reverting to the subject.

In order to illustrate the formation of opinion on this question in the United States, it will be well briefly to refer to the history of the successive Pharmacopœias of that country. The first was published towards the close of the year 1820, under the authority of a "National *Medical* Convention" that met at Washington. Before breaking up, this Convention passed a resolution to meet again in 1830, which resulted in the publication of a Pharmacopœia of that date. The Convention met for a third time in 1840, and appointed a committee of seven medical men—in which Dr. WOOD acted as Chairman, and Dr. BACHE as Secretary—to superintend the revision and publication of the Pharmacopœia; it also authorized the Committee to request the co-operation of the Colleges of Pharmacy of the United States. Such assistance was accordingly asked and given, especially by the Philadelphia College; still the responsibility of accepting or declining suggestions lay with the *medical* committee, and the U. S. Pharmacopœia of 1842 was published "by authority of the National *Medical* Convention." But in the usual instruction to the President to call another meeting of the Convention after ten years, he was told to invite delegates from colleges of pharmacy also, and as a consequence two pharmacists were included among the committee of nine to whom the revision of the Pharmacopœia was then entrusted; the edition of 1851, however, was still published "by authority of the National *Medical* Convention. In 1860 the committee appointed appear to have consisted of four pharmacists and five medical men, and that of 1870, of seven pharmacists and eight medical men, and the resulting Pharmacopœias of 1864 and 1873 were both published "by authority of the National Convention for Revising the Pharmacopœia.

The approach of the time for the sixth decennial revision, and the alteration of the conditions under which the work was formerly done, has given rise to a discussion of the questions in whom the copyright should be vested, and by whom the work should be done. According to Dr. SQUIBB, the remuneration for the labour spent on former editions has been made in a very indirect manner. Dr. WOOD and Dr. BACHE, the editors of the well-known 'Dispensatory,' gave their labour to the Pharmacopœia with the effect of increasing the sale and giving authority to the 'Dispensatory' based upon it, and rendering the 'Dispensatory' one of the most successful medical books, in its financial results, ever published. For many years these two books, being revised mainly by the same hands, supplemented each other. But in 1864 Dr. BACHE died, and Dr. WOOD became too infirm for work, and since then no additions have been made to the 'Dispensatory;" so that in 1872 the U. S. Pharmacopœia had for the first time to stand alone, a test that in the opinion of some it did not pass satisfactorily. What is now desired is that future Pharmacopœias should contain within themselves not only a list of official articles, but methods of recognizing whether they agree with the standard. Thus with respect to rhubarb it is asserted that it is not sufficient to define it as the root of *Rheum palmatum* and other species of rheum, but that the physician and pharmacist wish for something to tell them how to select good rhubarb, and care less for the botanical species than for sensible properties and tests. It is also proposed that only articles of established reputation should have a place in the Pharmacopœia, a course that would probably do away with the "secondary list" that has been eulogized by some persons in this country. In order to replace this probatory section, however, it is suggested that an "annual fasciculus" should be issued, not having the standard force and authority of the Pharmacopœia, and that the opportunity afforded by quinquennial revisions should be utilized for inserting in the standard work those articles that survive this preliminary test.

This leads up to the important question, Under whose control is all this to be done? The United States is, we are told, a free country; too free to allow its Government to interfere in the way of giving authority to a Pharmacopœia as in the Old World nations. But one consequence is that if a medical convention were to bring out one Pharmacopœia, there is nothing but the possibility of unsuccess to deter a pharmaceutical convention, or any other body or individual, from publishing another. Dr. SQUIBB would give the control, so far as this could be done, to the medical profession, on the ground that pharmacy is only a part of medecine, like surgery or any other speciality, and that for pharmacy to claim that it should revise and control the Pharmacopœia, and invite medicine to join, as seems to be proposed by some American pharmacists, would be an example of a stream rising higher than its head. He goes so far as to say that "every pharmacist should be a member of the medical profession by education, and should then be a member of the American Medical Association." Holding this theory, which indeed he has himself reduced to practice, Dr. SQUIBB contemplates the Medical Association this year seizing Time by the fore-lock, and sending an intimation to the medical and pharmaceutical bodies represented at the last National Convention for revising the Pharmacopœia to the effect that it has decided to take possession of the Pharmacopœia, and invites them to send their next delegates with authority to transfer their allegiance from the Convention to the Medical Association.

Dr. SQUIBB's course would so thoroughly place the control of the United States Pharmacopœia in the hands of the Medical Association that it is satisfactory to find that this is only because he wishes it to become the *fons et origo* of authority on the matter. He proposes that the work should be done by a "Pharmacopœial Council" of five members, responsible only to the Association. According to his scheme, the Medical Association would elect only the President of this Council; then invite the Surgeon-Generals of the Army and Navy to appoint two members, and the American Pharmaceutical Association to appoint the other two. An expert chemist and pharmacologist, liberally paid, would be employed permanently on the work under the direction and supervision of the President. The Council itself would meet during the revisions once in three months, at other times less often, and the members would be paid in proportion as the increasing profits from the copyright of the work would allow.

In the discussion which followed Dr. SQUIBB's speech his views received considerable support. His proposition so fully recognizes that even if pharmacy be a subordinate section of medicine it is the section peculiarly adapted for such labours as the construction of a Pharmacopœia, and it goes so far beyond what has yet obtained in this country, that we do not presume to criticize it. But unfortunately in some remarks with which Dr. SQUIBB closed the discussion he thought fit to introduce an offensive element. He said that a point that was not to be lost sight of was that more than one half of the pharmacists were merchants only, and that there was always danger when mercantile interests controlled the materia medica. He considered that the influences of trade and of profits were the only ones to be feared, and as these would be always on the side of the pharmacists they should be in the minority for safety to the Council and its work. Unless United States pharmacists differ very much from their English brethren, the prospects of an amicable discussion leading to satisfactory settlement will not be promoted by such statements as these.

THE CHEMISTS' BALL.

THE eleventh annual Chemists' Ball was held at Willis's Rooms, on Wednesday last, with a success similar to that which has attended this gathering from its first institution. The single toast of the evening, "Success to the Chemists' Ball,"—with three cheers for the ladies—was given, in a short but effective speech, by Mr. WILLIAMS, the President of the Pharmaceutical Society, and was most cordially received. The music in the programme was well selected, and it is hardly necessary to say was excellently rendered by Mr. DAN GODFREY's band.

Three hundred guests were present, and their acknowledgments are due to the Committee for the perfect arrangements that were made, and especially should they be offered to Mr. CARTEIGHE, the Chairman of the Committee, and to Mr. WALTER HILLS, the Honorary Secretary.

FATAL RESULTS FROM THE USE OF CHLORAL HYDRATE.

THE death of Dr. MERCER, of Beverley, from chloral hydrate, recently, leads the *British Medical Journal* to remark that whilst in this and similar cases the responsibility of this compound for the fatal result has been amply proved, in many of them the evidence that an over dose had been taken was defective. Our contemporary points out that scientific opinion inclines to the view that chloral hydrate, when taken continously for some time, even in moderate doses, exercises a paralysing influence over the vaso-motor nervous system and leads to a failure of the heart's action. This effect may occur suddenly, without any serious warning, and it is thought not improbable that in some cases in which it has been assumed that because death supervened an excessive quantity of the drug had been taken the assumption has been groundless. It may have been that the ordinary dose had been adhered to, but that the cumulative weakness which its oft repeated action had induced, ended in the stoppage of the vital processes.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of the above Association will be held at 17, Bloomsbury Square, W.C., on Thursday evening next, January 25th, at eight o'clock, when a paper will be read by Mr. W. R. ATKINS on "Faraday."

WE regret to learn that with the December number, which completed the twentieth volume, the publication of the *Revista de Pharmacia e Sciencias Accessorias do Porto* ceased. It was the editor of this periodical, Senor ALBANO ABILIO ANDRADE, who a few months ago wrote a spirited defence of Portuguese pharmacy in an article which was reproduced in this Journal.

Transactions of the Pharmaceutical Society.

BENEVOLENT FUND.

List of subscriptions received during the months of August, September, October, November and December, 1876.

	£	s.	d.
Baker, William, 46, High Street, Sheffield	0	10	6
Balmforth, A., 5, Pershouse Ter., Ardwick, Manchester	0	10	6
Barnett, A., The Colonnade, Buxton—1876-77	1	1	0
Bartholomew, William, High Street, Egham	0	10	0
Bateman, Thomas H., 55, Talfourd Road, Peckham	0	7	6
Bates, Henry, 38, George Street, Oldham	0	10	6
Beardsley, J., Nottingham	0	5	0
Beech, Thomas, Balsall Heath, Birmingham	0	10	6
Berry, Thomas, 189, Henshaw Street, Oldham	0	5	0
Biddle, James Wm., 54, Dale End, Birmingham	1	1	0
Birch, H. C., 7, Church St., Upper Norwood, Surrey	1	1	0
Bland, John, 57, Penton Street, London, N.	0	10	6
Blyton, John, 43, Heywood St., Cheetham, Manchester	0	5	0
Bosley, John L., 7, York Ter., York Sq., E.	0	5	0
Bowden, E. and A., 13, Charles St., St. James's, S.W.	1	1	0
Bowker, William, 259, North Road, Preston	0	5	0
Briggs, George, Oldbury	0	10	6
Briggs, James, Tipton	0	10	6
Brown, H. F., 3, Princess Rd., South Norwood	0	10	6
Burgoyne, Burbidges and Co., 16. Coleman Street, E.C.	2	2	0
Busby, H. H., 2, Grafton Street, Brighton	0	5	0
Cannon, Charles, 85, Upper Street, N.	1	1	0
Cawdell, George, 12, London Street, Norfolk Square, W.	0	10	6
Cole, Frederick, 38, Hills Road, Cambridge	0	10	6
Cook, Robert, Great Grimsby	0	10	6
Cooper, Wightman, 238, Hornsey Road, Holloway, N.	0	5	0
Cornelius, James, 73, Camden Road, N.W.	0	10	6
Corne, Andrew A., 11, High St., St. Mary's, Bedford	0	1	0
Corrie, Isabella A., 11, High St., St. Mary's, Bedford	0	5	0
Crosby, James, New Wandsworth	0	10	6
Cull, Joseph, 105, London Wall, E.C.	0	10	6
Davies, D. J., 8, Great Darkgate St., Aberystwith	0	5	0
Dickeson, R., Esq., J.P., Dover	1	1	0
Doubell, Joseph, 1, Tavistock Crescent, Westbourne Park, W.	0	5	0
Doulton and Co., Lambeth Pottery, S.E.	1	1	0
Evans, A. E., Brynmawr	0	5	0
Falkner, Richard, 12, Market Place, Banbury	1	1	0
Fardon and Son, Stone Street, Maidstone	1	1	0
Frith, John B., Coggeshall	0	10	0
Frowd, Edward F., Portishead	0	10	6
Gething, W. B., 75, Fleet Street, E.C.	1	1	0
Gill, W. H., 19, George Street, Croydon	0	10	0
Glover, John S., Oldham	0	5	0
Goodall, F., 46, Manchester Street. Oldham	0	10	6
Grant, Edward, 119, Fore St., Exeter (balance of 5s.)	0	2	6
Guyer, J. B., 11, Strand, Torquay	0	10	0
Hall, Samuel, 3, Alma Place, Eastbourne	1	1	0
Hallawell, Joseph, 10, College Lane, Liverpool	1	1	0
Hancorne, Edward, 9, East India Dock Rd., E.	1	1	0
Handley, T., 14, Market Place, Loughborough	0	5	0
Hardy, S. C., 177, Regent Street, W.	0	10	6
Hearder, H. P., 24, Westwell Street, Plymouth	0	5	0
Herrings and Co., 40, Aldersgate Street, E.C.	2	2	0
Hickman and Metcalf, Market Place, Newbury	1	1	0
Hickman, William, Archer Street, Notting Hill	0	10	6
Holdsworth, Thomas W., 31, Steelhouse Lane, Birmingham	0	10	6
Hooper, William, 7, Pall Mall East, S.W.	2	2	0
Hughes, Robert, Rhydlydan	0	5	0
Hulley, John, 97, Manchester Road, Heaton Norris	0	10	6
Hulme, John, 132, Huddersfield Road, Oldham	0	10	0
Johnstone, Walter, Cromarty	0	3	0
Kemp, J., 11, North Street, Brighton	0	10	6
King, W. S., 1, Montague Villas, New Brompton, Chatham	0	10	6
Knights, J. A., South Stockton	2	2	0
Linford, John S., 17, Charlton Villas, Church Lane, Charlton	1	1	0
Lord, R. B., Market Place, Oldham	0	5	0
Lorimer, J., North London Chemical Works, Holloway Road, N.	1	1	0
McDonald, H. S., 51, London Street, Glasgow	0	5	0
Mallen, James E., Llantrissant	0	2	6
Mather, James, 31, Cross Street. Bolton	0	10	6
Mumbray, Henry George, 215, Great Cheetham Street, Manchester	0	10	6
Mumbray, R. G., Richmond, Surrey	0	10	6
Myott, William, 4, Greenacres Old Road, Oldham	0	10	0
Nesbit, J., Portobello	0	10	6
Nicholson, J. H., 71, Eldon Street, Sheffield	0	10	6
Nobbs, W. M., 290, Euston Road, N.W.	0	10	6
Parrington, W., Batley	0	5	0
Pars, Robert C., Thrapstone	0	10	6
Pepper, J., 237, Tottenham Court Road, W.	0	10	6
Phillipps, W., 357, New Cross Road, S.E.	0	10	0
Pick, Richard, 1, Springfield Place, Leeds	1	1	0
Pickard, William, 338, Oxford Street, London, W.	0	5	0
Pinch, James E., 5, Cheap Street, Bath	0	5	0
Rees, Edward, Machynlleth	0	5	0
Rees, J. H. W., 2, Fairlight Place, Cheltenham	0	2	6
Ridding, W., 520, Oxford Street, W.	0	5	0
Rippon, R. O., Berkhampstead	1	1	0
Rowden, Lewis, 89, Princes Road, Notting Hill, W.	0	5	0
Savage, John W., 439, Coventry Road, Birmingham	0	10	6
Shaw, John, 24, Great George Place, Liverpool	1	1	0
Sheldrake, G., Keighley	0	5	0
Shepherd, James, 144, Huddersfield Road, Oldham	0	10	0
Shirley, J. G., 2, Westbourne Grove. Bayswater, W.	2	2	0
Simpkins, J., Minchinhampton	0	10	6
Simpson, Henry D., 2, New Street, Louth	0	10	6
Smith, J. G., Esq., J.P., Dover	1	1	0
Smith, R. F., 35, High Street, Barton-on-Humber	0	5	0
Starkie, R. S., 441, Strand, W.C.	1	1	0
Stephen, James, Protstonhill	0	2	6
Stephenson, J. N., Heckmondwike	0	5	0
Stevens, Felix, 51, Judd Street, W.C.	0	5	0
Sutcliffe, E. B., 21, Embden Street, Manchester	0	10	0
Swift, Francis, Spalding	0	10	6
Symes, Charles, 14, Hardman Street, Liverpool	1	1	0
Taylor, Charles. 10, Cleveland Square, Liverpool	0	10	0
Taylor, Thomas, 81, High Street, Peckham	0	10	6
Thompson and Capper, 55, Bold Street, Liverpool	1	1	0
Troake, R. J., 126, Whiteladies Road, Clifton, Bristol	0	10	6
Twiss, W., Hunstanton	0	10	6
Upjohn, F. W., 55, King Henry's Walk, N.	0	5	0
Waddington, B., Market Street, Thornton	0	5	0
Warner, C. H., 55, Fore Street, E.C.	1	1	0
Watts, Edward, 195, Queen's Road, Dalston, E.	0	5	0
Waugh, Mrs. E., Rose Cottage, Leatherhead	1	1	0
Wellington, H. A., Freshwater	0	5	0
Whitaker, Mrs. E. H., 27, Market Street, Shaw	0	5	0
Whitaker, John, 29, Higher Ardwick, Manchester	1	1	0
Wilcox, G., Prospect Row, Birmingham	0	10	0
Williams, R., 324, Coldharbour Lane, S.E.	1	0	0
Williams, Mrs., 23, Pulteney Street, Bath	0	10	0
Williamson, B., South Shields	0	10	0
Wills, George S. V., 4, Barkham Terrace, Lambeth Road, S.E.	0	10	6
Woolford, James, 61, Kirkgate, Leeds	0	5	0
Wooster, J. R., Broadway, Turnham Green	1	1	0
Wrighton, Henry, Market Place, Cannock	1	1	0
Wrigley, William, 182, Manchester Street, Oldham	0	10	6
Younger, Thomas, Brampton	0	5	0

DONATIONS.

	£	s.	d.
Slater, John, Beaumaris	0	10	6
"Thankoffering from a Lancashire Lad"	0	5	0

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The sixth general meeting was held at the Royal Institution, December 21st, 1876. Mr. Joseph Woodcock, Vice-President in the chair. The minutes of the previous meeting were read and confirmed.

Several donations to the Library were announced and to the Museum a specimen of Chrysophanic Acid, prepared by Messrs. Symes and Co.

Dr. Symes said that the sample of chrysophanic acid was prepared about a year since from araroba by the method suggested by Dr. Attfield, viz., solution in hot benzole; but he had found that re-dissolving in alcohol, as recommended by Professor Attfield, was quite unnecessary, it neither improved the appearance or purity of the product. Most of his hearers had read Mr. Balmanno Squire's remarks on chrysophanic acid ointment, and probably had been struck by the impracticability of the process suggested for its preparation. But he held that as pharmacists they were greatly indebted to that gentleman for his letters on new preparations, and he thought other members of the medical profession would do well to take a hint from him, viz., in bringing before the pharmaceutical world early notice of the remedies desired to be introduced, and thus enable the dispenser to become familiar with them, and the method of their manipulation before he found them in a prescription.

The following paper was then read on—

FATTY SUBSTANCES AND COPPER.

BY JAMES T. ARMSTRONG, F.C.S.

In the *Chemical News* for October 27, November 10 and 17 of this year, there is the result of a well conducted series of experiments "On the Action of Different Fatty Oils upon Metallic Copper," by Mr. William Thompson, F.C.S. In his experiments he took pieces of copper foil and slips of metallic copper and placed these in a given quantity of different oils and kept them in this condition about ten months and noted the results, which in the manner in which he has published them are very interesting and may, if the subject is further pursued, lead to some important facts.

With a view to do what Mr. Thompson has done, viz., to study the action of copper on a fatty material, but not working so elaborately and spending only a little time on the subject just with a view of getting preliminary results, I placed a fat that I knew certainly contained copper on April 1st of this year (therefore, as you see, knowing nothing of Mr. Thompson's experiments) in a basin which had a cover but which was not air-tight. The fat was a spent railway grease, which when I put it into the basin looked like a very dark low grease, but had not the slightest appearance of containing any copper. The sample was quite uniform in its look in every way.

I have now brought a sample to show the strong action that has taken place. And what do we find? That the fat is completely coated, and very thickly too, with a green salt of copper. The grease being chiefly palm oil I will now compare it with the results obtained by Mr. Thompson with palm oil.

Appearance of Palm Oil when examined by Mr. Thompson.	Appearance of Spent Railway Grease when examined by myself.
No change appears to have taken place in the oil.	No change appears to have taken place in the grease (excepting the surface becoming coated with copper.

Appearance of Strip of Copper. By Mr. Thompson.	Appearance of Surface of Grease. By myself.
The strip is covered with a bright green deposit of copper salt; at some parts, however, the copper appears quite bright.	It is covered with a bright green deposit of copper salt; some parts, however, the grease appears as when put in basin.

The relative amounts of copper left in the grease and the acidity I am not able to tell, not working as Mr. Thompson did with many samples.

When we therefore take into consideration that many of the oils examined by Mr. Thompson did quite the opposite to what I have described his sample of palm oil to do, it is of some service I think to know that the oil placed in a different position, viz., mixed with a grease, will give the same results, for might not this lead to copper being used as a test for the mixture of some oils one with another or with a fat? Mr. Thompson, in his experiments with tallow oil, found it absolutely free from even a trace of copper, and presuming that tallow would act in the same manner if palm oil or palm grease be mixed with it, we have here most likely a good test for its adulteration with that article.

The chairman then called upon Mr. Alfred Clay Abraham to read his paper entitled:—

Notes on some of the Processes and Preparations of the British Pharmacopœia.

I must ask your forgiveness if I bring before you this evening, under the title of notes on some of the processes and preparations of the British Pharmacopœia, a number of disconnected facts, and deal with them in a manner which may be thought cursory. I have, however, endeavoured to bring before you some facts which I have thought tended to show that an alteration might with advantage be made in some of the processes. In the first place let me say a few words regarding the general manipulation of drugs which has I think in some respects been so much improved by our American cousins.

I presume that every one who has been practically engaged in making pharmaceutical preparations, has had a difficulty sometimes in knowing to what degree of comminution drugs should be reduced before being subjected to the action of solvents. Now there are two methods by which preparations of a definite strength may be obtained.

The first and the old method is maceration, which if properly conducted removes just that proportion of the soluble matter which is practically represented by the proportion between the quantity of menstruum used, and the quantity recovered. Now this method is, if carried out with the nearest approach to theoretical accuracy obtainable, viz., reduction of the drug to fine powder and long maceration, a very perfect one, because, whatever the product may be, it must always be of the same strength, provided of course that the drugs operated upon are of the same quality. This process, however, has the disadvantage of being both very slow and very extravagant, as of necessity, if say 10 per cent. of the menstruum remains in the marc 10 per cent. of the virtues of the drug are lost.

The newer process—viz., that of percolation—which has to so great an extent replaced maceration, relies upon a better principle—viz., the complete transference of the soluble, or at least the active portions of a given quantity of a drug to a given quantity of the menstruum. This latter process has, however, been a good deal abused, owing in a great measure to the fact that it has been misunderstood, and that the Pharmacopœia has, I think, given insufficient instructions for its conduct. It has been stated that the object of percolation is, that the menstruum shall *pass through* the drug, which expression is, I think, if in a sense correct, liable to a dangerous misconstruction. Now we can conceive a liquid entering a substance, dissolving its soluble ingredients, and *diffusing* out again, to be replaced by more liquid, but I think it is not conceivable that any liquid can pass through drugs. It is of great importance, I think, to observe the difference between *passing through* and *passing round*, because upon this depends the degree of fineness required, and also the tightness with which the packing should be conducted, for if the menstruum actually passed through the drug it must become saturated so rapidly that the time occupied in its passage would be of little importance; whereas, if it only passes round the particles the time occupied ought to be in proportion to the rapidity of the diffusion between the liquid actually absorbed and that only surrounding.

Now, does the P. B. take complete, or practically complete, exhaustion as its standard? for if it does not it is evident that it has departed from a definite standard in favour of an indefinite one, which I feel sure Professor Redwood would be the last authority to sanction. Here it has, to a certain extent, retained the old method, but I fear that by not giving definite instructions as to the fineness of the powders to be acted upon it has not attained so nearly to the standard of uniformity as it might. To obviate this objection, which has been pointed out so often lately, I would suggest that in our new Pharmacopœia (when one appears) there should be introduced a standard of fineness for powders similar to, but not identical with, that adopted by the United States Pharmacopœia. It might also, I think, be well to give to the term "slowly" a definite meaning by fixing approximately the time to be occupied by the passage of a certain amount of liquid—for instance, the quantity of spirit which should pass in the preparation of a pint of tinct. belladonnæ in twelve hours. Perhaps, also, it might be well to suggest or *enjoin* the use of percolators having a tap at the bottom, so that when necessary the flow could be checked or stopped at intervals.

I may say that I have convinced myself of the nicety with which comminution and time may be adjusted without either being pushed to an inconvenient extent, by finding myself able to exhaust some of our most bitter drugs so completely that the latter portions of the percolate and the pressings were so free from matter in solution as to be indistinguishable by taste from the pure menstruum.

I should also like to have the opinion of the meeting as to whether the introduction of the sp. gr. of oils, fixed and volatile, tinctures, etc., would not be of great practical value, and perfectly appropriate in a national Pharmacopœia.

I will now, with your permission, mention verbatim a few preparations which have been a source of difficulty to me and perhaps to others.

Acid. Sulphurosum.—Many of the gentlemen present, have no doubt experienced the difficulty, and practically, the impossibility, of making and keeping this preparation up to the Pharmacopœia standard. Now, if it is desirable to have a strong solution of H_2SO_3 on account of its oxidizing proportionately more slowly, then I would suggest the addition of a sufficient quantity of spirit to enable a 10 per cent. volume to be easily made and kept.

Cera Flav.—I hesitate to mention this subject in the room where it was so fully treated by one of our ablest members on a former occasion. But I may mention that of four samples of wax prepared by myself from the comb, I found the melting points to be 144, 146, 144, and 142 respectively. The B. P. defines wax as the "prepared honeycomb of the hive bee," whereas I think it would be more correctly defined as "the substance deposited by the hive bee as a seal to the cells of the honeycomb." The honeycomb is far from being wholly or even principally wax. Looked at with the microscope it is seen to consist in a great measure of pollen grains, which are probably the chief ingredient of the bee bread, and are also thought to be the source of the flavour.

Emp. Cerati Saponis.—How is it that the ingredients of this preparation which, according to the London Pharmacopœia of 1851, formed a cerate, form a plaster in 1867 simply by losing a little more water? If any gentleman can explain this apparently strange phenomenon he would at least do me a favour.

Emp. Plumbi.—Why are glycerine and other impurities left in this preparation? Is it on account of any advantage derived from their presence, or is it from the supposed difficulty of separating them. I have myself found the plaster separate almost completely by allowing it simply to cool sufficiently slowly without it being stirred after the combination has taken place.

Ext. Cinch. Liq.—After trying several processes for the manufacture of this preparation I have fixed upon the following as the best. The powder having been passed through a sieve of about twenty meshes to the inch is packed tightly in a stoneware or metal percolator, boiling destilled water is poured on, and that which remains on the surface is kept at the boiling temperature by passing into or through it a jet of steam. The process is continued, allowing the percolate to fall into the evaporating pan until exhaustion is complete. The liquid will require filtration before evaporation has reduced it to a very low bulk, as hot water dissolves more of the cinchotannic acid and cinchona red, etc., than cold, but as I think the solubility (or perhaps I should say diffusibility) of the alkaloids is increased in an equal or increased ratio this advantage may be disregarded.*

* The difficulty being as I take it not in the want of solubility of the alkaloids in their natural state of combination, but merely in the difficulty of reaching them without removing the substances surrounding them, which are so insoluble in cold water.

Glycerinum Acidi Carbolici, Glycerinum Acidi Gallici, et Glycerinum Acidi Tannici.—The Pharmacopœia directs these to be made by first rubbing them together in a mortar, and afterwards heating them in a porcelain dish. All that I have found necessary is to place the ingredients in a jug or convenient vessel in a water-bath, and stir for a short time until dissolved. This is of course of little importance, but many might go out of their way to adhere to the letter of the Pharmacopœia.

Liq. Antim. Chlor.—I have only to say that this preparation as it is found in the market is often much below the sp. gr. given in the Pharmacopœia.

Liq. Fer. Perchlor. Fort.—Various experiments which I have made have led me to the conclusion that a modification of the process in the United States Pharmacopœia is the most convenient, and obviates the consequences (sometimes very disagreeable) of the great violence which often accompanies the peroxidation when the solution has become saturated with nitric acid and the evolution commences. I find that if the nitric acid (or a portion of it) is added to a part—say a third, of the ferrous solution, that the excess of nitric acid easily and rapidly peroxidizes the iron, and causes the nitric oxide to be evolved, and that the heat generated by the gradual addition of the remaining ferrous solution is sufficient to cause the evolution to proceed in a regular, and therefore, controlable manner. Any nitric acid withheld may now be added, although I think the Pharmacopœia might add the words "so long as effervescence is caused," the quantity of HNO_3 ordered being excessive. This method I prefer to that of the United States, because unless such a temperature is maintained as shall cause the immediate evolution of gas upon the addition of the nitric acid, a point will be reached when a sudden evolution must take place.

In conclusion I must remind you that these few notes (to which I had hoped to add several others) are merely the result of observations and experiments made during the course of laboratory work, and are only put forward as the conclusions of one where the experiences of many are necessary for the attainment of the desired perfection, and I am sure that Professor Redwood, the distinguished editor of the Pharmacopœia, would be the first to acknowledge that it is only by contributions from all quarters, and their free discussion, that our national Pharmacopœia, which already bears so favourable a comparison with similar works, can attain this object.

At the close of the paper a lengthy discussion took place, the Chairman, Dr. Symes, Messrs. Armstrong, Davies, Tanner, the Secretary, and others taking part; and with a cordial vote of thanks to Mr. Abraham, proposed by Dr. Symes, seconded by Mr. Alfred E. Tanner, the members adjourned.

OLDHAM CHEMISTS AND DRUGGISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The annual meeting of the above Association was held at the Church Institute on the 3rd inst. The President, Mr. John Taylor, occupied the chair. After the usual preliminary business the chairman called upon Mr. J. Naylor, the Honorary Secretary, to read his report for the preceding year. In complying Mr. Naylor stated that in placing before the members his report of the transactions of that Association for the past year, it gave him very great pleasure to be able to certify that the condition of the Association was most satisfactory, a fact which he ventured to say would be welcomed by all, and the progress made during the year was most encouraging, considering what it had been previously. During the year the Association had succeeded in getting a room for the entire use of its members, which had been converted into a Laboratory, Museum and Meeting Room, in which there was a very good bench with necessary apparatus for conducting experiments in chemistry and pharmacy. It was also in possession of specimens of the whole of the

British Pharmacopœia preparations, thus affording every facility to its members for the passing of the examination of the Pharmaceutical Society. The Museum comprised between five and six-hundred specimens in a good state of preservation. The Association had also been indebted to the following firms for specimens, apparatus, etc., viz., Messrs Barron, Squire and Co.; Messrs. Langton, Edden and Hicks; and Messrs. S. Maw, Son and Thompson, London; Messrs. Evans, Sons and Co., Liverpool; and Messrs. J. Woolley, Sons and Co., Manchester; also to the Pharmaceutical Society for the weekly issue of the Journal, and to Professor Attfield, of the Pharmaceutical Conference, for the 'Year-Book of Pharmacy.' It was also a gratifying fact to know that all the principal chemists of the town had in furtherance of its objects willingly allowed themselves to be enrolled as honorary members, without the aid of whom the Association could not have advanced so rapidly. During the year there had also been some very valuable lectures, essays, papers, etc., given on the following subjects, viz., 'Forms of Crystals,' and 'Certain Manufacturing Processes in which Carriers of Oxygen are concerned,' by Mr. A. N. Palmer, M.P.S., of Manchester, and formerly of Bloomsbury Square, London. These lectures were deserving of special mention, Mr. Palmer very kindly coming from Manchester to give the same; apart from that the lectures were of a very superior kind. 'Adulterations of the Materia Medica of the British Pharmacopœia,' 'Elementary Botany,' 'Inflorescence,' 'Alcohol and its Allied Bodies,' 'Materia Medica,' 'Mercury,' 'Citrates and Tartrates,' 'Acetic Acid, Acetates and Lead,' 'Magnesium and Zinc' and Bromides, Chlorides and Iodides,' by Mr. W. H. Burrows; 'Adulterations of the British Pharmacopœia,' 'Potassium, Sodium, and Ammonium,' 'Practical Dispensing,' 'Iron Salts,' 'Arsenic and Antimony,' 'An Introduction to the Acids' and 'Magnesium and Zinc,' by Mr. John Wood; 'Animal Structure,' Chemical Analysis,' and 'Life, History, and Classification of a Plant,' by Mr. H. Hurst; 'Quinine,' by Mr. G. Hunt; 'Scammony and its Preparations,' by Mr. H. Critchlow; 'Glycerine,' by Mr. T. Pennington; and 'Doses of the British Pharmacopœia,' by Mr. L. Watson. In addition to the above, examinations had been conducted periodically; there had also been a class held on Monday and Thursday evenings, on the various subjects specified in the examinations of the Pharmaceutical Society. It would be unjust to conclude the report without reminding the members that it was probable the Association would lose one of its best members in a very short time, a fact to be regretted by all, as Mr. Burrows contemplated leaving the town; however, if such was the case, the energetic manner in which that gentleman had worked in connection with the Association would no doubt make a lasting impression upon its members.

The Treasurer (Mr. W. Hurst) then read his financial statement, which showed that the expenditure during the year had been exceptionally large, owing to the furnishing, painting, etc., of the room; notwithstanding this the accounts showed that there still remained a small surplus. A hearty vote of thanks was then given to the retiring officers, after which the election of officers for the ensuing year took place, and resulted as follows—President, Mr. John Taylor; Vice-President, Mr. John Wood; Treasurer, Mr. Walter Hurst; Librarian, Mr. Robert Thatcher; Secretary, Mr. Joshua Naylor.

The President, Mr. John Taylor, then gave his inaugural address as follows:—

Gentlemen,—Allow me to return you my warmest thanks for placing confidence in me by re-electing me President for the ensuing year, assuring you that nothing shall be wanting on my part in the furtherance of the objects of this Association. It is now seven years since this Association was established, the first meeting (called by advertisement) being held at the Waverley Hotel, in January, 1870, and in response we had most of the assistants and apprentices of the town and neighbourhood present to consider the advisability of forming an Association having for its object earlier closing, and to provide for its members a better system of education and mutual improvement for the various examinations required by the Pharmaceutical Society. At this meeting officers were elected, and all present gave in their names as members, which was very satisfactory. The first subject which your Association took in hand was "earlier closing," and in that direction it had been somewhat successful, the hours of business being much shorter now than they were then, which I am sure is a great boon to us all, giving us more time for study and recreation, and making us more fitting for the next day's business. It then took into consideration the forming of classes for the study of chemistry, pharmacy, materia medica, and Latin, which were very well attended and of great assistance to the members in preparing for their respective examinations. Three years passed over very pleasantly, when from some cause the members became lukewarm, owing, perhaps, to its officers passing their examinations and commencing business, which left the Association rather awkwardly fixed. This state of things lasted for two years but the Association still had an existence, and in 1875, when the time arriving that some of the members thought of going in for their examinations, it put a little more energy into the society, and it was reorganized, and I believe since then it has advanced more rapidly than in the whole time of its existence. From the commencement we have been greatly encouraged by masters who have given us every assistance, not only by the shortening of the hours of labour, but latterly by becoming honorary members by payment of an annual subscription. It has been a great help by placing means at our disposal by which we have been enabled to rent a room for our exclusive use, which has been fitted up with every convenience for the students, as mentioned in the Secretary's report, and I feel assured it will be taken advantage of by the members. In conclusion, I trust the coming year may be a successful one to this Association.

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

The third meeting of this College for the present session was held on the 19th December, under the presidency of Mr. Dillwyn Parrish. The first paper read was by Mr. R. V. Mattison on Diluted Phosphoric Acid, in which he described a process for its manufacture that he claimed to be rapid and safe in execution without requiring any special apparatus. The paper will be printed in a future number. Professor Maisch then read the following paper on—

THE USE OF PETROLEUM BENZIN IN PHARMACY.

BY L. WOLFF.

Petroleum benzin has been frequently proposed and variously experimented with by different operators, with the view of substituting it for the much higher priced ether in preparing oleoresins, and has been repeatedly found not to answer the purpose intended for it. Although its valuable solvent powers for fatty matter, wax and essential oils cannot be disputed, it fails to extract the resins and the active ingredients, which are of the utmost importance in oleoresins. Ginger treated with benzin yields an oil containing all the odoriferous properties thereof, but none of the pungent-tasting resin for the remedial properties of which it is justly celebrated, and which subsequent to the benzin process is readily dissolved from it by ether or alcohol. Buchu under like treatment, as reported by another contributor on this subject, gives an oily substance devoid of the diuretic properties of the leaves, though possessing their specific odour. Cubebs, though completely exhausted by benzin of its fixed and essential oils, fails to yield its cubebic acid to it, black pepper its piperin, and wormseed its resin and santonin; but all of the mentioned substances, and many more which have been subjected to the same process, are readily deprived of their fixed and essential oils, leaving them inodorous, seemingly dry and incoherent powders, that are, if treated with alcohol, ether or chloroform, readily deprived of their resins, thus affording a method for obtaining them separate from wax, fixed and essential oils.

Its extraordinary solvency for essential oils destines benzin for an important place in pharmacy, and oils derived by its aid from cinnamon, cloves, and other drugs are, if their odour is any indication of their value, if not superior, certainly not inferior to the distilled oils of these articles.

The oils obtained by exhaustion with benzin and its subsequent evaporation are mixed with wax and fixed oils to some extent, which can easily be separated therefrom by dissolving in alcohol, in which the latter are insoluble, filtration of this solution, and either expulsion of the alcohol by evaporation at the moderate heat of a water-bath, or much safer and better, by mixing the filtered alcoholic solution with several times its bulk of water, when the essential oil will arise to the surface or subside beneath it, as its specific gravity may be.

The oils by this cold process have a beautiful aroma, superior to many of the distilled ones, and the easy manner of obtaining them may, without doubt, prove a valuable method for the pharmacist who cannot always procure in the market the oils he wants, and has no facilities for distilling them, besides giving him fair means to arrive at a quantitative estimate of the essential oil contained in an article under analysis.

The essential oil of parsley seed cannot thus be separately prepared by the aid of benzin, as it contains another peculiar oily substance, well known by the name of "apiol," which is soluble both in it and in alcohol.

A great deal of the apiol in the market, both in bulk and in capsules, is nothing more than an oleoresin of parsley seed, which can lay no claim whatever to its name, being of green colour, insoluble to a large extent in alcohol, and congealing at ordinary winter temperature, all of which properties "true apiol" does not possess. Apiol has come into extensive use of late years, secured high praise as an emmenagogue, and is also claimed by its discoverers to be an antiperiodic but little, if any, inferior to quinia; but its high price, consequent to the expensive process as proposed by Messrs. Joret and Homolle perhaps, more than anything else, prevents its general introduction.

Powdered parsley seed, exhausted with benzin, and the liquid spontaneously evaporated, yields a mixture containing principally fixed oil, wax and apiol; the latter alone being soluble in alcohol can readily be recovered therefrom by repeated washings in stronger alcohol. The washings evaporated over the water-bath with a gentle heat, leave as residue "true apiol," corresponding in every respect with the article sold under the name of "Joret and Homolle's," having the advantage of its low price making it accessible to persons of limited means, as well as to the more favoured by fortune, especially if it is not dispensed in capsules, for which there is no occasion, since it may be given dissolved in essence of peppermint, or in emulsion, disguised by the oil of the same name. Samples of "apiol" prepared in this manner, have been tried by several prominent physicians, in their practice, and were pronounced to be equally as efficient as the imported French article.

Quite frequently the fixed oils much encumber the result of the pharmaceutical operations, as is prominently the case in preparing the "alcoholic extract of nux vomica," which has often been noticed and given attention to by many writers. Nux vomica, if exhausted with benzin, yields a large percentage of a clear fixed oil, congealing at ordinary winter temperature, and the powder, if subsequently treated in the usual manner with stronger alcohol, gives an extract which offers no trouble by proper evaporation in reducing it to the dry state. The oil derived from the benzin exhaust, to make sure of not losing any strychnia or brucia that may be contained therein, should be repeatedly shaken with dilute alcohol until the washings fail to betray to the palate the specific bitter taste of their alkaloids; then the washings must be mixed with the extract in course of evaporation, and the whole reduced to proper consistency. By the ordinary way, the separation of the oil from the extract is at best a tedious matter, causing the loss of extract, and is never completely performed, thus preventing evaporation to dryness, which by the benzin process is readily effected.

Another article, which the pharmacist has frequently to purchase at an exorbitant price, is "purified oleic acid," which has been much used of late in making the oleates now in use, and can be easily and at small expense prepared with benzin as solvent, in the following way:—

Oil of sweet almonds, saponified with caustic potash and the soap decomposed with tartaric acid, is washed with hot water to separate the precipitated bitartrate of potassium from the mixture of oleic and palmitic acids. These are combined with litharge forming the oleomargarate of lead, from which the benzin dissolves the oleate of lead, leaving as residue the undissolved palmitate thereof. From the benzin solution the lead is precipitated by dilute hydrochloric acid in form of chloride of lead, and on evaporation of the benzin "oleic acid" will remain sufficiently pure for pharmaceutical purposes, giving clear and permanent solutions with the red and yellow mercurial oxides, as high as 30 per cent. if necessary.

As crude commercial oleic acid can be bought at very low figures it may be purified by combining it with litharge, deriving from it the oleate of lead, from which again, by the aid of benzin, the purified oleate can be separated, and as before stated, purified oleic acid prepared at but a small expense.

To gain the same end the simplest way, perhaps, is to utilize the ready-made oleo-palmitate of lead, the officinal lead plaster, dissolve it in benzin and extract from it the oleic acid by precipitating the lead by aid of hydrochloric acid.

Oleic acid thus prepared has been used for some time, and found to answer better for the preparation of the oleates than the article sold by some of the manufacturing chemists.

The above results by no means limit the utility of petroleum benzin as a solvent and important pharmaceutical factor, but they will show that this refuse article, of comparative little commercial value, which has been applied to but little more than the removal of oil, grease or paint stains, may be turned to good account by its very deficiency to act like ether or similar substances as a general solvent for both fats and resins.

Professor Maisch regarded this as a very interesting subject, and one which was by no means exhausted. Some time since he had presented to the meeting styracin made of the use of petroleum benzin, and other observers had borne testimony to its manifold uses. Mr. William L. Harrison found in it an easy and cheap way of obtaining cinnamic acid, besides styracin, and Mr. Wallace Procter had separated with it a white crystalline substance from *Magnolia tripetela*. It was an excellent solvent for monobromated camphor and other crystalline bodies, and afforded a ready means of obtaining them in good crystallizations.

Professor Remington said that an odour of kerosene might remain in such preparations from the employment of a petroleum benzin which had not been carefully rectified

Dr. Pile said in preparing some oleoresins he had used the kind known as gasolin, and did not find any odour remaining.

Professor Maisch exhibited quinine flower, so called, and said that from experiments made by Mr. T. Beckert it was possible that it might contain an alkaloid; if so, it would be the first found in the Gentianaceæ. Mr. Beckert observed that the tincture evaporated, thrown into water, slightly acidulated and filtered, would yield a slight precipitate with Mayer's solution.

Dr. J. Dabney Palmer, of Monticello, Florida, had sent the quinine flower and its tincture; also tincture and fluid extract of buttonwood (*Cephalanthus occidentalis*) and tincture of *Sarracenia flava*, or trumpet plant, which appeared to be employed medicinally in that section of country.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

At the meeting of this Association on the 11th inst., the following paper was read:—

The Hieroglyphics or Signs Used to Decorate the Show Bottles of the Pharmacist.

BY J. H. HUGILL.

The abbreviation of words, by signs or hieroglyphics, in order to prevent their frequent repetition (a good example, for instance being °/ₒ for "per cent.") is supposed to have been introduced by the Arabians, and it is very probable that the alchemical signs used by the ancient alchemists were originally derived from the same source. In some ancient works they are very numerous and complicated, more especially those that occur in the writings of Bergmann. In a great many cases each writer used signs of his own, *i.e.* devised signs and terms for his own private use, or at least they were very far from being universal; and on account of their complexity they must have been very perplexing, for the great endeavour in those times seems to have been to render everything as hidden and difficult as possible to inquirers into chemical research, rather than to help in any way and make matters as simple as possible. This is more easily understood, when we consider that alchemy, translated, means "the hidden art," alchemists being those who practised this art; and not to have kept their knowledge a mystery would have been to make everybody equally rich; hence their great amount of secresy.

As before stated many of these signs were so complicated as to render them comparatively useless, but many of the commoner ones were universal, and frequently used to decorate the pharmacists' show bottles of the present day indiscriminately, and without any reference to their meaning. Amongst the most common of these ancient signs are the following:—

A circle with a dot in the centre ☉, intended to represent the sun. In chemistry it stood for gold, this being the brightest of metals, as the sun is the brightest of the heavenly bodies; but in some works it also represented Sunday—Die Solis—*i. e.*, literally, the day of the sun, hence the derivation of the word. It was, doubtless the anxiety and great aim of all alchemists to discover this metal, from any and every source, which led to the discovery of most of the others; as in searching for gold or traces of it (even when traces of its presence failed), other elements were discovered, up to that time unknown, and the knowledge of alchemy advanced step by step.

Silver was represented by a crescent or moon-shaped figure, ☽. The ancients, probably saw some analogy between the pale light of the moon and the well-known bluish-white lustre of silver; and even at the present day we hear of people speaking of the "silvery light," meaning moonlight; hence the representation of silver by this sign in former days, was far from incorrect. Lunar caustic is another term bearing on the point. The sign also stood for Monday—Die Lunæ. Thus the sun and moon, two of our greatest heavenly bodies, were taken by the old alchemists to represent what were then the rarest and most valuable metals, gold and silver.

Iron from its usefulness in making implements of warfare, was dedicated to Mars, the god of war, and the sign which is supposed to represent the spear and shield of Mars, ♂, was universally adopted. It also did duty for Tuesday—Die Martis.

Mercury, named after the god Mercury, or the "morning star," was represented by the annexed figure ☿, which is a rough representation of the "caduceus," or wand with two snakes twining round it, which that god is always represented as holding. It also stood for Wednesday—Die Mercurii.

Copper was dedicated to the goddess Venus, and is represented by the figure ♀, being intended for the looking-glass of that goddess, on account, no doubt, of its smooth and bright appearance when burnished and polished. Friday, or Die Veneris, has also the same symbol.

The figure that represented lead, ♄, was supposed to be an imitation of the scythe of Time, or Saturn, being dedicated to that planet. The name "Saccharum Saturnii" being even now frequently used to indicate sugar of lead. Also the derivation of Saturday—Die Saturnii.

So we see that all these seven metals were well-known to the ancients, by whom they were considered to be compounds of mercury and sulphur in different proportions. The signs for some of the less known metals are also met with.

The metals arsenic and antimony were represented by characters, the origin of which seems to be unknown; arsenic by two circles connected with a bar, antimony by a diamond-shaped figure, probably on account of the crystalline appearance of that metal.

Cobalt was hardly known at all to the ancients, although the fact of its having a sign shows that something was known of it. Probably, judging from the similarity of this and the sign for arsenic, it was considered to be a modification of that metal, the hieroglyphics being very similar but inverted.

In the earlier days, zinc was unknown to the ancients; although brass was manufactured so far back as the Old Testament, and was the chief metal used in making the spears, shields, and armour in the Trojan war, yet zinc was not known as a separate metal. The brass was made by smelting together a mixture of copper and calamine (a mineral containing zinc). The symbol that formerly belonged to brass, has now fallen to the lot of zinc, and is something similar to that of copper, but only half of the circle remains, showing that brass contained half copper; the rest of the sign represented calamine.

The foregoing symbols were, as before mentioned, the most universal of the alchemical signs, but independently of these the old writers adopted a series of their own. In some of these we find the initial letter of the element used to denote the name, in connection with a sign or figure, which served to denote the nature of the substance. Thus, some used a circle ○ to denote a metal, and placed the initial letter inside. I may here mention that gold only required a dot inside the circle ☉, and was then identical with the pre-mentioned figure of the sun.

Again, acids were represented by a square figure □, with the initial letter enclosed.

The alkalies were represented by a triangle, standing upon its base △, and by placing the initial inside, the name of the alkali was indicated. The same figure reversed, gave the alkaline earths, thus ▽

An alloy of two metals was represented by joining the two circles each containing the initial letter of a metal, thus forming a combination of their two respective signs. Compounds were represented by joining the two separate symbols of the component parts, as to ▽□ indicate an acid and a base.

When a liquid state was to be denoted, as mercury in its normal state, an up-stroke was attached to the left-hand side of the figure ׀◯ ; thus ׀⊙ for gold in a state of fusion, etc., but a down stroke upon the same side ׀◯ denoted a state of vapour, as mercury volatilized by heat. Spirituous substances were signified, when a diamond-shaped figure was used ◇, as for ether. The non-metallic elements were expressed by strokes, thus Oxygen —, Nitrogen /, Hydrogen ↄ, Carbon C, so it will be easy to understand that the acidulous radicals of the non-metallic elements were formed by combinations of the above, thus ∠ the symbols of nitrogen and oxygen united denoted nitrates, hence nitrate of a metal would be written ◯∠.

In a later date we find that sulphides, phosphides and carbides were known; these of course required no horizontal stroke, because they contain no oxygen and were written thus—⊙) sulphide of gold, the circle and dot to represent gold, the semicircular stroke, sulphur; ◯⌒ phosphide, ◯Ⅼ carbide. The symbols or signs for the oxides of the metals were written by attaching the symbol for oxygen — to the top of the circle thus ◯‾.

So it will be seen that if the foregoing signs were once committed to memory, it would be very easy to write the symbol for any inorganic substance, although the quantities and proportions of the elementary ingredients would remain unexpressed, and for that reason these signs would be quite useless at the present day, when no organic compound can be expressed without the proportions of the ingredients are clearly shown; but at that time few, if any, organic chemicals were known (that is the composition of them) so of course that system of shorthand hieroglyphics answered every purpose.

Again to return to an earlier date I may also mention that certain signs were used to express the different chemical processes, as for instance ≏ to sublime, ▽ to precipitate, ◯⌒ to distill, ≋ to fuse, —+— to ignite. The latter sign had reference to the crucibles which were always impressed with a cross, thus ✠; the name crucible is derived from the word crux, meaning a cross. The testing of metals in a crucible was said to be the crucial test, for, as it is known, none but the nobler metals, gold, silver and platinum, will stand intense heat without oxidizing, so the origin of the cross on some crucibles and of the name crucible is apparent. There can be no doubt that the employment of symbols and signs as an abbreviated way of denoting the composition of bodies was suggested by the difficulty experienced in many cases of finding names to express the constitution of chemical compounds, especially minerals. One of the first men who sought to unravel chemistry from the mysteries and mazes of alchemy was Libavius, and he more or less succeeded. He discovered the perchloride of tin, even now known as the "fuming liquor of Libavius." Later on we find the theory of phlogiston causing a powerful interest in chemistry; indeed it was on the ruins of this theory that Lavoisier, Priestley and Scheele raised modern chemistry.

As regards the symbols in use at the present day I think that we may safely consider Berzelius to have been the founder; he seems to have been the first to change from the ancient signs and figures of alchemy. The result is that chemical formulæ are now so identified with chemistry that the chemical student must have a thorough knowledge of the different symbolic expressions.

The symbols of Berzelius still hold good, although his system has been greatly modified. He was the first to to connect the formulæ for compounds by algebraical signs. Although the utility of these algebraic formulæ cannot be denied, they have been found very lengthy when the object is merely to express the composition of bodies, and one of the chief abbreviations of Berzelius was to indicate degrees of oxidation by dots over the symbols; he also often dispensed with the plus sign, by writing combined elements side by side, the sign being understood instead of expressed thus H_2O, Fe S, instead of H_2+O, Fe+S. He also expressed the vegetable and animal acids by the first letter of their name with a dash over it; thus $\overline{T}$, $\overline{A}$, $\overline{C}$, stand for tartaric, acetic, and citric acids. Liebig and Poggendorff in modern days have made various modifications of these symbols, and brought them more or less to their present state of perfection.

I have no doubt that many of these signs will be recognized as old familiar friends that have often been gazed at, on some one carboy or another, with wonder perhaps as to what their meanings were, or whether they had any meaning at all. I, for one, am sorry to see the old custom of decorating the carboys with these ancient signs so fast going out of date; for these carboys of coloured water seem to be an institution that no chemist can dispense with, or rather I should say, dispense without, and I think if we must have them, we should have them as they were, in all their pristine beauty and mysterious significance. In old works may be found signs far different to those I have explained, but these were not so generally used by alchemists.

Review.

MEDICINAL PLANTS, being Descriptions with Original Figures of the Principal Plants employed in Medicine, and an Account of their Properties and Uses. By ROBERT BENTLEY F.L.S., and HENRY TRIMEN, M.D., F.L.S. London: J. and A. CHURCHILL.

The general scope and character of this work have already been pointed out in the columns of this Journal, and we need therefore only allude to the progress that has been made in it during the past year. Sixteen parts have now been issued, containing altogether 117 plates. These include several drawings of plants not previously figured. Of these we may notice *Stillingia sylvatica, Dorema Aucheri, Toluifera Pereiræ* and *Ferula galbaniflua.* Some of the plates also are much superior to those which have appeared in other works.

The botanical nomenclature has been brought up to the latest date, many of the names adopted having been those advocated in the 'Pharmacographia.' A few, however, such as *Toluifera Pereiræ* for the balsam of Peru plant, *Artemisia pauciflora* for the santonica plant, *Schœnocaulon officinale* for the plant yielding cevadilla seed, will probably be new to most of our readers. The additional weight of authority given by the work under consideration may be expected to lead to their adoption in the next issue of the 'British Pharmacopœia.'

The botanical descriptions are very full and accurate, and the language employed is as free as possible from superfluity of technical terms, affording a striking contrast to the short, insufficient, semi-Latin descriptions so much in vogue at the present day.

Aided by the magnified details of the structure of the flowers, etc., on each plate, the reader, even if possessing only a slight knowledge of botanical terms, will be able, without any difficulty, to master the structure of such abnormal flowers as those of the aconite, hellebore, valerian, larkspur, violet, and castor oil plant, and to understand the details of very small flowers, such as those of the juniper, alder buckthorn, bistort or wormwood.

The colouring in the last few numbers has shown a decided improvement, that of *Rheum officinale* and some others being very true to nature. As a whole, however, it has scarcely come up to that standard of excellence which characterizes the work as a whole, and it will we trust receive more attention from the publishers than hitherto.

Considerable pains have evidently been taken to make the portions relating to materia medica as complete as possible, and the very latest sources of information have evidently been consulted. This is especially noticeable in the articles on aconite, santonica, coca, eucalyptus, galbanum and rhubarb, so that the work may be looked upon not only as an excellent descriptive work on medicinal plants but also as the most recent treatise on materia medica. This portion has also an additional value from the fact that the various roots, fruits, etc., used in medicine are in many instances represented of the natural colour on the plates, and in some instances transverse sections are given also so as to exhibit the internal structure. This is an improvement which we hope to see followed up. Possibly in a few cases a little more might have been said. Thus no mention is made under oil of thyme of its extensive adulteration, which may be deduced from the singular fact that it is usually sold at half the price it costs the wholesale dealer. The statement that yarrow owes its name of "nose-bleed" to its former high reputation as a vulnerary, scarcely coincides with the statement of Gerarde (on the page quoted by the authors in their bibliographical list) that "the leaues being put into the nose do cause it to bleed and ease the paine of the megrim." But these are minor matters. We trust that the work, which must entail great expenditure of time and trouble, will continue to give as much satisfaction as it has hitherto done. We are glad to notice that the plates have already been turned to an useful purpose in the economical museum at Kew, where they may be seen in glass frames illustrating the various products obtained from them. This example is worthy of adoption by science schools and museums, and nowhere could this example be more appropriately followed than in the museum of the Pharmaceutical Society. It is to be regretted that the plates cannot be obtained separately, only sufficient having been prepared to accompany the text.

BOOKS, PAMPHLETS, ETC., RECEIVED.

VIVISECTION. Being Short Comments on Certain Parts of the Evidence given before the Royal Commission. By GEORGE MACILWAIN, F.R.C.S. London: Hatchard. 1877. From the Author.

Obituary.

ALFRED SMEE, F.R.S.

We regret to record the death, on the 11th inst., of Mr. Alfred Smee, whose researches on electricity have lastingly associated his name with that science. Mr. Smee was elected a Fellow of the Royal Society in 1841, when only 23 years of age. For many years he held the appointment of consulting surgeon to the Bank of England. He was the author of several works on electricity, metallurgy, etc., and also of one entitled "My Garden," which was reviewed in these columns and was the outcome of a very favourite hobby. Mr. Smee died at the age of 58 years.

Notice has been received of the deaths of the following:—

On the 28th of November, 1876, Mr. Alfred Kent, Pharmaceutical Chemist, Iffley, Oxon. Age 67 years. Mr. Kent had been a Member of the Pharmaceutical Society since 1853.

On the 28th of December, 1876, Mr. Eldred Edward Tomlinson, Chemist and Druggist, Whitehaven. Age 20 years.

On the 7th of January, 1877, Mr. William Henry Wardle, Pharmaceutical Chemist, Stalybridge. Aged 58 years. Mr. Wardle had been a member of the Pharmaceutical Society since 1858.

On the 13th of January, 1877, Mr. Joseph Taplin, Pharmaceutical Chemist, Bristol. Aged 61 years. Mr. Taplin had been a Member of the Pharmaceutical Society since 1852.

We also learn from a paragraph in the *Western News* of the death of Mr. Thomas Clarke, of Bodmin, in his 90th year. Mr. Clarke for many years carried on the business of a Chemist and Druggist, and was one of the promoters of the Bodmin and Wavebridge Railway, which is said to have been the second railway opened in the United Kingdom.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

MILK OF SULPHUR.

Sir,—Although probably he does not mean it, Mr. H. Brown, L.R.C.P., etc., has surely "touched widely enough this subject" of milk of sulphur. From the context it may be gathered that he means "comprehensively" or "conclusively" when he uses the word "widely."

Although he seems to think that now he, the "Daniel come to judgment," has spoken, all must hereafter hold their peace, will you allow me to say that his arguments and quotations appear to me either "misty" or decidedly against his own view of the matter.

He quotes the old official London and Edinburgh formulæ for making the very medicine which the Runcorn authorities pronounce "a poisonous drug" and a preparation which "destroys more human lives than half a dozen plagues." Can he be serious in thinking that anyone at any time ever succeeded or even attempted to wash out the calcium sulphate with "parcels of water?" Has he ever tried to do it, or has he ever seen this pure "lac sulphur of bygone days?" Has he ever made or ever seen lac sulphur prepared according to the quoted Edinburgh formula free from calcium sulphate?

When we remember that, according to his own figures, it would take nearly a hogshead of water to clean a pound of the lac sulphur, we may indeed well admire "the diligence" of such "washings." What ground has he for asserting then that "no one will affirm that the lac sulphuris prepared in the Edinburgh form could by any possibility contain calcium sulphate?"

He does not say where "we are told if common sulphur," etc.; probably it was in the "Old Dispensatory" he before mentions; but I am at a loss to see how this quotation proves the absence of calcium sulphate in "lac sulphuris made in 1720."

I would call Mr. Brown's attention to Professor Redwood's evidence, page 585, as to the alteration between the 1721 and 1746 Pharmacopœias. Surely there was a reason for leaving out the alternative muriatic acid process and retaining only the formula which produced a mixture of the calcium sulphate? Might not some members of the "scientific committee" of 1746 have had similar experience to Mr. Pemberton, page 584?

With regard to the precipitated sulphur, Dr. Todd Thompson says, in 1833, "It differs in no respect from sublimed sulphur, and is an unnecessary refinement," etc. Probably his opinion caused it to be entirely omitted from the 1836 Pharmacopœia. But such a statement cannot be made with regard to milk of sulphur. It does essentially differ both from sublimed and precipitated sulphur. This the public have learnt from experience, and there has been a continued demand for the compound article, notwithstanding its complete omission from the 1836 Pharmacopœia.

Perhaps this demand was the reason for placing sulphur præcipitatum in the 1851 Pharmacopœia. But I would ask the question seriously, Did not the compilers of the 1851 edition make the same mistake as is being continually made now, in jumping to the conclusion without any experience that the calcium sulphate was not a beneficial mixture with the sulphur?

Mr. Brown also, without reference to any experience or researches of his own or any one else which warrant his speaking in such an *ex cathedrâ* manner, says, "I can see no advantage in continuing to make an article according to an old form," etc., but, with the greatest respect, I would ask why must the public receive his *ipse dixit*, or even the mere assertion of better known medical men, if they are not fortified by facts.

Perhaps it is through forgetfulness or lack of information on my part, but what Mr. Brown says about "selenited sulphur" and "selenited (*sic*) lac sulphuris" is a perfect mystery to me. My impression, however, is, that he has, as he says, "touched widely enough on this subject" too, and left it in a "misty cloud."

I can only now refer to the abridged edition of Pereira, but I find nothing there about these mysterious bodies, nor have I been able to find anything in either of the British Pharmacopœias about the composition of lac sulphuris, although Mr. Brown alludes to it.

In the absence of any facts proving that the mixture is injurious, and considering the great and continuous demand for the genuine old milk of sulphur, I think I have far greater warrant than Mr. Brown has for his concluding sentence, in saying that while, no doubt, B. P. formula should always be used for sulphur præcipitatum, calcium sulphate should always be an ingredient in milk of sulphur.

Surely chemists in business may reasonably protest against this continued interference of half instructed "analysts" in matters that they do not understand, and we may well express our surprise that the Runcorn magistrates preferred the opinions of Dr. Bell to those of such a veteran as Professor Redwood, sustained as he was by Mr. Pemberton.

Barnstaple, Jan. 13, 1877. W. SYMONS, F.C.S.

Sir,—All your correspondents seem to have overlooked the fact, that the last London Pharmacopœia of 1851 (by which chemists for seventeen years should have been guided) describes "Milk of Sulphur," thus—

"Sulphur Præcipitatum Milk of Sulphur." { Sulphur precipitated from sulphuret of calcium by hydrochloric acid.

Lee Bridge, Lewisham. EDWIN L. CROW.

[*** In the London Pharmacopœia, 1851, sulphur præcipitatum is included among the articles described under the head of materia medica. The description given of it (translated) is, "Sulphur precipitated from sulphuret of calcium by hydrochloric acid."

In Phillips's translation, which was edited by Denham Smith, the formula from the Pharmacopœia of 1824 is given, and there reference is made to lac sulphuris, of 1721, and sulphur præcipitatum of 1746—1788, and 1809, the several pharmacopœias in which it was ordered.

In the London Pharmacopœia of 1836, sulphur præcipitatum was omitted altogether.—ED. PH. J.]

AMENDMENTS TO THE PHARMACY ACT, 1868.

"Dig the well before you are thirsty."—CHINESE PROVERB.

Sir,—The members of the Society have doubtless read with much interest the debate at the last Council meeting upon Mr. Hampson's motion (to appoint a sub-committee to consider any desirable amendments to the Pharmacy Act, 1868), and I, for one, must express my thanks to that gentleman for refusing to acceed to Mr. Hills' request that the matter should be discussed in committee—*i.e.*, out of sight and hearing of the members of the Society and the trade which that Council is elected to represent.

Your readers must indeed have a very small appreciation of the humorous if they have not enjoyed a hearty laugh at the proceedings thus placed before them—for it is no ordinary spectacle to see two gentlemen (who during the debate have done their utmost to throw out the original motion) suddenly propose an amendment almost twin-brother to the motion against which they have been fighting; for if I am correctly informed that the Law and Parliamentary Committee consists of all the members of the Council, it can surely matter very little whether a sub-committee be chosen by the members sitting in Council or in Committee.

"Strange that such difference should be,
'Twixt Tweedledum and Tweedledee."

Your readers have doubtless turned with interest to the remarks of Mr. Sandford, the father of the Pharmacy Act, 1868, and they can scarcely be surprised that he considers that it would be difficult to improve it; but when he says that "he considers the appointment of such a committee as the proposed utterly needless," I must (notwithstanding the respect that all must feel for so eminent a pharmaceutist) beg leave to point out that those who live neither in the Paradise of Piccadilly nor the Eden of Oxford Street feel that the Act has imposed upon them examinations and restrictions, costing each one a considerable amount of money and labour, and in return has made assistants scarce and driven many of their best workers from the trade, and has failed to protect them from the competition of the unlicensed company or the unregistered dealer in drugs.

While we outside peris are not so unreasonable as to suppose that the Council could remove all our difficulties in a breath, it would not appear unwise to examine the Act with a view to amending (when possible) our position with regard to—

The unscrupulous shifts of unregistered drug vendors.

The competition of unlicensed companies.

Evasions of the poison regulations under cover of medicine stamps.

The application of fines and penalties to Her Majesty's Treasury instead of the treasury of the Pharmaceutical Society, etc., etc., etc.

It may be that no opportunity will arise for improving our position this session, but when a sub-committee has found out and considered carefully what the trade wants, we shall then be in a better position to ask for it when the opportunity presents itself.

Birmingham. WALTER J. CHURCHILL.

CHEMISTS AND DRUGGISTS AND THE MEDICAL ACTS.

Sir,—I am sorry that I have not been able to convince Mr. Yewdall that an apothecary is by the Act, 1815, and other more recent Acts, assumed to be a legally qualified practitioner of medicine. I cannot admit that the term "medicine" is synonymous with "pharmacy" any more than I can admit that a person who practises surgery is simply a surgical instrument maker. Besides, my friend contradicts himself, for he says "the only person qualified to treat sick people was the physician who was lawfully licensed to carry on the practice of physic." Now, if "medicine" mean "pharmacy" and "physic" mean "medicine," then the physician was, according to Mr. Yewdall's own showing, only allowed to practise "pharmacy," and therefore was no more qualified than the apothecary. The latter was required to pass an examination as to his knowledge and skill in the science and practice of medicine, and although there is no definition of the profession of an apothecary, except that given in 5th section, so far as the Act, 1815, is concerned, a general practitioner and apothecary are spoken of in the Medical Act as being one and the same; and in the Sale of Poisons Act, sect. 17, an exception is made in the case of any medicine supplied by a legally qualified apothecary to his patient.

One difference between a physician and an apothecary is this: the former is, by a bye-law of the college, forbidden to dispense medicines except for his own patients; the latter is not only allowed to practise medicine on his own account but is also bound by law to dispense the prescriptions of a legally qualified physician.

I would refer Mr. Yewdall rather to the wording of Baron Bramwell's decision than to the decision itself.

Finally, I wish it to be understood that I am giving no opinion on the advisability or otherwise of chemists prescribing, but simply regarding the subject in a legal point of view.

Batley Carr, Dewsbury. J. FRYER.

Sir,—As several of your correspondents seem at a loss to understand the true status of the apothecary, may I ask if you will indulge me, by inserting in your next week's issue of the Journal the subjoined portion of abstract of principal laws relative to medical men?

"The practice of an apothecary may now be said to consist in attending and advising patients afflicted with diseases requiring medical (as distinguished from surgical) treatment, and prescribing, compounding, and supplying medicines for their cure or relief. The class of cases which it is the province of the apothecary to treat includes most of the diseases by which the human frame is affected; for instance, diseases of the brain, the lungs, the heart, the stomach, the liver, and the bowels, when the disorder is unattended by any external wound, sore, or tumour, and when medical treatment, unaided by any manual operation, is called for. A penalty of £20 may be inflicted, for every such offence, upon any person acting or practising as an apothecary in England or Wales, without the licence of the Society, and a penalty of £5, for every such offence upon any person acting as assistant to an apothecary to compound and dispense medicines, without having obtained the certificate of the Society. The Society can, therefore, afford no protection against practice by bone-setters, and that class of persons, but it can supply an efficient safeguard against irregular practice by chemists and druggists, for it has been held that a chemist who not only sells but also applies and administers medicines, in the ordinary course of attending patients, practises as an apothecary, and is not exempt from the penalty."

After a careful perusal of the above, I think we may fairly conclude that the licence granted by the Society of Apothecaries of London is truly medical, and one that three-fourths of our British medical practitioners have selected, being quite equal to the medical licence granted by the Edinburgh College of Physicians. Also the wording of the licence of Apothecaries' Hall of London is that its recipient has been carefully and deliberately examined as to his skill and abilities in the science and practice of medicine; and further, that he is duly qualified to act as an apothecary.

ROBT. E. THREADGALE, L.S.A. LOND.

Upper Norwood.

Sir,—In reference to the Act of 1815, I must confess that before I read it carefully through, I thought that at that time the chemist and the apothecary was one and the same person, but after reading it I saw that I was in error.

If the chemist had been one with the apothecary, why should the chemist have been exempt from registrations under the Act and his trade or business so clearly defined? For in clause xxviii. it reads:—

"Provided always that nothing in this Act contained shall in any way affect the trade or business of a chemist and druggist in the buying, preparing, compounding, dispensing and vending drugs, medicines and medicinable compounds, wholesale and retail," etc.

There is not any reference to his right to practise medicine.

We need not go so far back as 1815 to know that the practice of medicine by a chemist and druggist is contrary to law. Let us see what the Pharmacy Act of 1868 says on the subject.

It opens thus,—"Whereas it is expedient for the safety of the public, that persons keeping open shop for the retailing, dispensing and compounding of poisons and persons know as chemists and druggists, should possess a competent practical knowledge of their business," etc.

This clause shows what a chemist and druggist may do, and clause xvi. states what he may not do. The latter portions of it run thus:—

"Provided always that registration under this Act shall not entitle any person so registered to practise medicine or surgery, or any branch of medicine or surgery."

Having found out how we stand from a legal point of view, the question arises, What are we to do? Well, I see only one way open to us, that is to petition Parliament to exempt us from all fines and liabilities whatever, by reason of our advising and prescribing over the counter, for any ailment that may come under our notice, providing that we be not allowed to visit any person at his own home, nor to sue in a court of law for advice or visits. Surely this would satisfy the medical profession.

W. B.

Horncastle.

THE HYGIENIC INFLUENCES OF THE PINE AND EUCALYPTUS.

Sir,—Dr. Bond's second letter calls for but little reply from me. It is chiefly concerned with personalities which I cannot discuss and with statements which, if they prove anything, establish the fact that their author is unacquainted with modern chemical research. I requested Dr. Bond to kindly point out to me where I could find his published researches, and he refers me to an advertisement column!

One more word in regard to terebene. The substance ordinarily known by this name was not discovered by Dr. Bond, while in relation to its uses as a disinfectant or antiseptic, I adhere firmly to my already stated opinions. Dr. Bond should be precise in his discussions; Sanitas, which is my discovery, is not a solution of camphoric acid, as he states, but a mixed solution of peroxide of hydrogen, camphoric acid, camphor, etc. I hope shortly to provide Dr. Bond with a better opportunity of defending the virtues he claims for terebene, meanwhile I must decline to continue this correspondence.

CHARLES T. KINGZETT.

LARGE DOSE OF VIN. ANTIM. TART.

Sir,—When I have seen cases published of poisoning by tartar emetic, I have often thought of a case which left a serious impression on my mind, although it happened many years ago, as it bears the caution, that the materia of the pharmacist are like edge tools, and to use them for practical joking is as criminal as presenting a pistol at a man. Perhaps it may be worth relating.

About ten years before Jacob Bell founded the Pharmaceutical Society, I was in business as a chemist in Brazil; my servant (an African slave, I could get no other servant) annoyed me by drinking my wine, a very cheap Spanish wine, which in the hurry of business I often forgot to lock up.

I filled a bottle with vin. antim. tart., and soon found the man had fallen into the trap. I found twelve ounces gone, which at two grains to the ounce contained twenty-four grains tartar emetic. I was soon alarmed to find that he was not only purged and vomiting, but that he had convulsions or involuntary twitchings of the arms and legs, as he lay on his bed.

I lost no time in looking for an antidote, and soon prepared a quart of decoct. cinchonæ from the best red bark. I gave this in half-pint doses, and the convulsions were relieved; but I had to prepare another quart, which the black drank freely, and after a long sleep he recovered, for which I was very thankful. I received a serious lesson, which I would not repeat for any consideration; but I am now an old man.

JOSEPH LEAY.

S. A. Purvis.—*Nessler Reagent.*—Boil 35 grams of iodide of potassium and 13 grams of corrosive sublimate in 800 c.c. of water, stirring until dissolved. Add cold saturated solution of corrosive sublimate, cautiously, until the precipitate of red iodide of mercury remains permanent. Then render alkaline by adding 160 grams of solid caustic potash, or 120 grams of caustic soda, and dilute with water to a litre. Finally, add more solution of corrosive sublimate and leave the mixture to settle (Wanklyn).

"*Novircus.*"—Apply to the Secretary for a copy of the Regulations of the Board of Examiners.

"*Derfla.*"—We cannot say.

A. P. S. (Edinburgh).—Your question should be addressed to Professor Attfield.

"*Inquirer.*"—(1) Several recipes for this preparation have already been given; see vol. vi., p. 598. (2) The Mistura Alba, of the King's College Hospital Pharmacopœia, is:—

Magnes. Carb.	10 gr.
Magnes. Sulph.	60 „
Aq. Menth. Pip.	1 oz. Mix.

It is also in several hospital Pharmacopœias varying in strength.

G. Dobson.—(1) Roscoe's Lessons in Elementary Chemistry, published by Macmillan; (2) We are not acquainted with such a work.

G. W.—The examination extends only to an elementary knowledge in the subject.

W. T. H.—We think the advantage would lie in the other direction.

H. Cock.—The office of the *Lancet* is No. 423, Strand.

R. Williams.—The phylloxera is an insect which has done serious injury to the vines in several wine districts. See vol. v., p. 405.

"*Minor.*"—The sole object of the examination is to test whether the candidates are sufficiently skilled and competent to conduct the business of a chemist and druggist. When this has been done we do not think that more can be "demanded."

"*Alpha.*"—Ure says that strong nitrous acid diluted with five volumes of water and a little sal ammoniac added, is used.

"*Compound Radical.*"—It is not necessary to pass any examination before using the title.

W. Lea.—The colour would vary according to the age, purity and freedom from oxidation of the phosphate of iron, but, we do not think without filtering, which is not intended should be done, the mixture can be of a straw colour. There is nothing to produce sweetness in the mixture, so that there should not be any difference in this respect between your mixture and that of the London house.

"*Kino.*"—The substance is asbestos.

COMMUNICATIONS, LETTERS, ETC., have been received from Mr. Abraham, Mr. Taplin, Mr. Haydon, Scotus, Dispenser, Assistant, W. L. A.

"THE MONTH."

Under this title we propose to refer cursorily once a month to subjects which may appear to present points of more or less passing interest to the readers of this Journal. For instance, it has more than once been suggested that a short notice each month of the medicinal plants which happen to be in blossom would be acceptable. Besides dealing, therefore, with topics allied to science generally, it will be the object of this and subsequent papers to provide such a list as will enable a botanical student to see, at the proper time and place, all the plants of medicinal interest in the botanical gardens around London, or which may be found in a wild state in this country.

A country ramble at this time of the year will yield but very few specimens in flower of any kind, and none at all of a medicinal nature. The white dead-nettle, shepherd's purse, dandelion, daisy, and in the southern counties the fragrant winter heliotrope (*Petasites fragrans*), with possibly a stray snowdrop or primrose here and there, and the catkins of the hazel, are probably all that will reward the collector. Nor must a long list be expected even from botanical gardens or hothouses at this time of the year.

At Kew, the herbaceous ground shows very little of interest. One specimen is, however, worthy of special notice, since it can be seen to the best advantage at this time of the year, when all the leaves have fallen off. This is the Turkey rhubarb plant (*Rheum officinale*, Baill.), which, introduced only a few years ago by the late Daniel Hanbury, has now grown to a large size. It may be found by the side of the walk through the herbaceous ground near the No. 2 Museum. The portion visible above ground is a sort of crown (*sympodium*), consisting of several stumps, or short thick shoots, about 8—10 inches high, and 4—5 inches in diameter, covered with the scars of fallen leaves, and presenting here and there small leaf-buds in the axils of the scars. It is from this portion of the plant that the Turkey rhubarb of commerce (according to Professor Baillon) is prepared, the subterranean portion not affording pieces of equal size. With this statement the large specimens of rhubarb in the Museum of the Pharmaceutical Society appear to correspond, as they closely resemble the shoots in shape and size. It must be remembered, however, that some Russian rhubarb is also derived from another species, *Rheum palmatum*, var. *Tanguticum*, Max.

In the economic house at Kew several medicinal plants may be seen in flower. Almost the first to attract notice is the star anise, *Illicium anisatum*, L. In China and Japan it grows to the height of a small tree, but as growing at Kew it much resembles in size and habit the sweet-scented daphne (*D. Cneorum*), being about 2 feet high, and having smooth entire lanceolate leaves somewhat crowded together towards the ends of the branches. The pale yellowish-white sessile flowers may be seen here and there, nestling among the upper leaves or growing out of the naked stem near the scars of fallen leaves. The flowers are about the size of the common daisy, or perhaps a little larger, and have a faint odour not at all resembling that of aniseed. The bracts, sepals and petals are all of the same yellowish white colour, so that at first sight it seems scarcely possible to distinguish where the one begins or the other ends. More careful observation, however, will show that the sepals are broader and less tapering than the petals, while the bracts are much shorter and at the back are tipped with reddish-purple. The stamens, which are numerous, having very short filaments, are closely packed in the centre of the flower, and hence resemble the yellow disk of a daisy in appearance. After a time the sepals, petals and stamens fall off, while the bracts remain for some time longer. The carpels may then be seen to be quite erect on the thalamus, not spread out as they afterwards become in the well-known star anise fruit.

The variety planted in the neighbourhood of temples in Japan is sometimes described as a distinct species, under the name of *I. religiosum*. It is used in Japan to decorate the tombs, and the bark is burnt as incense. Singularly enough the leaves both of this species and of that which grows in Florida have the repute of being poisonous.

The *Drimys Winteri*, Forster, has a sufficient general resemblance to the last plant to indicate, even to a casual observer, that it belongs to the same natural order. As growing at Kew, the plant is from two to three feet high, and the stems are longer and more distantly branched than in the *Illicium anisatum*; but the leaves are similar in character, if anything rather longer, and with the white midrib contrasting rather more strongly with the dark green colour of the leaf. The flowers are also similar in colour and appearance, but are arranged in small terminal umbellate cymes, each branch of which consists of a group of from three to five flowers. When in fruit it differs still more from the star anise plant, the carpels being berry-like and containing several seeds. The specimen at Regent's Park Botanical Gardens is of more vigorous growth, but is not at present in flower.

In South America *Drimys Winteri* is a tree, but appears to vary very much in its botanical characters in different districts. It may be here remarked that the Winter's bark of commerce is not derived from this tree, as it should be, but from *Cinnamodendron corticosum*. True Winter's bark is of a red brown colour and has a very rough inner surface.

Boldo (*Peumus Boldus*, Mol.) will be remembered as a plant which was brought into notice in this country a few years ago as a remedy for certain liver diseases, and a tolerably full account of it was given in the pages of this Journal.* It may now be seen in blossom at Kew, and also at Regent's Park. The specimen at Kew is but a small one, but that at Regent's Park more nearly approaches its size in its native country, Chili, being between 12 and 18 feet high. It is an evergreen shrub, having much the aspect of the holly oak, *Quercus ilex*, L. The leaves, which are opposite, are remarkably convex, probably owing to the fact that the epidermis of the under surface of the leaf has only one layer of cells, while that of the upper has two or in some parts three layers; they are oval in outline, from 1 to 2 inches long and ½ to 1 inch broad, rather rigid and very rough to the touch. This roughness is due to little prominences, bearing stellate hairs, scattered over the surface of the leaf. The flowers, which have a delicate verbena-like odour, are rather small, being about the size of those of the lime tree, *Tilia Europæa*, L., but with much shorter stamens; they occur in small clusters (corymbose cymes) at the end of the main

* *Pharm. Journ.* [3], vol. v., p. 405.

branches or of short lateral branches. They are of a pale yellowish-white colour, contrasting well with the dark green foliage. Both the plant at Kew and that at Regent's Park bear only staminate flowers. The sepals (5) and petals (7) are very similar in appearance; the sepals may, however, be distinguished by being much more hairy externally than the petals, as well as shorter and rather broader. The stamens, which are numerous, are shorter than the petals upon which they are ultimately bent back. The filaments have two curious glandular appendages near the base, very like those to be found on the stamens of the bay tree. The anthers of the Boldo tree do not, however, open by valves as in the bay tree, but by longitudinal slits. The fruit, consisting of small drupes about the size of haws, are eaten in Chili. The bark is used for tanning, and the wood for making charcoal.

The *Helleborus niger* is now in blossom at the Botanical Gardens, at Regent's Park, and may be seen in bunches in Covent Garden market, where it is well known under the name of the Christmas rose, a name which it derives partly from its resemblance to a wild rose, and partly from its commencing to blossom about Christmas time. It may not uncommonly be seen also in country gardens. It is readily distinguished from all the other species of the genus by its bracts not being leaf-like; all the other species in cultivation or found wild in England having leafy palmate bracts, or flowers terminal on a leafy stem. The flower stalk arises directly from the ground (scape), and bears usually one, but sometimes two, blossoms, which have one or two concave bracts beneath them. The calyx is white, and consists of five distinct sepals. The petals are small, green and tubular, and form a whorl, which is almost hidden by the stamens. The base of the petals tapers into a short stalk, and inside the bottom of the petal will be found some honey-like fluid secreted by the nectariferous base of the tube. Projecting beyond the stamens are the styles of the apocarpous ovary—the carpels of which are many-seeded, and ripen in the form of follicles. Similar petals to those of the Christmas rose may also be seen in the winter aconite, *Eranthus hyemalis*. The sepals, unlike those of most of the Ranunculaceæ, are persistent.

Daphne Mezereum.—At Regent's Park this little shrub is just beginning to blossom in the open air. The flowers, of a pale purplish-red tint, are arranged in small clusters of about three in number along the upper branches. They are quite sessile, and are surrounded by several scaly bracts. The calyx, for there is no corolla, is four-parted, and has eight anthers, arranged in two rows, sessile in the tube of the calyx. When the flower is fully grown, the tube of the calyx separates into two layers, which are readily seen on slitting open the flower. The ovary is superior, one-celled, with a short style and button-shaped stigma. The ovary when ripe forms a scarlet drupe. All the plants of this genus are remarkable for the toughness of their bark and for their acrid properties. The Mezereum may be seen frequently in cottage gardens, and rarely in woods—in which, in most instances, it is probably an escape.

The following plants possessing an indirect interest for the pharmaceutist are also in blossom at Kew:—*Osmanthus fragrans*, an oleaceous shrub, the small flowers of which are used by the Chinese for flavouring tea, and which possess a powerful fragrance exactly resembling the odour of Gosnell's violet powder *Kola acuminata*, a sterculiaceous plant growing in tropical West Africa, where the seeds are used, under the name of Cola nuts, as an aid to digestion, and which are remarkable for containing theine; also several varieties of the tobacco plant. The varied forms of the fruits of *Capsicum annuum* are also well worthy of observation, both at Kew and at Regent's Park.

In other scientific directions there is but little specially worthy of record; this month, the first of the year, being one which is rarely fruitful of results so far as their publication is concerned. The reason of this is, that the various learned societies have but just commenced their after Christmas sessions, and have scarcely got into activity again. This season, however, abounds in lectures of various kinds and of various merits, of which those delivered at the Royal Institution attract not a little attention from the outside public. The work of this Institution takes the character of interpretation to the unscientific public of scientific advances, and no doubt serves a very useful purpose in its way; the danger to be anticipated from its influence is not slight, however, for the public, knowing no better, regard it as the seventh heaven of science, and its professors as the archangels thereof.

Scientific men must have been disappointed with the discourse given by Professor Tyndall on the evening of Friday, the 19th inst. The title chosen by Professor Tyndal was "A combat with an infective atmosphere," and suggested something more striking than was forthcoming. Virtually, the discourse constituted a *résumé* of various researches, including those of Professor Tyndall, in reference to the so-called germ theory, and the question of spontaneous generation of life. The lecturer recalled to the memory of his audience the fact which he had demonstrated on a previous occasion, that a ray of light is visible only by means of the vibrating motes which float about in it, and that if time be allowed, these motes settle perfectly, so that a ray of light passing through the atmosphere which previously swarmed with them is no longer visible. It is to these motes seen in the sunbeam that Professor Tyndall attributes the power to start putrefactive and other processes of life in certain infusions from vegetable and animal sources, and indeed this is what he claims to have established. But before noticing further his experimental observation we may point out that he was anticipated to some extent by a writer of twenty or thirty years ago. L. H. Grindon in his work entitled 'Life, its Nature' (2nd edition 1857), writes—"It is not improbable that the glittering *motes* seen in the sunbeam when it shines through a small aperture into a dark room, consist in part of these otherwise imperceptible *eggs* and *seeds*. Light we know is the great and universal revelator." We pass on from this interesting historical note, to follow Professor Tyndall somewhat into his methods of experiments and arguments, and these may be very briefly described. He has taken infusions of various kinds, and exposed them to an atmosphere which is rendered free from these so-called life motes by various means, such as simple deposition, expulsion by steam, or exhaustion with an air pump, and he claims to have established in this way that such an atmosphere has no power to cause fermentation or putrefaction in any vegetable or animal infusions.

In spite, however, of all this, Dr. Bastian claims to have proved the doctrine of spontaneous generation of life, and as the matter is still in dispute and is not a one-sided question, we are not disposed to attempt any settlement of it on paper. We cannot, however, depart from this subject without calling attention to the defective methods of experiment employed by Professor Tyndall. He confessed that for a long time his results had been directly opposed to his own theory, but impressed with the truth of this latter he investigated and investigated until the matter cleared up. In short he ultimately found he had been introducing air containing life-germs into his solutions while charging his tubes with the various infusions. He was in the habit of charging these tubes by pouring the liquids through a tube plugged with cotton wool, and, as every chemist knows, it is almost impossible by this method to ensure that no air shall pass down the tube with the liquid. Finally, however, having made this discovery, he henceforth employed, what a chemist would probably have used in the first place, a separating funnel, by which it is possible to introduce into a vessel to which it is attached the liquid contained in it without permitting any ingress of air.

Professor Gladstone's lectures on the chemistry of fire are now concluded; among other matters he dwelt somewhat upon the spontaneous combustion of various substances, as hay, cotton waste, small coal, pyrites, etc., and finally discoursed on the means and methods of extinguishing fires.

On Thursday, the 19th inst., Dr. C. R. A. Wright delivered at the same Institution, the first of his course of lectures on "Metals, and the chief industrial uses of these bodies and their derivations." After some introductory matters, and general considerations regarding the constitution of metallic bodies and their sources in nature, he proceeded to describe the various processes of volatilization, amalgamation, smelting, liquation, etc., for metal extractions. In conclusion, he treated of native metals and refining processes, and the means of isolating metals from simple ores.

The pharmaceutical world has of late been disturbed by discussions on the milk of sulphur question, but as this matter has been treated of somewhat fully in these columns, we shall here only point out what is in our opinion a salient feature. The various prosecutions have been undertaken upon the basis of the Food and Drugs Act, but it is questionable whether milk of sulphur can be regarded as a drug, and if it is not a drug in a legal sense, the prosecutions are, from that point of view, unjustifiable. At least this is the view which is taken by many pharmacists, who will still continue to sell "milk of sulphur" when asked for it, but who will supply "precipitated sulphur" if the request takes that form.

Of late there have been several outbreaks of typhoid fever, notably at Salford, and attempts have been made as usual to connect the outbreaks of the disease with the bad nature of the milk supplied in these districts. Thus at Salford, it is stated that all the sufferers from typhoid fever have been supplied with milk from the same dairy. Notwithstanding this, however, it is extremely desirable to investigate the matter more fully, for apart from a sort of logical process of exclusion there is no scientific evidence bearing out this assumed relation of the disease to the impure nature of the milk consumed.

Much attention has of late been directed to the economic production of gas suitable for use as a fuel. It is said that by the Lowe process it can be made at a cost not exceeding 8*d*. per 1000 cubic feet, a figure which would allow of a very wide and cheap consumption. It is made, as is well known, by the mutual decomposition of petroleum vapour and steam by means of coke at a high temperature, and therefore consists in the main of carbonic oxide and hydrogen gases, into which all solid fuel may be converted by means of heat before it is burnt, as for instance in the gas furnaces introduced by Mr. Siemens. It seems, however, very questionable whether gaseous fuel prepared from petroleum—a material so much more costly than coal—can possibly be cheaper to use as fuel.

While speaking of this matter, it is worthy of remark, that a method of using petroleum as the fuel for steam engines has been invented in Italy, and patented in America and elsewhere. The medium employed is asbestos, which being inconsumable and a non-conductor is said to allow of the safe combustion of petroleum, while by its use there is saved a large percentage of heat, which would otherwise be lost. For many purposes the asbestos is made into a pliable millboard of one-eighth of an inch in thickness and with this material the furnace may be coated both externally and internally.

Mr. Churchill, the British Consul at Resht, Persia, has recently made a report about the naphtha wells in the Caucasus. These wells are situated near the town of Bakou, and for centuries naphtha has been extracted from them. In 1874, the production, as calculated by the tax inflicted by the Government, amounted to 1,120,000 poods of petroleum and no less than 180 works were in operation in the outskirts of Bakou. If an economy could be effected in the means of transport of the raw material to the manufactories, it is thought that the trade could fairly compete with that of America. As it is, the naphtha is said to be largely used instead of coal for steamers in the Caspian Sea.

Considerable attention has been given of late to nickeliferous pyrites which occurs plentifully in Italy. In some specimens there is contained as much as three per cent. of nickel, and if this nickel could be economically extracted it would probably find a ready market in Germany for use in the coinage departments. Since copper and silver are now so profitably extracted from pyrites, it is not unreasonable to expect that nickel may be as cheaply extracted from other ores in the future. Moreover, quite lately it is reported that a large mass of native iron has been found in Brazil (province of Santa-Catharina) containing as much as 36 per cent. nickel and 64 per cent. iron. These percentages correspond tolerably well to the formula Fe_2Ni.

The uses of salicylic acid and certain compounds chemically allied with it, have again during the past month attracted the attention of medical men. Thus at a recent meeting of the Clinical Society several papers were read treating of the use of salicin, salicylic acid and salicylates in rheumatic and other fevers, and the opinion was almost unanimous that these substances are capable of exerting beneficial influences almost peculiar to them. When such men as Dr. Weber and Sir William Jenner endorse such views, we may feel tolerably sure that they are reliable; at the same time it must not be forgotten that the last outcry about salicylic acid was in its disfavour. It was said to cause processes of irritation, and when applied to sore surfaces to produce certain forms of eruption. While the whole subject deserves serious investigation, we do not see that the action attributed to these bodies is at all peculiar, and this on chemical grounds. Salicylic acid is a benzene derivative ($C_7H_6O_3$), while salicin, although a benzene derivative, is one that is far removed from salicylic acid. So far as we know salicin is a sort of glucoside which splits up by the agency of acids into saligenin ($C_7H_8O_2$) and glucose ($C_6H_{12}O_6$). There are a number of facts of this character which would appear at first blush to indicate that the therapeutical value of the various substances above referred to is one that may prove common to nearly all benzene derivatives of a certain order. Thus carbolic acid comes naturally within the category (C_6H_6O), and camphoric acid also ($C_{10}H_{16}O_4$), while the relation in which these various substances stand to each other and the whole number to benzene is evident from the following formulæ :—

Benzene	C_6H_6
Carbolic acid (Phenol)	C_6H_5HO
Salicylic acid	$C_6H_4(COOH)(OH)$
Camphoric acid $(CH_3)(C_3H_7)$	$C_6H_6O_4$.

This formula for camphoric acid is written in this way for the sake of simplicity and to bring out the fact that it is an acid derived by the oxidation of methyl-propyl-benzene.

To return to our original observations, it will be remembered that when salicylic acid was first brought before the public notice, it was stated that the salicylates were valueless for the purposes assigned to the free acid, and hence its internal application was looked upon as a useless proceeding, for it inevitably results in the neutralization of the free acid by the sodic carbonate present in the blood. Now, however, much praise is given to these same salicylates for purposes identical with those to which salicylic acid is applied.

There have been several cases of prosecution conducted under the Adulteration Act, which are of interest, especially those referring to the presence of copper in "tinned peas." Chemically, it is easy enough to prove or disprove the presence and even amount of copper in such articles of food if proper care be taken. One of the precautions to be observed consists in causing any carbon to be entirely burnt off, otherwise acids will not thoroughly extract the copper from the mass. Assuming that the copper be obtained in the metallic state, a check over its amount is readily got by simple ignition in air of the platinum vessel upon which it is deposited, so that in this way a second weighing is obtained (of the oxide), which should correspond proportionately to the weight of metal found.

In the cases to which we have alluded, the magistrate was puzzled, not by the chemical question but by the medical opinions. Copper is undoubtedly a cumulative poison, as is testified by the amount invariably to be found in the brains, livers and spleens of persons after death, and it has been established fairly well that the metal exists in actual combination with the organic principles. But there is no medical evidence to show to what extent the presence of this copper is either useful or injurious. And it appears to us that the question to be determined by the magistrate in such cases, is rather whether the peas have been coloured by a cupric salt, or whether copper has been introduced by the method of preparation or perhaps from the tins in which the peas are packed. This the chemical evidence did not show.

G. Belluci* has continued some observations made originally by Lender, Gorup-Besanez, Morin, Monte, and others, regarding the production of ozone by the pulverization of water. The author has conducted his experiments in the neighbourhood of the falls of Terni, and beyond noticing the odour of ozone, he has observed that papers soaked in iodide of potassium and starch turn blue in contact with the atmosphere, even at a distance of 80—100 metres from the stream. On the same theory, the asserted presence of ozone in the air over ocean districts has been explained. Belluci concludes that the ozone is produced by means of the action of induced electricity upon the oxygen in the air, the electricity in its turn being derived from the friction of the water drops one against the other.

J. de Girard† states that the spontaneous alteration of anhydrous hydrocyanic acid is to be explained as arising from the calcium chloride used in drying the acid. The use of neutral calcic chloride furnishes a pure acid, but an alkaline chloride by reason of the excess of lime forms calcium cyanide, which with the water (contained in the hydrocyanic acid) gives rise to calcium formate and free ammonia, and it is known that even traces of ammonia are powerful to induce the decomposition of anhydrous hydrocyanic acid.

Yet another substitute for litmus has been added to the already lengthy list.‡ G. Pellagri finds that phyllocyanin, the blue colouring matter of flowers, is extremely sensitive to minute traces of free alkali. The phyllocyanin can be readily obtained from the iris, the violet, or the purple verbena, etc., by extracting the petals with warm water. The solution thus obtained is treated with dilute sulphuric acid until it is of a purple colour, and in this state it is sensible to the ammonia contained in rain water, or to the plumbic hydrate present in water which has been in contact with leaden pipes. These reagents turn it blue; a solution of potassium hydrate containing one part in 1,200,000 parts of water gives also with the solution of phyllocyanin a definite blue colour, while a solution of potash six times this strength turns it green.

COMPARATIVE EXAMINATION OF THE MORE IMPORTANT COMMERCIAL VARIETIES OF GALBANUM AND AMMONIACUM GUMS.§

II. AMMONIACUM.

BY EDWARD HIRSCHSOHN.

(*Continued from page* 572.)

1. *Historical.*—As is the case with galbanum little is known with certainty of the history of this drug. Thus, Martiny states that the first mention of ammoniacum was made by Hippocrates,‖ whilst

* *Gazetta Chimica Italiana*, vi., 88–97.
† *Compt. Rend.*, lxxxiii., 344.
‡ *Gazetta Chimica Italiana*, vi., 35–38.
§ From a memoir for which the gold "Suworow" medal has been awarded by the Medical Faculty of the University of Dorpat. (*Pharmaceutische Zeitschri für Russland*, April 15, 1875, p. 225.)
‖ 'Opera, ed. Foes,' p. 670.

Borszczow and Hanbury,* attribute it to Dioscorides.†

Discorides and Pliny both mention two sorts of ammoniacum; the best kind, called θραῦσμα, resembling olibanum, and having a smell like castoreum and a bitter taste, which was used for incense (the *ammoniacum thymiama* of Paulus Æginus); and the inferior quality, called φύραμα, having a resinous appearance, and mixed with stones and earth.

According to Pliny, the word ammoniacum comes from ἄμμος, sand, the mother-plant growing in a sandy soil. It is also stated that the word was sometimes written "armeniacum," indicating that the plant was a native of Armenia.

The time when Persian ammoniacum first came into use cannot be exactly fixed. It is not mentioned by the Greeks or Romans, probably, therefore, only the African was known to them. Avicenna (lib. ii. c. 8) does not give the source of this ammoniacum (called in the Arabic *assach*). The ammoniacum of Abu Mansur Mowajik (*Lib. Fund. Pharm.*, i., 35, ed. 1800) a Persian physician of the eleventh century, was without doubt the Persian sort, as was also the ammoniacum (*derukht ushuk*) of Beva Ben Khuas Khan (Ainslie 'Mat. Indic.' i. 160), who lived in the beginning of the sixteenth century. The Arabian words *assach*, *eschack*, and *ushuk*, applied by the last-named three writers to ammoniacum, resemble in sound *oshac*, by which it is at present known in Persia, and it may be assumed that all these names are synonymous. In Buchara the gum resin bears the name, *Kandal*. According to Bunge and Bienert the same name, and *Kämak*, are given to the plant in Persia; whilst Wright gives *weschak*, and Dr. Buhse *oschak* as the true names of the plant in that country. According to Borszczow, *Dorema Ammoniacum* is called by the Kirghises, *bal-kurai*, or "honey-cane." The Arabic name of African ammoniacum is *fasogh* or *fashook*.

2. *Origin*.—Dioscorides believed that ammoniacum was obtained from a species of *Ferula*, called *agasyllis*, which grew at Cyrene, in Africa; Pliny, on the contrary, called the plant *metopion*, and stated that it grew in Africa, in the neighbourhood of the temple of Jupiter-Ammon. The most celebrated botanists of the Middle Ages, C. Bauhinus, J. Bauhinus, Lobelius, and Dodonœus, quoted by Borszczow, say nothing new respecting it, but repeat with slight variations the statement of Dioscorides. Chardin,‡ who lived in Persia from 1666 to 1677, stated that the plant called *ouchag* by the Persians was met with plentifully on the southern borders of Parthia, i.e., south of Ispahan.

Chaw‖ and Jackson§ speak of the mother-plant of ammoniacum which they found in the Libyan Cyrenaica, and the latter compares it with a kind of fennel, called by the Arabs *feshook*. This plant according to him grows principally on the plains of the interior, but especially around El Araiche and M'Sharrah Rumellah.

From seeds found in the gum Willdenow¶ obtained plants which he named *Heracleum gummiferum*, but which Sprengel identified with *Heracleum Cyrenaicum*; this species, however, according to him, contains no juice resembling ammoniacum.

More exact information as to the origin of this gum resin is given by Johnson, Hart, and Wright. Johnson* saw a large quantity of the ammoniacum plant in the neighbourhood of Jesdekhast, in stony plains, which were quite covered with it. Hart† met with it in Bombay, in the neighbourhood of Yorda, Kaust, and Kumischa, in the Vauk district. He adds that it is there called Oschak, and contains ammoniacum in such quantity that the gum resin exudes from the smallest incision and even from the leaves.

In 1829 Don‡ described as a *Dorema*, one of the plants collected by Lieutenant Wright in the Persian province of Iran Adschemi and presented by him to the Linnean Society. But according to Merat,§ this plant was previously known to R. Brown, and still earlier to Fontanis, who found it while exploring the Levant on behalf of the French government, and gave some specimens and a drawing to the Museum of Natural History. But neither Brown nor Fontanis published anything on the subject, and the plants collected by them might have belonged to another species; so that Don must be considered the first to give a good description of the ammoniacum plant, the *Dorema Ammoniacum*, which appears to have a wide distribution in Persia. According to Borszczow the *Dorema paniculatum* discovered by Karelin and Kirilow in Songarei is identical with *D. Ammoniacum*; the same may be said of *Disserneston gummiferon*, Jaub. and Spach., and *Dorema aureum*, Stocks.

Between 1825 and 1832 Aucher-Eloy and Szowitz found in Persia two more indigenous species, *Dorema glabrum*, Fisch., and *Dorema Aucheri*.

Dr. Loftus also discovered other umbelliferæ in Southern Persia, such as *Dorema robustum*, *D. hirsutum*, and *D. odoriferum*. But these species of *Dorema*, according to Borszczow, cannot, on account of their rarity, be considered the origin of commercial ammoniacum. The most important, as before stated, is *D. Ammoniacum*.

According to Borzsczow‖ the entire distribution of the *Dorema Ammoniacum* has the shape of an obtuse-angled triangle, the south-eastern (obtuse) angle lies about 80° lat., and 33½° long., and of the two acute angles, the northern about 45° 30′ lat. and 84° long., and the western about 37° lat. and 73° long.

The same botanist describes the plant as follows:—"The plant seldom attains the height of 6 to 7 feet, or falls below 3 feet. The hollow leafless striated stem is furnished with pericladia at the internodes; as a rule it is very straight, and gradually tapers towards the top. At the base it is from 1 to 2 inches thick and towards the tapering end it gives off from 12 to 16 erect branches, upon which short-stalked simple umbels are arranged in a racemose manner, and from the flowers being nearly sessile have the appearance of capitula; the flowers are surrounded by a dense soft down. The fruit is ovate, in the unripe condition covered with hairs, but afterwards nearly smooth. The mericarps are flat, the dorsal surface having three narrow and two broad raised

* *Pharm. Journ.*, 1873, vol. iii., p. 741.
† Lib. iii. c. 98.
‡ 'Voyage de Chevalier Chardin en Perse,' Paris.
§ 'Travels in Barbary and the Levant.' Oxford, 1790.
‖ 'Account of Morocco.' London, 1809.
¶ 'Berlin, Jahrb.' 1806, p. 78.

* 'Journey from England to India through Persia.' London, 1818.
† 'Trans. Med. Soc. Calcutta,' vol. i. (1825).
‡ 'Trans. Linn. Soc.,' vol. xvi. p. 610.
§ 'Dict. Universal de Mat. Med.' voi. i.
‖ 'Bull. Soc. Imp. Nat. Mosc.' (1850) vol. xxiii.

ridges, extending to the margin; the furrows have each a single vitta, which rests upon the ridges, the commissure is flat, with two very broad vittæ. Before the flowering the stem is of a yellow-green colour and covered with a peculiar white down; after the flowering and during the formation of the fruit this down gradually disappears, and in specimens with ripe fruit the stem is nearly smooth and somewhat shiny. The stem leaves are entirely wanting, being replaced by the pericladia, the upper greatly prolonged portion of which is always reflexed. The size of the root-leaves varies between a foot and a foot and a half broad and long. The petiole is channelled at its base, but towards the top becomes nearly cylindrical. About 9 inches from the point of attachment it divides into three branches, which are once or twice pinnate. The leathery leaflets are arranged in pairs, except the terminal one, and are of an oval shape; in breadth and length they vary very much.

3. *Collection.*—Jaenson (1804), who lived for a long time in Morocco, stated that the gum exudes through incisions and becomes contaminated through running downwards. Johnston supposes that the stem of the plant is perforated by a beetle and that the gum exudes through the perforations and then hardens. According to Borszczow the young roots are especially rich in milky juice, which runs in large drops through cracks in the root bark, resulting from the prolonged heat of the soil, and is absorbed in the surrounding sand. Upon solidifying, it forms a very hard brown grey mass, which is exposed upon digging up the root. A very plentiful exudation of the juice also takes place between the bast bundles of the crown, and this forms an inferior brown variety of ammoniacum, much contaminated with sand, the so-called "gummi ammoniacum in massis." The gum resin which exudes at the axils of the flower-bearing branches and from the bases of the small umbels, as well as from the stem, is milk-white, presents a peculiar nacreous lustre, and is as soft as wax. It usually forms drops varying from the size of a pea to that of a nut, or even lumps ¼ to ½ inch in diameter. Exposed to the air the drops become covered with a yellow brittle crust.

4. *Commercial Varieties.*—Distinction is made between the African and Persian ammoniacum, only the latter of which at the present time appears in European commerce.

a. Persian ammoniacum.

(i.) Ammoniacum in grains, s. in lachrymis, s. in amygdaloides. Ammoniacum in grains or tears.—It consists of irregularly shaped, mostly roundish, pieces varying from the size of a millet seed to that of a walnut separated, or more seldom stuck together. The tears externally are of a pale yellow; or more or less reddish or brownish yellow colour, they have a dully waxy lustre, and are opalescent and opaque. Internally they are bluish or yellowish white, with a waxy lustre. They have a conchoidal fracture and in thin flakes or at the edges are translucent. At the ordinary temperature ammoniacum tears are hard and brittle, but readily soften in the hand, the more so the fresher the gum is. This kind is generally met with very pure, but nevertheless containing fruit, fragments of stem, etc.

(ii.) Ammoniacum in massis, s. placentibus, s. in panibus. Ammoniacum in mass, cake or bread.—Largish pieces, weighing one pound or more, of a dirty dark brown colour, with lighter spots. Sometimes the pieces have a marbled appearance from the alternation of dark and light portions. This sort is either softer than the preceding, smeary and sticky, or harder and more brittle, and more shiny and uneven at the fracture. Usually it contains fruit, stalk fragments, sand, and other impurities. Martiny describes a variety of this kind as containing very few impurities, and forming a conglomeration of whitish, reddish, yellow and greenish tears, mostly melted one into the other. This mass has a granite like appearance. Its smell is not like that of the ordinary kind, but very alliaceous and disagreeable, and it has a very bitter and acrid taste.

The Persian ammoniacum has a peculiar smell that has been compared to a mixture of garlic and castoreum, which is specially manifest upon heating or fracture; its taste is acrid and peculiar. Triturated with water it forms a white emulsion. When heated it melts slowly and incompletely. Spec. gr. 1·207. It dissolves in alcohol, 3 parts in 4, giving an acid solution.

b. African ammoniacum.

Pereira includes under this name* the viscous resin, which according to Lindley is yielded by *Ferula tingitana*, L., and which he considers to be the ἀμμωνιακόν of Dioscorides. He describes it as a light brownish, reddish, or, in parts, even bluish mass, which is soft, sticks easily to the fingers and smells quite differently to Persian ammoniacum. Hanbury also mentions this sort,† and says that the mother plant, according to Leared, is called in Morocco, "*Kelth.*"

As before stated, almost all the ammoniacum appearing in commerce in Persian. Most of it, according to Martiny, Henkel and Vigier, is imported through Bombay, but some comes direct from Persia. Vigier states that some passes through Bordeaux, whilst another portion goes from Persia through Astrachan into Russia.

African ammoniacum has only appeared twice in the London market, in 1857 and 1871. Hanbury says it was imported from Mogador. He also believed African ammoniacum to be still an article of commerce, not only in Morocco, but also in Egypt and Arabia, where it is carried by the Mecca pilgrims for use in fumigations.

GALICIAN OZOKERITE AND CERESINE.‡

BY DR. J. GRABOWSKY.

Ozokerite is found in Galicia (Austria) principally in Borislaw near Drohobycz, and Dzwiniacz near Stanistawow. Both places are situated at the northern foot of the Carpathian mountains; the formation is miocene, and of some importance on account of its petroleum springs. The production of "earth-wax" (ozokerite) was estimated to have amounted to about twenty million of kilogrammes in 1875, upwards of eighteen million of kilogrammes coming from Borislaw alone. According to F. v. Hauer, the largest crystals of salts, which are found in connection with the ozokerite, as well as the saline springs in the petroleum-bearing strata, prove that these latter belong to the zone of the calcareous neogene formation. They contain the fluid oil as well as the solid "earth-wax" partly in more or less regular beds, partly in fissures and pockets. The exploitation is affected by

* Elements 'Mat. Med' (1853) II., part 2, p. 1715.
† *Pharmaceutical Journal* [3], vol. iii., p. 741.
‡ Read before the American Chemical Society, October 5, 1876. From the *American Chemist*.

means of shafts and tunnels, the former being from 40 to 80 metres deep and about 1 metre square, the latter being generally quite short on account of the very primitive method of ventilation and the great amount of gases. The shafts generally pass, first, through 8 to 10 metres of gravel mixed with boulders, then, through blue loam and plastic clay, which contains numerous layers of marl, slate, and sandstone. In this clay, usually at a depth of from 40 to 50 metres, petroleum springs and ozokerite are found. This latter forms lumps or layers from 1 to 3 feet thick, these lumps sometimes weighing several hundred kilogrammes. This native ozokerite is transparent, of pure honey-yellow colour, possessing the hardness of common beeswax. More frequently, however, ozokerite is found in thin layers and small pieces, which must be separated from the gangue; the smallest pieces are only obtained by a process of washing.

Besides pure, good "earth-wax," some varieties occur which are especially distinguished by hardness and colour.

The best "earth-wax" should have a pure yellow or greenish colour, and be easy to knead between the fingers; this, after having been tried (melted), yields a "prime" earth-wax, which is generally used for the manufacture of "ceresine." The poorer kinds are coloured black, and either very soft (containing much petroleum), or too hard, resembling asphaltum, fusing at a high temperature. After trying, these produce an "earth-wax" which is chiefly used for the manufacture of paraffin.

Occasionally there are found pieces of ozokerite, which are very compact, as hard as gypsum, fuse above 100° C., and are dichroitic (dark green in reflected and pure yellow in refracted light).

The composition of ozokerite is best expressed by the formula C_nH_{2n}. Very little is known about its formation. It appears to me to be very probable that it has to be considered as a product of the oxidation and condensation of petroleum hydrocarbons. Only lately we have seen that hydrocarbons, as, *e. g.*, naphthalene, can form by oxidation not products containing oxygen, but dinaphthil:

$$2C_{10}H_8 + O = C_{20}H_{14} + H_2O.$$

By supposing a similar oxidation of hexan or octan, we obtain compounds of the formula C_nH_{2n}, which again may condense with hydrocarbons of the marsh-gas series, and thus give rise to the formation of very complicated hydrocarbons of high melting point, *e. g.*:—

1. . . . $2C_8H_{18} + O_2 = C_{16}H_{32} + 2H_2O.$
2. . . . $C_{16}H_{32} + C_8H_{18} + O = C_{24}H_{48} + H_2O.$

By this hypothesis the formation of petroleum may be reduced to an oxidation of marsh-gas, and thus the close connection between ozokerite, petroleum, and coal be explained in the most simple manner.

As stated above, the crude ozokerite is separated from the gangue by melting, and worked into paraffin or ceresine. The trying is effected either by direct fire or by steam. In the former case, the ozokerite is placed into iron kettles of about one and a half metre in diameter by one metre in height, melted, drawn off, and the residue boiled with water, when all the ozokerite will rise to the surface of the water. In the latter case, the melting is done by steam in the same manner as with paraffin or stearin, and needs no further description. The tried ozokerite is clarified by allowing it to settle for several hours, and then poured into iron moulds. It is shipped in this form, without any further packing, and in pieces of about fifty to sixty kilogrammes.

There are principally two kinds of commercial ozokerite: prime and second. Prime "wax" ought to be as free as possible from earthy impurities and in small transparent, greenish-brown to yellow pieces; the lighter in colour and the more transparent, the better it is. "Second wax" is dark brown, almost opaque, occasionally containing a great deal of earthy impurities, and is generally much softer than the prime. Both are used for the manufacture of either paraffin and illuminating oils, or ceresine. The manufacture of paraffin from the ozokerite is effected by distillation over direct fire, from iron retorts with flat bottoms containing from 700 to 1000 kilogrammes. The products of the distillation are:—

Benzine	2 to 8	per cent.
Naphtha	15 „ 20	„
Paraffin	36 „ 50	„
Heavy (lubricating) oils	15 „ 20	„
Coke	10 „ 20	„

The paraffin is pressed, treated with sulphuric acid and caustic soda, filtered through paper and fine animal charcoal, and manufactured into candles. The naphtha is purified in the usual way, and the heavy oils are sometimes subjected to fractional distillation, but mostly shipped as such to Vienna.

The manufacture of ceresine consists of the removal of the impurities from the "earth-wax" by the aid of sulphuric acid and animal charcoal; but only the best kinds of ozokerite are used. The different processes are kept secret and are also protected by patents. In general, the ozokerite is melted with concentrated sulphuric acid and the residue from the manufacture of yellow prussiate, pressed, treated again with prussiate residue, and filtered. 100 parts good prime "earth-wax" yield 60 to 70 parts white wax, which in its properties very closely resembles white beeswax, and is called "ceresine." It is either further purified by repeated treatment with acid and prussiate residue, or coloured with gamboge or alkanet, and thereby made to closely resemble common beeswax. In the manufacture of ceresine only sulphurous acid and press residues are obtained, the former of which escapes into the air, but might be utilized, thus reducing the cost considerably. The consumption of sulphuric acid in Borislaw alone is said to amount to one million kilogrammes a year. The prussiate residues are obtained from the lixiviation of the crude prussiate in Moravia.

The finely divided animal charcoal seems to be the active agent, since a fair ceresine may be obtained by simply treating commercial "earth-wax" with bone char and concentrated sulphuric acid.

Comparatively only a small quantity of earth-wax is worked in Galicia; it is shipped principally to England, Moravia, and Vienna. The ceresine is exported in large quantities to Russia, where it is sold as beeswax; for this purpose it is melted together with a little beeswax, in order to impart to it the characteristic odour. Good ceresine is hardly to be distinguished from beeswax; the best methods are the following:—

1. Ceresine is not as easily kneaded between the fingers, and becomes brittle more readily than beeswax. This test is, however, doubtful, if the sample consists of a mixture of the two.

2. Ceresine is scarcely attacked by warm concentrated sulphuric acid, whereas beeswax is completely destroyed by it. By this test the quantities of beeswax and ceresine can be determined in a mixture of both.

In many cases ceresine can be employed in the place of beeswax. It is sold at from 32 to 40 dollars per 100 kilogrammes in Vienna, whereas the price of the commercial earth-wax varies from 10 to 12 dollars per 100 kilogrammes.

The whole exploitation of the ozokerite, on account of the want of enterprising men, is in the hands of the Jewish population. It is very imperfect, and necessarily requires many changes in the mining laws.

EMODIN FROM RHAMNUS FRANGULA BARK.*

BY C. LIEBERMANN AND M. WALDSTEIN.

Frangulic acid was first isolated by Faust from the bark of *Rhamnus Frangula*, and considered by him to be an anthracene derivative. With the object of comparing it more closely with the other isomers of alizarin—the authors used a substance which Dr. Merck had extracted for the purpose from a large quantity of frangula bark. The bark was exhausted with dilute soda ley, the extract precipitated with hydrochloric acid, the precipitate boiled with excess of soda ley, and again precipitated with hydrochloric acid. The washed and dried precipitate was dissolved in boiling absolute alcohol and then allowed to crystallize. Faust's method differs from this only in a purification through conversion into a lead salt before the crystallization.

Merck's substance, which was a red powder, appearing under the microscope in small needles, still contained an admixture of a glucoside, but the quantity was too small to allow of the preparation and determination of the sugar. After boiling with dilute sulphuric acid and three or four recrystallizations from alcohol or glacial acetic acid, the substance was obtained pure. From the acid it crystallized in beautiful silky orange-coloured needles, containing water and acetic acid, upon losing which at a temperature of 140° C. they became dull. In their characters these crystals agreed entirely with Faust's frangulic acid, except that no tables occurred with the needles, as in his observations.

Faust attributed to the air-dried frangulic acid, the formula $C_{14}H_8O_4+1\frac{1}{2}H_2O$, and stated that 1 mol. of water was lost at 120° C., but the other $\frac{1}{2}$ mol. only at 180° C. Therefore only a sample dried at above this temperature yielded him figures corresponding to bioxyanthraquinone (C, 70 p. c., and H, 3·3 p. c.), whilst the mean of five analyses of the compound dried at the lower temperature was C, 67·3 p. c.; H, 4 p. c. The authors' analyses of their purified compound constantly agreed very closely with the latter figures (Anal. I. and II.), even when heated to 190° C., by which the substance suffered a slight loss of weight through sublimation. A small quantity also was sublimed, the sublimate crystallized from absolute alcohol and dried at 150° (Anal. V.).

	I.	II.	III.	IV.	V.	Calculated for $C_{15}H_{10}O_5$.
C	67·0	67·4	66·7	67·2	67·1	66·7 per cent.
H . .	4·3	3·9	3·9	4·1	3·7	3·7 „

These results agreed very well with the formula of emodin ($C_{10}H_{15}O_5$); the carbon found was, however, a little too high (average 0·4 per cent.).

The authors obtained the acetyl compound of their substance by heating it at 180° C. with anhydrous acetic acid, purifying the product by treating it with dilute alkali as long as this was coloured after standing with it a little while. Upon crystallizing from alcohol, it was obtained in yellow needles, which melted at 193° C., and when dried at 115°, corresponded with the formula $C_{15}H_7(C_2H_3O)_3O_5$. This compound did not agree either in its external characters or its composition with the acetyl compound obtained by Faust.

An examination of the hydrocarbon resulting from the action of zinc dust, showed that it did not behave quite like anthracene, but exactly like the mixture of anthracene and methyl-anthracene obtained from emodin and chrysophanic acid. The melting point observed by Faust (195° to 200°) agreed well with that of methyl-anthracene.

The substance obtained by the authors from frangula bark agrees with emodin in the following characters:—The solubility, crystallization, and the colour of the solutions in alkalies are alike. Baryta and lime-water give red precipitates, which dissolve when boiled in water, giving it a slightly red colour. Alum solution gives with both only a yellow colour, and ammonia causes in these solutions a red precipitate. With the vapour of nitric acid they form a yellow nitro-compound, soluble in water with red colour. The crystalline needles of both remain shining at 100° C., and become dull at 140° C. Both compounds when completely dried and pure melt at 257° C.

The authors therefore consider that by their experiments, the presence of emodin in black alder bark has been established, and that it will be possible to obtain this costly substance, hitherto observed only in rhubarb, in larger quantity. Black alder bark, however, appears to contain only about 0·2 per cent. Faust's frangulic acid, especially judging from the acetyl derivative, they think is a different substance, probably a lower oxidation stage of their emodin, occurring side by side with it, like alizarin and purpurin. They therefore propose to seek it in the mother liquor of their compound. In the acetic acid mother liquor they have found a small quantity of a resinous body, fluorescent in alcoholic solution, and showing a characteristic absorption band, and to which the peculiar odour of the crude substance is due.

The bark used for these experiments was tolerably old, and it is quite concievable that during its storage an oxygen compound had gradually undergone further oxidation. This may perhaps be ascertained by examination of other specimens of bark.

The original glucoside of the bark, frangulin, also requires further investigation. Faust represents the formula and decomposition as—

$$\underset{\text{Frangulin.}}{C_{20}H_{20}O_{10}} = \underset{\text{Frangulic acid.}}{C_{14}H_8O_4} + C_6H_{12}O_6$$

This the authors believe to be wrong, as the decomposition would not result without water, and they suggest that the decomposition is probably as follows—

$$C_{21}H_{20}O_{10} + H_2O = C_{15}H_{10}O_5 + C_6H_{12}O_6$$

* 'Berichte der deutschen chemischen Gesellschaft,' i p. 1775

THE NUTRITION OF PLANTS.

The Italian botanist, Professor Cugini has recently contributed to the Italian Journal of Botany an exhaustive paper on the alimentation of cellular plants. The view most generally adopted with regard to the relative value of the different elementary substances contained in the soil for the nutrition of plants, is that stated by Sachs in his 'Text Book of Botany' (English edition, p. 619), who arranges them in three series, in their order of importance, thus:—

Carbon, Hydrogen, Oxygen, Nitrogen, Sulphur.
Potassium, Calcium, Magnesium, Iron.
Phosphorus, Chlorine.

Professor Cugini distributes them into five series instead of three:—

Carbon, Hydrogen, Oxygen, Nitrogen.
Sulphur.
Potassium, Phosphorus.
Iron, Magnesium.
Silicon.

In order, however, for these elements to become useful to the plant for purposes of nutrition, they must first be combined into proximate food-materials soluble in water or in very dilute acid. These substances he arranges in the following table:—

Necessary	Organic carbon-compounds. Water. An ammoniacal salt. Sulphates of potassium and iron. Phosphate of magnesium. An alkaline silicate.
Occasional	Chloride, Iodide, Bromide } of sodium or potassium. Phosphate, nitrate, or sulphate of calcium, salts of zinc, manganese and aluminum.

The author discusses at length the much vexed question of the part played by potassium in the vegetable economy He considers its function to be altogether different from that of any other elementary body, and to bear a somewhat similar relation to the production of the carbo-hydrates to that which phosphorus bears to the production of the albuminoids. Calcium he does not regard as an indispensable element. Iron must, however, be so considered, from its peculiar relationship to the colouring matter of chlorophyll. He is unable to assign any special function to magnesium, although it appears to be essential.

ACIDUM PHOSPHORICUM DILUTUM.*

BY RICH. V. MATTISON, PH.G.

To the average reader it seems hardly possible that anything new can be said on this subject, so thoroughly has it been discussed and this discussion commented upon by recent writers. The U. S. Pharmacopœia directs either of two processes, directing preferably the oxidation of phosphorus by nitric acid, and the subsequent dilution to the proper specific gravity. The objection to this process, we believe, comes from only one source, viz., the retail druggist, to whom it is both dangerous and insufferably tedious, requiring constant watchfulness regarding temperature, "eternal vigilance" being the only price of safety, besides being a source of constant expense through the breakage of funnels, capsules and the other paraphernalia of the phosphoric acid apparatus usually found at the command of the pharmacist. It is, however, the process usually followed by manufacturers, because of its most striking allurement, viz., cheapness; and for their benefit we will describe a piece of apparatus employed by ourselves for the past two years in the manufacture of this preparation.

We place in the yard attached to the laboratory a tub of twenty-five gallons capacity, into which we place some smooth bricks, and upon these we place a graphite crucible, of say ten gallons capacity, such as are used in the steel works for melting and refining of cast steel, and upon the top of this we insert a funnel and carefully lute the edges with flaxseed meal or clay—having previously placed in the crucible the quantity of phosphorus we wish to convert into phosphoric acid. Into the spout we place a glass tube reaching to the bottom of the crucible, and at the apex insert a small funnel; the apparatus is now complete with the exception of the method of applying heat.

On the upper floors of the laboratory are the steam-pans from which the condensed steam passes through the drip-cock, either to the boiler tank or to the ground below. Now we take a small steam-pipe and attach one extremity to the drip-cock and allow the other to terminate into the tub in which stands the acid apparatus. We start the process by putting the phosphorus into the crucible, luting the funnel as before described, and through the tube in the spout, adding the quantity of nitric acid, slightly diluted, that may be requisite. We then allow the condensed steam to fill the tub, and pay no more attention to it excepting to add water or nitric acid as occasion may require. Through the daily use of the steam-pans, stills, etc., there is abundance of condensed and live steam passing into the tub, the water in which is thereby kept constantly hot, without requiring any attention, and the process may go on for weeks without the slightest danger or annoyance to the motive power, which is furnished at a minimum of expense by the waste product (condensed steam) which would be utilized for no other purpose.

A note here regarding the practical working of the first process by the pharmacist. The case in point is this: We had occasion some time ago to drop into the store of a gentlemen well known for his pharmaceutical attainments, and who makes it an item of especial pride that "he prepares his dilute phosphoric acid from phosphorus direct." Well, at the time of our call we beheld the "youngest apprentice," we judged from the exceedingly crude methods of manipulation he practised, at work on the officinal process in question. To say "he took no note of time" is inapplicable, but that he took no note of *temperature*" certainly is, for his chief design seemed to be to burn the largest amount of phosphorus in the shortest possible time—the phosphorus being mostly on fire, and dense clouds of phosphoric anhydride issuing from the mouth of the funnel escaped up the chimney besides clouding the atmosphere of the store. Upon our modestly offering the suggestion that the proper place for the anhydride was in the capsule instead of the atmosphere, the proprietor rather curtly informed us that "Oh, he (the youngest apprentice before referred to) knows all about it; *he's made it before.*"

These are the facts; the commentary is that if an educated pharmacist is unable to prepare phosphoric acid by this process without losing 50 per cent. of the anhydride, the acid thereby being proportionately reduced in strength, then the process is not a proper one to be left in the hands of druggists generally for the manufacture of this preparation.

The second process of the Pharmacopœia is unsuitable, and should not, on any account, be followed, because of the fact that all the metaphosphoric acid of the United States market is contaminated with quantities varying from 15 to 35, or more, per cent. of sodic phosphate, which is added to the pure metaphosphoric acid by the German manufacturers for the purpose of causing it to concrete into those beautifully transparent, solid masses, in which shape it is more easily handled commercially.

The objections to this process then are very grave ones, viz., that the metaphosphoric acid is largely contaminated with sodic orthophosphate which, upon heating is converted into pyrophosphate, and the resulting acid formed by following the Pharmacopœia process is not only deficient in strength, which varies accordingly with the amount of sodic salt contained therein, but the presence of the pyrophosphate precipitates the corresponding ferric salt when the acid is added to solutions containing iron.

A third process, which is known as "Markoe's process," consists in acting upon phosphorus with bromine in the presence of water. With care the process is esteemed a safe one, but the fact remains that at least one experienced experimenter has had proof positive of the contrary, and we would not recommend the process as one to be left in the hands of the inexperienced, though that it does furnish excellent results at a limited cost is undeniable.

The fourth process is the one we propose for the next Pharmacopœia. It is not designed for the manufacturer, but for pharmacists. Its chief feature is simplicity, combined with ease and rapidity of execution. Its simplicity depends upon the ease with which amorphous phosphorus is converted into orthophosphoric acid by the action of nitric acid, and we would propose the following modification of the first officinal process:

Take of Phosphorus (amorphous) 370 grains.
Nitric acid . . . . 5 troyounces or q. s.
Water, sufficient quantity

Add the nitric acid to eight fluidounces of water in a porcelain capsule, and to this add the amorphous phosphorus; raise the temperature of the mixture to boiling, and evaporate until the solution has lost the odour of nitric acid. (It would be almost superfluous to caution the operator at this period regarding the passage of ortho- to pyro-phosphoric acid by increased temperature.) When perfectly free from nitric acid it should be diluted to the measure of twenty fluidounces, or to the requisite specific gravity, the arsenic and other impurities, if present, having been previously removed.

* Read at the Pharmaceutical Meeting of the Philadelphia College of Pharmacy, December 19th. From the *American Journal of Pharmacy*.

Of a sample of acid prepared by this process one hundred grains were neutralized by twenty-four and six-tenths grains of perfectly dry crystals of acid potassium carbonate; solution of ammonic nitrate gave a yellow precipitate; it did not coagulate albumen or precipitate with tincture of the ferric chloride when mixed in various proportions.

The operation is finished in fifty minutes, and if judicious note of temperature is taken the finished product is free from pyro- or meta-acids, perfectly free from danger either to person or property, no gauze spectacles or additional insurance, a process that the youngest apprentice cannot blunder over; easy, efficient and economical, what more could be desired?

OIL OF CINNAMON LEAVES.*

BY N. A. KUHN.

This oil has a sharp, biting taste, with an odour reminding at first very faintly of nutmegs, afterwards strongly of cloves, but if heated with KHO that of cinnamon is predominant. The colour is near that of true oil of cinnamon, and the specific gravity is about the same, it being a little heavier than water, sinking when put in that liquid.

It does not fulminate with iodine, does not give any colour with nitro-prusside of copper, nor with hydrochloric acid; with nitric acid a brown colour similar to an iodine stain; with sulphuric acid a violet purple, which is turned brown by nitric acid, as the oil treated with the latter alone is.

A portion was treated in a test tube with a small portion of sulphuric acid and potassium bichromate. In the vapours from this a piece of bibulous paper that had been dipped first in guaiac tincture, then in a weak solution of cupric sulphate, was turned blue, showing the presence of hydrocyanic acid. Care was taken that the oxidizing agent was not in excess, else the benzoic aldehyd, which was generated from the cinnamic acid contained in the oil, would be converted into benzoic acid, which is odourless, and would not give any reaction in the state of vapour.

This reaction, showing the presence of cinnamic acid, was obtained from the distillate of the next also.

Another portion of the oil, after adding some potassa, was heated and the vapour condensed. The part remaining was treated with dilute hydrochloric acid and filtered. To the filtrate nitric acid was added and the liquid concentrated, when a reddish-brown resin and star-shaped crystals, resembling oxalate of ammonium, were obtained.

A solution of the crystals yielded a precipitate with calcium chloride which was insoluble in acetic acid, but soluble in hydrochloric acid, showing an oxalate. This with the brown resin indicates that eugenic acid ($C_{10}H_{12}O_2$) was present.

When the nitric acid was added, an odour so familiar was produced that it took some time to place it. It was that of aromatic vinegar, indicating that acetic acid was also among the products of the decomposition of residue left in the test tube.

MERCURIC PEPTONE AS A SUBSTITUTE FOR THE PROPOSED MERCURIC ALBUMINATE.†

Albuminate of mercury was introduced into medical practice not quite one year ago,‡ and it appears to have already found a substitute in the so-called "Mercuric Peptone." Prof. H. v. Bamberger, who originated the abulminate, found that it was not merely difficult to prepare a clear and pure solution of this compound, but that it was moreover rather liable to spoil by keeping. He therefore replaced the albumen by a substance nearly related to it, namely, peptone. This latter body is easily soluble in water, resists the effects of heat, alkalies and salts, may be easily filtered, and forms a compound with mercury without difficulty. To prepare the latter, it is necessary to first make a solution of mercuric chloride (corrosive sublimate) of exactly five per cent., and a solution of sodium chloride of twenty per cent. One gramme of meat-peptone is dissolved in 50 c.c. of water, and 20 c.c. of the mercuric chloride solution are added. This produces cloudiness, which is removed by the further addition of 15-16 c.c. of the sodium chloride solution. The finished liquid contains one per cent. of mercuric peptone. The results of all trials which have thus far been made with this preparation are very satisfactory.

* From the *American Journal of Pharmacy*, January, 1877.

† From *New Remedies*, December, 1876.

‡ *Pharm. Journ.*, vol. vi., p. 961.

TREATMENT OF RINGWORM BY LEAVES OF CASSIA ALATA.*

BY DAVID FOULIS, M.D.,

Lecturer on Pathology, Glasgow Royal Infirmary School of Medicine.

When resident in India (Cachar) many years ago, I had numerous opportunities of observing a form of vesicular ringworm which afflicted both natives and Europeans. It commenced by a minute cluster of vesicles on the skin, soon extending in the form of a ring, or segment of a ring, the centre being left free; it was very itchy, and the scratching which this induced left the little vesicles torn, and the surface raw and weeping, or else covered with scabs. Not a few of the tea-planters of the district caught the disease; and they resorted to various remedies, the favourite one being the ointment of the red iodide of mercury, applied so as to blister the skin. This gave a temporary relief at the cost of a good deal of suffering, especially if the surface affected were large. But none of the remedies in use there could at all compare for efficacy with the native remedy. This consisted in the fresh leaves of the *Cassia alata*, called in Hindostanee the "daod patta." A few of the leaves were taken and vigorously rubbed over the diseased area until the leaves were torn to fritters; the expressed juice was left to dry on the skin, which it stained for the time of a light brown colour. The effect invariably was, that the itching at once disappeared, and that in a day or two the skin was restored to its normal healthy aspect. The process of rubbing was by no means painful; on the contrary, the patients seemed rather to feel an indefinite pleasure from it. So useful did I find this remedy, that I procured some cuttings of the plant, and planted them in the vicinity of my bungalow; and many a time have I had the pleasure of relieving those suffering from this annoying disease by the gift of a handful or two of these leaves.

I may mention, by the way, that the imported coolies in the tea-gardens did not suffer so much from the ringworm as the native Cachar villagers. I remember treating one of the latter, whose whole bodywas covered with it; and a few applications of the leaf effected a cure, which I believe was permanent.

It would be interesting to learn whether the Goa powder, recommended by Sir J. Fayrer, contains these leaves in any form; and also, whether their active principle has any affinity with the chyrsophanic acid which Mr. Squire finds so useful in psoriasis. The *Cassia alata* belongs to the same genus as the senna plant, and experiment might reveal some analogy in their therapeutic actions; but I am not aware of any trials of the leaves having been made except as a remedy for ringworm.

* From the *British Medical Journal*, January 20, 1877. The author calls this plant "*Cassia lata*" in the original paper, no doubt in error for the *Cassia alata*, which is included in the Indian Pharmacopœia.—Ed. P. J.

The Pharmaceutical Journal.

SATURDAY, JANUARY 27, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, *17, Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

WHAT IS ADULTERATION?

UNDER the title "What is Adulteration?" the *British Medical Journal* has published an article, which appears to be the first of a series intended to elucidate this question, and, *apropos* of the Runcorn case, milk of sulphur has unhappily been selected as the starting point of the discussion. The whole tenour of the writer's remarks indicates that he entertains a decided opinion in favour of restricting the term "milk of sulphur" to the preparation of sulphur ordered in the British Pharmacopœia under the designation of precipitated sulphur. Having his mind possessed by this idea it is both natural and necessary that he should come to the conclusion that the other preparation, about which there is so great a difference of opinion, is an adulterated article.

Beyond affording an illustration of the self-satisfaction with which a fallacy may be propped up by this circular style of argument we fail to perceive that the article in the *British Medical Journal* has done anything to throw light on the question whether the sale of the "milk of sulphur" prepared according to the directions of the Pharmacopœia of 1721 is, or is not, a breach of the law.

It is true the article contains a number of *ex cathedrâ* affirmations, let off with all the assurance requisite for concealing their want of sound foundation in fact; but there is neither evidence nor argument to support them. The evidence given on the Runcorn case, to the effect that the sulphur was rendered much more beneficial by the presence of hydrated calcium sulphate, is disposed of simply by calling it "remarkable," and attaching a note of admiration; but this mode of procedure is scarcely sufficient to dispose of the facts upon which that evidence is based. Again sulphate of lime is pronounced to have no medicinal properties, though we are not favoured with a statement of the grounds upon which this assertion is made. Only a few lines further on, with striking inconsistency, this substance is stated to cause constipation and other unpleasant symptoms when taken internally as an ingredient of some hard waters. This statement we believe to be incorrect, for so far as our experience extends the efficacy of sulphate of lime in hard drinking water is manifested in a precisely opposite manner.

The writer of the article in the *British Medical Journal* has also carried his disregard of fact to the extent of misquoting our report of the Runcorn case, by stating that we described the article sold as milk of sulphur, as actually containing "plaster of paris," and having dragged in this sensational peg, he proceeds to hang upon it an appropriately flimsy argument that milk of sulphur containing sulphate of lime is the precipitated sulphur of the Pharmacopœia in an adulterated form, and it is suggested that the more correct name would be "plastered sulphur."

We regret our inability to designate this language as being either "learned," or altogether honest. The merest tyro in chemistry knows well enough the difference between plaster of paris and the sulphate of lime contained in the "milk of sulphur," and the use of the term plaster of paris in relation to this preparation can only be ascribed to ignorance or unfairness. We will not pursue this point further than to suggest that whatever may be the advantage to be gained by introducing the ideas associated with plaster of paris, it is a means of influencing opinion more adapted for a police court attorney than for a journal representing the medical profession.

It is not less unfair to represent the sale of milk of sulphur as being instigated by fraudulent motives, and in our opinion it is an unworthy course which the writer in the *British Medical Journal* takes when he says:—"Hence profit and loss enter largely into the selection of the compound for sale, and we are, therefore, not surprised that the Chemists and Druggists' Trade Association should take up the defence with such zeal and earnestness." This uncompromising insinuation is based upon the consideration that if hydrochloric acid were used in the decomposition of calcium sulphide the druggist would lose his acid and lime, while if he used sulphuric acid he would utilize them and sell them as sulphur. Probably most of our readers are sufficiently acquainted with the relative value of the materials here in question to appreciate the cogency of such argument, and it would be unworthy of notice if it were not that by its speciousness it carries some weight with persons ignorant of chemistry and prone to be infected by such mental "disease germs."

The contention that "milk of sulphur" containing sulphate of lime is not an article of the nature, substance, and quality demanded by the purchaser because it contains no milk is unaccountably frivolous. With as much reason hepar sulphuris might be objected to because it contained no liver. Again the asserted indigestibility of the sulphate of lime might probably be urged against the sulphur itself, with at least as much reason. Those who defend the sale of milk of sulphur do so upon the ground that it is a familiar article, and one for which there is a decided preference with many persons who also object to the precipitated sulphur.

The presence of sulphate of lime in it is a necessary consequence of the method of preparation authorized by the Pharmacopœia Revision Committee in 1746, and whether the preparation be included or not in the present Pharmacopœia, that fact is sufficient to bring it within the terms of the exceptions provided for in the Sale of Food and Drugs Act, since the sulphur is in the process of preparation unavoidably mixed with sulphate of lime. Whatever objection, real or imaginary, there may be in the minds of some persons to the presence of sulphate of lime, it is at least unfair to call it an adulteration, and still more to call it fraudulent. Precipitated sulphur can readily be obtained by those who desire to have it, and we cannot perceive why those who desire to have the other preparation should be debarred from doing so.

We trust that our contemporary in pursuing the discussion of the question "What is Adulteration?" will in future be more fortunate in the selection of subjects and methods of dealing with them. The question is one well deserving consideration from various points of view, and there is room for rendering good service, not only to the public at large, but also to the trading community, by carrying it out with impartiality and a due regard to the inexorable logic of fact.

LEAD PIPES.

A SHORT time since it was stated that the symptoms of lead poisoning observed in a patient received into one of the London hospitals were traced to their source in the pipes of the public house patronized by him. The man, being an early riser, was in the habit of drinking a glass of spirit as soon as he could obtain it, and being generally the first customer, received it from the publican contaminated, it was affirmed, with a certain quantity of lead that it had dissolved whilst in contact with the pipes during the night. A similar matter seems to have also occupied the attention of the Medical Society of Ghent. In the report just issued of a committee, of which DR. MOREL is the reporter, it is stated that cases of saturnine poison are very frequent in Ghent among adults, and that in many cases it has been recognized in persons who are in the habit of frequenting the *cafés* and *estaminets* early in the morning, and drinking beer that has possibly lain in contact with the leaden pipes of the beer engine during the night. After referring to an investigation of Meurin in 1853, which led the French Government to issue a decree prohibiting the use of pipes of lead, copper, or zinc, or of tin containing more than 16 per cent. of lead, in connection with beer engines, the committee expresses its adhesion to the principle of the French decree, and recommends the Ghent Medical Society to take the initiative in impressing upon the Belgian authorities the necessity of dealing with the question immediately.

MUNICIPAL.

AT a special meeting of the Town Council of Cambridge, held January 18, MR. ARTHUR DECK, the Local Secretary of the Pharmaceutical Society, F.C.S., was unanimously elected an Alderman of the Borough in the place of MR. C. E. BROWN, J. P., deceased. We believe it is the first occasion within the memory of the oldest inhabitant of one of our pharmaceutical brethren occupying a seat upon the aldermanic bench in Cambridge.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

A meeting of the Board of Examiners for England and Wales was held on Wednesday, January 24, 1877.

Present—Mr. Williams, President; Messrs. Allchin, Barnes, Carteighe, Gale, Haselden, Martindale, Moss, and Taylor.

The Report of the College of Preceptors on the Preliminary Examination held on January 8 was received.

Two hundred and seventy seven candidates had presented themselves for examination, of whom *one hundred and twenty five* had failed. The following *one hundred and fifty two* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

(Arranged alphabetically).

Adamson, Joseph William ......Epworth.
Alldridge, Charles ....Bath.
Aubrey, Isaac Thomas ....Tredegar.
Bain, John.........................Bridge-of-Allan.
Barker, William ....Grimsby.
Bassingthwaighte Arthur Weston Norwich.
Bell, Robert Rushton ....Liverpool.
Bellerby, William Albert ......Sunderland.
Bennett, Charles Joseph ....Widnes.
Bird, Henry ....London.
Botham, William Bland .... Sheffield.
Bowen, Ebenezer ....Pendre Cilgerran.
Boyd, John ....Carlisle.
Branston, John William ....Bourne.
Bray, William ....Redruth.
Brent, Oscar Bernard ....Ashford.
Bruce, Joseph Percy ....Hastings.
Butterworth, John Thomas ...Manchester.
Cable, John ....Forfar.
Campbell, David ....Motherwell.
Carter, William Henry ....Sutcombe.
Cave, Herbert William ....Wisbeach.
Caw, James Mathew ....Edinburgh.
Chaplin, Joseph H. ....Dolseran.
Charles, William Frederick ...Loughborough.
Charrington, William, jun. ......Lichfield.
Clegg, Thomas ....Macclesfield.
Cockburn, James ....Glasgow.
Cook, Henry Gardner ....Grimsby.
Coombs, William Thomas ......Brentford.
Curry, Nicholas ....Spennymoor.
Dangerfield, William Henry ...Devizes.
Davies, Rees ....Swansea.
Day, John Robert ....Liverpool.
Dow, William ....Kinross.
Drake, Harry Francis ....Stowmarket.
Dye, Charles Page ....Bury St. Edmunds.
Dymond, Thomas Southall ......Bristol.
Eddy, Walter John ....Looe.
Elliott, Charles Robert ....Easingwold.
Ellis, John William...............Abergele.
Elston, William Alfred ....London.
Emmett, Richard ....Paignton.
Evans, Daniel Thomas...........Llandyssul.
Evans, William.....................Cardigan.
Fenton, John Mailler ....Dukinfield.
Field, George Willoughby ......Cambridge.
Findlay, James.....................Glasgow.
Finlay, John S......................Liverpool.
Foden, Edwin ....Eccles.
Forret, John Alexander ....St. Andrews.
Fraser, John ....Edinburgh.
Fryer, John ....Stockton-on-Tees.
Gascoigne, Charles ....Hurworth.
George, Alfred Walter ....Gt. Yarmouth.
Golds, Lewis George ....Steyning.
Gordon, Adam ....Aberchirder.

Goss, Samuel Howard	Barnstaple.
Greenwood, George	Grantham.
Harrison, Thomas	Birmingham.
Harrison, Thomas Nicholson	Lincoln.
Harston, Charles Edward	Lincoln.
Hay, William	Aberdeen.
Hepple, Thomas	North Shields.
Hill, Richard Mainprise	Scarborough.
Hoddinott, Francis Frederick	Chipping Campden.
Hodgson, Isaac Clark	Wishaw.
Holdcroft, Francis Joseph	Coventry.
Hollingworth, Frederick William	Halifax.
Hudson, Tom	Wells.
Hunter, Andrew	Edinburgh.
Hutchinson, John	Kendal.
James, Philip Walter	Egremont.
John, Morgan Thomas	Hirwain.
Johns, Thomas Phillipps	Hirwain.
Jones, James	Liverpool.
Jones, John Albert	Liverpool.
Jones, John Richard	Swansea.
Jones, Morgan Isaac	Aberdare.
Jones, William Forsyth	Notting Hill.
Judge, Edgar Harvey	Newark-on-Trent.
Kennedy, William	Kirkcaldy.
Kettle, Charles John	Talgarth.
Keeling, John Henry	Hackney.
Kilner, Frederick James	Bristol.
Kitchin, John	Ulverston.
Lambert, Oliver	Hull.
Leach, John Pickering	New Shoreham.
Lee, George West	Melton Mowbray.
Lewis, David Thomas	Hackney.
Lewis, John	Hanley.
Lissaman, Thomas	Coventry.
Lloyd, Thomas	Stratford.
Logan, Robert	Beith.
Low, Robert	Norwich.
Lowe, William	Lynn.
MacDermott, Robert John	Islington.
McKee, Samuel Chambers	Manchester.
Markham, Alan Douglas	Hull.
Meadows, Francis James	Shepherds' Bush.
Michie, Charles Coutts	Aberdeen.
Miller, John William	Preston.
Milner, Henry Robert	Doncaster.
Moffet, William Emslie	Carlisle.
Morgan, Edwin Abraham	Callington.
Morrison, John	Belfast.
Mortimer, Edward	Clifton.
Moyle, Walter Henry	Helston.
Newbery, Frank	Lambeth.
Northey, Edward John	Truro.
Oates, Edmund Ernest	York.
Orton, Arthur	Foleshill.
Otty, William Hare	West Bromwich.
Owen, John	Cwmllwchur.
Parkinson, William Armor	Preston.
Partington, Reginald James	St. Asaph.
Pearson, John	Nottingham.
Phillips, Benjamin	St. Clears.
Pigg, Joseph	Hexham.
Pirie, William	Arbroath.
Pursell, John Rushton	Liverpool.
Redman, Annie Maria	Birmingham.
Robertson, George	Burntisland.
Rouse, Frederick William	Clapham.
Scott, John	Fraserburgh.
Sellen, Elijah	Maidstone.
Shone, Owen Ellis	Lambeth.
Simpson, Samuel	Gosport.
Skidmore, John	West Bromwich.
Smith, Alex. Cyril Thompson	Horsleydown.
Smith, James William	Louth.
Smith, Thomas	Wellingborough.
Smith, Tilson	Manchester.
Sollitt, Arthur	London.
Spinks, Alfred William	Rhyl.
Stacey, Frederick Charles	London.
Steer, Thomas	Islington.
Tennant, Alfred	Lancaster.
Thomas, John Edward	Swansea.
Thompson, Lawrence	Sunderland.
Thompson, Richard	Sunderland.
Turney, Edward Genge	Plymouth.
Walker, David	Forfar.
Walker, Edward	Leeds.
Watson, Robert William	Maryport.
Whiteley, George	York.
Wigg, Willis	Lynn.
Winter, Joseph	Lancaster.
Withers, Herbert Percival	Penwortham.
Woodcock, Herbert de Carle	Sheffield.
Wright, Harry	Bradford.
Young, Herbert William	Manchester.

The Questions for Examination were as follows:—

First or Preliminary Examination.

January 8th, 1877.

(*Time allowed: Three hours for the three subjects.*)

I. Latin.

1. Translate into English:—Dum hæc in colloquio geruntur, Cæsari nuntiatum est equites Ariovisti propius tumulum accedere et ad nostros adequitare, lapides telaque in nostros conjicere. Cæsar loquendi finem facit, seque ad suos recepit, suisque imperavit, ne quod omnino telum in hostes rejicerent. Nam etsi sine ullo periculo legionis delectæ cum equitatu prœlium fore videbat, tamen committendum non putabat, ut, pulsis hostibus, dici posset eos ab se per fidem in colloquio circumventos.

2. Decline *hæc, lapides, telum*; and together, *ullo periculo*.

3. Account for the cases of *equites, tumulum, hostes, periculo, legionis*, and for the mood of *posset*, in the passage above.

4. Give the present, the perfect, the infinitive, and the supine of *accedere, rejicerent, facit, recepit, putabat, videbat.*

5. Define an Ablative Absolute, and give two examples.

II. Arithmetic.

[The working of these questions, as well as the answers, must be written out in full.]

6. What number subtracted from three hundred and sixty-five millions twenty-seven thousand and forty-five, will leave eighty-four thousand two hundred and six?

7. A bankrupt's debts are £5760, he is able to pay 12*s.* 0½*d.* in the £; find his assets. How much will a creditor to whom he owes £48 10*s.* lose?

8. Simplify:— $(3\frac{3}{20} \times 15\frac{4}{7}) - \left(\frac{2}{3\frac{3}{4}} \div \frac{2\frac{3}{4}}{3}\right)$.

9. Reduce $\frac{17}{256}$ and $\frac{1}{101}$ to decimals; and find the value of 36·42 tons at 17*s.* 7¼*d.* per ton.

10. What will be the cost of glazing a window containing 60 squares, each 1 ft. 3 in. long, and 11¼ in. wide, at 5*s.* 4*d.* per square foot?

III. English.

11. Define the term *Pronoun*. What is meant by *personal, relative,* and *demonstrative* pronouns? Give the objective cases of the pronouns *I, he, it, me, they, who.*

12. In what ways may the feminine of nouns be formed from the masculine in English? Give the feminine forms of the following nouns:—*author, duke, hero, king, czar, executor, earl, nephew, he-bear, turkey-cock.*

13. Parse the following lines:—

"A sensitive plant in a garden grew,
And the young winds fed it with silver dew."

14. Give a sketch of the life of Queen Elizabeth, *or* Charles I., *or* Oliver Cromwell; *or* write a short account of the late Arctic Expedition.

The following is a list of the Centres at which the examination was held, showing the number of candidates examined at each Centre, and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	6	4	2	Leicester	3	2	1
Aberystwith	1	1	0	Lincoln	8	4	4
Barnstaple	1	1	0	Liverpool	10	7	3
Birmingham	12	7	5	London	39	16	23
Boston	1	0	1	Lynn	2	2	0
Brighton	3	2	1	Macclesfield	2	1	1
Bristol	7	4	3	Manchester	14	6	8
Cambridge	4	2	2	Newcastle	9	5	4
Canterbury	3	2	1	Northampton	3	1	2
Cardiff	4	2	2	Norwich	10	5	5
Cardigan	2	2	0	Nottingham	6	2	4
Carlisle	5	4	1	Oxford	2	0	2
Carmarthen	2	1	1	Perth	1	1	0
Carnarvon	4	3	1	Peterborough	3	2	1
Cheltenham	1	0	1	Plymouth	5	4	1
Chester	3	2	1	Portsmouth	2	1	1
Colchester	1	0	1	Preston	9	6	3
Darlington	8	3	5	Reading	2	1	1
Doncaster	2	2	0	Scarborough	1	1	0
Dundee	6	4	2	Sheffield	3	1	2
Edinburgh	13	6	7	Shrewsbury	3	1	2
Exeter	3	1	2	Stafford	2	1	1
Glasgow	11	6	5	Swansea	6	6	0
Hereford	2	1	1	Taunton	1	0	1
Hull	5	4	1	Truro	3	3	0
Leamington	1	1	0	Worcester	1	1	0
Leeds	10	4	6	York	6	3	3

The following Certificates were received in lieu of the Society's Examination:—

Certificate of the College of Preceptors.

Braithwaite, John Oldham ......London.

Certificate of the Royal College of Surgeons of England.

Billinton, Arthur ....London.

Certificate of the University of Cambridge.

Rookledge, Francis Eyre.........Easingwold.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The third meeting of the session of this Association was held on the evening of Wednesday, 17th January last. In the unavoidable absence of the President (Mr. Frazer), Mr. Kininmont, Vice-President, occupied the chair.

After the usual preliminary business was disposed of, Dr. A. T. Machattie, F.C.S., etc., was called upon, and delivered a most interesting and instructive lecture, the first of a course of three, on "Modern Chemistry," the subject being treated in its general relations to all the other natural sciences.

The lecturer began by discussing the various theories held by ancient and modern philosophers regarding the existence or non-existence of what we understand by the term *matter*. Assuming its existence, the divisibility, finite or infinite, was then commented on, with reference especially to the atomic theory. *Inertia*, or the absence of any power in matter to spontaneously change its position or condition, coupled with the obvious fact that matter is not at rest, led to the meaning of what is now known as *motion* or *force*, and the domain of natural science shown to be limited to a consideration of *matter* and *force*. It was stated that many kinds of matter and many kinds of force exist, but however much the appearance of the former or direction of the latter may vary, matter and force are equally indestructible. If matter could be created or annihilated by any human means, or if motion could originate in or proceed from nothing, or lapse into nothing, no science of chemistry could possibly exist.

The different kinds of motion in matter, *i.e.*, movements of masses of homogeneous molecules and of heterogeneous molecules were next considered. The last-named being referred to as the special province of chemistry.

The lecture concluded by a sketch of some of the happy guesses at truth made by the alchemists and other early philosophers, which in some instances come so near to the most advanced theories of modern natural science.

The lecture was listened to with marked attention, many of the points being loudly applauded, and at the close the customary vote of thanks was cordially given to Dr. Machattie.

The second lecture will be given on the 31st inst.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, January 18, 1877, Professor Odling, F.R.S. Vice-President in the chair. After the names of the visitors had been announced, and the minutes of the previous meeting read and confirmed, the following names were read for the first time:—Messrs. Michael Conroy, A. Pearson Luff, A. W. Glover, J. Angell, J. Bardsley, and M. Algernon Adams. Messrs. William Harrington, John Comyns Leach, and the Rev. D. W. Sadler, were ballotted for and duly elected, after their names had been read the third time.

The first paper, by Dr. E. Jäger, "On Some Derivatives of Dithyamyltrichlorethane," was read by the Secretary. The author prepares the substance by the action of sulphuric acid diluted with one-third its volume of acetic acid on a mixture of chloral (one molecule), and thymol (two molecules). It forms colourless monoclinic crystals, melting at 198°, and by the action of oxidizing agents is converted into thymoquinone. Dithymyltrichlorethane, $Cl_3CH\langle{}^{C_{10}H_{12}OH}_{C_{10}H_{12}OH}$ when heated with zinc dust yields dithymylethane $CH_3CH\langle{}^{C_{10}H_{12}OH}_{C_{10}H_{12}OH}$ and dithymylethene $CH_2{=}CH\langle{}^{C_{10}H_{12}OH}_{C_{10}H_{12}OH}$ the former crystallizing in flat plates, which melt at 180°, and the latter in needles, melting at 170°. By the action of feeble oxidizing agents it yields a green crystalline compound, *dithymylquinhydroethene*, $CH_2{=}C\langle{}^{C_{10}H_{12}OH}_{C_{10}H_{12}O} \; {}^{OH\,H_{12}C_{10}}_{—\;O\,H_{12}C_{12}}\rangle C{=}H_2C$ which by the further action of the oxidizing agent is transformed into a red substance, *dithymylquinonethene*, $CH_2{=}C\langle{}^{C_{10}H_{12}O}_{C_{10}H_{12}O}\rangle$ these are related to one another, and to the parent hydrocarbon in the same way that green quinhydrone and quinone are related to hydroquinone.

The Chairman said the fellows were much indebted to the author for introducing to their notice these complex compounds related so nearly to the quinones.

Dr. Armstrong said the experiments of Dr. Jäger possessed considerable interest, and although he agreed with him as to the formula he had assigned to the quinone, he could not say as much for that attributed to the green crystals, for it must be remembered that in the formation of green quinhydrone three molecules of quinone took part, and not two, so that it was highly probable that the author's green compound should be represented as derived from three molecules of quinone, and not two only.

The next paper "A Preliminary Account of Some New Reactions in Organic Chemistry, and their ultimate bearings," by Mr. C. T. Kingzett and Dr. H. W. Hake, was read by the former. After referring to the colour reactions known as the "Pettenkofer reaction," produced by the action of strong sulphuric acid on a mixture of sugar and cholic acid, and some other substances, as glycocholic, hyocholic, oleic and lithofellic acids, etc., and various compounds occurring in brain substance; the authors state that they have found that many other bodies behave in a similar manner, as benzene, phenol, turpentine, camphor, salicylic acid, pyrogallol, piperin, morphine, clove and other essential oils and various fatty bodies. Camphor dissolves in concentrated sulphuric acid, forming a deep red solution, and this when mixed with cane sugar syrup solidifies to a rose-coloured paste, but on adding water the colour is destroyed, and an almost colourless precipitate produced, which is soluble in ether. When treated with sulphuric acid it now gives the colour reaction without the addition of sugar, although even when boiled for several hours with dilute sulphuric acid, no sugar could be detected in the solution, in which this substance differs in a marked manner from the ordinary glucosides. From a comparison of the reactions yielded with the Pettenkofer test by benzene, benzoic acid, and phenol on the one hand, and turpentine, camphoric acid, and camphor, on the other, the authors are of opinion that camphor stands in a somewhat similar relation to turpentine that phenol does to benzene, and camphor indeed may be the phenol of turpentine, and not a ketone as ordinarily supposed. The authors concluded with some observations on the ultimate bearings of these new reactions, which they consider to cover a very wide field, leading, for instance, to the question of the general constitution of sugar and similar substances. Some of the reactions mentioned in the paper were exhibited.

Dr. Odling having thanked the authors for their interesting paper, Mr. C. E. Groves asked whether they considered the new compound obtained with the camphor solution and sugar to be of the nature of a glucoside, or whether the cane sugar which they employed was converted into glucose.

Mr. Kingzett replied, that from the difference observed when such bodies as mannite were substituted for sugar in the reaction, he considered it probable that glucose might be found. The compound, however, was not an ordinary glucose or saccharide, as it was not decomposed by boiling with dilute acids; he believed, however, it would prove to be of the nature of a substitution derivative of a hexatomic alcohol $C_6H_8(OH)_6$, in which one or more OH groups were replaced.

Dr. Armstrong said they were much indebted to the authors for bringing before their notice these interesting colour reactions, but he thought the facts adduced as yet did not justify the speculative conclusions which they had shown, as for instance, that the relation between camphor and turpentine was similar to that between phenol and benzene.

Mr Kingzett replied, that although he had not done so, he could give structural formula to illustrate his meaning, and proceeded to show how some of the brain substances were split up under the action of sulphuric acid, when they gave this colour reaction. With regard to the relation between turpentine and camphor, he considered there was strong evidence to prove that camphor was a phenol, and comparatively little to show that it was a ketone. The relation was brought out distinctly, on comparing the formulæ.

Benzene C_6H	Turpentine $CH_3\ C_3H_7\ C_6H_6$
Phenol $C_6H_3\ OH$	Camphor $CH_3\ C_3H_7\ C_6H_6\ OH$

Dr. Wright remarked, that although one argument in favour of the hydroxyl nature of camphor was its behaviour with such reagents as zinc chloride and phosphorus pentasulphide, giving rise to cymene, yet on the other hand, with phosphorus pentachloride, it yielded dichlorinated derivatives, which was not in accordance with the ordinary behaviour of alcohols under similar circumstances.

The next paper on "Dinitroso-orcin and Dinitro-orcin" by Dr. J. Stenhouse, F.R.S., and Mr. C. E. Groves, was read by the latter. The authors, after some preliminary remarks on the nitroso-compounds, described the method for the preparation of dinitroso-orcin, $C_7H_4(NO)_2(OH)_2 + 2OH_2$, which consisted in adding a solution of nitrosyl sulphate, NO,HSO_4, in strong sulphuric acid, to a dilute solution of orcin when the nitroso-orcin was deposited after a short time as a yellowish brown powder. It was purified by suspending it in alcohol, and converting it into the ammonium compound by the cautious addition of alcoholic ammonia. The green crystals thus produced are collected, pressed, and decomposed by dilute acid; a repetition of the process suffices to render the nitroso-orcin pure. In this state, it is a pale-coloured crystalline powder, insoluble in water, alcohol, ether, benzene, etc., but decomposed by boiling with alcohol. It forms green crystalline salts with potassium, sodium, and ammonium, but those of the alkaline earths and heavy metals are brown amorphous precipitate.

Dinitro-orcin, $C_7H_4(NO_2)_2(OH)_2$, strong nitric acid converts nitroso-orcin into trinitro-orcin, but with dilute nitric acid in the cold it yields dinitro-orcin. This crystallizes in deep yellow rhomboidal plates, which melt at 164°.5 C, and may, with care, be sublimed at a higher temperature. Heated rapidly on platinum foil, it deflagrates. Dinitro-orcin is almost insoluble in cold water, moderately soluble in cold alcohol, and readily in ether. The alkaline salts of dinitro-orcin crystallize with difficulty, but with barium it forms compounds, one, of a deep crimson colour, and insoluble in water, which is basic, the other having the composition $[C_7H_4(NO_2)OH]_2\ BaO_4 + OH_2$ is sparingly soluble in boiling water, but crystallizes out almost completely on cooling, in long silky needles of a brilliant orange colour. The authors also find that nitrosyl sulphate may be advantageously employed in the preparation of nitroso-phenol, nitroso-thymol, nitroso-naphthol, and dinitroso-resorcin. This paper was experimentally illustrated.

The Chairman having thanked the author, the Secretary read a paper by Dr. T. Carnelley "On High Melting Points, with Special Reference to those of Metallic Salts, Part III." The author has determined the "time values" of nine standard salts, by comparing the time of melting with that of sulphur; the times of melting of the different salts always bearing a constant ratio to one another and to sulphur, and this ratio is the true value for each given salt. By interpolation, the author has constructed a table giving the melting points corresponding to various time values from 0 to 241.

After the Chairman had thanked the author in the name of the Fellows, he adjourned the meeting until Thursday, February 1, when there will be a paper by Dr. H. E. Armstrong, "On Kekulés and Ladenburg's Benzene Symbols," and one on the formation of coumaric, cinnamic, and other analogous acids, from the aromatic aldehydes, by Mr. W. H. Perkin.

Parliamentary and Law Proceedings.

THE SALE OF FOOD ACT IN THE QUEEN'S BENCH.

IMPORTANT OPINIONS OF THE JUDGES.

On Wednesday Jan. 17, two appeals from the Justice of Derby, under the Sale of Food and Drugs Act of 1875, were heard before Mr. Justice Mellor and Mr. Justice Lush; but owing to the cases not being sufficiently explicit on certain points they were sent back to the magistrates to be re-stated. There was, however, a good deal of argument, from which our readers will learn how the judges view the Adulteration Act. There were two cases—Sandys *v.* Markham, and Sandys *v.* Clarke—the appellant being the inspector appointed to prevent the adulteration of food and drugs in Derby. The Court took the first case of Sandys *v.* Markham, stated by the magistrates, from which it appeared that on March 24, 1876, at the County Hall, Derby, an information was laid by the inspector against Emma Markham, charging her with unlawfully selling to him "to his prejudice, half a pound of an article of food, purporting to be mustard, but which article was not of the nature, substance, and quality of mustard, which was the article then demanded by him." The charge was framed under the Act of 1875. It was proved, and not disputed, that on the day in question, the inspector entered the shop and asked for half a pound of mustard, and the respondent weighed out and supplied to him from a mustard-tin, half a pound of what appeared to be mustard; but there was no label on the tin indicating the nature of the article sold. But on an analysis, it was found to be a compound of mustard, with about 35 per cent. of wheaten flour, turmeric, and cayenne pepper. It was submitted, that notwithstanding the admixture of these articles, the article sold was of the nature, substance, and quality of mustard, and that the inspector not having paid the price of pure mustard, had got what he asked for, and value for his money. There was no proof of what were the relative prices of the pure mustard and of the article sold. It was alleged by the respondent, and not disputed, that she had bought the article in the state in which she sold it; but it did not appear of whose manufacture the article was, or whence she obtained it. It appeared on the reading of two letters from Messrs Colman, the mustard manufacturers, in reply to the request of the magistrates (and which were taken as evidence), that in the course of their business, they make and supply to their customers a considerable variety of articles of the nature of mustard, some professing to be "pure mustards," and others "mustard condiments," produced mainly by the admixture of wheaten flour; and that some regard the pure mustard as nauseous, and consider the mustard condiments more palatable. The inspector contended—first, that though the article might be said to be of the nature of mustard, it could not be said, considering the large admixture of flour, turmeric, and cayenne pepper, to be of the nature, substance, and quality of mustard; and, secondly, as he asked for mustard, he was entitled to receive pure mustard; or, if not, he ought to be informed by a label that the article was mixed with some other ingredient; and, thirdly, that the fact of Messrs. Colman selling mustard condiments as distinct articles of commerce from pure mustard, showed that the label was necessary to protect the seller. The case concludes—"We being of opinion—firstly, that the article so sold was, though not pure mustard, at least an article of the nature, substance, and quality of mustard; secondly, that the thing was not to the prejudice of the purchaser; and, thirdly, that the respondent was exempt from the penal consequences under sub-section 1 of section 6, on the ground that the matters or ingredients were not injurious to health, and were required for the production or preparation of an article of commerce in a state fit for consumption—dismissed the information. If the Court should be of opinion that the article sold was of the nature, substance, and quality of mustard, or that it was not sold to the prejudice of the purchaser within the meaning of the Act of 1875; or that sub-section 1 of section 6 exempted the seller of such an article from the penalties imposed by that section, then our decision will stand; if otherwise, the Court will please ask us to re-hear the case."

Mr. Buck appeared for the appellant; and Mr. Firth appeared for Markham; and Mr. Wills, Q.C., for Clarke.

Mr. Buck having read the case,

Mr. Justice Lush observed that, as far as the case stated, the article sold here was neither the "pure mustard" nor the "mustard condiment" that Messrs. Colman speak of.

Mr. Buck: It is composed of 65 per cent. of mustard, with 35 per cent. of wheaten flour, turmeric, and cayenne pepper; and that proportioned to the half pound would be as three ounces of the mixture to five ounces of the pure mustard. In the case of Clarke the difference was that there was 75 per cent. of mustard and 25 per cent. of wheaten flour, turmeric, and cayenne pepper. The learned counsel then quoted the preambles of the Adulteration Acts of 1874 and 1875, showing that the Legislature desired that food and drugs should be sold in a pure and genuine condition. Section 6 of the Act of 1875 prohibited the sale of articles of food and drugs not of the proper nature, substance, and quality of the article demanded by the purchaser, and a penalty not exceeding 20*l.* was imposed for the offence. Then the following proviso came in: "An offence shall not be deemed to be committed under this section in the following cases; that is to say (1) Where any matter or ingredient not injurious to health has been added to the food or drug because the same is required for the production or preparation thereof as an article of commerce, in a state fit for carriage or consumption, and not fraudulently to increase the bulk, weight, or measure of the food or drug, or conceal the inferior quality thereof;" then sub-section 4: "Where the food is unavoidably mixed with some extraneous matter in the process of collection or preparation." This section is important. It says: "Provided that no person shall be guilty of any such offence as aforesaid in respect of the sale of an article of food or a drug mixed with any matter or ingredient not injurious to health, and not intended fraudulently to increase its bulk, weight, or measure, or conceal its inferior quality, if at the time of delivering such article or drug he shall supply to the person receiving the same a notice, by a label distinctly and legibly written or printed, on or with the article or drug, to the effect that the same is mixed." Then the 13th section enables certain officers (including the appellant) to obtain a sample to submit it to analysis; and section 24 says: "In any prosecution under this Act, where the fact of an article having been sold in a mixed state has been proved, if the defendant rely upon any exception or provision contained in this Act, it shall be incumbent on him to prove the same." Then section 25: "If the defendant prove to the satisfaction of the justices or Court that he had purchased the article in question as the same in nature, substance, and quality as that demanded of him by the prosecutor, and with a written warranty to that effect, that he had no reason to believe at the time when he sold it that the article was otherwise, and that he sold it in the same state as when he purchased it, he shall be discharged from the prosecution, but shall be liable to pay the costs incurred by the prosecutor, unless he shall have given due notice to him that he will rely on the above defence." Now, here it was not proved that the defendant had purchased the article in question as the same in nature, substance, and quality as that demanded by the prosecutor, and she had no written warranty, and she had no reason to believe that the article was otherwise.

Mr. Justice Lush: That is the case of buying with a written warranty.

Mr. Buck: She has to prove all these things to entitle her to the benefit of this section. If she had a warranty she could recover the penalties from the person who sold the goods to her; but in order to do that she must show that she sold the article in the same state in which she received it. There is no protection to the seller of a mixed article unless he affixes a label showing that he sells it as a mixed article.

Mr. Justice Lush: What does the third sub-section of section 6 mean, "where the food or drug is compounded as in this Act mentioned?"

Mr. Wills: It means nothing at all. The former part of the Act has been struck out probably, and it has been left in.

Mr. Justice Lush: That must be so.

Mr. Buck continued: This question of the adulteration of mustard has been already decided in the case of Pope *v.* Tearle (ninth volume of the Law Reports, Common Pleas, page 499). It is a decision on the 3rd section of the Act of 1874, and it shows that this admixture of mustard brings the persons under the penalties of the law. It was there held that "a person who had sold mustard admixed with flour and turmeric (substances not injurious to health), declaring at the time of such sale that he did not sell the article as pure mustard, had not been guilty of any offence, and that it was not necessary to declare the proportion of the substance admixed." If he had sold the article without such a declaration he would have been convicted of the offence of selling an article adulterated as unadulterated. The question in this case is whether this stuff sold to the appellant was of the "nature, substance, and quality of mustard."

Mr. Justice Lush: Is it to be alleged that flour is of the nature of mustard?

Mr. Justice Mellor: Would not it be the same as saying that milk and water are the same?

Mr. Buck: There was a case about gin, which I have not been able to find, where there was an admixture of 40 per cent. of water to 60 per cent. of gin, and it was held that that was not gin.

Mr. Justice Mellor: It was gin and water.

Mr. Justice Lush: At present I am utterly unable to see how flour can be of the same "nature, substance, and quality as mustard."

Mr. Justice Mellor: In the gin case did they hold that was an adulteration?

Mr. Buck: Oh, yes.

Mr. Justice Lush: That water was not of the nature of gin.

Mr. Buck: The next point is whether this was a sale to the prejudice of the purchaser."

Mr. Justice Mellor: It was not bought for consumption. The case does not state for what purpose it was bought.

Mr. Justice Lush: It has reference to the article that is sold to the public.

Mr. Buck: I put it thus: That a person by asking for mustard is entitled to be supplied with mustard, and not with sixty parts of mustard and forty parts of flour, turmeric, and cayenne pepper.

Mr. Justice Mellor: You say that it ought to be hot in the mouth, and they say it ought not. It might be required for a mustard-plaster.

Mr. Justice Lush: If the buyer asks for a pure article, and gets an adulterated article, that is to his prejudice, I suppose?

Mr. Buck: Yes.

Mr. Justice Lush: The 6th section says that the seller shall not be deemed to have committed an offence if the ingredients were necessarily put into the article sold to render it fit for carriage or consumption.

Mr. Wills: Have not the magistrates found it so?

Mr. Justice Lush: This admixture is liked by many people; but nobody would say that the admixture was necessary to make it "fit for carriage or consumption." It is perfectly fit for consumption when it is pure.

Mr. Firth, for the respondent Markham, began by reading from a copy of the *Times* of May 29 last, the decision of Baron Cleasby in the gin and water case referred to above. It was an appeal under the 6th section of the Adulteration Act of last year; and the question was whether, when a man asked for gin, it was an offence to sell him gin and water.

Mr. Justice Lush: The retailer is liable, whether he knows of the adulteration or not.

Mr. Justice Mellor: He is bound to know what the article is composed of that he is selling.

Mr. Justice Lush: It is only where he buys with a warranty that he is protected.

Mr. Firth: The gin case goes to this point—that a certain article was sold as gin containing 20 per cent. of water, and it was held to be no adulteration; and according to the finding here, the sale of the mustard would be 35 per cent. below proof.

Mr. Justice Lush: It does not appear that Mr. Colman sells his "mustard condiments" as "mustard."

Mr. Justice Mellor: In contracts of sale in products where there is a certain mixture of inferior matter, the question arises whether it reasonably answers the description. But the fact here is, that there is such a thing as mustard commonly sold which is pure; and there are also sold "mustard condiments." The magistrates have found the facts in such an odd way that it is difficult to decide. With regard to two of the questions I should have very little hesitation—viz., with regard to the article sold being of "the nature, substance, and quality of mustard, and not sold to the prejudice of the purchaser;" but then comes the difficulty in their finding—"or that sub-section 1 of section 6 exempted the seller of such an article from the penalties imposed by that section, then our decision will stand; if otherwise, the Court will please ask us to re-hear the case." I don't know what they mean by that.

Mr. Firth: They have found that the mustard was in a fit state for consumption. I submit that that was a finding within their jurisdiction.

Mr. Justice Lush: They do not negative the remaining part of the sub-section—"and not fraudulently to increase the bulk, weight, or measure of the food or drug, or conceal the inferior quality thereof."

Mr. Wills: I am quite sure that they would negative that if it were sent back.

Mr. Justice Lush: It may be that the mixture of a certain portion may be required, but that much more would be injurious.

Mr. Wills: I gather from the statement of the case that it never was suggested that there was anything fraudulent or improper.

Mr. Justice Mellor: One doesn't find any statement that it was necessary for the purpose of making it an article of commerce.

Mr. Wills: They have two letters of Messrs. Colman; and I have no doubt that the magistrates would to some extent act upon their own knowledge about such matters; and if it be, as is stated, that the majority of people prefer this admixture to the genuine mustard, then it is an article of commerce, and the mixture is necessary to reduce it to that state, so as to make it fit for consumption as an article of commerce.

Mr. Justice Mellor: It is ambiguous. But if their finding really is such as you suggest, then it would be found a good answer. I certainly don't see anything which induces me to think that it was put in to add to the weight for the purposes of fraud.

Mr. Wills: Of course if it was I quite agree with Mr. Justice Lush that that protection of sub-section 6 would be gone.

Mr. Justice Lush: As to the matter being sold to the "prejudice of the purchaser,"—suppose a man orders a pure article, and he does not get it pure, he is prejudiced.

Mr. Wills: But isn't the man bound to show that he expected to get pure mustard? Whether it is to prejudice or not is a question of fact in each case, and therefore the finding of the magistrates is conclusive.

Mr. Justice Mellor: The case had better go back.

Mr. Justice Lush: They ought to find whether this was the substance usually sold as mustard; and whether the public who order the mustard expect to get this compound instead of pure mustard. If so, then I shall say that the parties who get it are not prejudiced; and then, thirdly, if they don't find that in favour of the respondent, then that exemption of the first sub-section of section 6 does not apply.

The case was remitted back to the magistrates accordingly to re-state the case.—*The Grocer.*

Copper in French Preserved Peas.

At Marlborough Street Police Court on Monday, Louis Barron, Compton Street, Soho, importer of foreign provisions, was summoned before Mr. Knox, charged with selling French preserved peas in tins which were adulterated with copper and, consequently, injurious to health. There were three other dealers summoned, but it was arranged to take one case as decisive of the rest.—The Metropolitan Board of Works prosecuted.—Similar summonses were heard at this court about three weeks ago, and dismissed on technical grounds taken by Mr. Lewis. It was then arranged as differences between analysis results were shown to exist that a portion of the peas should be sent to Somerset House for the investigation of the government analyst.

Frederick Taylor, an officer of the Board of Works, proved purchasing a tin of French *petits pois* at the defendant's shop for analysis.

Mr. Charles Piesse, No. 303, Strand, analyst, analysed a portion of the peas, and produced some of the copper. He had no doubt that copper was present on the peas. He found the result of his analysis was to discover ·56 of a grain in a specified portion of the peas. This quantity taken regularly would, in his opinion, prove injurious to health.—The government certificate of analysis was produced. It stated that the quantity of copper specified contained ·31 parts of a grain. The analysis of Mr. Piesse showed ·56 parts of a grain.

Dr. Evans, district of London officer of health, thought that the quantity of copper found in the peas, if taken repeatedly, would be injurious to health.

Mr. E. Lewis, for the defence, said what he had to establish was that by no possibility could the quantity of copper, taking even the analysis of Mr. Piesse, prove injurious to health.

Dr. Pavy, F.R.S., No. 35, Grosvenor Street, author of a work on food, and lecturer at Guy's Hospital, was of opinion that ·31 of a grain of copper would not be injurious to health. If a tin of peas was consumed at once, he was of opinion that no injury to health would result. Copper was one of the natural constituents of the body.

Mr. Knox said the question was one of great public interest. On the one hand if he gave an adverse decision an important trade would be seriously affected; on the other, if the theory that the peas were injurious to health were correct, the public would be poisoned. It had been shown in the cross-examination for the defence how widely medical men differed in opinion. Taking into consideration the importance of the case he would adjourn his decision that he might fully consider the evidence, and he hoped that the result of the adjournment would be to induce qualified persons to discuss the question in medical circles, and to give him the benefit of their deliberations.—The summonses were then adjourned.—*Standard.*

Poisoning by Phosphorus Paste.

An inquest was held on Thursday, at Dalston, by Mr. Humphreys, concerning the death of Mrs. Emily Mary Ann La Riverie, aged 31 years. Since her last confinement, two years ago, she had suffered from nervous depression.

Mr. John Bambro, grocer, 47, Greenwood Road, recollected, on the 8th inst., selling a lady two threepenny bottles of phosphor paste, but he could not again recognize her. It was a very unusual occurrence for a person to ask for two bottles, but deceased said she was overwhelmed with beetles. The bottles were marked poison, and there was no law against them selling twenty bottles to one person.

Mr. Alfred Thomas Gibbons, surgeon, who was called in to deceased, said that she had swallowed phosphor paste two or three times previously. She said that she had committed the unpardoned sin and wished to die. She died on Sunday from exhaustion, consequent on poison by phosphor paste.

A consultation took place amongst the jury as to the legislature allowing poison to be sold in such a manner, which they strongly condemned. The Coroner concurred with these remarks.

A verdict of suicide whilst in a state of unsound mind was returned.—*Standard.*

Poisoning by Carbolic Acid.

On Wednesday, Mr. John Humphreys, the Coroner, held an inquiry in Finsbury, relative to the death of John Padian, aged 78, through swallowing a quantity of carbolic acid.

Sarah Padian, the widow of the deceased, a labourer, stated that on the night of Saturday, the 20th, they provided themselves with a bottle of beer for Sunday. About seven in the evening of Sunday he asked for some, and she accordingly poured out and made hot what she took to be beer, but which proved to be carbolic acid. Finding him to be in pain, she also took a small quantity to satisfy herself that such was the case, and called in a neighbour and a doctor, but deceased died two hours after.

The jury returned a verdict of "Death by misadventure."—*Echo.*

Death from Eating Hemlock.

An inquest respecting the death of Gabino Simone Carcich, 20 years of age, who died at the Sailors' Home, Falmouth, on Monday January 15, was held on Tuesday by Mr. Carlyon.—Francesco Moroto and Francesco B. Luigi Bosco, the deceased's comrades, gave evidence, the former stating that he partook of what he believed were similar herbs to those that caused the death of the deceased, but he felt no ill effects, nor did the deceased show any alarming symptoms until two hours after he had eaten the herb, when they had arrived at Falmouth, having rowed there from St. Just in Roseland.—Mr. Vigurs, surgeon, who was with the deceased up to the time of his death, gave it as his opinion that he ate the leaves of hemlock, the symptoms being similar to those of hemlock poisoning, and other deaths having occurred in the locality through persons having eaten of that herb.—The jury returned a verdict of "Death from poisoning."—*Western Morning News.*

Notes and Queries.

[532]. LIQUOR FERRI MAGNET. PHOS. COMP., or Lightfoot's Solution of Iron.—Can any reader inform me whether there is a published formula for this preparation, and, if so, where it is to be found?—F. J. B.

[533]. BOILED OIL AND GLYCERINE.—Can any one inform me how to mix Glycerine and Boiled Oil together and remain transparent?

H. S.

[534]. LAC SULPHURIS.—Could you favour me by inserting in your next issue the formula for Milk of Sulphur according to the Pharmacopœia of 1721?

SIRIUS.

"*Lac Sulphuris, P.L.* (1721).

℞ Sulphuris partem unam.
Calcis vivae, vel Salis Tartari partes tres.

Coque in Aquæ Fontanæ q. s. ad solutionem Sulphuris. Filtra calidè; praecipita cum Spiritu Vitrioli; edulcora, et sicca."

[535]. COCCULUS INDICUS.—I shall feel extremely obliged if any reader will inform me through the Journal regarding the dose of Cocculus Indicus. It is being used by some medical men in London, but I can ascertain nothing definite as to the strength of the tincture used by them. What proportion, for instance, might be used with safety to make a tincture—dose 10 to 30 minims? Also whether with Proof Spt. or S. V. Rect?

"SCOTUS."

[536]. SYR. FERRI ACETATIS c. STRYCHNIA ET QUINA.—R. G. would be obliged by being supplied with a form for making this preparation.

Obituary.

Notice has been received of the deaths of the following:—

On the 4th of December, 1876, Mr. George Braylesford Greaves, Chemist and Druggist, Clifton, Derby. Aged 72 years.

On the 9th of January, 1877, Mr. G. T. Naldrett, Pharmaceutical Chemist, late of Hammersmith and Bognor. Aged 34 years. Mr. Naldrett had been a Member of the Pharmaceutical Society since 1872.

On the 15th of January, 1877, Mr. Albinus Roberts, Pharmaceutical Chemist, St. Albans. Aged 63 years. Mr. Roberts was one of the Founders of the Pharmaceutical Society and a Subscriber to the Benevolent Fund from its commencement.

On the 15th of January, 1877, Mr. Joseph Carr, Chemist and Druggist, Normanton.

On the 16th of January, 1877, Mr. William Willson, Chemist and Druggist, Alford, Lincolnshire. Aged 69 years. Mr. Willson had been in business at Alford nearly fifty years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

THE MILK OF SULPHUR QUESTION.

Sir,—Mr. Symons, of Barnstaple, has written a letter which requires correction, and one dealing in personalities so great as to display his animus in no common form. A little calculation would have shown him how absurd it is to talk about a hogshead of water as the quantity required to "clean" one pound of selenited lac sulphuris. His enthusiasm has carried his imagination out of the sphere of lac sulphuris altogether.

My stand-point is this: if properly prepared, milk of sulphur should be free from calcium sulphate whether prepared by the old London form or the Edinburgh one, and it matters not how much water it required to dissolve the selenite, perfect freedom from it is proved by the fact of the lac sulphuris, when submitted to sublimation, leaving no residue.

Want of proper washing is the cause even now of the adulteration coupled with the use of sulphuric acid. I affirm that the test given more than a hundred years ago is the same as recommended by Professor Redwood in Gray's 'Supplement,' *i.e.*, sublimation, and therefore, the Edinburgh and old London formulæ, when the instructions were adhered to, yielded a pure sulphur, and not the adulterated rubbish, containing 50 or 60 per cent. of plaster of paris, advocated by Mr. Symons and others who think as he does.

Does Mr. Symons think that calcium sulphate is easily sublimed? If he does, we shall leave him to indulge in his belief, and think of him as one hopelessly beyond conviction.

As regards Professor Redwood, I must say his evidence requires some explanation, and I cannot reconcile his altered views.

In Gray's 'Supplement,' 3 Ed. 1857, pp. 948 and 949, are given three formulæ for the preparation of precipitated sulphur, viz., a Continental, a United States and a descriptive British one, that of Ph. London. 1851. All are to be prepared by the hydrochloric acid process.

Now I defy Mr. Symons, and all the chemists and druggists in Great Britain, with Professor Redwood and Mr. Oliver Pemberton in conclave, to prove that sulphate of lime should form an integral admixture with the sulphur precipitated by those processes. The thing is impossible. But what is more, Professor Redwood, on p. 949, says the synonym of precipitated sulphur is "lac sulphuris."

Surely in the face of such facts, and with the authorities quoted in my former letter, not one leg is left whereon Mr. Symons and his fellow partisans can stand.

Why Professor Redwood has changed his way of thinking I know not; but I say, as the responsible Editor of the 'British Pharmacopœia,' the medical profession, as well as the public at large, have a right to demand some explanation from his hand not only as to his change of "front" but why the words "lac sulphuris" or "milk of sulphur" were not inserted in the B. P., 1867.

Some good reason was the cause of the omission, no doubt. What was it, and why? If Professor Redwood is right now, he was wrong in 1857.

Mr. Symons should know that selenite is crystallized calcium sulphate, and not ask to be instructed on such a point.

Mr. Pemberton's evidence may satisfy Mr. Symons and others; I have no desire to dispute their tastes, any more than I have the inclination to attach myself to erroneous views.

How can calcium sulphate be a beneficial admixture?

Why not mix jalap and scammony with calcium sulphate if it possesses such beneficial effects?

All authors, then, are agreed that lac sulphuris and precipitated sulphur are one and the same thing, and this was Professor Redwood's opinion in 1857. Mr. Symons' expression about "half-instructed analysts" is ungracious and ungentlemanly.

The Runcorn magistrates were perfectly right in the decision arrived at. A decision otherwise would have been against facts and figures.

HENRY BROWN.

Northallerton, Jan. 20, 1877.

Sir,—From time to time the formulæ and the nomenclature of the pharmacopœial preparations have been again and again altered, the former with the object of improving their medicinal efficacy, the latter with the purpose of more exactly or more clearly indicating their composition. These latter have sometimes been such that if vested in their newest garb their inventors would hardly recognize them. Thus, "Balsamum Traumaticum," of 1746, in course of time became "Tr. Benzoini Co." "Mercurius Dulcis Præcipitatus," of 1721, "Hydrargyri Chloridum," and "Lapis Infernalis sive Septicus," of 1721, became "Potassæ Hydras." or "Potassa Caustica." "Lac Sulphuris," of 1721, though not so completely metamorphosed, is changed to "Sulphur Præcipitatum," a name which it has retained to the present day. Not only was its nomenclature improved but an improved formula was prescribed for its preparation. As when sulphuric acid was employed in its manufacture the resultant precipitate contained some 50 per cent. of calcium sulphate, which no amount of "diligent washings," with an unlimited number of "parcels of water," could well get rid of, hydrochloric acid was substituted for it. Here, in passing I would observe that the London formula, as quoted by Mr. H. Brown, only directs the precipitate to be washed "in fresh parcels of water," till it becomes insipid. That certainly could not mean till all the calcium sulphate was got rid of, for that has less taste than the sulphur. It doubtless meant until every trace of acid had disappeared. The improved formula was evidently intended to prevent the possibility of a person desiring to take a dose of sulphur introducing at the same time into his stomach at least as large a quantity of inert, if not noxious, sulphate of lime. It was not meant to be an addition to the materia medica, the intention was to substitute a scientifically-prepared remedy, for one unscientifically prepared—when the one appeared the other was struck out. Sulphate of lime is not an article of any materia medica. I never heard of any one pretending that it possesses therapeutic virtues, but if what Mr. Pemberton says (page 584) be true then sulphate of lime should forthwith be added to our materia medica, in order to be mixed with any and every purgative powder, to ameliorate its action, and "soften the motion to a creamy consistency that has to come away without pain to the patient." But I don't think Mr. Pemberton will immortalize himself by bringing it into vogue.

I hold that to adulterate pepper with ground rice is excusable compared with adulterating sulphur with sulphate of lime. What would a druggist think if a grocer were found selling arrowroot mixed with sulphate of lime? Yet the fraud would be no greater than the other, beyond the fact that the consumer of the arrowroot would be likely to swallow more of the deleterious adulteration than the consumer of the sulph. præcip.

I deny emphatically that there is either a "great or continuous demand for the genuine (save the mark!) old milk of sulphur," and assert most positively that the reverse is the case. It were sad indeed if in these days of growing enlightenment it were not so. I can only infer from Mr. Symons' statement that the people of Barnstaple who patronize physic are exceptionally benighted. It is many years since I kept any other than the pure article, and when I kept both I never in my life met with an individual, rich or poor, literate or illiterate, who preferred *per se* the sophisticated article to the pure one. Occasionally if a customer were asked whether he wished that at 1*d.* or that 1½*d.*, he would say that he was accustomed to buy that at 1*d.*, but whenever time would permit the explanation, that the one was impure and the other pure, and half the dose would suffice forty-nine times out of fifty, the latter would be preferred, and I have never once found the impure article required since I determined to have none of it. Dr. Bell (*The Analyst*, p. 581) states that out of nine samples sold as "milk of sulphur," eight were genuine, "genuine" in an antithetical sense to that employed by Mr. Symons, *i.e.*, containing no calcium sulphate, thus corroborating my assertion that the reverse of Mr. Symons' statement is correct.

As Sir Robert Peel, when addressing the House of Commons, said of Lord Palmerston, "we are all proud of him," so I am sure every pharmaceutical chemist and member of the Society will say of Professor Redwood; and because they have such regard for him, it is a matter of regret to numbers that he should give his aid to the side he does in this question. The Pharmaceutical Society should be like Cæsar's wife—above suspicion. The desire and endeavour to discountenance anything and everything savouring of adulteration should be unmistakable and patent. In opposition to what Mr. Pemberton and Professor Redwood stated at Runcorn Petty Sessions, I venture to say that a prescription taken to any first-class dispensing pharmacy, either metropolitan or provincial, containing "lac sulphuris," would almost certainly be dispensed with pure precipitated sulphur. In nineteen cases out of twenty the adulterated article would not be found on the premises. The difficulty of mixing the pure article with water may be a little greater than that of mixing the impure, but it is scarcely greater than every cook has to encounter in mixing flour and water to make melted butter, or any poor ignorant person in making a dish of "hasty pudding." Lastly I would point out, how fallacious is the argument that "lac sulphuris" specially indicates "sulphur containing sulphate of lime." In the Pharmacopœia of 1721, the earliest record we have of its being an officinal preparation, two forms are given for its manufacture—the result of following one is to make an impure precipitated sulphur, of the other to produce a pure precipitated sulphur, but both were called "lac sulphuris."

I have just received a circular from the Chemists and Druggists' Trade Association, soliciting me to become a member, but while its funds are spent in defending these milk of sulphur cases I hardly feel disposed to do so. I observe that in the case the Association defended, it was admitted that the article was dispensed unlabelled.

ROBT. CHIPPERFIELD.

Southampton, Jan. 23, 1877.

T. B. writes that he considers "Mr. Crow's translation of a quotation from the P. L., 1851, is very creditable, one little inaccuracy excepted. The words "Milk of Sulphur" are not in the original." T. B. does not appear to have read the note to the same effect appended to Mr. Crow's letter.

TRACINGS OF AUTOGRAPH PRESCRIPTIONS.

Sir,—Having recently had the pleasure of reading through the books of autograph prescriptions in the library of the Pharmaceutical Society, I conceived the idea of possessing a collection of my own, but as real autographs prescriptions are quite out of the reach of most assistants, I am obliged to content myself with the next best thing, viz., copies, which for purposes of study are of equal value. I cut up a sheet of architects' tracing paper into pieces the size of a half sheet of note paper, and laying one of these over the prescription to be copied, I very carefully traced every line, with ordinary ink and pen, and afterward mounted them in an ordinary 1*s.* scrap book; and I now have a very nice collection. A prescription after a little practice, may be copied in a little over five minutes. I merely throw this out for the benefit of my fellow assistants, to whom it may be new. I observe that most of the "lithographed" prescriptions are mere tracings.

ASSISTANT.

26, *Leonard Street, Hull, Jan.* 17, 1877.

"APPEAL TO THE BENEVOLENT."

Sir,—Will you allow me to announce that the following subscriptions have been received in reply to a letter in the *Pharmaceutical Journal* of the 13th inst., headed "Appeal to the Benevolent":—

	£	s.	d.
E. R. (Bradford)	0	10	0
Davenport, J. T.	1	1	0
Humpage, Benjamin	1	1	0
Matterson, E. H.	2	0	0
Potts, Richard Smith	0	10	0
Proctor (B.) and Son	2	0	0
Rimmington, F. M.	0	10	0
Savage, William Dawson	1	1	0
Savage, William Wallace	0	10	6
Taylor, Thomas (Peckham	1	0	0
Watson, Edw. Morgan	1	1	0
Willan, William (Preston)	1	1	0
	£12	5	6

Further contributions may be forwarded to Mr. Bremridge or myself.

W. D. SAVAGE.

4, *Park Road East, Brighton,*
Jan. 24, 1877.

J. C. H.—See a note on the subject on p. 478 of the present volume.

"*Carbon.*"—On p. 314 of the present volume. But see also pp. 388, 408 and 428.

J. S. H.—Oliver's 'Lessons in Elementary Botany,' published by Macmillan.

W. L. A.—(2) Imperfect, probably *Lastræa spinosa*; (3) *Adiantum Capillus-Veneris*; (4) *Athyrium Filix-fœminea*; (5) *Asplenium trichomane*; (7 and 8) Varieties of *Polystichum angulare*; (9 and 11) *Lastræa dilatata*; (10 and 12) Exotic, probably *Asplenium viviparum*; (13) *Scolopendrium vulgare*; (14) *Lastræa spinulosa*; (15) *Polypodium Phegopteris.* We cannot undertake to name exotic plants.

"*A Dispenser.*"—Rub the croton-chloral to a fine powder before adding it to the mixture, and label, "shake the bottle."

COMMUNICATIONS, LETTERS, ETC., have been received from Mr. Martin, Mr. White, Mr. Martins, Mr. Willson, Mr. Yewdall, Mr. Bennett, "One who does not like to trade on Sunday," "Tamara Ostium," "Valky ril," A. D., R. G.

THE MICROSCOPIC STRUCTURE OF THE STEM OF JABORANDI.

(*Pilocarpus Species.*)

BY M. H. STILES.

Few drugs of recent introduction have received the amount of attention accorded to that which is the subject of this paper: yet, although much has been written respecting its botanical origin, chemical composition, and physiological action, I believed no account of its microscopical structure has been published, with the exception of a slight outline given by Professor Planchon in the *Journal de Pharmacie et de Chime* (1875, vol. xxi., p. 295).

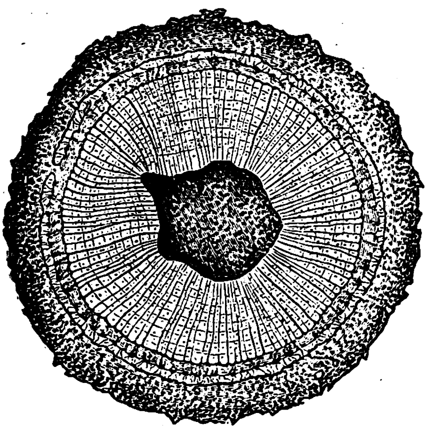


Fig. 1. Section of stem of Jaborandi (*Pilocarpus species*). Magnified 10 diameters.

Fig. 1 exhibits a transverse section of a stem, about ⅜ of an inch in diameter, taken from the upper portion of an internode, and will give a good general idea of the distribution of the various tissues. The pith has an irregular pentangular outline, one of the angles being especially prominent, this angle being that which is nearest to the base of a leafstalk, or the triangular scar remaining after the decay of the petiole. If a section of a young stem be made exactly across a node the pointed portion is found to be prolonged into the leafstalk, carrying with it bundles of spiral vessels and entirely dividing the zone of woody tissue; the latter comprises about three-eighths of the semi-diameter of the stem, it is traversed by very fine medullary rays, and contains numerous small vessels. A little beyond the wood zone is seen a ring of tissue which will afterwards call for special remark; outside this is the bark parenchyma, presenting near its exterior a number of oval glandular cavities and bounded by several layers of dark-coloured cork cells. The outer edge of the bark is somewhat rugged, partly due to contraction and consequent disruption of the tissue during drying. There were no hairs present on the specimen examined, and the epidermis had nearly disappeared, being only occasionally present in small patches.

The bark so readily separates from the wood, especially in a young stem, that considerable care is required in order to obtain and mount a characteristic section.

In more minutely describing the component portions of the stem I will begin with the medulla. The irregular form of this is well shown in fig. 1. In a moderate sized stem it occupies about one-fourth of the diameter. The cells of which it is composed are cylindrical in form and arranged more or less in vertical columns with tolerably large interspaces, their length in the central portion of the pith being about equal to their diameter, but towards the outer part they become narrower and longer. The cell-wall is slightly thickened by secondary deposit and irregularly pitted, the pits being oval or oblong and arranged with their longer diameter at right angles to the axis of growth.

Many of the cells contain a yellow or yellowish brown colouring matter, and nearly all contain starch; the granules, which frequently occur in groups of two, three or four, varying in size from ·00008 to ·0004 inch in diameter; the simple ones are regular in shape, being uniformly round, with a central nucleus, and without striæ; examined by polarized light they are seen to be highly doubly refractive, the usual black cross being very distinct and regular.

Besides starch, the cells of the medulla contain an abundance of raphides. These, which proved to be oxalate of calcium, are met with in two forms:—rhomboidal crystals, one, sometimes two, in a cell, and spherical clusters, the latter occurring much less frequently than the former. The cells containing raphides are generally free from starch. There are also present, in addition to starch and raphides, bodies which externally bear considerable resemblance to very large granules of the former, but differ in not being affected by polarized light or by solution of iodine.

Closely investing the medulla, and forming an irregular cylinder projecting more or less into it, lies that portion of the primary wood to which the term medullary sheath has been given. This tissue consists chiefly, in the present case, of two to three or even four rows (the largest number occurring near the prominently pointed portion of the medulla previously mentioned) of spiral vessels, interspersed with long pitted woody fibres and occasionally reticulated vessels. The spiral fibre is a single one and is coiled in the normal direction, *i. e.*, from right to left when looked at from above.

The medullary rays are very numerous and well marked; as seen in a transverse section, they are composed of from one to three or sometimes four rows of cells, elongated radially and minutely pitted; they contain starch granules, usually simple and much smaller than those found in the cells of the medulla; crystals are not present in the rays traversing the wood.

The woody tissue, which in the stem figured occupied nearly half the semi-diameter, is exceedingly dense, the cells being so consolidated by secondary deposit that but a small cavity is left; the walls are not pitted. Woody parenchyma, distinguished by its thin-walled slightly pitted elongated cells with square or rounded ends, occurs rather frequently in combination with the vessels; the latter which are slightly oval in transverse section are numerous but small, the longer diameter of the largest being not more than ·0015 inches: they have slightly oblique septa with circular perforations and are profusely pitted with very minute oval bordered pits arranged in a somewhat spiral manner. The woody tissue is divided into irregular zones varying much in width, but generally narrow, by the occurrence at intervals of one, two, or sometimes three, rows of thinner-walled wood cells, frequently containing starch.

The cambium tissue is interesting; it consists of several layers of exceedingly thin-walled cells, showing in transverse section a quadrangular outline, elongated tagentially (D, fig 2). In radial section they are seen to

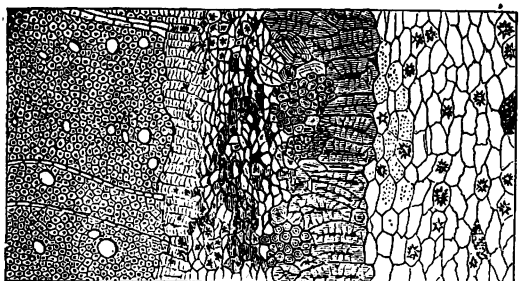


Fig. 2. Section of portion of stem of Jaborandi (*Pilocarpus species*).—A, Mesophlœum; B, Sclerenchymatous zone; C, Liber bundles; D, Cambium; E, Woody tissue. Magnified 100 diameters.

be of two forms;—those in continuation with the medullary rays being of a similar type, and containing comparatively large conglomerate raphides of oxalate of lime or minute starch granules; the others being of the prosenchymatous type, long and tapering at both ends, also containing conglomerate raphides, much smaller than those just mentioned. In some of these tapering cells from twenty to thirty minute crystals might be counted, diminishing in size to accommodate themselves to the internal form of the cell. In transverse section the raphides of the prosenchymatous cells are not often seen, being washed out in the usual preparation for examination, while those of the cells of the medullary rays of the inner liber are readily retained. The cells of the inner liber exhibit in transverse section a somewhat peculiar appearance, their walls being wrinkled and irregularly thickened; the author has observed this in the corresponding tissues of other stems, and believes it may be due to a collapse of the cell walls, caused by the active growth of the wood on the inside and the resistance of the schlerenchymatous zone without; followed, possibly, by a cementation of the cell-walls thus placed in juxta-position. This thickening by no means takes place uniformly; cells frequently occurring in which little or no change appears.

Outside this tissue, and partly within and partly mixed up with the ring of thick-walled cells, are isolated bundles of liber tissue, at least they appear isolated in transverse section, though a tangential one shows that they anastomose with each other, forming a rough network through the meshes of which pass continuations of the medullary rays.

These liber cells are long and tapering, thick-walled and roughly hexagonal in transverse section; long and beautifully pitted, bast vessels are also occasionally met with.

Just beyond the liber tissue occurs one of the most characteristic features of the stem—an almost perfect zone of from one to two rows of very beautiful sclerenchymatous cells, for the most part, as will be seen from the engraving (B, fig. 2), elongated radially. In these intra-cellular deposition has taken place to such an extent that in many cases the original cavity has been almost filled up; the successive layers of deposit may be rendered very evident by treatment with diluted sulphuric acid (1 part to 3 of water). The porous canals, simple and branched, with which these cells are freely traversed are strikingly shown by deeply staining a section with magenta, then quickly washing it with spirit, oil of cajeput, and turpentine successively, and mounting it in cold balsam; treated in this manner the canaliculi are seen to be injected, as it were, with the staining fluid, the thick cell-wall being not at all, or only slightly, coloured. Cell contents are rarely found in the older cells; in the younger ones a granular substance, staining deeply with magenta, is sometimes met with. The individual cells of this tissue, isolated by Schultze's method of maceration, present the most varied and peculiar shapes. The presence of this thick-walled and unyielding zone of cells will, to a great extent, account for the invariable separation of the bark from the wood during drying.

The mesophlœum occupies about one-fifth of the semi-diameter of the stem, and presents several interesting features; the cells of which it is composed are thin-walled, moderately large, irregular in form, and usually elongated tangentially. Sclerenchymatous cells are occasionally present, either isolated or in small groups. Of the cell-contents of this portion of the stem probably the most conspicious, especially near the tissue last described, are large sphæraphides of oxalate of calcium. It is a noteworthy fact that only this form of crystal is found in the bark, whereas both varieties are met with in the medulla, though in the latter the rhomboidal greatly predominates. Starch is also abundant, the granules being rather smaller and less frequently aggregated than those present in the cells of the medulla. Scattered over the whole of the mesophlœum, but becoming more abundant near the epiphlœum, are cells containing a dark brown resinoid substance, partially soluble in solution of potash, and acquiring a greenish-black colour with perchloride of iron. When a longitudinal section is examined it is found that these cells are invariably arranged in long vertical columns.

Near the epiphlœum occur large oval interspaces, with the longer diameter arranged tangentially in transverse, and longitudinally in radial sections; these are evidently the remains of old oil glands, with which the bark of a young stem is plentifully dotted. The bordering cells of these cavities are usually somewhat ruptured, and those immediately surrounding them contain the dark brown resinous deposit recently alluded to. The epiphlœum consists of six or seven rows of deep brown tabular cork cells, elongated tangentially, with the remains of the ruptured epidermis on the exterior.

Not desiring to confine myself to the examination of one stem, I obtained samples from various sources with the view of comparing their structure, and among these was an authenticated piece of a young stem of *Pilocarpus pennatifolius*, from Kew, kindly furnished by Mr. Holmes.

Some of these, including that from Kew, were found to differ to a certain extent from the stem described, both in their internal structure and external characters, the most prominent variations being the following:—the occurrence of an intercellular substance in the woody tissue, about one-third of the distance from the cambium to the medulla, forming an interrupted zone, sometimes single, sometimes double. A portion of this tissue is shown in Fig. 3. The stem from Kew being a young one, this zone in it was not perfect, and was nearer the cambium. It was at first thought to be a resinous deposit, but the application of various reagents dissipated this idea. In transverse section it occurs in irregular patches, the outline of which is determined by the walls of the cells with which it is in contact; in vertical section the deposit forms columns of considerable length. It is of a pale yellow colour, and perfectly translucent, so

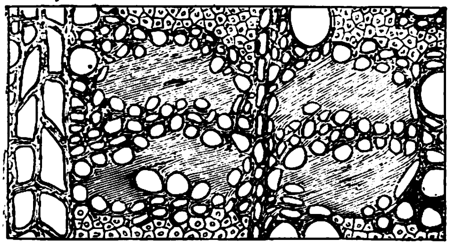


Fig. 3. Section of portion of stem of Jaborandi, probably. *Pilocarpus pennatifolius*; showing inter-cellular deposit. Magnified 175 diameters.

much so that when a bleached section is mounted in balsam or dammar this portion of the stem is nearly as transparent as the medium in which it is placed. The walls of the cells which border upon it can be readily distinguished. It was found to be insoluble in the following:—benzine, ether, alcohol (boiling), oil of turpentine (boiling), chloroform and hot solution of potash. It is slightly coloured by magenta; heated in strong sulphuric acid it darkens much more rapidly than the adjoining woody tissue. It is usually homogeneous in structure, though occasionally fissures may be detected. Touched with the point of a needle it is found to be tough and moderately hard. When a transverse section is boiled for two or three minutes in a mixture of one drachm of dilute nitric acid and two grains of chlorate of potash (Schultze's process) this deposit becomes dark and opaque, and after isolation from the neighbouring bleached and disintegrated cells has, under a high power, a decidedly spongy appearance.

I have not been able to satisfactorily determine the nature of this tissue, if it can be so termed. Judging from the foregoing experiments it may possibly be a modified form of cellulose infiltered by some substance not soluble in ordinary reagents but oxidized and removed by the nitric acid treatment. In the young stem from Kew, this substance is readily stained by carmine, the surrounding woody tissue not being affected; the same colouring agent applied to the older foreign stems gave no result. In the root of the latter it is much more abundant than in the stem, but whether this rule holds good in the Kew-grown plant I am unable to say, nor have I had an opportunity of examining the root of the stem first described and figured.

Both Planchon and Hardy agree in considering this a resinous deposit, but the negative results obtained with the usual resin solvents will I think disprove their statement.

The presence of this deposit in some stems and its absence in others, coupled with the fact that those containing it have usually a lighter, thinner, and more easily separable bark, would seem to give additional confirmation to the fact, already noticed by other observers, that there are two if not three varieties of *Pilocarpus* met with in commerce under the name of Jaborandi, and that one of these so closely corresponds with an authenticated specimen of *Pilocarpus pennatifolius*, both in internal structure and external characters, as to justify its being referred to that species.

Before however pronouncing decidedly on this point it would be well to examine the stem of a more mature authenticated specimen than that I had at my disposal, and I hope that I may be in a position to do this. The subject is one of great interest and deserves fuller investigation.

300, *High Holborn.*

BROMIDE OF ETHYL AS AN ANÆSTHETIC.

BY M. RABUTEAU.

At a recent meeting of the Academy of Sciences* M. Rabuteau gave some details of an investigation of the physiological properties and mode of elimination of bromide of ethyl.

Bromide of ethyl (C_2H_5Br), or "hydrobromic ether," is a colourless liquid, with an agreeable odour; it boils at about 40° C., has a density of 1·43, and burns with difficulty. The boiling point and density are therefore intermediate between those of chloroform and sulphuric ether.

Bromide of ethyl absorbed by the respiratory passages produces absolute anæsthesia as rapidly, or even more rapidly, than chloroform. This result has been established with frogs, rabbits, dogs, etc. After five minutes', sometimes after two minutes' inhalation, by means of a sponge saturated in bromide of ethyl, dogs are completely anæsthetized. The animals recover more rapidly than when chloroform is used.

When a solution of hydrochlorate of narceia or hydrochlorate of morphia was injected under the skin of dogs, before inducing anæsthesia, an action was observed analogous but perhaps inferior to the simultaneous action of narceia, or morphia, and chloroform.

Bromide of ethyl is not caustic, nor even irritant, compared to chloroform. It can be ingested without difficulty, and applied without danger, not only subcutaneously, but to the external auditory meatus and to the mucous membrane. In this respect it is preferable to chloroform, which is very caustic, and to sulphuric ether of which the ingestion is nearly impossible. Introduced into the human stomach in doses of 1 to 2 grams, bromide of ethyl does not produce anæsthesia as when absorbed in sufficient quantity by the respiratory passages. It soothes pain and does not disturb the appetite.

This anæsthetic is nearly insoluble in water. Nevertheless water shaken with it acquires a pleasant taste and odour. Frogs placed in water so saturated undergo anæsthesia in ten or fifteen minutes.

Bromide of ethyl is eliminated nearly entirely, if not completely, by the respiratory passages, whatever may have been the mode of absorption. At most only traces of it are found in the urine when it has been introduced into the stomach, and an extremely small quantity can be detected in that liquid when it has been inhaled. The author finds that bromide of ethyl does not decompose in the organism to form an alkaline bromide, such as bromide of sodium, a salt that is easily eliminated by the renal passages.

From his experiments the author concludes that bromide of ethyl is an anæsthetic agent possessing properties intermediate between those of chloroform, bromoform, and ether.

---

* *Comptes Rendus*, vol. lxxxiii., p. 1294.

HOW TO KEEP VEGETABLE DRUGS.*

BY HANS M. WILDER.

Judging from several remarks the author has met with in various journals, a notion seems to prevail that vegetable drugs, particularly herbs and roots, cannot be kept except they are as much as possible hermetically sealed, or at least packed in tin cans, or saltmouths with tight-fitting covers; one person even goes so far as to seal the cover with beeswax every time the can has been opened, on the plea that drugs spoil by exposure to the air—*and still they spoil.*

This is in direct contrast with the assertion of old druggists, that in *their* youth herbs, etc., kept very well, although no better receptacles were at hand than drawers, boxes, paper bags, specie jars, etc. Furthermore, the wholesale dealers' stocks of herbs, etc., are generally in a fair condition, although kept in barrels, wooden bins, and boxes, and in a room where there is a constant draught of fresh air.

This latter condition solves the mystery! Vegetable drugs (and their powders) will not keep for a reasonable length of time except where the air in immediate contact with them can equilibrate itself, as it were, with the surrounding air; this, with exclusion of light and of extra moisture from a damp locality, are the three chief conditions necessary.

The reason of drugs spoiling, notwithstanding all extra care in the shape of tight fitting covers and the use of tins and glass, is the following:—

When herbs, etc, are properly dried, they still contain a not inconsiderable quantity of water, and will, if kept in non-porous receptacles, by each rise of temperature load the air on top with vapour which condenses at a lower temperature, and shortly the contents begin to grow mouldy. If, on the contrary, kept in porous receptacles, such as wood, pasteboard, etc., the moist upper layer of the air will equalize itself through the pores with the surrounding air. Herbs that are over-dried attract moisture as soon as the receptacle is opened. That vegetable drugs should be kept in a dry place it is not necessary expressly to state.

The foregoing is supported by the following experiments with vegetable powders, taken from *J. de Pharm. et de Chim.*, quoted in Buchner's *Repert. f. Pharm.* Hérouard (1862) found that most powders kept better in paper bags than in glass, and he instances a sample of powdered cantharides which was twelve years old and still gave an excellent blister, although kept all the time in paper; while a sample kept a year in close stoppered glass had become mouldy and quite lost its power.

Breau (1865) divides powders into three classes:—

I. Those that keep *only* in paper or pasteboard:—Aconite, angelica, belladonna, cantharides, conium, cochineal, columbo, digitalis, elecampane, hellebore, gentian, gum arabic, hyoscyamus, ipecacuanha, jalap, liquorice root, marshmallow, orris root, rhatany, roses, savin, stramonium, and similar powders.

II. Powders which keep as well in paper as in glass:—Agaric, angustura, arnica, anise, benzoe, cascarilla, catechu, charcoal, colocynth, cream of tartar, euphorbium, male fern, guaiac, ginger, Peruvian bark, rhubarb, saunders, tartar emetic, turmeric, etc.

III. Powders which keep only in well-stoppered bottles:—Asafœtida, camphor, castoreum, cubebs, gum tragacanth, opium, squills, etc.

The writer must add that tartaric acid keeps better in paper than in glass.

By conforming to the following, one's stock of vegetable goods will always be in a satisfactory condition. As soon as the first warm days come in spring, or in the forepart of summer, give all your herbs, etc., including the drawers, boxes, etc., a thorough airing and sunning. The sun, if not a scorching noon-day sun, will not hurt them. Do not put the herbs, etc., in tin cans or glass before they have cooled down a little; with drawers and boxes it makes no difference. Before setting them away garble and free them from the finest dust. If you have tins and glass, make one or two holes in the tin covers with a nail; with glass put a strip of pasteboard or a bit of thin stick of wood, or wire, between the stopper and the neck; the contents will be all the better for it. When you get your stock filled up from the wholesale druggist, open the parcels and give them a good drying before putting them away. When you dry the roots give them a good overhauling with an old clothes brush, so as to remove all the dust; roots are not hurt by a good heat. If possible, repeat this airing in the fall. As to powders, give them an airing at least once a year; and, before you put those you get from the wholesale druggist away, open the parcels and spread the powders in quite a thin layer to air-dry them. It is evident that the foregoing general rules do not apply to special cases; delicately coloured flowers and strongly scented herbs and roots must be treated carefully—dried in a shady place, and so on.

This seems troublesome, but is nothing more than is done every year in Germany and adjacent countries.

* From *The Druggists' Circular and Chemical Gazette*, January, 1877.

A COMBAT WITH AN INFECTIVE ATMOSPHERE.*

BY JOHN TYNDALL, F.R.S.,

Professor of Natural Philosophy.

A year ago I had the honour of bringing before the members of the Royal Institution some account of an investigation in which an attempt was made to show that the power of atmospheric air to develop life in organic infusions—infusions, for instance, extracted from meat or vegetables—and its powers to scatter light went hand in hand. I then endeavoured to show you that atmospheric air, when left to itself, exercised a power of self-purification; that the dust and floating matter that we ordinarily see in it disappeared when the air was left perfectly tranquil; and that when the air had thus purified itself, the power of scattering light and the power of generating life disappeared together. For the sake of reminding you of this matter, we will now cause a beam of the lamp to pass through the air. You see the track of the beam vividly in the air. You know that the visibility of the track is not due to the air itself. If the floating matter were removed from the air, you would not be able to track the beam through the room at all. You see the track in consequence of the floating dust suspended in the air. If the air be enclosed in a place free from agitation the dust subsides, and then as I endeavoured to show you a year ago, the air possesses no power of generating life in organic infusions. The nature of the argument is this. You see the dust as plainly as if it were placed upon your hand and you could feel it with your fingers. You found that the dust, when it sowed itself in organic infusions, produced a definite crop in those infusions; and you are equally justified in inferring that the crop thus produced is due to the germs in the dust, as a gardener would be in believing that a certain crop is produced from the seeds which he sows. I say that the inference that his crop is the product of the seeds that he sows is not more certain than the inference that those crops produced in the organic infusions are due to the seeds contained in them.

You know the method that we resorted to for the purpose of enabling us to get rid of this dust. The object was to allow the air to purify itself and it was done in this way. I have here the first chamber that was used in these experiments. You see at the bottom a series of test-tubes entering the chamber: they are air-tight, and

* A lecture delivered at the Royal Institution, on Friday, January 19, 1877. Reprinted from the *British Medical Journal*, January 27.

they open into it. There are windows at the sides, and here is a pipette through which the liquids can be introduced. Behind we have a door which opens upon its hinges. Now, imagine this perfectly closed; imagine it abandoned entirely to itself, left perfectly quiet. In a few days the floating dust of the air contained in the chamber entirely disappears: it has removed itself by its own subsidence; and then when you send a beam of light such as we have here through these windows, you see no track of the beam within the chamber. When the air is in this condition, you pour through this pipette infusions of beef, mutton, or vegetables into these tubes, and allow them to be acted upon by the air. Last year, between fifty and sixty of these chambers were constructed, and the invariable result was that these infusions never putrefied, never showed any change, were perfectly sweet months after they were placed there, as long as the air had this floating matter removed. You had nothing to do but to open the back door and allow the dust-laden air to enter the chamber to cause these infusions to fall into a state of putrefaction, and swarm with microscopic life, in three days after opening the door. I have a smaller chamber here—for we use chambers of different sizes—and it will enable you to understand our exact process. You see here the stand on which the chamber rests. There are two bent tubes that communicate with the outer atmosphere, for I wish to have a free communication between the air outside and the air within. You see the pipette through which the tube is filled. When the infusion is poured in, you place it in an oil-bath contained in a copper vessel, such as we have here, in which you boil it for five minutes. Now, that boiling for five minutes was found capable of sterilizing every germ contained in the infusions placed in these chambers. This year our experiments began by a continuation of those that we made last year. In order to enable you to judge of the severity of the results obtained last year, I have here five cases belonging to the experiments then made. You will see that the infusions are vastly concentrated because of their slow evaporation. The quantity of liquid is reduced to one-fifth of its primitive volume, but this one-fifth is as clear as rock crystal; whereas, the tubes exposed to the ordinary air outside fell long ago into utter putrefaction. They became turbid and covered with scum; and when you examine these infusions to ascertain the cause of that turbidity, you find it to be produced by swarms of small active organisms.

This year our inquiries began in the month of September. But we will pass over these inquiries for the moment and go to those of October. On October 29th, two members of the Royal Institution collected a quantity of fungi in Heathfield Park, Sussex. These were brought to London on the 30th. They were placed for three hours in warm water, and whatever juices they possessed were thus extracted from them. They were placed in chambers and digested separately. There were three kinds of fungi: we will call them red, yellow, and black. Now, I confess that, thinking I had secured a perfect freedom from any invasion of those contaminating organisms that produce putrefaction, I expected that we should find that these infusions of fungus would maintain themselves perfectly clear. To my surprise, in three days the whole of them broke down; they became turbid, and covered by a peculiar fatty, deeply indented, corrugated scum. Well, that was a result not expected, but I pursued the matter further. I got another supply of fungi. Even in this first experiment, I had adopted care at least as great as that which I adopted last year, and which led to a perfect immunity from the invasion of putrefaction. With the fresh supply of fungi, I operated with still more scrupulous care. The infusions were placed as before in three chambers. In one of these, the infusion remained perfectly pellucid; there was no trace of any organism to be seen. In each of the other chambers one of the three tubes gave way. Each chamber contained three tubes; so that out of nine tubes containing an infusion of fungus, seven proved to be intact, entirely uninvaded. Therefore, whatever argument or presumption was raised by the first chamber in regard to the idea that life was spontaneously generated in it, was entirely destroyed by the deportment of the other chambers. Seven out of the nine remaining intact, was sufficient to show that it was some defect in the experiment that caused the first chambers to give way so utterly. I continued the experiments, and inasmuch as fungi disappeared on the approach of winter, other substances were chosen. I took cucumber and beetroot, having special theoretical reasons for doing so, and prepared infusions of them with the aid of my excellent assistant, Mr. Cotterell. We placed these in our chambers as before, boiled them for five minutes, and abandoned them to what I supposed to be the moteless air within. Again, to my surprise, an infusion of beetroot in one chamber, and an infusion of cucumber in another, broke down. All the tubes became turbid and covered with this peculiar fatty scum. Other chambers were then tried. I had begun to suspect that we were operating in a contaminated atmosphere; that my infusions were in the midst of a pestilence which it was hardly possible to avoid. The consequence was, that I withdrew the preparation of the infusions from the laboratory downstairs, and I went to one of the highest rooms in the Royal Institution, had the infusions prepared there, and introduced into the cases, which were afterwards boiled in the laboratory below. There were a great number of these cases. The substances chosen were cucumber, beetroot, turnip, and parsnip. Great care was taken to have the infusions properly prepared, and to have them rendered as clear as possible. To give you an idea of the care taken, I may mention that the infusions of turnip and beetroot were passed through twenty-four layers of filtering paper, and were thereby rendered clear; that the infusion of cucumber was passed through one-hundred and twenty layers of filtering paper, and thereby rendered clear; and that the infusion of parsnip was passed through three hundred layers of filtering paper, and it was still opalescent. The suspended particles were so small that the filtered paper had no power whatever to arrest them, and the finest microscope ever made would have proved powerless to exhibit the individual particles that produced this opalescence. Notwithstanding all this care, the chambers containing these infusions in three days became filled with bacterial life. They were turbid, covered with scum, and showed all evidences of putrefaction. This was on November 20th. On November 25th, we went upstairs and prepared another chamber, or a series of chambers. When the tubes containing the infusions were placed in the oil-bath, the liquids within the tubes opening into the case of course boiled, steam was discharged into the case, the air of the case being thereby rendered warm. It was found that on the cessation of the ebullition, although the pipette was immediately plugged with cotton-wool, and the bent tubes also plugged with cotton-wool, still, in consequence of the contraction of the air within, there was a considerable indraught. Last year, we found invariably that the interposition of the cotton-wool entirely sifted this entering air so as to arrest any germs of seeds that it might contain. I thought, however, in this case, that the germs might be carried in by the suction when the air of the chamber contracted. In the former case, we operated after having filled the chamber with the infusion, and boiled it in the laboratory; in this case, we took the additional precaution of boiling the infusion upstairs, and taking care that it was properly plugged with cotton-wool. But here, again, notwithstanding this augmented care, the infusion utterly gave way, and showed those evidences of life that had distracted me previously. When I say distracted, it is not meant that I was in the least degree daunted or perplexed about it. I knew perfectly well that the matter would be probed by and by. On November 27th, a new chamber was constructed containing cucumber and turnip. Particular care was taken with the stopping of the pipette, and also the bent tubes opening into the atmosphere. In one instance about this time, it was noticed that the infusions in the tubes within the chamber opening into the moteless air, or at least what I supposed to be the moteless air, fell more rapidly into a state of putrefaction, became more rapidly covered with scum, than the tubes exposed in the air outside. When the tubes containing precisely the same infusion were exposed to the air outside they were perfectly clear, while those within were turbid and covered with scum. This brought to my mind an experiment made the previous year with trays placed one above the other. It was found that, when two trays were placed one above the other, although the upper tray had the whole air of the room for its germs to deposit themselves, the under tray was always in advance of the upper in the development of life. The reason was simply this. The air in the under tray was less agitated, and this floating matter had time slowly to sink in the infusions. There was no other solution possible than that, by some means or other, the germs had insinuated themselves into my chamber, and that these germs, sinking slowly through the unagitated air of the chamber, were able to produce the effect within, in advance of the effect produced upon the openly exposed tubes without. On November 27th, I had a similar case, and also on November 30th, and on December 1st. The chambers were prepared and filled with all care, and yet the infusions broke down, became turbid, and were covered with scum. I then had a number of tubes filled with infusions, and sealed them hermetically. They were exposed in an oil-bath, and heated for a quarter of an hour to a temperature of 230 deg. Fahr., for I wanted to see whether these effects were due to any germs of life in the infusions themselves. This superheated cucumber-infusion was introduced into the chamber, and it was found that the superheating of the infusion did not even retard the development of life. In two days, every tube of the chamber was swarming with bacteria. I then passed on to another system of experiment pursued last year, that is, the exposure of the infusions to air calcined by passing a voltaic current through platinum wire, so as to raise the wire to a state of incandescence. Such arrangements are here. We have underneath this shade two wires, and stretching from wire to wire we have a spiral of platinum. Passing a voltaic current through the spiral, it was found last year that five minutes of incandescence were sufficient entirely to sterilize and destroy all germs contained in this air, and to protect the infusions underneath from all contamination; the time of incandescence was doubled this year. The wire was raised as close to the point of fusion as possible; still, notwithstanding all this additional care, the infusions one and all gave way. I thought that there might be some defect in the construction of the apparatus. Here, you see, is an old broken apparatus containing infusions that have remained perfectly good since last year; but great pains were taken in having the apparatus of the most improved form. Still, notwithstanding all my efforts, the infusions broke down and became swarming with life. My attention was now very keenly arrested, and on December 1st, I scrutinized more closely than ever I had done previously the entry of the infusions through the pipette tube into the tubes opening into the chamber, and I noticed, at all events, a danger of minute air-bubbles being carried down along with the decending infusion. That caused me to adopt another mode of experiment; but previously to this, I fell back upon some of the infusions found so easy to sterilize the previous year. I operated upon beef, mutton, pork, and herring infusions, and found that even such infusions, which with the most ordinary care were completely sterilized last year, and are preserved to the present hour intact like the others, all gave way.

How, then, are we to look at these things? Here are results totally different from those that we obtained last year. You may ask me, perhaps, "Why do you not loyally bow to the logic of facts and accept the conclusion to which those experiments apparently so clearly point? Why do you not regard them as a demonstration of the doctrine of spontaneous generation? Is there any other way of accounting for it than by a reference to this doctrine?" You may ask whether I was held back by prejudice from accepting this conclusion; whether I was held back by a love of consistency, or by the fear of being turned into ridicule and sneered at by those whom I ventured to oppose on a former occasion. Ladies and gentlemen, there is a title which I believe, as the generations pass, will, if the owners of the title are true to themselves, become more and more a title of honour—that is, the title of a man of science; and of that title I should be utterly unworthy were I not prepared to trample all influences and motives such as those mentioned under foot, and were I not ready, did I conceive myself to be in error in what was brought before you last year, to avow here frankly and fully in your presence that error. I should be unworthy the title of a scientific man if my spirit had not been brought into this state of discipline as to be able to make such an avowal. Why, then, do I not accept those results as proving the doctrine of spontaneous generation? The celebrated argument of Hume comes into play here. When I looked into all my antecedent experience, and into the experience of other men for whom I have the greatest esteem as investigators, it was more easy for me to believe the error of my manipulation, to believe that I had adopted defective modes of experiment, than to believe that all this antecedent experience was untrue. It was my own work that was thus brought to the bar of judgment, and my conclusion was, that I was far more likely to be in error than that the great amount of evidence already brought to bear upon the subject should be invalid and futile. Hence, instead of jumping to the conclusion that these were cases of spontaneous generation, I simply redoubled my efforts to exclude every possible cause of external contamination. This was done by means of doing away with the pipette altogether, and using what we call a separation funnel. Here you have a chamber with a pipette entering. This pipette tube has not a bulb or mouth such as you have here; it is simply closed by a tube of India-rubber, and that again is closed by pinch-cock. Now, here we have an infusion of hay. At present, this stop-cock stops it. I turn it on; it goes down: I turn it off, and this liquid column is now held by atmospheric pressure. This was introduced into the India-rubber tube, the India-rubber tube being first filled with the infusion, so that no bubble of air could get in. When the separation funnel was placed thus, and the cock was turned on, the liquid was introduced into the chamber without an associated air-bubble. Mr. Cotterell will show you the result of this severe experiment. Here is an infusion of cucumber, the most refractory of all infusions that I have dealt with. It was prepared on December 8th, 1876, so that it is between six and seven weeks old. Two days were sufficient to break down this infusion when contamination attacked it; but, by this more severe experiment, it is enabled to maintain itself as clear as crystal, although it has been there for six or seven weeks. You will see by the light behind that it is, as I have described it, perfectly clear. You will observe that the infusion is diminished by evaporation, but it is as clear as distilled water, and there it remains as the result of this severe experiment.

Let us now ask how it is that these curious results that I have brought before you were possible; how is it that the results of this year differ so much from those obtained previously. The investigation of this point is worthy of your gravest attention. I am now called back to the experiments with which the inquiry this year began. As already stated, it was begun in September, and, leaving out the earlier experiments, I passed on to October 30th. I have now to bring your attention back to the earlier experiments performed in the laboratory. They were suggested by the ingenious investigations of Dr. William Roberts, of Manchester, and by the subsequent investigation of a man to whom we are indebted more than to any other for the knowledge we possess of the different species of those small organisms that we call bacteria: I refer to Professor Cohn, of Breslau. Let me say that I entertain the very highest opinion of the intelligence and ability with which Dr. Roberts has carried out these experiments; they are in the highest degree creditable to him. This is the experiment to which I refer. Some chopped hay is put into a little can; it is raised to a temperature of 100 deg. to 120 deg.; it is kept for three hours, then poured off and filtered. Last year, we found that hay thus treated was sterilized by five minutes' boiling. I mean that, when it is exposed to the air that has this floating matter removed from it, it never shows any sign of microscopic life. Now, if you examine this natural hay-infusion with litmus paper, you will find that it turns the litmus paper red, showing that it is an acid infusion. Dr. Roberts found that acid infusions could be easily sterilized. He took a vessel with an open neck at the top and filled it two-thirds full with the infusion he wanted to operate upon; he then stuffed the neck with cotton-wool, and sealed it hermetically with a spirit-lamp above the plug of cotton-wool; he then placed it in a vessel containing cold water, and he gradually raised the water to a state of ebullition and maintained the boiling temperature for any required time. In that way, he avoided all commotion, all evaporation, all ebullition in the infusion. After he had placed the tube in this condition in the water, and subjected it to a boiling temperature for any required time, he took it out and simply filed across the neck and broke it off. Here you have the infusion practically exposed to the atmosphere. The plug intervenes to prevent the entrance of dust and still allows an interchange between the air of the bulb and the air outside. When Dr. Roberts took this acid infusion and neutralized it by the addition of caustic potash, he found it to possess the most extraordinary power of resistance to heat; he found that, in some cases, it required more than two hours to reduce this infusion to sterility; he also found that, in a particular case, it actually required no less than three hours' boiling to produce this effect. This was very different indeed from the results that I had obtained last year. I made many experiments with hay-infusion, and in every case we sterilized it by five minutes' boiling. I was led to take up the subject this year through the emphatic manner in which Professor Cohn corroborated the results of Dr. Roberts. I operated sometimes with tubes like those of Dr. Roberts, and sometimes with those which I call Cohn's tubes. These are formed by heating a certain portion of a test-tube and drawing it out so as to leave an open funnel above, a bulb below, and a narrow tube between both. These are Cohn's tubes. His method was this. He placed the tubes, as they are placed here, in boiling water, and when they had been subjected to a boiling temperature for a sufficient time, he simply lifted them out. He found a certain amount of water condensed upon the neck of the bulb; he waited one or two minutes until that evaporated, and then quietly plugged his tube with cotton-wool, and he thought that this was perfect immunity against the entrance of contamination; and Professor Cohn is very emphatic in saying that there is no thought of contamination from without in pursuing this method of experiment. I operated upon a great variety of hay-infusions, and after a time, by pursuing with the most scupulous exactness the method laid down by Dr. Roberts and Professor Cohn, it was possible for me, by practice, now to corroborate and now to contradict them. It is perfectly useless to bring forward before public assemblies merely opposing assertions, so that I did not really content myself with falling back upon the results I obtained last year, but tried to get some knowledge as to whence the differences arose which showed themselves between me and these distinguished men. Here are tubes of alkalized hay, some of them subject to a boiling temperature, not for three hours, but for ten minutes, and they are perfectly brilliant; there is not the slightest evidence of life in them; they have been entirely sterillized by an exposure to a boiling temperature for ten minutes. If I illuminate them, you will find that these infusions are perfectly brilliant; there is no turbidity that gives any sign of the production of animalcular life. These tubes have remained there for three months perfectly intact, uninvaded by those organisms which were invariably found both by Dr. Roberts and by Professor Cohn. Again, we turn to another series of tubes, and find that every one of them has given way. Thus I went on ringing the changes, until, as I have said, it was in my power, by pursuing with undeviating fidelity the mode of experiment laid down by Dr. Roberts and Professor Cohn, to get at one time a contradiction and at another time a corroboration of their results.

And what was the meaning of these irreconcilable contradictions? The meaning was this: when we came to analyse these various infusions, we found that those that were sterilized by a boiling of from five to ten minutes were invariably infusions of hay mown in the year 1876, whereas the others were infusions of hay mown in 1875 or some previous year. The most refactory hay-infusion that I have ever found was in the case of some Colchester hay five years old. Now, what do these experiments point to? The answer may be in part gathered from an observation described in the volume of the *Comptes Rendus* for 1863 by one of the greatest supporters of the so-called doctrine of spontaneous generation. A description is there given of an experiment that was made by the wool-staplers of Elbœuf. They were accustomed to receive fleeces from Brazil, which were very dirty, and had, amongst other things, certain seeds entangled in them. These fleeces were boiled at Elbœuf sometimes for four hours; and the seeds were afterwards sown by some of these expert fellows that had to deal with the fleeces, and were found capable of germination. The thing was taken up by Pouchet. He gathered these seeds, exposed them to the temperature of boiling water for four hours, and then examined them closely; and he found (and I recently made an experiment which showed the same thing to be true with regard to dried and undried peas) that the great majority of the seeds were swollen and disorganized, while the others were scarcely changed; they were so indurated and perhaps altered in the surface as to prevent the liquid from wetting them. At all events, a number of them appeared to be quite unchanged. He separated these two clases of seeds and sowed them side by side in the same kind of earth. The swollen seeds were all destroyed; there was no germination; but in the case of the others there was copious germination. Here, then, you have these seeds proved to be capable, by virtue of their dryness and induration, of resisting the temperature of boiling water for four hours. There is not the slightest doubt that, if time permitted, I could heap up evidence of this fact, that the wonderful sterility of this old hay is due to the induration and desiccation of the germs associated with it. Here you have three tubes containing cucumber infusion of crystalline clearness; they have been simply subjected to a boiling temperature for ten minutes; they have been completely sterilized, and they are as clear as when the infusions were first introduced into the tubes. On the other hand, here are tubes that have been subjected to a boiling temperature for five hours and a half showing a swarming development of life. What is the reason of this difference? The reason depends entirely upon the method of experiment. When Dr. Roberts filled his bulbs, he simply poured in his infusion, plugged his tube, sealed it, and subjected it to a boiling temperature. Not only did the liquid contain germs, there was a quantity of air above the liquid, and the germs were diffused in the air. Germs thus diffused in the air are very differently circumstanced from germs diffused in a liquid: they can withstand for hours a boiling temperature; whereas that selfsame temperature, brought to bear upon germs immersed in liquid, destroys them in a few minutes. And why do these tubes differ? The reason is to be sought entirely in the method of filling the tubes containing the clear infusions. Take one of Dr. Roberts bulbs. You see that the top is united to a T-piece with a collar of India-rubber. This comes down and ends in the neck of the bulb. Here is an air-pump, and here is the end of the T-piece surrounded by a tube of India-rubber, and here is a pinchcock to close that tube of India-rubber. If you open the pinchcock and work the air-pump with which this end is connected, it is completely exhausted. You may allow it to be filled with air; you may then open the pinchcock; the air will enter through the cotton-wool, and will fill the bulb. In this way, you get the bulb filled, not with common air, but with filtered air. This process is carried on three or four times, so as to make sure that the common air has been displaced by the filtered air. We will suppose that I detach the tube from the air-pump, and other precautions taken. At present, you see the bulb is empty. Taking an infusion of hay, I put the end of the T-piece into the infusion to be introduced into the bulb. The bulb is dipped into hot water; the air expands, and it is driven out. Simply introducing our bulb into cold water, the air shrinks, and by atmospheric pressure the liquid is driven into the bulb. Again we drive the air out, and, by a few operations of this kind, we find that we can charge our bulb with a very great degree of accuracy. You can see the liquid in the bulb at the present time. In this way we charge a bulb which has had its common air and floating matter removed with our infusion. When it is charged, it is very carefully removed, and great precautions are taken so as to prevent any indraught of air. For instance, it is always removed from the cold water, so that, when it is lifted up into the air of the laboratory, a slight expansion shall take place, so that the motion of the air shall be from within outwards, instead of from without inwards. In that way we can, by careful manipulation, obtain bulbs devoid of this floating matter. These are the bulbs you now see before you showing this beautifully pellucid infusion.

Were this a biological investigation, and not a physical one, I should feel myself out of my element in dealing with it. I leave the determination of the species of bacteria to others far more competent than I am. I can see these organisms and wonder at them when I see them through the microscope; but I have no ability or knowledge to classify them and divide them into species, genera, etc. But these are purely physical experiments, and it is only by such severe experiments that this question can be freed from the haze and confusion in which it has been hitherto involved. Even the celebrated Professor Cohn—I say it with the greatest regard and respect for him—appears to have no adequate notion of the care necessary to be taken in experiments of this kind. To lift a tube out of the boiling liquid, and allow it to remain quietly in the air, the entry of the air taking place from without inwards, and then, after one or two minutes' exposure, to plug it with cotton-wool and say that no contamination can reach it, is in my opinion a great mistake. He could not, but by the merest accident, get an infusion free from contamination by operating in this way. I have here tubes prepared according to his method. Here are some melon-tubes all putrid, all gone into a state of fermentation. I ask you to compare those with some other melon-tubes that I have operated upon in a different way and that are as clear as crystal. The others are all gone, simply through a defect in the mode of manipulation.

The defeats that I at first described to you were due entirely to the contaminated atmosphere in which we worked. It ought to be noted that, in the earlier experiments in this inquiry, the results were always in accordance with those brought before you last year. By degrees, however, masses of hay were introduced into the laboratory—old hay and new hay from various places; and they ended by rendering the atmosphere so virulently infective that everything was contaminated by the germs set afloat. It resembled the case of a surgical ward of a hospital, where gangrene and putrefaction have attained such a predominance that the surgeon has in despair to shut up his ward and abandon it to disinfection. Desiring to free myself from this pestilential atmosphere, I wrote to my friend the President of the Royal Society, Dr. Hooker, and I found that he was able to furnish me with a means of getting away from it. In Kew Gardens, there is a beautiful new laboratory, erected by the munificence of that most intelligent supporter of science, Mr. Thomas Phillips Jodrell. He, at his own expense, has had this beautiful laboratory built—being designed, I believed, by Dr. Thiselton Dyer. It is one of the neatest things I have ever seen, and it is to me a great gratification that the first experiments made in that laboratory were those to which I have now to refer. I broke away from the contaminated air of the Royal Institution. It is very well for you that I can tell you, that all the germs referred to are perfectly innocuous to human beings, for I have no doubt the air of this room is contaminated with them. A series of chambers was made—not of wood, for I wanted to get rid even of that, but of tin—and I would not allow Mr. Cotterell to carry those chambers into the Royal Institution at all. They were carried from the tinman's where they were made to the laboratory at Kew. There, with the greatest care, the tubes were treated first with carbolic acid and then washed with water, and then with caustic potash, to get rid of all traces of carbolic acid, and finally drenched with distilled water. Carbolic acid, as you know, is a deadly foe to these germs. In this way I hoped that every contamination that might be adhering to the tubes would be destroyed, and that, having got clear of an infected atmosphere, we might get the same results as we invariably obtained last year. The temperature was raised to between 80 deg. and 90 deg., and once a little above 90 deg., so that the warmth was all that could be desired for the development of those organisms. It gives me the deepest gratification to find that what was foreseen has occurred, and that this very day these chambers have come back from Kew perfectly intact. They comprise the most refractory substances that I had experimented upon here. It was almost impossible to save a cucumber; I never did succeed in saving a melon-infusion from contamination, and from this so-called spontaneous generation. But here, when the air had been allowed to deposit all its motes, and when we were withdrawn from an infected atmosphere, as I have said, the chambers were returned with their infusions as clear as crystal. Mr. Cotterell will show you some of them. You will see that one of these is muddy and turbid, and it has a deposit at the bottom. These are all dead bacteria, and the muddiness is due to swarming baterial life. Here you have two infusions perfectly clear. Why did the other tube give way? When we came to examine it, a little pin-hole was found at the bottom of the chamber, and through that pinhole the germs got in. Here is a melon-infusion; and, in order to show you what would have occurred if the infusions had not been protected from the floating dust of the atmosphere, we have hung beside this case two tubes that have been exposed to the common air and have fallen into a state of utter rottenness. In this way, from the Jodrell Laboratory at Kew, we have had these cases returned with their infusions perfectly intact. Even in our infected atmosphere, when we subject our infusions to experimental conditions sufficiently stringent, we are able entirely to shut out contamination, and to show that spontaneous generation never occurs. When we get clear of our atmosphere altogether, this is a matter of perfect ease and facility; and we find in Kew Gardens that nature runs her normal course.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 3, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

VEGETABLE DIGESTION.

THE proposition that certain plants have the power to exercise special digestive functions has excited much interest and elicited diverse opinions. In our own Journal the statement of Mr. DRUCE that *Saxifraga tridactylites* must be added to the list of "carnivorous plants" called forth a protest from a respected correspondent, and we have reason for believing that more than one eminent British pharmacist is at present engaged in making observations on the subject. It may therefore be of interest to lay before them and others some recent results obtained by foreign investigators.

Since the discovery of the remarkable phenomena connected with the absorption of their food by so-called "carnivorous plants," the view has been rapidly gaining ground that there is in reality but little essential difference between the processes of the assimilation of food by plants and by animals. Professor CALDERON, of the Institute of Las Palmas, Canary Isles, has lately propounded the idea that plants do not, as is usually supposed, derive their nitrogen entirely from the nitrates and ammoniacal salts dissolved in the soil, but to a considerable extent also from the nitrogenous organic matter which is always floating in the air in a solid form. The purpose of the viscid hairs or glutinous secretion with which so many plants are provided, he believes to be the detention of this floating organic matter. To prove the importance of the solid particles floating in the air to the life of the plant, he deprived air of all its organic matter in the way described by Professor TYNDALL, and subjected some lichens to the access only of this filtered air and of distilled water, when he found all their physiological functions to be suddenly suspended. Professor CALDERON divides the nutrition of plants into three classes:—(1) *necrophagous*, the absorption of dead organic matter in various stages of decomposition; (2) *plasmophagous*, the assimilation of living organic matter, without elimination or distinction of any kind between useful and useless substances such as the nutrition of parasites; and (3) *biophagous*, the absorption of living organisms, such as that known in the case of insectivorous plants.

Professor ED. MORREN, of Liége, has contributed an important paper on vegetable digestion to the proceedings of the Royal Academy of Belgium. He commences by the assertion that digestion is not a function peculiar to "carnivorous plants," but that it is common to all living beings, vegetable as well as animal. Animal digestion is, he states, according to the most recent observations, a fermentation consisting essentially in a hydration, or transformation of colloids into crystalloids, this change being a necessary preliminary to absorption. It is caused by the action of certain substances known as ferments, which are especially abundant in particular secretions, such as the saliva, gastric juice, and pancreatic juice. In the same manner all plants digest, and the process is precisely analogous to that of animals, being in this case also essential before assimilation is possible. Such a transformation of a colloid into a crystalloid is illustrated in the ordinary change of starch into glucose, which takes place so commonly in plants; the active ferment in this case being diastase, which has been detected in barley, as also in the potato.

$$\underbrace{2\,(C_6H_{10}O_5)}_{\text{Starch.}}+H_2O=\underbrace{C_6H_{10}O_5}_{\text{Dextrine.}}+\underbrace{C_6H_{12}O_6}_{\text{Glucose.}}$$

$$\text{or } C_6H_{10}O_5+H_2O=C_6H_{12}O_6.$$

But, for the fermentation or digestion of albuminoids and other nitrogenous substances, a different ferment is required, and this we have in pepsine, which has been detected by Riess and Will, and other observers, in the viscid secretion of *Nepenthes*, *Drosera*, and other insectivorous plants. A similar substance has been observed in the latex of *Carica Papaya*, and elsewhere in the vegetable kingdom. It seems probable, in fact, digestion is as widely diffused a phenomenon, and as various in its forms, among plants as among animals. It consists essentially in the transformation of the raw insoluble food-material (a colloid such as starch) into soluble crystalloids capable of assimilation. The process takes place chiefly in the reservoirs of reserve-material, such as seeds, bulbs, tubers, roots, the pith, and the bark. The nutrition of plants is, therefore, made up of three successive processes:—(1) elaboration, or the production out of its elements of carbohydrates, which can take place only under the influence of light; (2) digestion, consisting essentially in a hydration, such as the conversion of starch into glucose, associated commonly with evolution of carbonic acid, and accompanied by a molecular change which renders the product soluble and diffusible; and (3) assimilation, the absorption into the tissue of the substances thus prepared, accompanied usually by a loss of water, and the reversion of glucose to the condition of cellulose, a substance isomeric but not isomorphic with starch, and the consequent production of the cell-wall. Intussusception is, therefore, a process which can only succeed digestion. No essential difference can, in fact, be maintained, between the manner in which animals and plants digest their food.

THE EVENING MEETING.

An Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, February 7th, when the following papers will be read:—"On the Admixture of Veratrum with Valerian Root," by Professor Bentley; "The Colouring Matter of the Petals of Rosa Gallica," by Mr. Harold Senier; "Note on the Action of Dilute Nitric Acid on Brucia," by Mr. W. A. Shenstone; "The Pharmacopœia Test for Quinine Sulphate," by Dr. B. H. Paul. The Chair will be taken at half-past eight o'clock precisely.

"CASTOR OIL LOZENGES."

An anonymous writer in the *Lancet* calls attention to the extensive sale of so-called "castor oil lozenges," which he says are largely used by pregnant women of the lower class, and commonly given to children in the east of London as a pleasant aperient. In the letter it is implied that each lozenge contains three grains of calomel, and the writer states that he has just seen a severe case of mercurial salivation in a young girl who had taken half-a-dozen in two days. If it be true that the lozenges have the composition suggested, and are taken to the extent stated, it is almost a wonder that it is a single case that is reported and not a score.

A BUTTER TEST WANTED.

The *Sanitary Record* states that a prize of 300 francs is offered by the Food Bureau of the Leipzic Pharmaceutical Society, for the discovery of a "practical and certain method for the detection of the adulteration of butter with other fats." The papers of competitors are to be sent not later than the 30th of September next, to Herr Apotheker Kohlmann, Leipzic. They are to be marked simply with a motto, and accompanied by a sealed envelope bearing the same motto, and enclosing the name of the author. The copyright of the successful prize essay is to become the property of the Society giving the prize.

THE METRIC SYSTEM IN PRESCRIBING.

We learn from *New Remedies* that the movement among the physicians of New York in favour of the use of the metric system in prescriptions appears to be growing. We mentioned recently that it had received the unanimous endorsement of the Medical Society of New York; its principal advocates are, however, as might be expected, to be found among the younger men.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of the above Association will be held at 17, Bloomsbury Square, on Thursday evening, February 8th, at eight o'clock, when a paper on "The Diagnoses of the Principal Natural Orders" will be read by Mr. E. M. Holmes, F.L.S.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

The third meeting of the present session was held in the Society's rooms, 119, George Street, on the evening of the 24th ult. Mr. William Gilmour, President of the Branch, in the chair. The following papers were read:—

I. On the Composition of Ewes' Milk.

BY DR. STEVENSON MACADAM, F.R.S.E.,
Lecturer on Chemistry.

During the sessions 1874 and 1875, I directed the attention of the Society to a lengthened series of experimental observations which I had made on the composition of cows' milk, both from town and country dairies. At the same time, I had analysed various samples of goats' and ewes' milk, though the results of these experiments were not specially included in the papers read before the Society. The general results then arrived at were, that milk varied much in quality as yielded by animals of the same species, even when the kind of food, the housing, temperature, time of milking, etc., were the same—not to speak of exceptional causes, such as the period of calving—as in all cases the milk, immediately after dropping the young, was very rich in quality.

The average quality of the different milks was then found to be as follows:—

Per cent. by weight.	Town Dairy. Cows' Milk.	Country Dairy. Cows' Milk.	Goats' Milk.	Ewes' Milk.
Total solids . .	12·27	12·77	13·43	17·78
Solids not fat . .	9·69	9·89	9·12	12·06
Fat in solids . .	2·58	2·88	4.31	5·72
Ash in solids . .	0·71	0·71	0·73	0·94

The most striking part of the investigation being the richness of ewes' milk, not only over cows' milk, but even over goats' milk, which has long been regarded as of very rich quality. Indeed, whilst the goats' milk was similar to rich cows' milk in proportion of ingredients, the ewes' milk was nearly half again as rich as cows' milk in total solids and twice as rich in fat or butter element.

In order that more light might be thrown upon the relative superiority of ewes' milk over cows' and goats' milk, I arranged for a more extended series of observations, and my friend Mr. Lyal, of Caddonlee Farm, on the north bank of the Tweed, kindly agreed to place a number of sheep at my disposal during the month of May, when the pasture was in excellent condition and there was a good flow of milk.

Ten sheep were selected for the experiments, and they, with their lambs, were placed in a small field by themselves. The number of sheep was not sufficient stocking for the grass, so that the sheep may be regarded as being under more than ordinarily favourable circumstances for feeding. The grass was of third year's growth and was in excellent condition. The milk taken from each ewe was kept separate, and the following table gives the results of the analyses of the ten samples:—

Analyses of Milk from Ewes fed on Natural Pasture.

	Total Solids.	In 100 parts by weight. Fat in Solids.	Solids not fat.	Ash in Solids.
Ewe No. 1. . .	17·45	5·02	12·43	0·79
" " 2. . .	18·77	6·56	12·21	0·81
" " 3. . .	20·25	8·94	11·31	0·82
" " 4. . .	21·01	9·56	11·45	0·95
" " 5. . .	17·76	5·30	12·46	0·87
" " 6. . .	18·76	6·63	12·13	0·81
" " 7. . .	18·94	7·37	11·57	0·73
" " 8. . .	17·04	5·37	11·67	0·93
" " 9. . .	17·44	4·56	12·88	0·93
" " 10. . .	20·13	8·46	11·67	0·89
Average of all	18·75	6·77	11·97	0·85
Lowest . .	17·04	4·56	11·31	0·73
Highest . .	21·01	9·56	12·88	0·95

These results fully bear out the very rich quality of ewes' milk, even when the sheep are fed solely on natural pasture. Arrangements were now made to supply artificial food to the sheep in addition to the natural pasture, in order to observe how far the extra food would enrich the milk. The sheep Nos. 1, 2, and 3 were each supplied daily for a period of ten days with a pound weight of linseed cake; Nos. 4, 5, and 6 with a pound of cotton cake; Nos. 7, 8, and 9 with a pound of oats; whilst No. 10 received no artificial food. Excepting at the times when they were consuming the feeding stuffs, the whole of the sheep were grazing at large in the same field. At the end of ten days, the ewes were again milked, and the various samples gave, on analysis, the following results:—

Analyses of Milk from Ewes fed on Artificial Food and Natural Pasture.

		In 100 Parts by Weight. Total Solids.	Fat in Solids.	Solids not Fat.	Ash in Solids.
Linseed Cake.	Ewe No. 1.	21·32	9·79	11·54	0·87
	— 2.	18·87	6·63	12·24	0·85
	— 3.	16·28	4·67	11·61	0·87
Cotton Cake.	— 4.	22·17	10·15	12·02	0·84
	— 5.	19·33	7·63	11·70	0·88
	— 6.	20·65	8·56	12·09	0·91
Oats.	— 7.	19·44	6·96	12·48	0·87
	— 8.	22·20	10·48	11·72	0·96
	— 9.	20·13	8·41	11·72	0·77
	— 10.	20·75	9·40	11·35	0·88
Average of all		20·11	8·27	11·84	0·89
Lowest		16·28	4·67	11·35	0·77
Highest		22·20	10·48	12·48	0·96

In contrasting the above analyses with those given in the previous table, it will be observed that the extra feeding stuffs have not raised much the quality of the milk yielded by the ewes, either individually or collectively.

It was distinctly noticed, however, by the shepherd, that there was an extra flow of milk in all those ewes which received the artificial feeding stuffs, though to what extent the milk was increased in quantity could not be determined, as the lambs were still with the ewes. In one case, that of No. 3, the artificial feeding appeared to take away from the quality of the milk, though the animal remained in good health, and such can only be explained by a greater yield of the milk. The influence of the extra feeding will probably be better observed by stating the averages so that the peculiarities of each individual sheep may be counteracted by those of the other sheep. The following tables give the average of the quality of the milk before and after feeding with linseed cake, cotton cake, and oats.

Average Milk from Ewes 1, 2 and 3.

1lb. linseed cake each day.

In 100 parts by Weight.	Before feeding with cake	After feeding with cake.
Total solids	18·82	18·83
Fat in solids	6·84	7·03
Solids not fat	11·98	11·80
Ash in solids	0·81	0·89

Average Milk from Ewes 4, 5 and 6.

1lb. cotton cake each day.

In 100 parts by Weight.	Before feeding with cake	After feeding with cake.
Total solids	19·17	20·72
Fat in solids	7·16	8·78
Solids not fat	12·01	11·94
Ash in solids	0·88	0·91

Average Milk from Ewes 7, 8 and 9.

1lb. of oats each day.

In 100 parts by Weight.	Before feeding with oats	After feeding with oats.
Total solids	17·81	20·59
Fat in solid	5·77	8·62
Solids not fat	12·04	11·97
Ash in solids	0·86	0·87

From the above tables, it will be observed that the feeding with linseed cake made in these trials no practical difference in the quality of the milk; the feeding with cotton cake gave an increase of 1½ per cent. in total solids which was strictly due to the milk being extra rich in fat or butter element; whilst the feeding with oats gave the more decided increase, there being nearly 3 per cent. more total solids, due also to an increase in the fat. Of course, other sheep fed in the same way might have given results more or less differing from these, as undoubtedly the individual sheep have much to do with the quality of the milk, independently of the feeding.

One of the best sheep of the series for quality of milk was No. 10 ewe, which, fed merely on natural pasture, gave even at the commencement, very rich milk, and at the end of the trials yielded fully as rich milk as the average of the whole of the ewes which were under extra feeding. The following table will show this:—

In 100 parts by Weight.	Average milk from nine ewes under extra feeding. Commencement of trial	Termination of trial	Milk from No. 10 ewe fed solely in natural pasture. Commencement of trial	Termination of trial
Total solids	18·60	20·04	20·13	20·75
Fat in solids	6·59	8·14	8·46	9·40
Solids in fat	12·01	11·90	11·67	11·35
Ash in solids	0·85	0·89	0·89	0·88

The averages are more reliable than the individual milks, especially when it is remembered that the last runnings from the udder are richer in cream than the first runnings, and consequently if the udder of the sheep is nearly empty when the sample is taken, the milk will be richer and give a larger proportion of total solids, as well as of fat in solids; while if the udder is full, the milk will be less rich and yield a smaller percentage of solids and of fat.

Taking these experimental observations on the quality of ewes' milk as a whole, the results prove the very rich nature of the milk yielded either under good natural pasture, or under such supplemented by artificial food. The averages of all the trials gave as follows:—

Average quality of Milk from Ewes.

In 100 parts by Weight.	Commencement of trials.	Termination of trials.
Total solids	18·75	20·11
Fat in solids	6·77	8·27
Solids not fat	11·97	11·84
Ash in solids	0·85	0·89

These results establish satisfactorily the very rich quality of ewes' milk, especially in the fat or the butter element, and it remains for medical practitioners to determine how far a milk containing two to three times the quantity of fat found in ordinary cows' milk may be employed as an important article of diet especially in the case of invalids.

II.—THE PRESENCE OF WATER FLEAS IN DOMESTIC WATER CISTERNS.

BY WILLIAM IVISON MACADAM.

For some time I have directed considerable attention to the presence in domestic water supplies of a class of animals known by the name of "Water fleas." These animals belong to the division of the sub-kingdom Annulosa called Entomostraca, and are principally of two families—the first genus being of the family Daphniadæ, one of the divisions of the order Cladocera, and is the *Daphnia pulex*. The second is a member of the Legion Lophyropoda, belonging to the order Copepoda, of the family Cyclopidæ, and is called *Cyclops quadricornis*. These are the principal forms of water fleas, but there are varieties of these, and also members of other orders which occur less frequently.

The first of these little Crustaceans, the *Daphnia pulex*, is enclosed in a bivalve shell which is joined at the upper part, and is hingeless although capable of slight contraction. It is quite transparent and by means of the microscope the structure of the animal can be easily seen. The body is divided into two equal parts, (1) the head, and (2) the thorax and the abdomen which are in one. The head is outside the shell, and has a hard covering. There is only one eye, which, by means of very strong muscles, has a semi-rotary power. It is connected with the brain, and is composed of about twenty crystalline pear-shaped lenses. From the top of the head there are the larger antennæ, which from their branched appearance have won for the daphnia the title of the *arborescent flea*. These antennæ are composed at the base of one segment which is divided into two branches, the first of which has three segments, and the second four segments. From the junction of these segments we have many smaller branches furnished with minute setæ or hairs. The superior antennæ are small and evidently useless. They are larger in the male than in the female. The body is divided into segments, the first of which only is attached to the shell, thus leaving a space between the body and the shell which is used by the female as an egg repository and in which the eggs remain till hatched. There are five pair of legs, two of which seem to be respiratory, but all of which are useless for locomotion. The colour of the insect is black or red. The young undergo no transformation but, like the full grown animal, frequently moult.

In the *Cyclops quadricornis* the thorax and abdomen are very distinct. The thorax has four segments, the first of which is the largest. The abdomen is divided into six segments—the second and third of which are nearly joined in the female. The superior antennæ are shorter in the male than in the female and are articulated, each articulation being furnished with either one or two setæ. The antennules have four articulations all furnished with setæ. There is one eye of a blood red colour. The legs are five pair, four of which come from the thoracic rings, whilst the fifth pair start from the first abdominal segment. Besides these we find two pair of smaller legs coming from the first thoracic segment which are considered to be employed by the animal in seizing food and carrying it to the mouth. The tail has two elongated segments furnished with setæ. The colour of the cyclops is white or grey to almost black or red. In the female the eggs are deposited in two small sacs, one on each side, and coming from the joint between the last thoracic and the first abdominal segments. The eggs are 30 to 40 in number in each bag and remain in the pouches till hatched, a process which requires from the three to twelve days according to the temperature of the water. The young cyclops on emerging is quite unlike the adult, being a sort of little bag with three pair of legs. It moults often and every moult brings a change on the cyclops, until in about twenty days it assumes the full form.

Both these crustaceans, or water fleas, are found in Edinburgh water during summer in considerable abundance, more especially the cyclops. They may be obtained in the cisterns through the year, and there are now specimens exhibited before the Society which were taken from cisterns in Edinburgh and Portobello, all of which contain the cyclops. The daphnia species is never so common as the cyclops, and probably this is due to the fact that in the large collecting reservoirs the daphnia is found mostly near the shore and in shallow water, while the cyclops is to be had all over the loch, but specially off the shore, and are thus more likely to be drawn off by the supply conduits and pipes which carry the water from the reservoir at a low level.

All cisterns do not contain these forms of life. Wherever the sediment in the cistern is foul and decomposing, due to improper attention to the cistern, the fleas are not to be found. It is true that in all cisterns there is a deposit, but if they are properly looked after and regularly cleaned out, the sediment is not putrescent, and consists principally of earthy matter along with a proportion of oxide of iron. The latter appears to be favourable to the life of the water flea, owing probably to its power of aiding in the aeration of the water. The fleas are very delicate; are only found in good impounded waters, and they cannot survive extremes in heat or cold. They are to be found in the water supplies of all our towns when carefully looked for.

The paper was illustrated by diagrams and microscope preparations.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS' ASSOCIATION.

The annual supper of the members of this Association was held at the society's rooms, Halford Street, on Friday evening last, January 26. Between thirty and forty gentlemen sat down. Mr. W. Clark presided, in the absence of the Mayor, who had been invited. The tables having been cleared the chairman gave the usual loyal toasts, which were duly honoured.

Mr. Henry Cooper gave the "Pharmaceutical Society," and in doing so remarked that it was some time since he was at the society's place, but he had pleasant recollections of what he did when he was there. He always found the examiners and everybody connected with the society very pleasant. They might consider the society as their *alma mater*, as they were governed by it in all things pharmaceutical, and they might as well take kindly to it as not. If they were not under the guidance of the Pharmaceutical Society they would perhaps be under the thumbs of the Medical Council, which would be far worse. He hoped the Pharmaceutical Society would long continue to prosper.

Mr. T. E. Butler responded, and said he thought they had not much fault to find with the Society, although it was rather hard upon their young friends. The examinations of the society were now very hard. He had thought at times that they had aspired rather too high, and it would, perhaps, be as well if they rested a little now and let the students get perfectly initiated into the learning and education that they were attempting to reach, and then in twenty years time they might go a step further; they would then probably be better prepared for it. Although a good many prizes had been gained by the members of the Association, he thought the examinations were very difficult for many of their young friends, but at all events the Pharmaceutical Society was doing good, and they must try and obey its rules and regulations.

Mr. Butler then proposed the toast of "The Leicester Chemists Assistants' Association," and said he was exceedingly pleased to find that there was such a society existing in Leicester, and that such a goodly number attended it. Old veterans, like himself, could not do much for them, but whatever he could do he would. They began very late in life and had not the pleasure of going up to London to pass the examinations of the Pharmaceutical Society, but the young men would have to do it, and there was no use mincing matters about it. He was glad to find that there were so many in Leicester who had passed the examinations, who were willing to assist the apprentices to pass theirs. They were aspiring to a very high standard, and it could only be reached by great energy and perseverance, and he wished he could help them more. He sympathized with them in the difficulties they had to encounter, and hoped they would long have Mr. Clark among them, as he was able to do them a deal of good. There were others also among them, such as Mr. Thirlby, who could help them very much. He hoped they would not withdraw their efforts but that the society would long continue to be very successful.

Mr. Clark responded, and said from the way those present had received the toast, he concluded that they had great interest in the welfare of the Association, and that they wished it to be firmly established and to see it more prosperous in the future than it had been in the past. He impressed upon all the members, especially the younger ones, the necessity of punctual and regular attendance at the meetings of the Association, for it was only by this that they could obtain a minimum of knowledge which it was necessary for them to obtain. By their regular attendance they would encourage the lectures and thus promote the best interests of the Association. The honorary members could also afford them very practical aid. He did not ask them for increased subscriptions, for though these were necessary he knew they would gladly give them all they required, but he wanted them to come amongst them occasionally if they could by any means find time. There was another way in which they could afford the assistants great aid. They all knew the difficulty there was to get anything like careful assistants, those whom they could depend upon, at a moderate salary, but if principals would tell their new assistants that such a society as theirs was in existence they would do it a good deal of good, and the knowledge that such an excellent Association as this was in existence in the town would no doubt draw many more clever assistants to the town. He would commend these thoughts to their honorary members, who he hoped would render all the aid they could in the future.

Mr. Henry Cooper proposed in eulogistic terms the "Mayor and Corporation," which was responded to by Mr. C. H. Butler.

Mr. Thirlby gave "The President, Vice-President, and Committee of the Association," and regretted the absence of Mr. Barron, the President, through illness. He was sure they all hoped Mr. Barron would recover and enjoy better health in future. He had rendered the society very great assistance during the time he had held the office of President, and during his enforced absence the Vice-President had occupied his place to the satisfaction of everybody. The Committee had the welfare of the Association at heart. That society was held up before the whole country as a kind of pattern that others should follow, and the *Pharmaceutical Journal* had called attention to it as being one of the most successful of the provincial societies. He hoped the society would always be as well spoken of.

Mr. Hammond, the Vice-President, returned thanks, and also expressed his deep regret for the absence of Mr. Barron. He believed the society now held a better standing than it did when he came to the town about two years ago. Whatever he had done for the society he had tried to do for its good, and the Committee had done all they could for its benefit. He hoped the society would be increasingly prosperous, and that it would continue to reflect credit upon the members and honorary members.

Mr. Rees proposed the "Honorary Members," and said he had never been to a town where the chemists had been so cordial in their relationship to their assistants, so early in their hours of closing, or so kind to their assistants as they were in Leicester.

Mr. Cadoux responded and said when he was an active member of the Association, he knew the subscription of the honorary members were very useful, and hoped they would continue, and that the honorary members would take the hints thrown out by Mr. Clark to-night.

Mr. Thirlby gave "The Class Teachers," and spoke of the valuable service rendered by them to the Association. The study of botany was becoming a stricter rule of the Pharmaceutical Society than it used to be, and if the Association could arrange a half-day outing sometimes for the practical study of botany, as was done in other places, he believed it would be attended with great good. He had no hesitation in saying that the principals in the town would be glad to give their assistants the time requisite, and it could be easily arranged on some future day.

Mr. Raynor responded, and said the teachers were happy to do what they could for the classes of the Association. He, himself, had obtained the knowledge he possessed at the Association's meetings, and he felt it his duty to impart it to others.

Mr. E. H. Butler proposed "The Chairman," which was responded to by Mr. Clark, who also announced that a number of letters had been received from gentlemen expressing their inability to be present.

The other toasts were "The Ladies" and "The Press." During the evening a number of songs were given by gentlemen in the company, which added much to the evening's enjoyment.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual supper of the members of this Association was held at the Flying Horse Hotel, on Wednesday, January 24th, when nearly forty gentlemen sat down. The chair was occupied by the President of the Association, Mr. J. H. Atherton, F.C.S., and the vice-chair by Mr. J. Lewis.

After the usual loyal toasts had been given by the Chairman, Mr. R. Fitzhugh, F.C.S., proposed "Success to the Pharmaceutical Society," and coupled with it the name of Mr. Atherton, one of the Council of that Society, who suitably responded.

The toast of the evening, "Success to the Nottingham and Notts Chemists' Association" was then proposed in complimentary terms by Mr. H. Major, B.A., B.Sc., and it is almost needless to say it was heartily drunk.

The next toast on the list was the "President, Vice-President and Council," which was given by Mr. G. Shepperley, and responded to by the President.

Mr. Lomas next proposed "The Treasurer," to which Mr. J. Rayner responded; the health of the Hon. Secretary was next proposed by Mr. C. A. Bolton and responded to by Mr. Roberts Jackson. The remaining toasts were "The Teachers of the Science Classes," "The Vice-chairman," "The Visitors," and "The Ladies."

In replying to the toast of "The Visitors" Mr. F. J. Clarke, of Lincoln, whose name was coupled with it, very kindly promised a donation of £10 to the funds of the Association.

A good selection of songs, duets, etc., by efficient vocalists, accompanied by an excellent pianist, agreeably diversified the proceedings, and a most pleasant evening was concluded by singing the National Anthem.

Proceedings of Scientific Societies.

NEWCASTLE-UPON-TYNE CHEMICAL SOCIETY.

At the general meeting of this Society on the 21st of December, Mr. B. S. Proctor described a slight modification of the customary form of percolator, to adapt it to the exhaustion of small quantities of opium, etc., in analysis. It consists of the usual cylindrical tube and receiver, with the addition of a cylinder of tin plate or other suitable material, closed at both ends, fitting loosely within the percolation tube; the object being to get a slightly increased hydrostatic pressure with a small quantity of solvent. The substance to be exhausted diffused through a small quantity of the solvent, is poured into the glass tube, and then the tin tube being brought down till it touches the top of the liquid, its position is fixed, and more of the solvent is added. As this addition occupies the narrow space between the two cylinders, a head of 6 or 8 inches is obtained with a small quantity of liquid. This arrangement has also the advantage of permitting fresh additions of solvent without their mixing with that portion which by contact with the marc has become charged with extractive.

Mr. Proctor also described the following luting and washers for ether, sulphide of carbon, or other volatile liquids.

No. 1.		No. 3.	
Clay	30	Clay	5
Water	3	Gelatine	2
Glycerine	8	Water	2
		Glycerine	6
No. 2.		**No. 4.**	
Clay	30	Felt.	
Gum Tragacanth	1	Gelatine	2
Water	3	Water	2
Glycerine	8	Glycerine	6

Where a clay luting is required to retain its impervious character for a length of time, the addition of glycerine by preventing its drying imparts that character; but if glycerine and clay alone are used, the mass becomes softer by exposure, from the absorption of moisture. In the luting No. 1, the glycerine and water are present in such proportion as to give it little tendency to become either harder or softer.

A joint made with No. 1, if not kept rigid, ceases to be tight; but No. 2 will allow of a little motion, especially if rather more moist. No. 3 gives more flexibility, but requires to be applied warm, and of course will not resist heat—even a gentle heat—in use.

The presence of the clay makes the gelatine less fluid while warm, and consequently more convenient in application. Fluidity is still more completely got rid of in the following. No. 4 takes the form of a washer, and may be applied warm to delicate apparatus, or cold where mechanical pressure can be used freely. It appears to be quite impervious to the vapour of ether. The felt is simply soaked on the melted gelatine and glycerine, and the superfluous quantity pressed or drained out. Corks and bungs may be saturated with the same compound by being boiled in it for half an hour, and kept submerged till the temperature has fallen considerably. If then drained, and the superfluous jelly rubbed off the outside, they are in a condition suitable for stopping vessels of ether, sulphide of carbon, or benzine.

Glass stoppers may be lubricated with this glycerine jelly in some cases where oily lubricants would be objectionable.

Probably casks might advantageously be lined with a similar compound before being used for petroleum or coal oils.

THE SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of the above Association was held at 17, Bloomsbury Square, on January 11, 1876, Mr. Harold Senier, Vice-President, in the chair, when Mr. W. Ralph Atkins read a paper on "Faraday," of which the following is an abstract:—

Michael Faraday was born near Manchester Square in 1791, and obtained his first situation at the age of eighteen, in a bookseller's shop in Blandford Street. After a year's employment, in consideration of his faithful service, he was taken as an apprentice without a premium. He attended his first lectures on Natural Philosophy in 1809. At the expiration of his apprenticeship, he obtained the post of laboratory assistant to Sir Humphrey Davy, at the Royal Institution, with a salary of 25*s*. per week, his duties being to assist the lecturers, and to clean and dust the instruments and models in the glass cases. Not content with discharging these somewhat menial duties, he re-arranged the mineralogical collection, and was soon engaged extracting sugar from beet-root, making bisulphide of carbon, and other duties not strictly required of him. Soon after his appointment, he accepted an offer of Sir H. Davy's to travel with him on the continent, as his amanuensis, and travelled for a year and a half. In 1815, his engagement at the Institution was renewed with an increased salary of £100 per annum. He gave his first lecture in 1816, and in the same year the *Quarterly Journal of Science* published his first paper on an analysis of some native caustic lime from Tuscany.

At the age of twenty-seven the whole of Faraday's spare time was occupied in manufacturing rare chemicals, and in original investigations. Chlorine, iodine and naphthaline, were all studied by him. He tried for a long time to harden steel by alloying it with platinum and the rarer metals, but was more successful in the sciences of magnetism and electricity. In 1820, he was made honorary secretary to the Athenæum Club, and in the following year married Miss Barnard, the daughter of a silversmith of Paternoster Row. In conjunction with Stodart, he read papers on hydriodide of carbon, a new compound of iodine and carbon, and on the action of salts upon turmeric paper, before the Royal Society, but for forty years his great energies were concentrated in the investigation of the relation of electricity and magnetism to light. In 1836 he was appointed scientific adviser to Trinity House, and in 1837 he was president of the Chemical Section of the British Association.

Among the medals he received, were each of those at the disposal of the Royal Society, and the Grande Médaille d'Honneur from the French Exhibition; he was also made a member of the senate of the London University, although he had never passed through a university career. He received altogether ninety-five titles and marks of merit, including the blue ribbon of science, for in 1844 he was chosen one of the eight foreign associates of the French Academy.

Faraday's character combined reverence and kindliness with firmness; and although he went little into society, he was by no means unsocial. He delighted in nature, under two aspects more particularly, viz., in a thunder storm, and in watching the sunset fading into twilight. In fact, so fond was he of the former, that if the storm was at a distance, he would drive there in order to see nature in its awful beauty. He was also much interested in marine animals capable of giving shocks, and he proved that the gymnotus, or electric eel, has power to deflect a galvanometer, to make a magnet, and to give a spark. It is said that Faraday's answer to a young aspirant who asked the secret of his success as a scientific investigator was "The secret is comprised in three words—Work, finish, publish."

Faraday at one time had a theory that all metals would become magnetized if cooled down low enough; he experimented with cobalt and manganese cooled in a mixture of ether and carbonic acid, but the results were negative.

Faraday was pre-eminently a discoverer, he liked the name of "philosopher." He became acquainted as no man ever was with the varied forces of magnetism and electricity, heat and light, gravitation and galvanism.

In 1858, the Queen offered him a house at Hampton Court and there was spent the greater part of the rest of his life. He died August 26th 1867, and was buried in Highgate Cemetery.

The following incidents were communicated to the author of the paper by Mr. Barnard Proctor, of Newcastle, as having come under his personal notice. Faraday, one day, came unexpectedly into the presence of one of his little nieces, and found her ornamenting a cardboard box with sealing wax impressions which she had got off sundry letters. He entered into the child's play, taught her to dissolve sealing wax in spirit of wine wherewith to varnish the cardboard, and from time to time supplied her with seals till the box was completely covered. The box remains to this day a treasured monument of his loving kindness. This same niece, on another occasion, when ailing, expressed a great wish to see her uncle, a wish which the elder members of the household thought too childish to be mentioned to him, till the little one's persistence won the day, and he was sent for. Faraday said, "So earnest a desire should not be kept back." When he arrived the child had nothing to say beyond the great wish she had to see him. He said, to her that he was pleased to come to see her, and perhaps it would gratify her to hear that he had come direct from Buckingham Palace to see her.

On another occasion, going to see his sister, he found that she and the elder members of the household were out, but her son and two of his cousins were in the kitchen trying to make gas; so he joined in their experiments, until they were brought to a successful issue, and then left without waiting for his sister's return.

Dumas, when he gave the first "Faraday Lecture" of the Chemical Society spoke thus:—"Faraday is the type of the most fortunate and the most accomplished of the learned men of our age. His hand in the execution of his conceptions kept pace with his mind in designing them: he never wanted boldness when he undertook an experiment, never lacked resources to ensure success, and was full of discretion in interpreting results. His hardihood which never halted when once he had undertaken a task and his wariness, which felt its way carefully in adopting a received conclusion, will ever serve as models for the experimentalist."

Among the deep mines of the Durham coalfield is one called the Haswell Colliery. One Saturday afternoon, while the men were working in it as usual, a terrible explosion of fire-damp occurred; the roof fell in; and the suffocating gases rushed along the narrow passages, and overwhelmed ninety-five men with destruction. To inquire into the cause, Faraday and Sir Charles Lyell were sent by the Government. These two gentlemen attended the coroner's inquest, where they took part in the examination of the witnesses; they inspected the shattered safety lamps; they descended into the mine, spending the best part of a day in the damaged and dangerous galleries, and left a practical form of their sympathy with the sufferers on departing. Whilst down in the pit, an inspector showed them the way in which the workmen estimated the rapidity of the ventilation draught, by throwing a pinch of gunpowder through the flame of a candle, and timing the movement of the little puff of smoke. Faraday, not admiring the free and easy way in which they handled their powder, asked where they kept their store of it, and learnt that it was in a large black bag, which had been assigned to him as the most comfortable seat they could offer him.

Inventors and promoters of useful inventions frequently benefited by the advice of Faraday, or by his generous help. A remarkable instance of this was related by Mr. Cyrus Field. Before commencing his great enterprise of uniting the old and new worlds by the telegraphic cable, he sought the advice of the great electrician, and Faraday told him that he doubted the possibility of getting a message across the Atlantic. Mr. Field, wishing to settle this fatal objection at once, asked Faraday to make the necessary experiments, offering to pay him for his services. The philosopher declined remuneration, but worked at the question, and soon reported to Mr. Field—"It can be done, but you will not get an instantaneous message." "How long will it take?" was the next inquiry. "Oh! perhaps a second." "Well, that's quick enough for me," was the conclusion of the American, and the enterprise was proceeded with.

In conclusion, Monsieur Dumas thus speaks of Faraday—"There was nothing dramatic in the life of Faraday. It should be presented under that simplicity of aspect which is the grandeur of it. There is, however, one useful lesson to be learnt from the proper study of this illustrious man, whose youth endured poverty with dignity, whose mature age bore honours with moderation, and whose last years have passed away surrounded by marks of respect and tender affection."

At the conclusion of the paper, Mr. Atkins read the following letter from Professor Attfield:—

"London, 17, Bloomsbury Square,
"Jan. 25, 1877.

"Dear Mr. Atkins,—In response to your request for reminiscences of Faraday, I will give you two illustrations of his kind and encouraging manner towards young men aspiring to a position in science,—a trait of character such as is always met with in the truly great.

"On the 26th of October, 1857, Faraday called at the chemical theatre, St. Bartholomew's Hospital, to congratulate Dr. Frankland on his recent appointment to the Chair of Chemistry in the Medical School of that grand old institution. My chief had gone out, but Faraday came into the laboratory, looked at the lecture-room, and asked me, not questions relating to the researches of Stenhouse, whom illness had just driven from the school, nor any respecting those with which Frankland had already enriched chemistry, but questions concerning the lecture-table,—its supply of gas and water, the mode of getting rid of fuming products of the experiments, etc., and quite took possession of my young and therefore praise-greedy heart by appearing charmed with a little plan of mine of arranging the sets of lecture-diagrams, all out of sight but within an arm's length of the table. Without appearing to encourage me, his every word had that effect. On that day my diary notes were written in red ink.

"Nearly five years passed. Faraday never lost sight of me, and you may be quite sure I never lost sight of Faraday. I was often at the Royal Institution during that time, preparing the illustrations to Frankland's courses of lectures, or to his Friday evening discourses. Faraday frequently came into the quiet laboratory or the dimly day-lighted theatre, always with the same child-like spirit of inquiry—always patient, always amiable, always with a wealth of original suggestions respecting new modes of performing old experiments, or the most telling, truth-telling, modes of making new ones. And he never left me without increasing my respect, and I think I may add my love for him.

"In 1861 and the early part of 1862, Faraday had more than once talked with me about the then recently discovered spectroscope and the experimental demonstrations with it, which it was my duty to arrange and elaborate for Dr. Frankland's lectures. He thus got to know that I was myself working out what appeared likely to prove to be the spectrum of carbon and took some trouble to give my work such publicity in the best circles as I could never have secured without his kind and thoughtful aid. He invited me, on June 14, 1862, to show my spectra to, as he said, one or two of his friends who would be calling on him that day at the Royal Institution. I went and he introduced me to Major-General Sabine, the then President of the Royal Society, Colonel Philip Yorke, an ex-president of the Chemical Society, Gassiot, who was then making brilliant researches in electricity, and the eminent foreign physicists Becquerel and Plücker; Tyndall, on whom the mantle of the great seer has fallen, also was present: each of whom thereupon took the kindest interest in my experiments and my subject.

"On the east wall of the upper cemetery at Highgate there is a plain stone slab bearing the words "Michael Faraday, born 1791, died 1867." It is the monument of one who when a man, though ever occupied in unveiling to our sight the grandest agencies of nature, never forgot that he had once been an obscure youth, and never failed to aid and encourage the young and the struggling.

"Yours faithfully,

"JOHN ATTFIELD."

A discussion followed in which Dr. A. Senier exhibited specimens of Faraday's liquid chlorine. He showed also hydrate of chlorine in crystals. In explaining the method employed in their preparation, he remarked that the crystals were once supposed to be solid chlorine, but were shown by Davy to be a compound of chlorine with water. This discovery of Davy's led Faraday to make the experiments which resulted in the liquefaction of chlorine.

Parliamentary and Law Proceedings.

Brand's Essence of Beef.

In the High Court of Justice, January 25, Chancery Division, before Vice-Chancellor Sir Richard Malins, there was a motion on behalf of Thomas Dence and John James Mason, carrying on business as provision dealers in Little Stanhope Street, Mayfair, under the title of Brand and Co., for an injunction to restrain the defendant, Frank Mason, from selling any essence of beef, concentrated beef tea, meat lozenges or other meat essences, in tins, skins, boxes, or otherwise, having thereon labels or wrappers in imitation or only colourably differing from the labels or wrappers used by the plaintiffs, and from using the name of Brand, either alone or in combination with Mason or any other name in connection with essence of beef or other articles, manufactured or sold by the plaintiffs, from selling any of these articles in such manner as to represent or lead to the belief that the same had been manufactured by the plaintiffs. The facts of this case were that the plaintiffs' firm originated about forty-five years ago, when it was conducted by Mr. Henderson William Brand, and was about the year 1855 acquired by Mr. Withall, who, on the 29th of September, 1873, sold the same to the plaintiff, Thomas Dence for the sum of £5000. The business had always been carried on under the name of Brand and Co. The plaintiff, John James Mason was for fifteen years employed as manager of the business, and the defendant, Frank Mason, who is a brother of the plaintiff, J. J. Mason, was for about fourteen years prior to March, 1874, when he left the plaintiffs' service, employed as a journeyman in the business. In January, 1874, the defendant entered into partnership with a grocer in Sloane Street named Robert Brand, and he then commenced the manufacture and sale of essence of beef and other articles under the style of Brand and Mason. An application was made to the Master of the Rolls in September, 1874, to restrain this use of the name of Brand, and by an arrangement between the parties the defendant agreed to continue his business under the style of Mason and Brand; but soon after the partnership between the defendant and Robert Brand was dissolved, and Robert Brand required the defendant no longer to use his name in connection with the business. The defendant had, nevertheless, continued ever since to use his name, and the injunction now asked for was to restrain him from using the name of Brand any longer.

The Vice-Chancellor said he should grant an injunction to restrain the defendant from using the name of Brand in the sale of this essence of beef and other articles manufactured by the plaintiffs, also from the use of the words "Agent for Mason and Brand's Essence of Beef," on a shop front in the neighbourhood of plaintiffs, the words "agent for" being in small letters and the other words being made large and prominent.

Review.

Aids to Botany. By C. E. Armand Temple, B.A., etc. Baillière, Tindall, and Co.: London.

During the last few years there has been an evident tendency to the simplification of botanical study. To this fact the numerous elementary works on the science issued by different publishers bears witness. Not only has this been the case with books intended for the use of students and the public generally, but even in scientific works, fewer botanical terms have been used, and many which are found in manuals and class books are rarely met with in works on systematic botany. The little work before us, from its size and general appearance, seemed intended to belong to this category, but upon perusal it appears rather to be intended rather to form what would generally be understood by the term "a cram-book." In fact, on the title page we read that it is specially designed for students preparing for examinations, and the selection of natural orders at the end, which consists of those specially required for botanical examinations, as well as the extremely condensed definitions and the immense number of terms noticed, indicate that it is intended for such a purpose.

The preface expresses the hope "that it may prove of some real service to the already hard-worked students, before embarking upon works of greater magnitude." This little book reminds one of the kind of notes that are made in students' days; in fact, it is an epitome of all the terms met with in botanical handbooks. It is just the sort of book to which a student who had been through a course of botanical lectures would refer, in order to refresh his memory upon any forgotten point. As an introduction to larger works, it is of comparatively little use, for from the absence of illustration and examples, and the unequal and often hazy character of the definitions, it would be almost impossible for a beginner in the science to make much real progress.

Some of the explanations are very clear and easily understood. Thus, speaking of the leaf of Endogens, the author says, "the small veins cross at right angles, and the larger are parallel and straight." Imperfect definitions are, however, common throughout the book, and of mistakes there are not a few. Thus, under adventitious roots we find, "the Tuberous, corresponding to the *tap-roots* of the carrot." On other pages, "Thorns are formed by *some modified portion of a leaf*;" Phyllaries are individual bracts occurring in the order Compositæ;" "A Phyllode is the name applied to a petiole, which becomes flattened and assumes the function of a leaf whose lamina has fallen off." The author has evidently become confused over the sub-classes Calycifloræ and Corollifloræ, and in his definition of the latter, has made no provision for such natural orders as the Ericaceæ and Campanulaceæ.

Though evidently written with the design of helping students to pass examinations (the object of which unfortunately seems to be in the present day rather to puzzle the student than to ascertain the character of his knowledge), we cannot but feel that botany is not the author's forte.

Obituary.

Notice has been received of the deaths of the following:—

On the 3rd of December, 1876, Mr. Robert Moncrieff Rome, Pharmaceutical Chemist, Langholm, N.B. Aged 58 years. Mr. Rome had been a Member of the Pharmaceutical Society since 1853.

On the 17th of January, 1877, Mr. Charles Humphries, Chemist and Druggist, St. Mary's road, Garston, Liverpool. Aged 40 years. Mr. Humphries had been a Member of the Pharmaceutical Society since 1869.

On the 18th of January, 1877, Mr. John Price, Chemist and Druggist, Treforest. Aged 50 years.

On the 20th of January, Mr. John Handel Bland, Pharmaceutical Chemist, Stourbridge. Aged 70 years. Mr. Bland was Local Secretary of the Pharmaceutical Society, of which he had been a Member since 1857.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

Milk of Sulphur.

Sir,—Although I do not find much in what is said by your correspondents, Messrs. Brown and Chipperfield, that ought to require further explanation and comment than have already been given in your Journal, I am unwilling to allow the appeal that has been made to me by the former, and some of the assertions of the latter of those gentlemen, to pass unnoticed. I can assure Mr. Brown that I am not aware of any change having occurred in my opinions with reference to the milk of sulphur question, other than the strengthening of convictions resulting from continued investigation of the subject. What I have said is that the term "milk of sulphur" has been and still is sometimes used as a synonym for "precipitated sulphur," but that the two terms have not entirely the same meaning, for while the latter is limited in its application to the article described under that name in the 'British Pharmacopœia,' the former has a double meaning, and although sometimes applied to precipitated sulphur, B.P., it is more generally employed in a sense in which it was officially used in the early part of last century, and in which it has ever since been used, to represent sulphur mixed with sulphate of lime. It seems hardly necessary to allude to the far-fetched suggestion of Mr. Brown that milk of sulphur made according to the Pharmacopœia of 1721, with lime and sulphuric acid, ought not to contain sulphate of lime, as the washing ought to be continued until that ingredient is all washed away; but the suggestion, founded as it has been upon an incorrect description of the Pharmacopœia process, shows what expedients the advocates of that side of the question are obliged to resort to. Even Mr. Chipperfield, who, in common with others, quotes, not the Pharmacopœia, but some commentary upon it, cannot accept the suggestion that the sulphate of lime was intended to be all washed away. I am glad to find that you have given in the last number of the Journal, at page 627, the exact Latin words of the Pharmacopœia process. Anything more than the word "edulcora" signifies, is not necessarily the meaning of the Pharmacopœia, but of some commentator upon it. Let practical men take the simple and concise terms of the process and construe them in accordance with common sense.

Much of the confusion and error which have been recently apparent in the statements published on this subject, have arisen from reference having been made, not to the Pharmacopœias themselves, but to annotated translations. I may perhaps on this account be excused for saying that without going further back than 1721, the only editions of the London Pharmacopœia that have appeared are those of 1721, 1746, 1788, 1809, 1824, 1836 and 1851. There were intermediate reprints, but in those there were no alterations except typographical corrections. The authorized works were all published in Latin, and the descriptions were generally given briefly under the Latin names of the articles referred to, without note or comment. Synonyms were but rarely inserted.

In saying that "lac sulphuris" or "milk of sulphur" has been used as a synonym for "precipitated sulphur" I do not intend to imply that after the adoption officially of the name "sulphur præcipitatum," for which a new process was given, the previously used name, "lac sulphuris," acquired a new meaning, or that the two names as used officially had strictly and entirely the same meaning. "Lac sulphuris, 1721," meant sulphur precipitated either with or without sulphate of lime, while "sulphur præcipitatum, 1746," meant sulphur with sulphate of lime, the alternative process for obtaining it without sulphate of lime having been omitted. Thus in one respect both the names had the same meaning, but the name "lac sulphuris" had a double meaning and might be used in either of the senses. Since the edition of the Pharmacopœia of 1721, the name "lac sulphuris" has not been officially used at all, and no new or altered definition has been given to it. Strictly, therefore, it still has the same meaning as it had in 1721. "Sulphur præcipitatum," which, in 1746, was directed to be made by a process which yielded the mixture of sulphur and sulphate of lime, had an altered process given for it in 1788, since which time the sulphate of lime has been excluded from it.

I am at a loss to understand the object of Mr. Brown's inquiry, "Why the words lac sulphuris, or milk of sulphur, were not inserted in the B. P., 1867," unless it be that, misled by Mr. Crow's mistake of an annotated translation of the Pharmacopœia for the Pharmacopœia itself, he concluded that lac sulphuris had been given as a synonym for precipitated sulphur in the London Pharmacopœia of 1851. As the question has been asked me, however, I will endeavour to answer it. Synonyms, as I have already said, were rarely given in the London Pharmacopœia, but they are freely given in the British Pharmacopœia. Whenever a preparation in the British Pharmacopœia is intended to represent, or to be substituted for, a preparation under a different name that has been ordered either in the previous edition of that work or in the London, Edinburgh, or Dublin Pharmacopœias, the preparation under its old name is inserted as a synonym. Now, lac sulphuris is certainly not inserted as a synonym under sulphur præcipitatum, which, if anything is to be inferred from it, indicates that sulphur præcipitatum was not intended to be substituted for lac sulphuris. Under the head of "antimonium tartaratum" we find inserted as synonyms, "antimonii potassio-tartras, Lond.," and "antimonium tartarizatum, Edin. and Dubl.," indicating that the new preparation might be used when prescriptions contained either of the old names. There are numerous other cases of a similar description, this being a special feature in the British Pharmacopœia. But now, if we turn to "*pulvis antimonialis*," which is the modern representative of what in the London Pharmacopœia had been called "*pulvis antimonii compositus*," we do not find this last name inserted as a synonym of the new one. So again, under "*tinctura rhei*, B.P.," we do not find *tinctura rhei composita*, Lond., as a synonym, although the new tincture replaced the latter; nor do we find "*pulvis comitis warwicensis*" given as a synonym of "*pulvis scammonii compositus*," although the former of these preparations, which was introduced into the Pharmacopœia with "lac sulphuris" in 1721, was the original from which the present "compound powder of scammony" has been modified.

The intention of the authors of the Pharmacopœia has been that where the names of old preparations are inserted as synonyms under those of their modern representatives, the new preparations may be used when the old names are employed in prescriptions, but this is not otherwise to be done. It would be incorrect, therefore, when *pulvis antimonii compositus*, or *tinctura rhei composita*, or *pulvis comitis warwicensis*, is prescribed, to use the preparations that are their representatives in the present Pharmacopœia. By a parity of reasoning also the pharmacist would not be justified in dispensing sulphur præcipitatum, B. P., if lac sulphuris were prescribed, without duly considering, and if need be, ascertaining by personal inquiry, whether that or the other preparation which the name represents was intended to be used.

Now there are two different classes of circumstances under which the term "*lac sulphuris*" or "milk of sulphur" may be presented to the druggist for interpretation, namely—

1st. When it is used in prescription by a medical man; and

2nd. When it is used by a customer in applying for the article it is intended to represent, in the ordinary mode of retail dealing.

1. Under the first class of circumstances, the question to be answered may present some difficulty, as I stated in my evidence at Runcorn. If, from knowledge previously possessed, the intention of the prescriber was known, that of course should be acted upon; otherwise, as the meaning of the term is ambiguous, it would be the duty of the dispenser to endeavour to ascertain what was intended to be used. But if there should be no means of obtaining this knowledge, and the dispenser is left to the exercise of his own judgment, he might be supposed to reason somewhat as follows. If the prescriber intended to order the precipitated sulphur of the present Pharmacopœia, why did he not use the only name that has been officially applied to that preparation during the last hundred years. The fact of his using a name which medically has been almost completely superseded—a name which has a double meaning, and which is now generally applied to the old preparation of sulphur with sulphate of lime—would seem to indicate that he intended that preparation to be used. A similar mode of reasoning would be pursued if *tinctura rhei composita* or *pulvis antimonii compositus*, or *pulvis comitis warwicensis*, were ordered by a physician in his prescriptions; but with reference to the first two of these latter names, there would be much less reason for interpreting them by referring to the Pharmacopœia in which they were used instead of adopting their modern substitutes than there would be in the case of lac sulphuris, because those names have been comparatively recently used in medical prescriptions, and their continued use might be ascribed to habit or forgetfulness, which could not be said of lac sulphuris.

2. With reference to the second class of circumstances, which are those alone that have any important significance, because it is very rarely that medical men prescribe lac sulphuris, the druggist should, I conceive, be mainly influenced by the requirements of his customers, subject, however, to the exercise of an intelligent discretion by which he may endeavour to influence the opinions of those who apply to him, if under a sufficiently strong motive he thinks he can do so for their benefit. I respect the motives of those who refuse to sell milk of sulphur containing sulphate of lime, although I think they are acting under mistaken ideas, which for several years past have been fostered by writers on materia medica, to whom the adulteration of milk of sulphur has been a sensational stalking-horse. If those writers had taken the pains to thoroughly investigate the subject, which I can find no evidence or indication of their having done, I believe they would have come to a different conclusion from that which they have adopted.

Mr. Chipperfield speaks very confidently of what the intentions were of the authors of the early pharmacopœias in altering the process for the preparation of precipitated sulphur, but he fails to explain the ground on which the scientific committee of revision in 1746 directed precipitated sulphur to be made with the admixture of sulphate of lime. I am quite ready to admit that the alteration afterwards made in 1788 had for its object the rejection of sulphate of lime, although I cannot agree with Mr. Chipperfield in saying that it was "to prevent the possibility of a person desiring to take a dose of sulphur introducing into his stomach at least as large a quantity of inert if not noxious sulphate of lime." The object of the Pharmacopœia is not to provide the public with medicines to be used on their own responsibility, although many of the medicines ordered are so used, but the immediate object is to define the medicines which medical men prescribe or require in the treatment of disease, and these medicines are generally administered not in the forms in which they are ordered in the Pharmacopœia, but after admixture as medically prescribed. Except in special cases, such as those alluded to by Mr. Pemberton, the precipitated sulphur in its unmixed state is better suited for the general purposes of the prescriber than it would be if previously mixed with what the prescriber may not wish to administer, although the addition, if made, might be neither noxious nor inert. The prescriber has the power and the knowledge to enable him to make such additions as may be required, but the non-medical public are in this respect in a less advantageous position. They have learnt, it is true, to mix cream of tartar with their brimstone and treacle, and they have also learnt from experience, what others with medical knowledge know, that milk of sulphur containing sulphate of lime has its aperient properties increased and modified, while its sensible characters are improved and the mixture is rendered better suited for administration by those who have neither the knowledge nor the appliances for making suitable additions to sulphur in other forms.

Mr. Chipperfield is quite entitled to the enjoyment of the opinions he may entertain in opposition to these views, but I do not think it is consistent with the exercise of the courtesy and forbearance due to those of his brethren who differ from him, and are equally capable with himself of forming a correct judgment on such matters, that he should compare the sale of an old and approved Pharmacopœia preparation under its proper name, to the sale, under the name of pepper, of what is a mixture of pepper with ground rice. Mr. Chipperfield speaks of the practice of the trade in a way that might induce a belief that the sale of the article he objects to is confined to a section consisting of those who are not first-class men. I can only say, if this is so, and perhaps Mr. Chipperfield has better means of judging than I have, that notwithstanding the information I have received from a large number, both of wholesale and retail druggists, I have been greatly mistaken and deceived.

In a class of men differing so greatly as do chemists and druggists, in the circumstances under which they are placed and the nature of the duties they are called upon to perform, it is necessary for individuals among them to be careful how they judge and may be disposed to condemn those differently circumstanced from themselves. The qualifications required for conducting a druggist's business in some localities are very different from what they are in others. The first-class dispensing chemist that Mr. Chipperfield speaks of, would be puzzled to interpret the provincial lingo, or to appreciate the local wants of the public in some parts of the country, while on the other hand, the druggist trained in such localities and qualified for the performance of all that is required of him there, would find himself oppressed with many doubts and difficulties if called upon to read and interpret the handwriting of the abbreviated bad Latin in which the last suggested combinations in scientific or eccentric pharmacy have been prescribed. The one is rarely puzzled with a prescription, while the other is never troubled with customers who must have a particular type of milk of sulphur, or if such customers present themselves, is willing to stand upon his dignity as a first-class chemist, and to draft them off to the second-class men, from whence they never return.

But the questions which, it appears to me, lie at the very core, and are the only questions that require solution, in connection with this subject, are,

1. Was the term milk of sulphur defined in the London Pharmacopœia of 1721, in addition to another meaning, to mean sulphur containing an admixture of sulphate of lime?

2. Has any altered definition been officially given to the term milk of sulphur since 1721? If so, when and where?

3. Has sulphur precipitated with sulphate of lime according to the P. L. process of 1721, been supplied to the public, under the name of milk of sulphur, continually from that date up to the present time?

4. Do the public, especially in some localities, when applying for milk of sulphur, often object to receive any other sort than that which contains sulphate of lime?

5. If a vendor, to whom no special instructions have been given by the purchaser, sells, under the name of milk of sulphur, an article which was officially ordered under that name by the London College of Physicians in 1721,—which has never been officially directed to be made in any other way than it was then directed to be made,—which from that time until the present has been recognized among dealers as one of the two forms in which milk of sulphur may be legitimately produced,—and which has been always, and is now, preferred to the other sort of milk of sulphur by a large proportion of that part of the public who are in the habit of using milk of sulphur,—can it be said that the vendor has sold "to the prejudice of the purchaser a drug which is not of the nature, substance, and quality of the article demanded?"

These are the questions that will have to be judicially determined, and the sooner the better.

T. Redwood.

17, *Bloomsbury Square*,
31 *January*, 1877.

Sir,—I have no wish to continue a controversy on the milk of sulphur question or to curdle the milk by unnecessary acidity, but Mr. Brown's style of writing was certainly very provocative of much sharper criticism than I administered; in fact much suggested itself at the time which on reperusal was cut down and mollified.

However, I trust you will allow me to make a few remarks on Mr. Brown's second letter. He says it is "absurd to talk about a hogshead of water"—"as required to clean a pound of selenited lac sulphuris." But he says calcium sulphate is soluble in about 460 parts of water (Brande says 500). If there be 60 per cent. of calcium sulphate in milk of sulphur it would require 27·6 gallons of water as a minimum to hold in solution the calcium sulphate of one pound of milk of sulphur. I believe I am right in saying these saturation tables always refer to distilled water, and no doubt my experience is not unusual in finding that it is generally impracticable to dissolve the calculated quantity of a salt in ordinary water. Surely Mr. Brown would not suggest that the "lac sulphuris of bygone times" was washed with distilled water. It would also be misapplied "diligence" to attempt to "wash" up to the point of saturation. I certainly do not mean to try the experiment, but should Mr. Brown feel inclined to undertake the task of thus removing the calcium sulphate from one pound of milk of sulphur, my impression is still that he will not have much of the hogshead of water left unused.

He speaks of dissolving the "selenite." There is no selenite to dissolve. All selenite may be calcium sulphate, but it does not follow that all calcium sulphate is selenite. Selenite is a peculiar form of gypsum which itself is only one peculiar form of calcium sulphate. When selenite loses its peculiar physical conditions it ceases to be selenite. In coining an adjective, why not call it "gypsified" sulphur? This term would be more in keeping too with the "advanced (?)" view of the milk of sulphur controversy, for it has been a hackneyed expression to speak of persons swallowing plaster of paris when taking milk of sulphur. Surely it would be as appropriate to call charcoal biscuits, "adamantine biscuits," because of the relationship of charcoal and diamonds, as to speak of milk of sulphur as "selenited sulphur." But a part of the mystery is that Mr. Brown speaks of both "selenited sulphur" and "selenited lac sulphuris.'"

Another "misty cloud" is why Mr. Brown asks, "Does Mr. Symons think that calcium sulphate is easily sublimed?" Where can he find an expression in my letter to suggest such a question?

With regard to the "defying" paragraph of his second letter, I cannot now refer to the 1857 edition of Gray, but only point out that Mr. Brown speaks of precipitated sulphur, with regard to which I have no difference with him. What I, for one, protest against is this confounding of precipitated sulphur with milk of sulphur, a point on which it ought to be needless to enlarge, seeing that the question at issue has been so tersely, logically and unanswerably put in its common sense light by so disinterested and influential authority as the *Lancet*.

I cannot see the force of the question as to scammony and jalap. It may as well be asked why mix sulphate of potash with pulv. ipecac. co., or phosphate of lime with pulv. antim.? The only reply to such a question is, that it is found practically useful and convenient; and so I contend has the combination (not the mere mixing) of sulphur and calcium sulphate as they are blended in milk of sulphur.

I cannot plead guilty to the charge of "ungentlemanliness" in protesting against the interference of "half-instructed analysts." Although I have not personally been brought into collision with the nuisance, some of our brother tradesmen have been called on to suffer innocently, but severely, through the officious meddling of these new brooms, attempting to justify their appointment and to advertise their importance.

With regard to Mr. Chipperfield's letter, I have only to say that I had intended in my first to refer to the object of washing "till it becomes insipid" as evidently intended to remove all the free acid. This statement quite favours my view of the matter.

As to the rest of Mr. C.'s letter, every point of his is so conclusively met by the quotation from the *Lancet* and the evidence of Professor Redwood and Messrs. Pemberton, Evans and Matthew Bell, as reported in the Runcorn case, that it would be a useless waste of paper and time for me to go over the matter again, as of course the opinions of such authorities must have far greater weight than any remarks of mine. I will only say that the evidence of the above-named commercial gentlemen show that the "cute northerners" seem as "benighted" as the consumers of Devonshire dumplings. Moreover, there can be little doubt that some chemists have been frightened into giving up the sale of the "genuine old milk of sulphur" through this analytical hubbub.

W. Symons.

Barnstaple, Jan. 27, 1877.

Sir,—The milk of sulphur question is on all fours with the coffee question. I for one decidedly prefer chicory mixed with my coffee and believe it to be more whol esome than coffee alone. Decisions in abundance insist that when chicory is mixed with coffee, a label stating the admixture shall be duly affixed; any one selling milk of sulphur with the pet admixture of lime sulphate is bound to disclose the same. There is not one law for coffee and another for milk of sulphur. Depend upon it the lawyerd will make very short work of the appeal. Coffee unquestionably meant, formerly, the chicory admixture in practice, precisely the same as London milk meant cow produce and pumpenheimer.

George Mee.

Sir,—I did omit the word "translation" in my last letter; the quotation is correct.

This work was so generally used in all the pharmacies with which I have been connected that I thought it the best one to quote from, as being more commonly known and referred to than the Latin edition. The book in question was published before Redwood's translation of the 1851, and is entitled the 'Pharmacopœia of the Royal College of Physicians of London, 1851. Translated by a Physician. London 1851. Henry Renshaw, 356, Strand.'

Squire also, in his 1851 edition of the three Pharmacopœias, describes Sulphur. Precip. P. L., as "milk of sulphur. Also Garrod in 1868 and Royle and Headland in 1868.

EDWIN L. CROW.

CHEMISTS AND DRUGGISTS AND THE MEDICAL ACTS.

Sir,—In the *Pharmaceutical Journal*, December 30th, 1876, Mr. Fryer criticizes the paper read before the Leeds Chemists' Association, reported in the same Journal, December 23rd, and in a letter addressed to you on the 6th inst., I endeavoured to make the subject a little more easily understood. It is satisfactory to find that I have succeeded so far as to obtain from Mr. Fryer an admission in his last letter, that there is no definition of the business or profession of an apothecary in the Act of 1815, except in the 5th section. The assertion of your correspondent in his first letter, that "the Act must have been read in the dark" is evidently correct, but cannot be applied to the Leeds chemists. The same want of care in reading my paper has led him to express sorrow that he cannot convince me of the true position of the apothecary, whereas, if he will again refer to it he will find that this is properly understood and clearly expressed.

In referring to my letter he again exhibits an obscurity of mental vision, when he says that "Medicine," "Physic," and "Pharmacy," having a similar meaning. This arises from the fact that he has not observed the difference in the spelling of two words used throughout the Act, and which in the sentences where they occur convey quite a different meaning. I refer to practice and practise. In expressing an opinion as to the probable meaning of the word medicine, I qualified it by reference to one section only, and according to modern phraseology. There has therefore been no contradiction, and as Mr. Fryer has advanced no new facts to alter the case, the conclusion arrived at by the Leeds chemists remains in *statu quo*.

E. YEWDALL.

Leeds, Jan. 22, 1877.

SUNDAY LABOUR.

Sir,—If the President of the British Pharmaceutical Conference, when in Glasgow in September last, found reason, in a day's observations, to characterize as "derogatory" one of the aspects of pharmacy in this city, I fancy that were he to stay over Sunday in our city he would find great cause to apply the epithet to another phase of our business as it is conducted here. No one denies the necessity for druggists keeping their shops open for a short time on Sundays for the dispensing of prescriptions and the supply of various articles which are at times required in cases of sudden illness. That these requirements, however, do not justify the druggists of this city in keeping open their shops for so long as they do is clearly indicated by the fact that the establishments in which most dispensing is done are, without exception, open for the shortest time, and those in which scarcely any dispensing is done seem to have no particular hour for closing, and the lurid glare reflected from their show bottles may be seen dazzling the eyes of the most belated straggler as he saunters home to bed.

It may be asked, what is the reason of this? The reason would simply appear to be that the latter keep open in order to do a trade. Moreover, the trade which they continue to carry on in effervescing drinks, pick-me-ups and cigars is something wonderful,—in truth I suspect it to be the most profitable day that a goodly number of them have. They must find it pay or they would not contribute so liberally to their gas bills.

Profession, forsooth! Our calling may be so from Monday till Saturday, but on Sunday it is certainly, in many instances, reduced to a huckster's business. The Sunday hours in the better class establishments are, closed from 9 a.m. to 7 p.m., during the hours of church service. Deduct four hours for church service and six hours remain as the time during which they are open. Even these hours are largely in excess of the requirements of necessity.

An hour morning, afternoon and night would, in the writer's humble opinion, afford sufficient facilities, to those requiring medicines, for procuring them.

Besides, while druggists, who are supposed to be men of fair education, and of whom better things would naturally be expected, keep open shop on Sunday for the unlimited sale of "drinks," cigars and confectionery, it is scarcely fair to make a noise about Sunday trading by persons whose business it is to deal in these articles during week days. Surely our hours of duty during the week are sufficiently long and confining without making them more so by working all day on Sunday.

The effect of this system on those who are continually on duty must be exhausting physically and depressing mentally —no leisure being afforded for bodily exercise or intellectual improvement.

"No blessed leisure to read or think,
And scarcely time to sleep."

Were some influential member of our calling to initiate a movement for the curtailment of the hours of Sunday duty in our city, might it not be hoped that it would not be so difficult to secure unanimity in the matter of closing on this day as during the week?

ONE WHO DOES NOT LIKE TO "TRADE" ON SUNDAY.

Glasgow, Jan. 20, 1877.

"*Inquirer*" is referred to the rule respecting anonymous communications.

A. Young.—Glycerine Jelly.—The following has already appeared in this Journal:—

White Soft Soap . . .	4 oz.
Pure Glycerine . : .	6 ,,
Almond Oil	3 lbs. in Summer. / 4 lbs. in Winter.
Otto of Thyme	2 drachms.

Mix the soap and glycerine in a mortar, add the perfume to the oil, and rub it in gradually, taking care not to add the oil faster than it can be incorporated.

"*Zero.*"—Roscoe's 'Lessons in Elementary Chemistry' (Macmillan), or Attfield's 'Chemistry' (Van Voorst).

"*Ol. Morrhuæ.*"—*Cod Liver Oil Emulsion.*—See Mr. Rogerson's article on this subject in *Pharm. Journ.* [3], vol. iii., p. 701; also recipes in vol. iv., pp. 466 and 581.

A. P. S.—We cannot say, as we have failed entirely to apprehend the principle which has guided the Board of Inland Revenue in some of its recent decisions as to stamping proprietary articles.

"*Charity.*"—Waring's 'Therapeutics' (Churchills).

G. Mee.—Sweet Spirit of Nitre would always contain aldehyd; and "Tincture of Steel," in the common acceptation of the term, would always contain free muriatic acid.

C. C. B.—A certificate that a candidate has been for three years practically engaged in the translation and dispensing of prescriptions would be received, but the candidate would not be allowed to enter for the Minor examination until he had passed the Preliminary. (2). No. (3). Yes.

"*Carlsbad.*"—The Homœopathic Pharmacopœia is published at the institution in Great Ormond Street.

"*Valkyril.*"—Possibly your conjecture may be right, but we are unable to give a decided answer to such an indefinite question.

"*Peter Brady.*"—Mayne's 'Medical Vocabulary,' published by Churchill, price 10s.

W. Jones.—The report was received too late for insertion in the present number.

W. G. Hall, (who is requested to prepay his letters in future).—Roscoe's 'Lessons in Elementary Chemisty,' and Oliver's 'Lessons in Elementary Botany' (Macmillans).

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly over the Editorial columns will prevent delay, and the consequent annoyance.

COMMUNICATIONS, LETTERS, ETC., have been received from Mr. Castell, Mr. Gittings, Messrs. Wood and Co. (New York), Professor Tuson, Mr. Young, Mr. Parker, Mr. Stanton, W. T. H., R. H. M., Alpha, W. P. B.

THE ADMIXTURE OF WHITE HELLEBORE WITH VALERIAN ROOT.*

BY PROFESSOR BENTLEY.

Honorary Member of the Pharmaceutical Society of Great Britain, and of the American Pharmaceutical Association.

The admixture of the rhizomes and roots of *Veratrum album*, L. with the similar parts of *Valeriana officinalis*, L., is so far as I know, entirely without precedent, but having recently detected such an admixture, I take the first opportunity afforded me of bringing it under the notice of a meeting of the Pharmaceutical Society, in order to guard, as far as possible, against the recurrence of this most serious adulteration.

The history of the present case is as follows:—A short time since I received a letter from an old pupil, who is now a pharmaceutical chemist in a large manufacturing town in this country, enclosing a sample of a drug picked out of a parcel sold to him as valerian root. In that letter he says, "I sold to a retail customer the other day a small quantity of valerian root. An infusion was made from it and intense sickness was caused by all who took it; the sickness was so violent that a doctor was sent for, the parties suspecting they were poisoned. They recovered in a few days but remained very weak and sore for several days from its effects." He adds, "Will you kindly examine it and inform me if it is genuine valerian root, as I cannot account for the extraordinary effect it produced?"

Before even reading the letter thus describing the effects of this specimen of valerian root, I at once saw that the sample sent had been derived from a species of *Veratrum*, and immediately wrote to my correspondent to that effect, and to say that the admixture was a most serious one, and that, as its use might be attended with fatal results, I requested him to send the remainder of the specimen to me, and to communicate at once with the house from whom he had received it. On receipt of my letter he telegraphed to the house from whence it had been obtained to stop the sale and get back what was sold of the valerian root, and forwarded as I had requested the remainder of his parcel to me. In this way all further injurious consequences were guarded against as far as was possible from this particular sample; and now, in the hope of preventing any future accidents from such a very serious admixture, I call attention to the principal distinctive characters between the two drugs as exhibited in the present specimen.

In the first place the veratrum rhizomes are either crowned by a conical bud of unexpanded leaves, or by the fibrous remains of leaves which they once bore. These leaves, at first sight, bear some faint resemblance to those found at the end of the creeping shoots or stolons which are developed from the rootstock of the true valerian plant, and by which that plant is propagated; but the leaves in the latter plant are opposite to each other, and overlap at their base, while those of veratrum form concentric sheaths, which are arranged one within the other. Moreover, in commercial specimens of valerian root, such stolons are rarely or ever found. The presence and arrangement of these leaves ought therefore, at once, to lead to the detection of white hellebore rhizomes when mixed with those of valerian.

Secondly, the white hellebore rhizomes are much larger than those of the valerian, and also entire, whereas the valerian are commonly more or less cut, as in the specimen now under examination. The rhizomes of veratrum are also of a darker colour, and when of any length marked below with the pits and scars of old roots.

Thirdly, a transverse section of white hellebore rhizome presents a large central woody or spongy portion of a whitish or pale buff colour, which is separated by a fine wavy-crenate ring from an outer broad white part which is coated by a thin dark brown or blackish bark-like portion. The appearance of this transverse section, particularly that of the undulating ring, is very different from a similar section of valerian rhizome, which although whitish at first, presents, in commercial specimens, a dark brown firm and horny central portion, separated by a dark interrupted cambial zone from the cortical part, which is also of a brown colour. A vertical section of veratrum rhizome is also very characteristic, and more especially so, from presenting a fine dark wavy conically arranged line running nearly throughout its whole length, and thus separating the outer from its central portion. No such wavy line is seen in valerian rhizome.

Fourthly, the roots of veratrum which arise from the upper part of the rhizome only, are of a paler colour externally than those of valerian rhizome; they are also commonly larger and more shrivelled.

Fifthly, the taste of veratrum rhizome and roots is at first sweet, then bitter, acrid, and somewhat numbing; while the similar parts of valerian have no acridity, but are evidently aromatic and somewhat bitter.

Sixthly, the veratrum in itself has no marked odour, and although by its admixture with valerian root it has acquired the peculiar odour of that drug, it is feeble when compared with valerian itself. The veratrum rhizome also excites sneezing when cut or bruised, as I found by its action on myself in making sections to examine its structure.

Such are the principal distinctive characters of white hellebore and valerian rhizomes and roots. It would not be difficult to mention several others derived from their microscopical and chemical examinations, but my object in the present paper is to allude only to a few characters by which, on the most general examination, the two drugs may be at once distinguished, and in this way, to guard against any possibility of their being confounded together. There is, however, one chemical distinctive character, which is so marked, and at the same time so simple and readily observed, that it will be useful to notice it. This is derived from the application of sulphuric acid to a transverse or vertical section of the two rhizomes. Thus if it be added to a section of white hellebore a deep orange-yellowish-red colour is at once produced from its action on the contained alkaloids, which soon changes to a dark blood-red; but its application to a section of valerian is simply to heighten the natural colour of that drug.

The sample of valerian root which forms the subject of this paper when it reached me weighed exactly forty-two ounces, of which thirty-four ounces were true valerian, and eight ounces white hellebore rhizome, so that the serious nature of the admixture

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, February 7, 1877.

may be at once seen. In the sample I also found a few pieces of veratrum rhizome without any trace of leaves, but with the roots still attached. Such pieces have, of course, a much greater resemblance to valerian root, but they can be readily distinguished with ordinary care, by the different appearances presented on making a transverse or vertical section of the two rhizomes, and by the action of sulphuric acid.

And now I must say a few words with regard to the botanical and geographical sources of the veratrum rhizome thus found mixed with valerian root, and the probable way in which such a mixture occurred. It would be difficult, if not impossible, from the specimen before us, to pronounce with absolute certainty as to the species from which it had been derived, but I have little doubt that it was from some form of *Veratrum album*, L., and that both it and the valerian rhizome were gathered together, and probably in ignorance of their different natures, on the continent of Europe, and imported into this country in this mixed condition. But since I first formed this opinion, my correspondent from whom the specimen was derived informs me, that the explanation now given to him is, "that the bales of valerian and veratrum had been broken at the docks—the contents scattered about and carelessly picked up and stuffed in any way." I can scarcely believe in such gross carelessness; and moreover an additional argument in favour of the cause of the mixture I have suggested, is derived from the fact that the veratrum rhizome is not imported in the state in which it is found in the present specimen, but commonly without attached fibre, and with but faint traces of leaves in the form of concentric sheaths at the apex. It is true that pieces of rhizome may be sometimes found in bales of white hellebore which present all the appearances I have described as being found in the present specimen; but so far as I know, bales of such rhizomes are rarely or ever found in commerce. But whatever conclusion we may form as to the cause of the mixture of the two drugs, it seems quite clear that it was accidental, for although foreign valerian root is higher in price than that of white hellebore, the difference is not more than two pence in the pound; so that there could scarcely be any temptation on this ground for the addition of white hellebore rhizomes to those of the valerian.

There are two practical conclusions which I think we may draw from the present inquiry. First, the pressing necessity of an examination by a competent person, appointed for that purpose, of imported drugs, more especially when these are plants or parts of plants, such as roots, rhizomes, leaves, etc., for every one who is familiar with the bad condition in which such drugs now frequently arrive in this country, and the accidental and intentional adulterations, to which they are liable, must see the importance of this; and secondly, we may learn that even we cannot be too careful in examining the drugs in our home stores and pharmacies, for so far as the specimen which forms the subject of the present paper is concerned, it has been traced through three houses, and its sophistication passed unnoticed, until the accident occurred from its use which caused it to be submitted to a careful examination, and its nature detected.

[*The discussion on this paper is printed at p.* 665.]

THE COLOURING MATTER OF THE PETALS OF ROSA GALLICA.*

BY HAROLD SENIER.

The red colouring matters which occur in the petals of flowers have been studied by many chemists, but no one, so far as I am aware, has examined specially the red colouring principle of rose petals. The researches to which I refer are those of Marquart, Filhol, Fremy, and Elsner, and while they have served to guide my steps, I have in many cases found them inaccurate as applied to the colouring principle of rose petals specially.

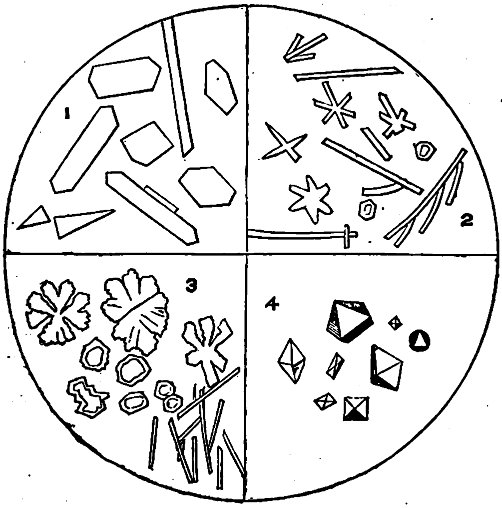
Extraction.—The dried petals of commerce were first digested with ether, and the ethereal solution removed by filtration. By this treatment quercitrin —the yellow colouring matter—and solid fat are removed (Filhol). Experiments were next made to ascertain the relative value, as solvents of the colouring matter, of chloroform water and alcohol. No colouring matter was dissolved by the chloroform; hot water dissolved it freely, but dissolved also much albuminous matter. Alcohol was found decidedly the best, yielding a solution comparatively free from other substances. But while the solution in water is of a bright red colour, that in alcohol is at first colourless—due most likely to some reducing action of the alcohol—but acquires in time a red tint, which brightens with age. From this alcoholic solution the colouring matter was precipitated in a green amorphous state by acetate of lead. This precipitate after washing and drying (100° C.), was treated in two ways:—Firstly, the precipitate suspended in rectified spirit was decomposed by sulphuretted hydrogen, and the mixture filtered (Elsner). Secondly, the precipitate suspended in rectified spirit was decomposed by dilute sulphuric acid, taking care to have the precipitate in excess, and the mixture filtered. Both these latter solutions have a bright red colour. The solution obtained by means of dilute sulphuric acid was found to be the purer, though most of the reactions detailed below may be obtained from either or even from the original alcoholic solution.

Action of Reagents.—Dilute *acids* deepen the colour, but concentrated they decompose it, concentrated nitric yielding a yellow solution. Alkalies change the colour from bright red to a deep red with a bright green fluorescence, and when added in excess give a yellow solution. A drop of solution of *soda* and a drop of the solution of colouring matter, placed on a glass slide and slowly evaporated by a gentle heat, yield under the microscope a mass of well-defined crystals. The drawing (fig. 1) represents their form. *Potash* yields crystals when treated in the same manner (fig. 2). *Ammonia* itself does not give crystals, but combined with soda gives the forms shown in (fig. 3). With potash, ammonia gives with the colouring matter perfect octahedra (fig. 4). These crystals under the microscope, if treated with an acid, yield the colouring matter in the red form, which evidently arises from the crystals not from the solution, thus showing that they are actual combinations of the colouring matter. With considerable difficulty I succeeded in preparing and separating a specimen of the ammonio-potassium salt in octahedra of comparatively large size.

* Read at an Evening Meeting of the Pharmaceutical Society, February 7, 1877.

These answer to the characters already described, and to those also of potassium and ammonium.

Alkaline carbonates act in the same manner as alkalies, except that the change of colour is accompanied with effervescence. *Chlorine* entirely destroys



1. Sodium salt. 2. Potassium salt.
3. Ammonio-sodium salt. 4. Ammonio-potassium salt.

the red colour, leaving a yellow solution. *Sulphuretted hydrogen* changes the red to brown, but so far as I have been able to determine, does not alter the chemical character of the solution. *Stannic chloride* changes the red to a beautiful dark magenta colour. On boiling with *metallic mercury* the red colour is changed to a dark violet or purple.

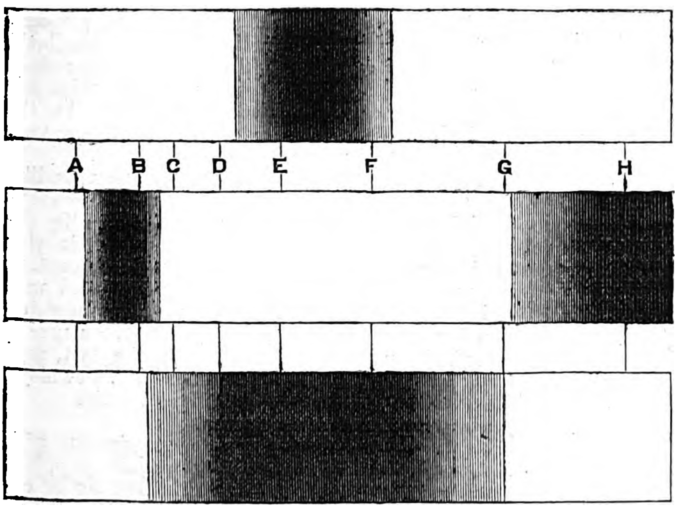


FIG. 5.

FIG. 6.

FIG. 7.

Mercuric nitrate and *chloride* both give a slight white or pinkish precipitate, soluble in water. *Hydrate of barium* yields a yellowish green precipitate, as does also *hydrate of calcium*, both becoming brown when deprived of moisture. No precipitates are given by *chloride of platinum*, *nitrate of silver*, or the usual alkaloidal reagents except very slight ones by *iodohydrargyrate* and *trinitrophenic acid*.

Carbonic acid does not redden the colourless or green modification, but though possessing this property, esteemed in cochineal, it has not proved practically useful in my hands as an indicator in alkalimetry.

Peroxide of hydrogen appeared to give no reaction. *Sulphurous acid* leaves the colour of a brown shade. To *test paper* all the solutions have an acid reaction.

Neutral and basic *acetates of lead* give precipitates of a colour varying from a green to a bluish-green. These precipitates decomposed by sulphuric acid yield the colouring matter to the solution, as already mentioned, and deposit sulphate of lead. The action of reagents leads me to conclude that the colouring matter is an acid, and that as such it forms salts—the crystals and precipitates described.

Analysis of Lead Salt.—A specimen of the lead salt, previously dried over sulphuric acid, was submitted to ultimate analysis, with the following results:—

I. 1·219 grams of lead salt gave 0·623 of sulphate of lead. 0·714 of lead salt gave 0·159 of water, and 0·559 of carbonic anhydride. 0·358 of lead salt, for nitrogen, gave 0·011 of platinum.

II. 1·261 grams of lead salt gave 0·647 of sulphate of lead. 0·545 gave 0·1215 of water, and 0.4341 of carbonic anhydride. 0·902 of lead salt, for nitrogen, gave 0·016 of platinum.

III. 0·169 gram of lead salt gave 0·088 of sulphate of lead. 0·2491 gave 0·0545 of water, and 0·191 of carbonic anhydride. Nitrogen was not estimated a third time.

In percentages,

	I	II	III	Average.
Pb . . .	34·94	35·05	35·50	35·16
C . . .	21·34	21·72	20·91	21·32
H . . .	2·48	2·48	2·43	2·46
N . . .	·43	·25		·34
O . . .				40·72

These figures (omitting the nitrogen which is probably an impurity) correspond to some such formula as the following:—

$Pb_2C_{21}H_{29}O_{30}$, thus—

2 Pb	.	414	35·23
21 C	.	252	21·45
29 H	.	29	2·47
30 O	.	480	40·85
		1175	100·00

Action upon Light.—The absorption action of the solution of colouring matter was examined by a two prism spectroscope. The solution used was made by decomposing about half a gram of the lead salt, suspended in rectified spirit, with sulphuric acid, until upon gently warming for some time only a small quantity of undecomposed lead salt remained. This solution was then filtered, and diluted with spirit to about six ounces.

Through a stratum of about half an inch of this solution—previously treated with reagents—light was passed. The stratum of solution was then diluted with rectified spirit until the bands became distinct, one part of solution to three of spirit being about the proportion required. The most interesting of the spectra observed are illustrated in figures 5, 6, and 7. Figure 5 represents the absorption spectrum of the solution rendered acid by sulphuric acid, figure 6 that of the solution made alkaline by ammonia, and figure 7 the spectrum of the solution treated with stannic chloride.

In conclusion, I have to thank Mr. Saunders for permitting me to work out most of this research in the laboratories of Messrs. Godfrey and Cooke, and my brother Dr. A. Senier, who by permission of Professor Attfield made the necessary combustions in the laboratories of the Pharmaceutical Society.

[*The discussion on this paper is printed at p.* 665].

NOTE ON THE ACTION OF DILUTE NITRIC ACID ON BRUCIA.*

BY W. A. SHENSTONE, F.C.S.

In an abstract of a paper by Professor Sonnenschein, published in the *Pharmaceutical Journal*, (No. 272, 3rd series) it was stated that by warming with dilute nitric acid, brucia yields strychnia, accompanied by a yellow resin, etc., carbonic acid gas being at the same time given off. In April, 1876 (*Pharmaceutical Journal*, No. 304), Mr. Cownley gave an account of a number of experiments made by himself on the subject, using pure brucia and nitric acid of various strengths. In no case was he able to obtain evidence of the production of strychnia. As Sonnenschein obtained strychnia in sufficient quantity to prepare its hydrochlorate and determine the chlorine in it, these statements are, I think, sufficiently opposed to make further experiments on the subject interesting, and I have therefore lately paid some attention to the subject.

1. My first experiments were made with commercial brucia of apparently good quality and of known source.

(*a*) About ·5 gram of brucia was heated in a water-bath with a mixture of 1 part of acid. nitric., B.P. and 9 parts of water, then rendered alkaline with potassium hydrate and shaken with chloroform, the chloroform solution drawn off by means of a separating funnel and evaporated; the residue gave full indications of strychnia with sulphuric acid and bichromate of potassium.

(*b*) A similar experiment to (*a*), but the solution of brucia in nitric acid was evaporated on a water-bath, the acid being thus gradually concentrated, this was in effect using a stronger acid. Only slight evidence of strychnia was obtained on examining the residue from chloroform.

(*c*) Also a similar experiment to (*a*), but using nitric acid half the strength of the acid employed in that case. Crystals were obtained in some quantity which gave the reaction of strychnia.

In all these experiments carbon dioxide was given off in considerable quantity, and the strychnia was accompanied by a small amount of a yellow resinous substance.

2. The following experiments were made with brucia specially prepared for me by Mr. John Williams, whom I take this opportunity of thanking for his assistance:—

(*a*) ·5 gram of brucia was warmed with several times its weight of nitric acid (17·5 per cent. HNO_3) as long as carbon dioxide escaped, then rendered alkaline with potassium hydrate, shaken with chloroform, the chloroform solution drawn off and evaporated, and the residue examined for strychnia. Six such experiments were made; in each case the residue was a yellow resinous substance, and in only two cases could strychnia be found in it, and then only after heating for some hours with strong sulphuric acid to destroy the resinous body.

(*b*) Another series of six experiments, using the same brucia as in (*a*), and nitric acid containing only 5·0 per cent. of HNO_3; in some cases heat was applied by a water-bath till escape of carbon dioxide ceased; in others care was taken to prevent any evolution of gas. The acid liquid was rendered alkaline with potassium hydrate, and treated with chloroform. On evaporating the chloroform a residue was obtained, which, after heating on a water-bath with strong sulphuric acid for some hours, diluting with water, adding excess of alkali, and agitation with and subsequent evaporation of chloroform, gave a small quantity of pale yellow residue that showed the strychnia reaction freely in every case.

3. Some of the brucia used for experiment No. 2 was dissolved in acetic acid and partially precipitated by potassium hydrate, the precipitate washed and dried, and two portions of ·5 gram each were treated respectively with nitric acid containing 17·5 and 5·0 per cent. of HNO_3, and after addition of alkali to the acid solution, strychnia was searched for by the same process as before, especial care being taken in heating with sulphuric acid to destroy the accompanying resin, as only a small amount of strychnia was likely to be present. The presence of strychnia was established in each case, but evidently in reduced quantity, the best reaction being obtained from the product of the 5 per cent. acid.

4. Brucia purified by myself, by a process described later on, was taken as before in quantities of ·5 gram, and heated on a water-bath with the five per cent. nitric acid so long as carbon dioxide escaped, the liquid alkalized, and exhausted with chloroform, the residue from evaporating the chloroform charred with sulphuric acid, and examined for strychnia by the usual plan. In one case a most doubtful indication, in the other three none at all, was obtained.

It will be seen that the above experiments, like Mr. Cownley's, fail to confirm Professor Sonnenschein's results, as the strychnia found steadily decreased with the increased care taken in purifying the brucia. I was not, like Mr. Cownley, fortunate in the purity of the brucia I first experimented with, and from the trouble I experienced in preparing pure brucia, I feel some curiosity as to the source of his alkaloid; but I do not regret the fact, as I think it has enabled me to confirm Mr. Cownley's observations by a somewhat different series of experiments to those made by him.

It will be observed that the experiments with 17·5 per cent. nitric acid do not give quite accordant results, and that even in one of the last set of experiments a reaction was obtained which may have been due to the presence of a trace of strychnia in the brucia; this led me to perform the following experiments, in order to ascertain whether a small quantity of strychnia in brucia may not be destroyed by heating with even very dilute nitric acid, in which case my own purified brucia may only have been so far free that the small quantity remaining is destroyed in searching for it.

* Read at an Evening Meeting of the Pharmaceutical Society, February 7, 1877.

·5 gram brucia adulterated with ·1 per cent. of strychnia was digested as before with 5 per cent. solution of nitric acid, till the colour of the liquid was pale yellow, and crystals of cacotheline were deposited; the liquid was then examined as before for strychnia, but no evidence of its presence was obtained. A second and similar experiment on impure brucia gave a like result. When an acid containing only 1 per cent. HNO_3 was used, the brucia was very slowly attacked by it, and I did not, therefore, attempt to use a weaker acid.

The fact of one's not finding strychnia in a specimen of brucia, by acting on it with dilute nitric acid, etc., is not therefore evidence of its absolute purity, as even a very dilute acid destroys small quantities. whilst as seen by experiments described under No. 1 (*b*) (*c*), and No. 2 (*a*) (*b*), a stronger acid will destroy a comparatively considerable quantity.

After completing the above experiments, it occurred to me to ascertain the quantity of strychnia in the sample of commercial brucia used in the first set of experiments. By treating with five per cent. nitric acid, alkalizing the solution, and extracting with a small quantity of chloroform, I obtained nearly pure strychnia, in amount corresponding to rather more than 1 per cent., only one agitation with chloroform was used, as my supply was exhausted, and considering this and the destructive action of the nitric acid, it is probable that the actual percentage was somewhat higher. Now as one writer, Andral, estimates the activity of brucia as only one twenty-fourth that of strychnia, this seems to me rather a high percentage of such an active impurity, and I therefore add to my note some details as to the method I employed in purifying my brucia. Possibly it is already known, but I have not met with it before.

The process depends upon the fact that strychnia precipitates brucia from its salts, and consists in partially precipitating the brucia from one of its salts with an alkali, standing aside for a few hours, collecting, washing, and redissolving the precipitate in a dilute acid, then again partially precipitating, etc. I found that my brucia gave no indication of strychnia after four precipitations. The cost of this purification need be but slight, as the unprecipitated brucia can be recovered.

In conclusion, I would express my thanks to Professor Attfield for kindly permitting me to do a portion of this and other work in the Pharmaceutical Society's laboratories during a recent vacation.

[*The discussion on this paper is printed at p.* 666].

THE PHARMACOPŒIA TEST OF QUININE SULPHATE.*

BY B. H. PAUL, PH.D.

It has long been my opinion that in using ether as a test for the purity of sulphate of quinine there is great liability of overlooking the presence of a very considerable amount of cinchonidine. Thus, for instance, the Pharmacopœia test is based upon the relative solubility of quinine and cinchonidine in ether. Quinine dissolves in less than its own weight of ether, forming a thick sirupy solution from which no kind of crystallization can be obtained, even when it has quite dried up. On the other hand, cinchonidine dissolves only sparingly in ether, requiring, according to different statements, from 100 to 150 times its weight.

The proportion of ether indicated in the Pharmacopœia is half a fluid ounce, or about 15 cub. cent. to ten grains of the quinine sulphate, and the absence of any separation of alkaloid crystals after the addition of ammonia, is stated to be evidence of purity. I do not find this to be the case.

Upon mixing one decigram of cinchonidine sulphate with about two cubic centimetres of ether, and adding ammonia sufficient to separate the base, the presence of the insoluble alkaloid becomes sufficiently distinct.

But when the same quantity of cinchonidine salt is mixed with a large proportion of quinine, the result is different, and it appears that the presence of quinine increases the solubility of cinchonidine in ether, or at any rate prevents the latter from separating in a crystalline state.

As to the Pharmacopœia test for detecting sulphate of cinchonidine, I have applied it to sulphate of quinine, which I have, by other means, ascertained to contain ten per cent. of sulphate of cinchonidine, but the mixture remained perfectly limpid, and any one applyng the test would say that the salt was absolutely pure. I have come to the conclusion in the course of repeated experiments in testing quinine that the limit within which cinchonidine cannot be detected in quinine is very much higher than is commonly supposed. I believe that in some books it is stated to be one half per cent. of cinchonidine in sulphate of quinine. Others put the limit of detection somewhere about two or three per cent.; but I am more inclined to think that ten per cent. is the limit, and that when there is ten per cent. or a little less there is not obtained, as a matter of certainty, any indication at all of the presence of cinchonidine. I mentioned that conclusion to a friend who was practically engaged in the manufacture of quinine, and he differed from me very decidedly. He was of opinion that the limit of detection was somewhere about two or three per cent., or perhaps less, and I put the matter on one side. But it so happens that my attention has lately been drawn to the question of purity of samples of quinine, and I have gone into it very carefully, and made a number of tests with different proportions of sulphate of quinine and sulphate of cinchonidine, of the purity of which I was perfectly certain. Those who are in the habit of testing quinine will, no doubt, have observed that there is a peculiar behaviour presented by the alcaloid, namely, that with ether it sometimes gelatinizes, and it is then difficult to determine whether the appearance it presents is due merely to bubbles of air or to crystals. A mixture consisting of half a gram of sulphate of quinine and five centigrams of sulphate of cinchonidine does not show a particle of crystallization. If gelatinization takes place, the little globules of air or liquid may look like crystals; but with a sufficient proportion of ether, mixtures of ten per cent. remain perfectly liquid. If the ether be evaporated off so as to leave the liquid quite sirupy, but still there is no crystallization.

In applying the Pharmacopœia test, although there would be nothing strictly wrong in using the proportions indicated in the Pharmacopœia—half a fluid ounce of ether to ten grains of the sulphate to be examined;

* Read at an Evening Meeting of the Pharmaceutical Society, February 7, 1877.

this is very much in excess of what is needed, and any one exercising his judgment would never use so much ether as is there directed. The solubility of cinchonidine in ether is so considerable, that a large quantity would pass unnoticed in that way. I have prepared a number of samples containing different proportions of quinine and cinchonidine, varying from seven tenths of a gram of quinine, and three tenths of a gram of cinchonidine, that is to say, a thirty per cent. mixture, and tested by the Pharmacopœia quantities even this would pass as being pure. A ten per cent. mixture of course passes. But even with much smaller quantities of ether it is impossible to rely on its use.

The plan that I have adopted for detecting the presence of cinchonidine has been that of fractional crystallization, and I find that it gives a very speedy indication whether there is any cinchonidine present or not. The operation is an exceedingly simple one. You take a small basin, and about thirty grains of the sulphate to be tested, add a fluid ounce and a half of water, and boil until the salt is nearly dissolved. The water is insufficient to dissolve it entirely; but when heated up to the boiling point, the greater part of the quinine sulphate is dissolved. Upon cooling, most of the quinine is deposited, and the more soluble cinchonidine sulphate remains in solution. The liquid portion is then a saturated solution of quinine sulphate, together with any cinchonidine that may be present. By applying the test to that liquid an indication may be got of cinchonidine, if present. This is a modification of the test which has been very much used on the Continent, known as Kerner's test, and the one adopted in the German Pharmacopœia. That consists in mixing the salt with a small quantity of water in the cold, then filtering off the liquid and adding a solution of ammonia, which produces at first a precipitate of quinine; but when a certain proportion of ammonia has been added, the quinine is entirely dissolved, and the result is a clear solution. The test is an exceedingly good one, and is founded on very sound principles, which are these: The sulphate of quinine is a very sparingly soluble salt, and cinchonidine sulphate is very soluble. One requires 750 parts of water, and the other only 100; so that putting those two facts together you may get a very good indication of whether sulphate of quinine contains cinchonidine or not. However, the defect attaching to this test lies in the application. It is based upon the assumption, that if you treat a mixture consisting of a large quantity of insoluble salt with a small proportion of soluble salt, you will take out the more soluble salt and leave the other. That is not the case; but the converse is more to be relied upon. If you have a solution, at a high temperature, of a salt that is sparingly soluble with a very small proportion of one that is more soluble, the less soluble salt will separate on cooling, the more soluble one being left in solution; and that is precisely the way I make the test. If, for instance, a sample of quinine sulphate, or a mixture containing one per cent. of cinchonidine sulphate, be treated with cold water, and the solution mixed with an equal volume of solution of ammonia, of 920 gravity, the result is a perfectly clear solution. But when the same salt is treated by boiling, the difference in the result is very marked, and even when treating the cold liquid with ether, the cinchonidine will separate.

In the examination of nine samples of quinine sulphate, I have found cinchonidine present in all cases, and varying in amount from one per cent. to ten per cent.*

Between these two extremes of one per cent. and ten per cent. there is a very wide margin, and I think the circumstance that such quantities may be overlooked in testing quinine is important both to manufacturers and to pharmacists, who are liable to be placed in circumstances of difficulty on account of this impurity. In the first place, a manufacturer who produced a pure article might be prejudiced in tendering for contracts, by being placed in disadvantageous competition with other persons, who offered quinine of the character I have mentioned, containing ten per cent. of cinchonidine, a proportion according to the present prices, amounting to a difference of tenpence on the ounce, which is a large extra profit on the quinine. A manufacturer offering really pure quinine, or such as that I have mentioned containing one per cent. of cinchonidine sulphate, would be unable to compete with another offering quinine containing ten per cent. So, in like manner, dispensing druggists might purchase quinine containing that amount of sulphate of cinchonidine, and might find themselves in an awkward predicament if a public analyst were to hit on the means of detecting that adventitious substance, and apply to them the mechanism of the Adulteration Act. I thought, therefore, that it would be of interest and utility to the members of the Pharmaceutical Society, if I pointed out the necessity of pharmacists being careful in examining their quinine. The plan that I should recommend for adoption is that which I have described—taking about thirty grains and boiling it with water, allowing the mixture to cool, and testing with a solution of ammonia the clear liquid obtained after filtering.

[*The discussion on this paper is printed at p.* 667.]

TESTING OF SALICYLIC ACID FOR PURITY.†

BY H. KOLBE.

Only absolutely pure crystallized salicylic acid should be used either internally as a medicine or as a preservative for wine, beer, fruits, etc. The less pure acid, which generally has a peculiar after-taste when used continually or given in large doses, may act injuriously on the health. The prejudice against salicylic acid of physicians who have failed to obtain good results with it, is due in most cases to the pharmacist having dispensed an impure preparation—the precipitated instead of the crystallized acid. The author has met with several cases in which such an acid was used. He therefore gives the following simple method of judging of the quality of commercial salicylic acid. Dissolve a small quantity, ½ gram, in about ten times as much strong alcohol, pour the clear solution into a watch glass, and leave it to evaporate slowly at the ordinary temperature of the atmosphere. The residual salicylic acid forms around the edge of the watch glass a ring of beautiful efflorescent aggregated crystals. This efflorescent mass is pure white if the acid used be quite pure and has been recrystallized; but yellowish or yellow if the simply precipitated acid be used. If the colour be brownish or brown, the preparation, however white and pure it may appear as a powder, should be rejected as bad.

* Owing to want of space the table of analytical results must be omitted until next week.

† *Schweizerische Wochenschrift f. Pharmacie*, xiv. 367.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 10, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE REGISTRAR'S STATISTICS.

THE very complete series of statistical tables which the Registrar laid before the Council in his Report last Wednesday are worthy in many respects of the attention of our readers. In the first place, they are notable as showing that although the number of persons passing the qualifying examinations during 1876 was considerably in excess of the number who passed in 1875, being 259 against 174, there has been, for the first time, a considerable decrease in the number of chemists and druggists on the Register. Of course it has been foreseen that such a decrease would take place, as time began to tell upon the large number who obtained registration without examination under the provisions of the Pharmacy Act, 1868. Last year the corner was turned, there being then a decrease of 10 upon the number of the next previous Register; but this year the decrease in the number of chemists and druggists on the Register has reached 98, the number in the Register at the time of the return being 13,178, against 13,276 at the end of 1875. The number of erasures due to authenticated deaths during 1876, namely, 182, has been very low compared with those of 1875, when they numbered 220, and, as will be seen, is far below the number of persons who have been placed on the Register by virtue of having passed their examinations. But the recent exercise by the Registrar of the power entrusted to him for the rectification of the Register, resulted in the erasure of 202 names, which will account for the considerable decrease on the gross total. To some persons who have decried the Pharmacy Act as a complete failure, we would commend as worthy of their attention, and probably unequalled in the experience of any other class of business men, the fact that in the face of an increasing population they have now just upon a hundred competitors less than at the beginning of last year.

The Register of Pharmaceutical Chemists now contains 2321 names, against 2335 in the previous year, or a decrease of 14. Here again comes into play the fact that the Register is liable to depletion by deaths of both unexamined and examined men, whilst it is only recruited from the examined class. But the decrease of pharmaceutical chemists is rather low in proportion to the gross decrease, as 14 on that Register would correspond to about 80 only on the whole Register, instead of 98. The relative proportion, therefore, of pharmaceutical chemists to the whole body of chemists and druggists is slightly higher than last year, being 17·61 per cent., against 17·59 per cent. Of course, in the relative proportion of the Major men (as well as of the Minor) to the whole body there will have been a more considerable advance, but this we shall not be in a position to state until after the issue of the Register.

We now come to discuss the number of registered chemists and druggists who are connected with the Pharmaceutical Society, either as Members or Associates. It is satisfactory to note that this is in excess of that of any former year. Although there has been a decrease in two classes, and one has remained nearly stationary, there has been an increase of 39 in the gross total, the number being now 4421. The entire strength of the Pharmaceutical Society therefore now reaches 33·55 per cent. of the whole number of chemists and druggists. The Pharmaceutical Chemist Members are fewer by 22, the cause of which has already been alluded to; but it is worthy of note that the elections and restorations are 8 in excess of the number of persons who passed the Major, this indicating that of the very small proportion of pharmaceutical chemists—only 10·75 per cent.—who had previously held aloof, some have now joined the Society. The Chemist and Druggist Members show an increase of 1; and as the number from which this class can be drawn yearly becomes less, and must eventually become extinct, probably a decrease here must be expected from this period. In the important class of Associates in Business, there has been an increase of 130, being a larger increase than in any previous year. On the other hand, there has been a decrease of 70 in Associates not in business, which perhaps may find a partial explanation in an increased tendency in examined men to embark in business on their own account. However this may be, if from the 232 persons who passed the Minor examination, and thus recruited the class from which Associates are eligible, 62 be deducted as representing those who passed the Major, and thus became ineligible as Associates, it is evident that the balance, even if they had all joined the Society, would, after allowance had been made for death, secessions, etc., have been barely sufficient to have supplied the increase (130) of Associates in Business, and that the balance of the number must have been drawn from the Associates not in business and from qualified persons who had not previously joined the Society. The number of Registered Apprentices or Students of the Society, who, of course, are not included in the Register of Chemists and Druggists, has increased from 852 to 934.

The following table therefore represents the strength of the Pharmaceutical Society relative to the Register of Chemists and Druggists :—

	1876.		1877.	
	No.	Per cent.	No.	Per cent.
Pharmaceutical Chemists, Members of the Society .	2084	89·25	2062	88·84
Other Registered Chemists and Druggists connected with the Society . . .	2299	—	2359	—
Total Number of Registered Chemists and Druggists connected with the Society	4383	33·01	4421	33·55
Registered Apprentices subscribing to the Society .	852	—	934	—

In conclusion, we would again point out the bearing that these figures have upon opinions that have been expressed more than once recently, when the strength of the Pharmaceutical Society relative to the Register has been much underestimated by various speakers and writers. On one occasion, when the rhetorical exaggeration went further than usual, and it was stated that "the Pharmaceutical Society in all these years has only brought in a tithe of the trade," we ventured to append a note pointing out that as a matter of fact, and not of opinion, one-third of all the chemists and druggists on the Register were connected with the Society. This note was stigmatized by a contemporary as "not quite relevant," as the speaker was obviously referring to chemists and druggists in business for themselves, and that therefore a deduction would have to be made from the Associates and Pharmaceutical Chemist Members. We do not know whether our contemporary had the authority of the speaker for this reading of the sentence, but unless it be assumed that the proportion in the Society of persons not in business is larger than among those on the general Register, it tells in favour of the view expressed by us. Here, fortunately, we have facts to deal with again. The number of chemists and druggists in business in Great Britain has been estimated, we have been told by a Vice-President of the Trade Association, at 8000, and probably this is near the mark. To these belong all the Chemist and Druggist Members, all the Associates in Business, and nearly all the Pharmaceutical Chemist Members. The sum, therefore, stands thus—

Pharmaceutical Chemist Members, 2062, less, say, 10 per cent., who are not in business	1856
Chemist and Druggist Members ...	839
Associates in Business	706
Total ...	3401

In proportion to 8000 this is upwards of 42 per cent. instead of 33 per cent. But can it be contended that men not in business for themselves have "obviously" no interest in the future of their calling?

In consequence of the space taken up in the present number by the reports of the Society's Meetings, we are compelled to defer the publication of several communications.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, February 7, 1877.

MR. JOHN WILLIAMS, PRESIDENT.

MR. WILLIAM DAWSON SAVAGE, VICE-PRESIDENT.

Present—Messrs. Atherton, Atkins, Betty, Bottle, Cracknell, Frazer, Greenish, Hampson, Hanbury, Hills, Mackay, Owen, Rimmington, Robbins, Sandford, Schacht, and Shaw.

The minutes of the previous meeting were read and confirmed.

The Board of Examiners for 1877.

The Secretary read a letter from the Privy Council, approving of the appointment of the examiners made by the Council in December last.

Penalties Recovered under the Pharmacy Acts.

The Secretary also read a letter that he had received from the Treasury, stating that a deputation from the Council would be received on the subject of the application of the penalties recovered by the Society under the Pharmacy Acts, and suggesting that Monday next should be fixed for that purpose.

Retiring Members of Council.

The lot being taken in the usual manner for the seven members of Council who should retire in May, the following names were drawn :

Atherton.	Frazer.	Shaw.
Bottle.	Greenish.	Williams.
Cracknell.		

The following, who remained in by lot last year, now retire by rotation :—

Betty.	Hanbury.	Robbins.
Brown.	Rimmington.	Stacey.
Hampson.		

The following remain in office for another year :—

Atkins.	Owen.	Savage.
Hills.	Sandford.	Schacht.
Mackay.		

Elections.

MEMBERS.

Pharmaceutical Chemists.

Churchill, Walter John ....Birmingham.
Davidson, Alexander ....London.
Robinson, Thomas Dexter ......Stevington.

Chemists and Druggists.

Lane, William ... .London.
Morris, Thomas......................London.
Storrar, David ....Kirkcaldy.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society :—

Minor.

Bray, William ....Glasgow.
Carruthers, Robert Buck... .....Manchester.
Davies, John....................... Swansea.
Farr, Joseph ....Yaxley.
Folkard, Montague ... .Hadleigh.
Harris, Evan William ....Merthyr.
Hart, James Connorton..........Blackheath
Heaton, George ....Little Hulton.
Moorhouse, Walter ....Wakefield.
Munro, Hugh ....Birmingham.

Saville, William ....Chapel Allerton.
Short, George William ....Taunton.
Widdowson, Reuben ....Nottingham.
Williamson, Nicholas ....Liverpool.

Modified.

Cape, John Sweet ....Exeter.
Dodd, William ....Camberwell.
Hunn, Benjamin...................Henley-on-Thames.
Robson, John ....Carlisle.
Taylor, Peter ....London.

ASSOCIATES.

The following, having passed their respective examinations and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Alpe, Robert Bird ....East Dereham.
Aves, Arthur Kerner.............Mansfield.
Bate, Joseph William............Walsall.
Beall, Samuel Smart ....Cambridge.
Betty, Robert ....London.
Biddiscombe, Charles ....London.
Brayne, John William Ward ...New Mills.
Davis, Henry John ....Newbury.
Ford, Horace Sidney ....Southsea.
Gorrie, Daniel ....Perth.
Ives, Robert Hanworth ....Norwich.
Jones, George Henry ....Hanley.
Jones, Thomas Mantle ....Stafford.
Mackie, George....................Banff.
Maynard, George Christopher...Moreton-in-Marsh.
Newton, Arthur James ....Dudley.
Simpson, William.................Sheffield.
Smith, Robert Frazer ....Glasgow.
Williams, James ....St. Clears.

Modified.

Anderson, Hugh Mackay ......Leeds.
Fox, George Clement ....London.
Steeper, Samuel ....Roughton.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Bailey, John Henry...............Wanstead.
Bain, John..........................Bridge of Allan.
Barfoot, John Richd. Doughty..Chesterfield.
Barker, William ....Grimsby.
Bennett, Charles Joseph ....Widnes.
Bird, Henry ....London.
Botham, William Bland ....Sheffield.
Bradbury, Thomas ....Ashton-under-Lyne.
Bray, William ....Redruth.
Burden, John Britten ....London.
Campbell, David ....Motherwell.
Carter, William Henry ....Sutcombe.
Charles, William Frederick.....Loughborough.
Christopherson, Fred ....Ipswich.
Clarke, William Henry ....Sleaford.
Clayton, John William ....Preston.
Cobb, Joseph Septimus ....Doncaster.
Cook, Henry Gardner ....Grimsby.
Coombs, William Thomas ......Brentford.
Corden, Fredk. Wm. Walter ...Streatham.
Dangerfield, William Henry....Devizes.
Davies, Caleb ....Saundersfoot.
Dewes, George ....Wolverhampton.
Dixon, Walter Henry ....Aberdare.
Donaghey, John Joseph ....Dundee.
Dunn, William Arthur ....Newark.
Elliott, Charles Robert ....Easingwold.
Ellis, John William...............Abergele.
Fletcher, Redfern ....Newcastle-on-Tyne.
Fryer, John ....Stockton-on-Tees.
Fugler, Augustus ....Probus.
Godsell, Philip George ....Great Malvern.
Greensill, William Joseph .....Birmingham.
Hall, David ....Bolton.
Hardwick, William ....Driffield.
Harris, George, jun. ....Moseley.
Harwood, George ....Folkestone.
Hill, John Rutherford ....Lasswade.
Hill, Richard Mainprise ....Scarborough.
Hinde, Frederick ....Pailton.
Hobson, Charles, jun. ....Windsor.
Hodgson, Albert ....Harrogate.
Holliday, John ....Birmingham.
Hollingworth, Fredk. William..Halifax.
Hornby, Charles Haycock ......Stockport.
Hurst, Walter ....Oldham.
Jackson, William John ....Lytham.
Jenner, William Edward.........Sandgate.
Judge, Edgar Harvey ....Newark-on-Trent.
Kennedy, William ....Kirkcaldy.
Kilner, Frederick James ....Bristol.
Laxon, Matthew ....Wisbeach.
Lloyd, Thomas ....Stratford.
MacDermott, Robert John ....Islington.
Mann, George Frederick.........Wells.
Meadows, Francis James ......Shepherd's Bush.
Michie, Charles Coutts ....Aberdeen.
Middleton, Christopher ....Thirsk.
Moore, John William ....Northampton.
Newbery, Frank ....Lambeth.
Norman, William Francis ......Towcester.
Orton, Arthur ....Foleshill.
Patterson, Thomas ....Preston.
Payne, William Henry ....Pensnett.
Pemberton, Joseph ....Pimlico.
Pemberthy, Harry Broad ......Redruth.
Phillips, Alfred James............Truro.
Pigg, Joseph ....Hexham.
Presbury, Herbert Henry ......London.
Rickard, William Rees ....Holloway.
Roberts, Robert ....Llangynidr.
Rookledge, Francis Eyre.........Easingwold.
Rouse, Frederick William ......Clapham.
Russon, Samuel Tonks............Birmingham.
Sanderson, Edward John.........Stockport.
Sergent, William Thomas ......Croyden.
Shone, Owen Ellis ....Lambeth.
Skidmore, John....................West Bromwich.
Slipper, Joseph Octavius ....London.
Smith, Sydney ....Whitby.
Sollitt, Arthur ....London.
Stephenson, George Richard ...Notting Hill.
Steer, Thomas ....Islington.
Suart, George ....Lancaster.
Sumner, John ....Wilmslow.
Swan, Michael Edward ....London.
Taylor, Edward ....
Tennant, Alfred ....Lancaster.
Thomas, John Edward...........Swansea.
Vickerman, Thomas..............Nottingham.
Walker, Charles J. ....London.
Walker, Edward ....Leeds.
Ward, John Septibo..............Stamford.
Warrell, Edmund ....London.
Webb, George Frederick.........Shepherd's Bush.
Whyte, William ....Busby.
Wigg, Willis........................Lynn.
Wright, Harry ....Bradford.

———

Several persons were restored to their former status in the Society, upon payment of the current year's subscription, and a fine.

REGISTRAR'S REPORT.

MEMBERS, ASSOCIATES, AND APPRENTICES OF THE SOCIETY FOR THE YEAR 1876.

	Members.		Associates in Business.	Associates not in Business.	Apprentices.
	Pharmaceutical Chemists.	Chemists and Druggists.			
Number of Subscribers, 1875... ...	1823	835	576	...	..
„ restored, 1876	6	1	2	...	...
„ elected, 1876	64	36	160	...	...
	1893	872	738	...	...
Deaths, secessions, etc.	82	36	32	...	...
Total number of Subscribers, 1876 ..	1811	836	706	814	934
Life Members	251	3	...	...	...
Total strength of the Society... ...	2062	839	706	814	934
Summary of Subscribing Members:—					
1875	1823	835	576	884	852
1876	1811	836	706	814	934
Increase	...	1	130	...	82
Decrease	12	...	...	70	...

COMPARATIVE STATEMENT OF THE NUMERICAL STRENGTH OF THE SOCIETY FOR 5 YEARS: 1872-76.

MEMBERS.—PHARMACEUTICAL CHEMISTS.

	1872	1873	1874	1875	1876
Restored to Membership ...	9	8	1	7	6
Elected „ ...	34	143	55	53	64
(Total additions) ...	43	151	56	60	70
Deaths, Secessions, etc. ...	74	69	72	69	82
Increase ...	...	82	...	...	...
Decrease ...	31	...	16	9	12
Total number of Subscribing Members	1766	1848	1832	1823	1811

MEMBERS.—CHEMISTS AND DRUGGISTS.

	1872	1873	1874	1875	1876
Restored to Membership ...	2	2	4	3	1
Elected „ ...	97	54	53	50	36
(Total additions) ...	99	56	57	53	37
Deaths, Secessions, etc. ...	19	27	24	29	36
Increase ...	80	29	33	24	1
Total number of Subscribing Members	749	778	811	835	836

ASSOCIATES IN BUSINESS.

	1872	1873	1874	1875	1876
Restored	1	...	1	...	2
Elected	105	141	110	148	160
(Total additions) ...	106	141	111	148	162
Deaths, Secessions, etc. ...	19	17	23	31	32
Increase ...	87	124	88	117	130
Total number of Associates in Business	247	371	459	576	706

ASSOCIATES NOT IN BUSINESS.

	1872	1873	1874	1875	1876
Decrease ...	...	...	...	...	70
Increase ...	90	25	149	54	...
Total number of Associates not in Business	656	681	830	884	814

APPRENTICES OR STUDENTS.

	1872	1873	1874	1875	1876
Increase ...	31	83	68	57	82
Total number of Apprentices or Students	644	727	795	852	934

LIFE MEMBERS.

	1872.	1873.	1874.	1875.	1876.
Pharmaceutical Chemists	278	272	269	261	251
Decrease	0	6	3	8	10
Chemists and Druggists	3	3	3	3	3

ANALYSIS OF EXAMINATIONS FOR THE YEAR 1876.

FIRST OR PRELIMINARY EXAMINATION.

Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Examination.	Average Number of Rejections at each Examination.	Percentage of Rejections.
1054	607	447	4	263·5	111·75	42·4

MAJOR, MINOR, AND MODIFIED EXAMINATIONS.

ENGLAND AND WALES.

Number of days on which the Board met for conducting the Major, Minor, and Modified Examinations... 21
Average attendance of the Members of the Board of Examiners at each Meeting ... ... 11·24

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	98	61	37	7	14	5·28	37·75
Minor	391	191	200	7	55·86	28·57	51·15
Modified	36	22	14	7	5·14	2	38·88

SCOTLAND.

Number of days on which the Board met for conducting the Major, Minor, and Modified Examinations... 8
Average attendance of the Members of the Board of Examiners at each Meeting ... ... 6·87

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	3	1	2	3	1	·66	66·6
Minor	77	41	36	5	15·4	7·2	46·75
Modified	15	5	10	5	3	2	66·6

THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS, 1876.

Additions during the year:—

Number of persons who have passed the Modified Examination		27
Minor „		232
Major „	62*	
Number of persons registered on payment of the Registration Fee, having been in business before August 1, 1868..............................		24
Number of persons restored to the Register on payment of a fine		8
Placed on the Register by virtue of restoration to membership—Pharmaceutical Chemists		3
An Associate of the Society before July 1842, restored and elected a Member—Pharmaceutical Chemist		1
Decrease of numbers on the Register		98
		393

*These having already been included in the number who passed the Minor, do not increase the numbers on the Register

Erasures during the year:—

Deaths:—	
Notices from Registrars	155
Other sources	27
Erased at the request of registered persons themselves..	8
Erased by order of the Council	1
Erased by the Registrar in pursuance of the provision set forth in Section 10 of the Pharmacy Act, 1868, after sending two registered letters to which no answer has been given	202
	393

Number of Pharmaceutical Chemists on the Register, December 31st, 1876	2,321	
„ „ Chemists and Druggists	10,857	13,178

The name of John Cort, of 62, Liverpool Street, Salford, Manchester, was ordered to be restored to the Register of Chemists and Druggists.

Registrar's Report.

The Registrar's Annual Report, showing the present numerical strength of the Society, the comparative numerical strength for five years, the analysis of examinations, etc., was placed upon the table. It is printed on pages 658 and 659.

Reports of Committees.

Finance.

The report of this Committee was received and adopted, and various accounts ordered to be paid.

Benevolent Fund.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow of a chemist and druggist having two young children dependent upon her.

£15 to a registered chemist and druggist suffering from dangerous illness.

£5 to a registered chemist and druggist, suffering from ill health.

£20 to a registered pharmaceutical chemist, who has been many years in business, but is in great misfortune owing to long illness.

£10 to a former member of the Society, aged 60. Applicant has had three previous grants of like amount.

£10 to the widow of a former member many years in business.

£10 to the widow of a late annuitant.

£10 to a registered chemist and druggist, aged 76.

Several other cases had been considered, of which some were deferred for further inquiries, and others could not be entertained.

Mr. Owen had reported that he had no opportunity of profitably applying the twenty guineas, recently placed in his hands for the purpose of ensuring the election of a child into the Orphan Asylum, and he had therefore returned the money.

Mr. Betty formally objected to one of the proposed grants, as having been recommended by the Committee on an informal application.

The President read the letter which had been received from the applicant's daughter.

Mr. Betty said he made no objection to the merits of the case, but merely as a matter of form, because he did not think the application came within the regulations. He did not wish to prevent the person referred to receiving a grant from the Society, and hoped that a few words would be introduced into the regulations which would enable such cases to be dealt with.

The President said he considered the petition originally sent in by the applicant himself, and upon which his name had been placed upon the approved list of annuitants, was quite sufficient to justify the recommendation of the grant.

The Vice-President, Mr. Owen, Mr. Sandford, and others, having expressed the same view,

The report and recommendations of the Committee were received and adopted.

Mr. Shaw moved the suspension of the standing orders in order that a motion of which he had given notice with reference to amending the regulations of the Benevolent Fund might be considered.

This was agreed to.

Mr. Shaw moved—

"That the Council adopt the Regulations of the Benevolent Fund which were recommended to the Council for adoption at its meeting in December last in the report of the Benevolent Fund Committee."

These regulations had been approved by a majority of the Benevolent Fund Committee in December last, and presented to the Council on the following day, when it was after some discussion decided to postpone the question. To this he objected, thinking it important that these amended regulations should come into operation, and he had therefore given this notice of motion, and a copy of the proposed rules had been sent to each member of the Council. He then briefly drew attention to the alterations which had been made by the committee, and moved their adoption. He proposed that the various clauses should be considered *scriatim*.

After some discussion it was decided to refer the proposed regulations for verbal revision to a small committee, consisting of Messrs. Shaw, Betty and Sandford. The report to be submitted to the Council at its next meeting.

The Secretary presented the following statement, showing the amount of temporary assistance given from the Benevolent Fund during the past year, and who were the recipients; also a table showing the number of subscribers and donors to the fund, and the amount contributed by each :—

BENEVOLENT FUND, 1876.

Temporary Aid Granted.

	No.	Amount. £	s.	d.	Total of each Class. No.	Amount. £	s.	d.	Total. No.	Amount. £	s.	d.
Connected with the Society.												
Members and Associates	6	55	0	0								
Widows & Orphans	12	170	0	0	18	225	0	0				
Not connected with the Society.												
Registered Chemists and Druggists	12	145	0	0								
Widows of Chemists and Druggists.....	8	100	0	0	20	245	0	0	38	470	0	0

Analysis of Contributions.

Subscribers or Donors of £	s.	d.	Subscriptions. No.	Amount. £	s.	d.	Donations. No.	Amount. £	s.	d.
0	2	6	191	33	17	6	2	0	5	0
0	5	0	828	207	0	0	6	1	10	0
0	10	0	90	45	0	0	2	1	0	0
0	10	6	802	421	1	0	5	2	12	6
1	1	0	321	337	1	0	7	7	7	0
2	2	0	35	73	10	0				
3	3	0	1	3	3	0	1	3	3	0
5	5	0	2	10	10	0	8	42	0	0
10	10	0	1	10	10	0	3	31	10	0
105	0	0					1	105	0	0
Odd Amounts.			40	83	4	7	1	0	3	6
			2311	1164	17	1	36	194	11	0

North British Branch.

The balance sheet of the North British Branch was presented, and the sum of £100 was ordered to be handed to the Honorary Secretary for current expenses, in addition to £13 0*s.* 2*d.* balance due to him on the account rendered.

Library, Museum, and Laboratory.

The report of this Committee included the Librarian's statement of the average attendance in the Library during the previous month, viz., day 23, evening 7. Circulation of books, 73 in town, 29 in the country, to 12 places. The Committee recommended that the 'Annalen der Chemie' be subscribed for, and that Baillon's 'Dictionnaire de Botanique' and Cooke's 'Mycographia' be kept for reference only, and not circulated. They had also given instructions as to the binding of the books purchased by the Hanbury Fund.

The Curator reported the attendance in the Museum to have been, on the average, day 20, evening 4. Also that the sets of specimens for the Professors were now completed.

Professor Redwood had reported that forty-nine students were now attending his class; also that the specimens supplied him for his lectures were satisfactory.

Professor Bentley had reported that thirty-eight students were attending his course, a number lower than the average. He also had expressed his satisfaction with the specimens supplied him for lectures.

Professor Attfield had reported fifty-seven entries in the laboratory since the commencement of the session, forty-four students now being at work, and that the attendance of the Bell scholars had been regular. The number of students was rather less than at this time last year, but was about equal to the average of previous years.

The Committee had considered a proposition submitted to it by the Council with reference to retaining a portion of the fees paid by candidates for examination who did not present themselves. It recommended that candidates failing to appear should be put upon the same footing as those who failed to pass. In cases of unavoidable inability to attend the Council would of course have power to waive the payment of a further fee.

Mr. Greenish hoped it would be understood throughout the country that members might obtain illustrated works from the library, by special application to the Secretary.

Mr. Cracknell did not think it would be wise to adopt the recommendation as to the forfeiture of fees by candidates who did not present themselves. The examinations were already surrounded by difficulties, and he did not think it would be wise to increase them. There might be many reasons why a candidate did not come up which would appear valid to him, though not to the Council, and as the cases were not very numerous he should prefer to let things remain as at present.

Mr. Rimmington took the same view.

Mr. Hampson asked how many cases occurred of candidates paying their fees and not coming up for examination.

The President said there were three last time.

Mr. Hampson did not think such a small number—say twenty in the year—was sufficient to justify the introduction of such a rule.

Mr. Mackay thought the whole fee should be returned when the candidate did not attend.

Mr. Bottle said he agreed with the proposition, but did not like these continual alterations in the rules.

Mr. Mackay said some of the candidates were under the impression that having failed to pass at one examination they could present themselves at the next examination, whereas they could not come up again in less than three months. These words ought to be added to the red ink notices which were pasted on to the syllabus.

Mr. Sandford explained with reference to the proposed alterations in the regulations regarding the fees that it might affect the arrangements of the Board of Examiners. The candidates did not always give notice that they should not attend, but simply stayed away. He also pointed out that the Council would be able to remit the fees in all suitable cases. He, therefore, thought the Council might safely accept the recommendation of the Committee.

Mr. Greenish said the Committee was not at all unanimous upon this point. He did not think the cases were numerous enough to warrant any alteration in the rules.

Mr. Betty considered the most objectionable part of the resolution was the power reserved to the Council to waive the fee. The suggestion ought to be carried out thoroughly or not at all.

It was eventually decided to accept the report and recommendations, with the exception of the portion relating to the retention of the fees of candidates who did not present themselves.

The Bristol Association.

Mr. Schacht said he should shortly have to make an application on behalf of the Bristol Association for a grant towards its proposed library, and he hoped members of the Council would consider the report, which would appear in the Journal, of what the Bristol Society had done and was doing.

House.

The report of this Committee referred to the work proposed to be done in the examiners' laboratory, and other matters connected with the house. The report was received and adopted, and the work proposed was ordered to be done under the supervision of the President.

Benevolent Fund Dinner and Conversazione.

The President said it was now ten years since a dinner had been held in aid of the Benevolent Fund, when many wholesale firms subscribed, their subscriptions entitling them to vote for ten years, which had now elapsed. It was therefore suggested that it would be a very proper time to hold another dinner in aid of the Fund, but if so it was necessary to form a small committee to make the arrangements. Another question was whether the Society should hold a conversazione this year.

Mr. Shaw suggested that the conversazione should be omitted this year and the amount it would cost should be handed to the Benevolent Fund.

Mr. Mackay said he would propose that no conversazione be held, and that the annual dinner in May be in connection with the Benevolent Fund.

Mr. Atkins said he personally should regret to see the conversazione discontinued, because it was the only occasion when ladies could be present. Would it not be possible to hold it at less expense?

The President said the great objection last year was to what was considered the exorbitant price charged for refreshments, and it was suggested that no refreshments should be supplied. The objection to this was that notice had not been given, but it was quite possible to announce it in good time this year, and thus make a great saving in the cost of the conversazione.

Mr Robbins took the same view. He thought it would be a great mistake to omit the conversazione altogether, but it was quite unnecessary to provide refreshments.

The Secretary said, the Society of Arts had held a conversazione at South Kensington without supplying refreshments, and he had been informed that no complaints had been made in consequence.

Mr. Betty thought it would be better not to hold a conversazione this year, but to concentrate all their energies on making the Benevolent Fund dinner a great success.

The President supported the idea of holding a conversazione at a reduced expenditure, since it would be a great disappointment to the ladies to discontinue it. The cost of refreshments last year was upwards of £120.

Mr. Greenish said there was nothing in common between the dinner and the conversazione. They should be kept quite distinct.

Mr. Frazer advocated the conversazione in order to make the Benevolent Fund dinner a success.

It was ultimately resolved to hold a conversazione at the South Kensington Museum on the 16th of May, if permission could be obtained from the Lords of the Committee of Council on Education; and that a Committee, consisting of Messrs. Betty, Greenish, Robbins, and Sandford, be appointed to make the necessary arrangements. An instruction was given to the Committee that refreshments should not be supplied. It was also resolved that a dinner be held, in May, in aid of the Benevolent Fund, and that Messrs. Betty, Bottle, Hills, Sandford, Savage, and Williams, be the Committee to make the necessary arrangement, with power to add to their number.

Mr. Owen moved—

"That it be a recommendation to the Dinner Committee to consider the desirability of making arrangements for the attendance of ladies at the proposed Benevolent Fund Dinner."

This motion was seconded by Mr. Hampson.

The President thought the matter had better be left to the discretion of the Committee.

Law and Parliamentary.

The report of this Committee contained a statement of the progress of proceedings in several cases of alleged infringement of the Pharmacy Act. Some correspondence had taken place between the Registrar and the Secretary of the Chemists and Druggists' Trade Association, with regard to the prosecution of persons for illegal trading; letters had also been received from a chemist in the country, stating that he was being threatened with prosecution by a Medical Association for prescribing over the counter. The Committee recommended that in this case the person prosecuted should be defended, if, on inquiry, it were found to be a case of simple prescribing over the counter. Messrs. Greenish, Hampson, Hanbury, Hills, Betty, and Sandford had been appointed the Sub-Committee to consider what amendments were desirable to be made in the Pharmacy Acts should an opportunity occur.

The following is a *résumé* of the correspondence referred to above:—

"Birmingham, 27th November, 1876.

"The Secretary,
"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, W.C.

"Sir,—On other side please find particulars of three cases of illegal trading under the Pharmacy Act. Should the Council of your Society think fit to proceed against these persons, the necessary evidence is in my possession, having personally purchased the poisons named during the last twelve days.

"I am frequently receiving letters from various parts of the country stating that unregistered men are openly dealing in Scheduled poisons. If I collect the necessary evidence to proceed in such cases, would the Council of your Society instruct their solicitor to go forward and sue for the penalties?

"Waiting your reply,
"I am, Sir, yours faithfully,
(Signed) "W. F. Haydon, Secretary."

[*Here follows a list of the cases referred to.*]

"November 28, 1876.

"The Secretary,
"Chemists and Druggists' Trade Association,
"Birmingham.

"Sir,—I am in receipt of your letter of yesterday's date, reporting three cases of infringement of the provisions of the Pharmacy Act, 1868, and will lay it before the Council at its next meeting.

"One of the persons you refer to is a registered chemist and druggist, and another has presented himself on several occasions for the Minor Examination, but hitherto without success.

"You are perhaps unaware that in cases of the sale of poisons improperly labelled, the law can be put in force by anyone, the intervention of the Registrar appointed under the Pharmacy Act not being required as is the case in prosecutions for the non-registration of the seller of poisons.

"I am, Sir, yours obediently,
(Signed) "Elias Bremridge,
"Secretary and Registrar."

[*Some further correspondence took place solely in reference to the person who was stated to be registered.*]

"December 8, 1876.

"To the Secretary,
"Chemists and Druggists' Trade Association,
"Birmingham.

"Sir,—Your letter of the 27th ultimo in reference to cases of illegal trading under the Pharmacy Act, was laid before the Council at its meeting on the 6th instant. I have to inform you, that acting under the instructions of the Council, I have communicated with Mr. [A.] in reference to his reported infringement of the provisions of the Pharmacy Act, 1868; and that the death of Mr. [B.] not having been officially notified to me, I am making inquiries as to the correctness of the report of his death. I have further to say that any evidence of infringements of the provisions of the Pharmacy Act, 1868, forwarded to me, will be submitted to the Council.

"I am, Sir, yours obediently,
(Signed) "Elias Bremridge, Registrar."

"Birmingham, 15th January, 1877.

"The Secretary,
"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, London, W.C.

"Sir,—I have to inform you that at a meeting of the Law Committee, held on the 10th inst., a resolution was passed instructing me to apply to the Council of the Pharmaceutical Society for a definite reply to the question contained in my letter of Nov. 27, 1876, which states: 'I am frequently receiving letters from various parts of the country, stating that unregistered men are openly dealing in Scheduled poisons. If I collect the necessary evidence to proceed in such cases, would the Council of your Society instruct their solicitor to go forward and sue for the penalties?'

"The final sentence in your letter of December 8th, 1876, is not considered by the members of the Law Committee by any means a satisfactory reply to this question.

"In your letter, of the same date, you state 'that the death of Mr. B—— not having been officially notified to me, I am making inquiries as to the correctness of the report of his death.' I shall be glad to know if your inquiries have convinced you of the correctness of my information in this case, and if the Council of your Society purpose taking any steps in the matter.

"I have already collected a further amount of evidence in numbers of large towns, which evidence is waiting a satisfactory reply to the question contained in my letter, previously referred to.

"I am, Sir, yours faithfully,
(Signed) "W. F. Haydon, Secretary."

"January 16, 1877.

"The Secretary,
"Chemists and Druggists' Trade Association,
"Birmingham.

"Sir,—I have to acknowledge the receipt of yours of yesterday's date, and will lay it before the Council at its next meeting.

"I have ascertained that Mr. [B.] is dead, and I have written to Mr. [B's successor] in reference to his infringement of the provisions of the Pharmacy Act, 1868. Mr. [A.] has disposed of his business.

"Allow me to suggest the desirability of your sending me the particulars of the cases of infringement you refer to, as I believe it is not probable the Council will consent to forego the consideration of, and judgment upon, any case you may have to report.

"I am, Sir, yours obediently,
(Signed) "Elias Bremridge, Registrar."

"Birmingham, 17th Jan., 1877.

"The Secretary,

"Pharmaceutical Society of Great Britain,

"17, Bloomsbury Square, London, W.C.

"Sir,—I am in receipt of your letter of yesterday's date, and note contents.

"My instructions forbid my complying with your suggestion that I should forward you the particulars of other cases of infringements of the Pharmacy Act, 1868, of which I have collected evidence, until the Council of your Society has given the Law Committee of this Association a satisfactory reply to the question contained in my letter of Nov. 27th, 1876, referred to in my letter of the 15th inst.

"I am Sir, yours faithfully,

(Signed) "W. F. HAYDON, Secretary."

Mr. BOTTLE moved—

"That the Registrar be directed to communicate with the secretary of the Chemists and Druggists' Trade Association to the following effect: That the Council of the Pharmaceutical Society of Great Britain will not instruct any solicitor to go forward and sue for penalties under the Pharmacy Act, 1868, in cases of alleged infringement of the provisions of that Act, until evidence in support of each charge of violation of the statute has been considered and found satisfactory by the Council, when the Registrar will be duly authorized to initiate proceedings for the recovery of the penalties incurred, in accordance with the provisions of the Pharmacy Act."

He said that the correspondence above referred to had been laid before the Law and Parliamentary Committee on the previous evening, but it seemed to him that it was a question for the Council to decide, and a very important one, too. He did not see how the Council could give to the secretary of the Trade Association that which he asked, viz., a definite and satisfactory reply. There would be no difficulty in giving a definite reply, but he feared it would not be a satisfactory one. It was evident, from the whole tenor of the correspondence, that the Association was anxious to collect evidence of illegal trading all over the country, and then that the solicitor of the Society should prosecute the offenders, at the expense of the Society, the Council having no opportunity given it of passing any judgment on the cases. It seemed to him it would be unwise, impolitic, and illegal to do so. It would be most unwise for the Council to surrender its powers, which it had hitherto exercised so well. It had been frequently reported to the Council that persons were carrying on business illegally, and when the cases were investigated it turned out that some had been brought forward out of personal pique; in some cases the infringement arose from ignorance; but sometimes it was from a deliberate attempt to violate the law. In such cases the Council had always put the law in operation, with uniform success. It appeared from the correspondence, that the Trade Association was desirous of using the Society's solicitor without coming to the Council for an opinion; it altogether ignored the *Registrar*, and addressed its letters to the *Secretary* of the Society. This might seem a very small matter, but the Act of Parliament said that the penalties for certain infringements of the Pharmacy Act should be sued for by the Registrar, he being duly authorized by the Council. It would therefore be illegal to give authority to the solicitor to carry on a prosecution without the Registrar. It would also be extremely impolitic to surrender any of the powers which the Council possessed. He was very desirous of seeing this Trade Association working hand in hand with the Pharmaceutical Society, but it appeared to him that it was attempting to step into the shoes of the Society. The Council had no authority to concede to the Birmingham Association the right of prosecuting wholesale, but each case must stand on its own individual merits, and when a *primâ facia* case was made out, it was the Registrar alone who, under the directions of the Council, could prosecute.

Mr. SANDFORD seconded the motion. It was perfectly absurd to suppose that the Council would undertake to initiate legal proceedings in any case it had not considered. It was, in fact, taking away one of its principal functions. The Council had no interest in forbearing to prosecute such cases, but quite the contrary; its interest, quite as much as that of the Association, was to stop all illegal practices. He could not understand how the secretary to the Association could say that the answer sent him was not definite, the answer being that all cases which were sent to the Registrar would be submitted to the Council.

Mr. MACKAY said it was not requisite for any one holding the views enunciated by Mr. Bottle to add anything further to what had been said, but he must say when he heard last night the tenor of this correspondence he was very much astonished, because it seemed to him that if the Council were to do what had been asked by what was called the Law Committee of the Trade Association, it would be untrue not only to itself but to its constituents. The members were sent to that Council Board not as a set of stuck-up images, but as men having a certain portion of brains and with some capacity of using them. The idea that the members of the Council occupying the position they did, as representing the Pharmaceutical Society of Great Britain, should under requirement of a recently formed association be so far lost to themselves as to say unconditionally that they would prosecute in cases respecting which the Council had as yet received no information was absurd, and if acceded to, the sooner they ceased to sit there the better. It had been their practice, and he hoped would be that of their successors at the Council, before taking any step in so serious a direction as the one indicated in the correspondence, to exercise careful judgment in every individual case; and he did not think the Council would be justified in prosecuting in a single case without having fully considered its merits and all the surrounding circumstances.

Mr. FRAZER said this Association asked the Council to do what it had never done for its own Law and Parliamentary Committee. That Committee matured and brought up cases to the Council, but still the Council reserved to itself the final decisions respecting them; so that it was quite unreasonable to ask it to concede to an outside body that which it did not concede to its own Committee. In one letter the secretary of the Association stated that he had collected information, but this had been done entirely without the authority of the Council.

Mr. HAMPSON thought there was a perfect misapprehension as to the meaning of this correspondence, because he did not conceive for a moment that any association would suppose that the Pharmaceutical Society would prosecute at its bidding without full and careful inquiry into every case. He was quite sure that was not the intention, nor did he think it was intimated in the correspondence. As far as he could gather, the idea of the Association was that if it collected evidence, as it considered it was its duty to do, that that evidence when tendered to the Society would be utilized for the general good and not laid aside. He believed that nothing more was required than a mutual understanding. It was absurd to suppose that the Society would take up prosecutions indiscriminately; but, on the other hand, if the Trade Association went to the expense and trouble of collecting information, it would naturally expect that the best consideration would be given to it, and he believed an answer to that effect was all that was required.

The PRESIDENT said he thought a reply to this effect had been given.

Mr. SHAW said although he was on the executive of the Trade Association, he was not a member of the Law Committee, and must say he was astonished at the language used in the correspondence, which he thought was a mistake. He had supported the Association from the commencement; not because he thought it was in any way antagonistic to the Society, but that it might become a handmaid of it, so to speak, in restricting illegal trading, and if the desires expressed by the Chemists and Druggists' Trade Association had been received in a more friendly spirit he thought there would have been no difficulty. They all knew that when evidence was wanted they had to depend to a great extent on their own members, perhaps on the Local Secretaries, and very often unpleasant consequences ensued, and difficulties arose as to getting information at all. There was now a person ready to get up the evidence necessary to put a stop to this illegal trading; and if a reply was sent to the effect that the Council could not undertake the prosecution of any case without receiving particulars of the charge to be brought, that would be all that was necessary.

Mr. Betty said he was at a loss to see what other reply could have been made than that which had been sent by the Registrar, who had invited the Association to send up the information it had collected.

The motion was then put and carried unanimously.

The report and recommendations of the Committee were then received and adopted, with the exception of the portion which referred to the defence of a chemist threatened with prosecution by a Medical Defence Association.

Report of Board of Examiners.

The Report of the Board of Examiners on the recent Preliminary examination was read, received, and adopted.

Examined.	Passed.	Failed.
277	152	125

PHARMACEUTICAL MEETING.

Wednesday, February 7, 1877.

MR. JOHN WILLIAMS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting were read and confirmed.

The following Donations to the Library and Museum were announced, and the thanks of the Society were awarded to the donors:—

Library:—'Catalogue of the Library,' 'Memoirs,' vol. 25, and 'Proceedings,' vol. 14, from the Literary and Philosophical Society of Manchester; 'Reports of the British Association for the Advancement of Science, 1872-5,' from Mr. J. Williams; 'A Manual of Cinchona Cultivation in India,' from G. King, Esq., M.B., (Author), Superintendent of the Botanic Garden, Calcutta; 'Notes on Asylums for the Insane in America,' from Dr. Bucknill, F.R.S. (Author); 'Calendar,' 1876, from the Royal College of Surgeons of England; 'Sur les Erreurs d'Interprétation ayant Rapport spécialement à l'Examen des Ecailles d'Insectes,' from Jabez Hogg, Esq. (Author); three old Catalogues of Drugs, from Mr. H. W. Pound; 'Ueber die wirksamen und einige andere Bestandtheile des Mutterkornes, von Dragendorff und Podwissotzky,' from Prof. Dragendorff; 'Rapport sur les Inconvénients que presentent les Tuyaux en Plomb pour l'Aspiration de la Bière,' from Dr. J. Morel (Rapporteur); 'Transactions,' vol. 1 to 7, from the Botanical Society of Edinburgh, per Professor Balfour.

Museum.—Specimens of the roots and leaves of *Gymnema sylvestre;* of the roots of *Euphorbia neriifolia, Clerodendron serratum, Nerium odorum, Zingiber macrostachys, Bryonia epigœa, Vitis latifolia, Abrus precatorius, Melia Azedarach, Azadirachta indica, Cocculus villosus;* of the barks of *Cinnamomum Tamala, Psidium sp., Alstonia scholaris, Casuarina muricata, Symplocos racemosa, Adansonia digitata, Myrica sapida, Holarrhœna antidysenterica, Calosanthes indica, Syzigium Jambolanum, Povetta indica, Michelia Champaca, Cordia angustfolia;* of the seeds of *Lathyrus sativus, Calophyllum inophyllum, Jatropha glandulifera, Convolvulus sp.* (Huban nil); of the leaves of *Cratæva religiosa, Cassia alata, Cassia obovata, Lawsonia alba, Rhinacanthus communis;* of the plants of *Cocculus villosus, Hydrocotyle asiatica, Cuscuta reflexa, Polanisia icosandra, Aristolochia brateata, Lobelia nicotianæfolia, Peganum Harmala, Pogostemon purpuricaulis, Eclipta prostrata;* of the fruits of *Bryonia cacuminosa, Randia dumetorum, Trichosanthes palmata, Xanthoxylon triphyllum;* of the gum resin of *Boswellia serrata, Canara Gamboge, Kuteera gum, Cochlospermum Gossypium;* of *Chaulmoogra oil (Gynocardia odorata)*, from Dr. Dymock, Bombay.

Specimens of the following Cinchona barks from Mr. J. E. Howard, F.R.S. *Cinchona Uritusinga, C. Pitayensis, C. lancifolia,* two specimens; *C. rotundfolia, C. subcordia, C. officinialis,* var. *colorada* and *lutea*; *C. Chahuarguera, C. pubescens,* var. *purpurea; C. ovata,* var. *vulgaris, C. Condaminea, C. viridiflora, C. Calisaya,* two specimens; *C. macrocalyx, C. villosa, C. lucumæfolia, C. lanceolata, C. Peruviana* and *C. micrantha; C. cordifolia;* also two spurious Cinchona barks, viz.: *Stenostomum acutatum,* and *Cascarilla magnifolia.*

Specimens of fresh Coca leaves from Mr. Charles Thomas; specimen of Nataloin from Mr. W. H. Pound; specimen of rare ferns from the Island of Ascension, and of the ingredients of a Chinese purgative prescription from Mr. Oswald A. Reade; of Valoura, from Mr. Ballchin; of Helmick's Damiana, from Professor Bedford, New York; of *Xanthium spinosum,* from Dr. Dyce Duckworth; of rhubarb, from *Rheum officinale* grown in England, from Mr. Rufus Usher; of hydrate of chlorine, from Dr. Senier; of crystallized mercuric chloride, from Mr. Bevan; of chrysophanic acid prepared by sublimation, from Mr. A. W. Postans.

In reply to an inquiry by the President concerning some of the donations to the Museum, Mr. Holmes said that the specimens of Indian drugs were presented by Dr. Dymock in illustration of recent papers in the *Pharmaceutical Journal*; that the cinchona barks presented by Mr. Howard were of considerable historical interest, one of them being the kind of bark which, according to tradition, cured the Countess of Chinchon, from whom the bark received its name; another being some of the first *C. lancifolia* imported into this country; and another, a sample of a highly esteemed bark, presented some years ago to the Pope by the people of New Granada; that the Coca leaves were freshly dried just before Mr. Thomas brought them from America, and that that gentleman informed him that Coca leaves were well known to lose their properties if exposed to air and light, even for a week. He (Mr. Holmes) thought it quite possible that, like coffee, Coca might owe its peculiar properties in some degree to a volatile oil, and that the want of success in this country in producing symptoms described by a few observers might perhaps be due to the difficulty in obtaining the drug in good condition. He also called attention to a sample of aconite from Japan which appeared in the London market last month, and which was very superior in appearance, soundness, and freedom from admixture, to that imported from Germany. He added, that good aconite root was at present a desideratum in the market, and if this Japanese kind proved to contain the same aconitine as *A. Napellus*, it would form a valuable and saleable article. Dr. Paul had undertaken to examine the root, and report upon the alkaloid contained in it.

At the invitation of the President, Mr. Postans, who exhibited a specimen of chrysophanic acid, remarked, with reference to the preparation of chrysophanic acid by sublimation, that it was stated in 'Watts' Dictionary' that in this process the acid was partly carbonized. He had verified tho fact by experiment, and it occurred to him that it would be important to know whether in this form any other change had taken place. The sublimed acid had a different appearance to that prepared by crystallization from benzol. As Professor Attfield had investigated this matter, he (Mr. Postans) hoped that he would favour the meeting with his opinion as to whether any special change had taken place in the acid.

Professor ATTFIELD said that no doubt chrysophanic acid did decompose when subjected to heat; but the proportion in which that decomposition took place depended a great deal upon the manner in which the acid was heated. He had sublimed chrysophanic acid in various ways; but he thought that when it was sublimed on a small scale, and in such a manner that the vapour was condensed on a cool surface as soon as it was produced, there was very little decomposition. He was not certain as to the proportion, but he should think that if ten grains were sublimed, less than one grain would be decomposed. If a large quantity was sublimed, and the vapour had to go any distance, obviously a vast amount of heat must be employed, and a great deal of the chrysophanic acid would be heated over and over again, and, no doubt, during prolonged exposure to a high temperature a large proportion would be decomposed. He did not think that there was any alteration in the portion which was sublimed.

The PRESIDENT said that this was a subject which was attracting a great deal of attention. It was evident that this sublimed chrysophanic acid was quite different from that produced by the ordinary means, namely, by crystallization from benzol or from alcohol, and it was very interesting to note whether any alteration had occured in its nature as well as in its appearance. It was known that salicylic acid, when sublimed, was partially decomposed, and the same thing might occur with regard to chrysophanic acid. So very little was known of these bodies that they were very thankful for any information on the subject.

A vote of thanks was passed to Mr. Howard and other gentlemen who had contributed the specimens.

A paper was then read on—

THE ADMIXTURE OF VERATRUM WITH VALERIAN ROOT.

BY PROFESSOR BENTLEY.

The paper is printed on p. 649, and gave rise to the following discussion:—

The PRESIDENT, in thanking Professor Bentley for his paper, said that this was a most important subject; and the paper proved how essential education was to the pharmacist. Without education he were at the mercy of accidents, and, perhaps fraud. The present instance was probably the rusult of carlessness; but it was most important that pharmacists should be able to distinguish the true from the false drug as it came to them. These drugs were so much alike that many pharmacists would possibly have found the difficulty of distinguishing between them a very considerable one. They were, therefore, much obliged to Professor Bentley for having pointed out to them the way in which this might be done.

Professor BENTLEY said that there was another important deduction to be made from the present case as well as the question of education. It was the state in which drugs came into this country, especially from certain parts of the Continent. One of his objects in bringing the paper before the Pharmaceutical Society was to call prominent attention to this. It was constantly the case that drugs of powerful action came into the docks much damaged, and adulterated in various ways; and he hoped that the time was not far distant when there would be a properly qualified inspector of drugs, whose duty it would be to take care that these damaged and adulterated articles should not be thrown broadcast over the country.

Mr. HOLMES said that it was his experience that drugs which came from the Continent, especially from Germany, contained a larger proportion of admixture than any others. It was difficult to say whether this arose from carelessness, or was absolute adulteration. It was needful to know the value of the drugs in the country from which they came, and the proportion in which they appeared to be mixed. A sample of arnica, which he had met with, consisted in a very large proportion of some cheaper root; and he had lately seen aconite adulterated with a root which was used in the country from which the aconite came.

Mr. GREENISH said that he would take this opportunity of again mentioning the value of the microscope in materia medica. If a student took the valerian root and the rootlet, and made sections of each of them, and again made sections of the veratrum, he could not possibly fail to detect the admixture.

Mr. HALL said that there was a practice in vogue at the docks, which merchants very much objected to, called "bulking," and it was possible that in the present instance a consignment of roots was made, and the usual system of bulking was followed so as to make the parcels of equal value. It was a subject often raised at public sales that parcels should be sold *in naturâ*, that was, in the state in which they arrived in this country; and it might now be seen in the catalogues of sales that parcels were sold worked or unworked. The "working" at the docks was conducted by men who were ignorant of the nature of the substances with which they had to deal, and the admixture might have occurred in that way.

Mr. ATKINS said that reference had been made almost entirely to imported valerian. He had heard no reference as yet to the fact that a large proportion of valerian was obtained in this country. It might be interesting to know that in the centre where he resided, a larger proportion of valerian had been collected for pharmacy and other purposes than in almost any other part. There was an extremely interesting portion of England, which was gradually disappearing, called Cranbourne Chase; and the amount of valerian gathered in that district, some thirty years ago, amounted to tons annually. When they considered that that product was gathered largely by children and by the poor, they could not be surprised at some amount of partial and unconscious admixture. This trade was one which was gradually disappearing in consequence of various causes.

Professor BENTLEY wished to mention that valerian root came from three sources. First of all, there was the English valerian, chiefly cultivated in Derbyshire, and in this he had never seen any serious adulteration. When in the sample which he had examined he found white hellebore, he knew at once that it was not English root, for the veratrum plant was not grown to any extent in this country. Then there was the continental veratrum; and up to a few years since these two kinds were the only varieties in the market, the English fetching the higher price. A few years ago the cultivation of valerian was commenced in America, and it had been so successful that at the present day American valerian root fetched a higher price than any other.

A paper was then read on—

THE COLOURING MATTER OF PETALS OF ROSA GALLICA.

BY H. SENIER.

The paper is printed at p. 650, and gave rise to the following discussion:—

Professor ATTFIELD said that he trusted that Mr. Senier would carry on this investigation farther than he had already done. When he (Professor Attfield) saw the ammonio-potassium salt in the form of beautiful octahedra, he saw a means of obtaining results still more important than those already produced. If Mr. Senier would obtain some ounces instead of a few grains of the salt, he would have an opportunity of elucidating in the most important manner the composition and constitution of such colouring matter as that of the *Rosa gallicâ*.

Mr. KINGZETT said that it was rather unfortunate that the lead salt had been chosen for analysis, for it was very difficult ever to get a combination of lead which was not of a basic character. He thought that an analysis of potassium salt would have been much more instructive. There were very few instances known where a colouring matter of this kind had the power to combine with sodium, while all salts of lead had a great power of combining with a number of extractives; and, so far as he could see from the paper, no means had been taken to remove extractive other matters from the colouring substance.

Mr. H. SENIER said that the crystalline ammonio-potash salt, if decomposed by sulphuric acid, yielded the colouring matter in the red form, showing that there really was a combination of the colouring matter.

The next paper read was a—

NOTE ON THE ACTION OF DILUTE NITRIC ACID ON BRUCIA.

BY W. A. SHENSTONE, F.C.S.

This paper is printed at p. 652, and gave rise to the following discussion:—

The PRESIDENT said that this was a matter of very great interest. Mr. Shenstone had shown how brucia could be really purified if necessary, and how very difficult it was to purify it to its utmost limit. The question of the presence of strychnia in brucia was one of great importance. The activity of brucia had been considered to be one-twenty-fourth that of strychnia, but perhaps even that estimate was due to the impurity of the brucia. They had good reason to suppose that brucia, in its action on the human system, was totally different to strychnia. This paper, in his opinion, had settled the question as to whether brucia was convertible into strychnia by any oxidizing agent.

Mr. HOLMES said that he observed that Mr. Shenstone expressed some curiosity as to the source of the alkaloid experimented upon by Mr. Cownley. He (Mr. Holmes) would be glad to know whether Mr. Shenstone's brucia was obtained from the bark of the nux vomica or from the seed. He had noticed that in Pereira's 'Materia Medica,' it was stated that the bark contained brucia, the statement being so worded as to imply that it did not contain strychnia. In the 'Pharmacographia,' it was stated that the wood of the nux vomica contained strychnia, but no mention was made of the bark containing strychnia. He should like to be informed whether the bark really contained strychnine or not.

The PRESIDENT said that it was difficult to answer the question. He thought that he might say that the brucia of commerce was a by-product from the manufacture of strychnia. The brucia thus obtained was purified as highly as possible, or rather as highly as convenient, by the manufacturers. But as to the question of whether strychnia was contained in the bark of the nux vomica, he was not able to throw any light upon it.

Mr. COWNLEY said that he had made a few experiments some time ago, in order to test the statement of Sonnenschein, but was not able to confirm his conclusions. He should have been glad, for scientific reasons, if Mr. Shenstone could have established a contrary result, although personally he was happy that Mr. Shenstone had confirmed his own experiments. Whether strychnine could be separated from brucia in the way mentioned, was a point upon which the President was a greater authority than himself; but he should rather doubt the value of separating strychnia by precipitation. He should be inclined to separate these alkaloids by the relative solubility of their nitrates. As to the other point, whether brucia was capable of being converted into strychnia by these means, he should rejoice to be able to transform these and analogous alkaloids so simply.

Professor BENTLEY asked if any experiments had been made upon strychnos bark. It was always considered that if the nux vomica bark contained strychnia it was in minute proportions only. The essential activity of the bark was generally regarded as due to brucia; and that was one of the facts which had been brought forward to show that brucia as well as strychnia must have a powerful physiological action. The substitution of nux vomica bark for augustura bark undoubtedly occurred years ago. It was, therefore, particularly interesting to know whether nux vomica bark contained any appreciable amount of strychnia, or whether its poisonous action was not entirely due to brucia. In the course of a conversation some years ago with the late Mr. Morson, that gentleman informed him that the principal alkaloid in nux vomica bark was undoubtedly brucia, but he (Professor Bentley) could not call to mind whether Mr. Morson stated that the bark contained any strychnia, or whether its poisonous action was not entirely due to brucia.

Mr. HOLMES said that he had that afternoon made an experiment with the bark of the nux vomica by applying the test for strychnia. He first tried nux vomica seed and got a faint purple reaction He then tried the bark and also found a slight reaction, but still less than in the seed. He inferred from the result of this rough test that the bark did contain strychnia as well as brucia.

Mr. MARTINDALE thought that it was of more importance that they should have pure strychnia than pure brucia. With regard to the nitrate of strychnia the purity of that was of greater importance than of other salts of strychnia, as on account of its greater solubility it was useful for making hypodermic injections. He thought that in commerce the nitrate of strychnia was generally met with in a pure state; but, as nitric acid was liable to decompose it, its manufacture required great care.

Professor ATTFIELD said that he should like to give prominence to the fact that strychnia was powerfully attacked by even dilute nitric acid; and he did so because of the importance of the fact in forensic analysis.

Mr. COWNLEY said that he did not wish to detract from what Mr. Shenstone had done, but in his (Mr. Cownley's) paper they would find he had stated that the effect of the action of even dilute nitric acid on brucia or strychnia was possibly to convert it into a nitro base; or, at any rate, so to alter the character of the alkaloid that fixed alkalies failed to precipitate it; therefore the point was settled then, and Mr. Shenstone's experiments were in accordance with that result.

Professor ATTFIELD said that that important point had long ago been established, but had now been confirmed by the experiments of Mr. Cownley as well of those of Mr. Shenstone. Hence the importance of observing that the sulphuric acid employed in toxicological investigations in cases of suspected poisoning by strychnia should be absolutely free from nitric compounds.

The next paper read was on—

THE PHARMACOPŒIA TEST FOR THE PURITY OF QUININE SULPHATE.

BY B. H. PAUL, PH.D.

The paper is printed on p. 653, and gave rise to the following discussion:—

Professor ATTFIELD wished to ask Dr. Paul how he obtained his pure sulphate of quinine for his experiments. He presumed that he did so by the fractional crystallization method.

Dr. PAUL said that was the plan which he had adopted. He might mention that it was an exceedingly tedious plan, and though it was too late to go into details he might state that about five recrystallizations were requisite in order to reduce the quinine to such a state that the ether test gave no indication of cinchonidine.

Professor REDWOOD said that he must admit that the statement of Dr. Paul had taken him, to a great extent, by surprise. He was not aware and was very much surprised to find that quinine was capable of exerting so remarkable an influence upon the solubility of quinidine or cinchonidine by its simple presence, as appeared to be the case. There was no doubt that the test given in the Pharmacopœia was founded upon a knowledge of the relative solubility of the two alkaloids in their separate state, and that it was supposed that test would be sufficient to indicate the presence of comparatively small quantities of the alkaloid quinidine, as it had been originally called, with the quinine. The test certainly might, without altering its nature, have been made much more strict than it really was, as Dr. Paul had stated; but when it was considered that, in bark, quinidine, or cinchonidine, was constantly present with quinine; that the difficulty of completely separating them was very great, and that this result had not hitherto practically been attained; and when it was considered that chemical manufactures were in a progressive state, and that at the period when the Pharmacopœia was framed, manufacturers were not in the habit of getting their sulphate of quinine in so great a state of purity as was the case at the present time, they might be able, probably, to make due allowances for the fact that the test at the present time was not found to be all that they might wish it to be. There were many cases which had a direct bearing upon this, with which they had been acquainted for many years, as, for instance, the influence which one kind of oil had by its presence on another oil in promoting its solubility, or one kind of resin in promoting the solubility of another kind of resin, and it would appear that one of these alkaloids was capable of greatly increasing the solubility of the other alkaloid. They were indebted to Dr. Paul for having brought the subject forward, and especially for having suggested a process which promised very good results and would admit of being adopted when a more rigorous and severe test for the purity of quinine was called for.

Dr. PAUL said that he had not lost sight of the fact that this was an age of progress, and that, consequently, greater expectations were entertained with respect to what could be done by manufacturers and druggists than formerly. He would not attempt to suggest that there should be an absolute separation of cinchonidine from quinine in its manufacture for pharmaceutical purposes. He believed that would not only be practically impossible, but not desirable, since it would enhance the price enormously. At the present time, when there were so many extravagant notions about adulteration which were apt to cause inconvenience, he thought it desirable that some means should be taken to draw a distinction between the presence of a large amount and a small amount of impurity. There could be no doubt that between the two limits which he had mentioned there was a margin of very considerable importance in a pecuniary sense.

The meeting was then adjourned till the 7th of March.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, Feb. 1, 1877, Professor Abel, F.R.S., President in the chair. After the minutes of the previous meeting had been read and confirmed, the following names were read for the first time:—Messrs. E. Hunter, F. C. C. Hewett, W. Terrill, A. Kininmont, J. Borland, W. H. Griffiths, and G. A. C. Pearce. Messrs. Arthur Gaved Phillips, and Ferdinand Kopfer, were duly elected Fellows after their names had been read the third time.

The President then gave notice that it was intended that the Fellows should dine together on the 20th March, and that they would shortly receive invitations. After the anniversary meeting, a special general meeting would be held to consider the regulations for admission to the Associateship of the Society, and also an alteration in the form of obligation which the Fellows sign on entering.

The first paper was by Dr. H. E. Armstrong, "On Kekulé's and Ladenburg's Benzene Symbols." The speaker, after pointing out that although Kekulé's symbol had been used almost exclusively up to the present time, Ladenburg's "prism" formula merited more consideration than it had hitherto received, said that these two symbols were in accord in representing benzene as a symmetrical compound, *i. e.*, in which the six hydrogen atoms were of equal value. This consideration was supported not only by the fact that no isomeric mono-derivatives of benzene had ever been obtained, but also by direct experimental evidence; for whichever hydrogen atom in benzene is displaced by the group OH, we always obtain the same phenol, as shown in the decomposition of the different oxybenzoic acids and similar reactions. With regard to the di-derivatives of benzene, there is no ground for supposing that more than three isomeric forms can exist; and in this respect also the two symbols are identical with regard to the number of such isomerides which they indicate. It has been urged that one of the chief reasons for the adoption of Kekulé's symbol is that the formation of additive compounds is readily explained on the supposition that when a molecule of a halogen unites with benzene, two adjacent carbon atoms united by a double affinity, each unite with an atom of halogen, and thus remain united to one another only by a single affinity. Ladenburg's prism formula, however, lends itself to a similar explanation with this difference, that it is the opposite carbon atoms in the ring, previously united by a single affinity, which unite each with a single atom of halogen, and at the same time cease to be directly united. After some observations on the difficulty of explaining the nature of the quinones, and on the influence a group exercises on others occupying the ortho- or para-position relatively to it, which could not be satisfactorily accounted for by the use of Kekulé's symbol, whilst Ladenburg's prism formula offered a possible explanation, the speaker expressed his opinion that the term para, as applied to the di-derivatives of benzene should be limited to those which were capable of yielding but a single tri-derivative, whilst those which gave rise to two and to three isomeric tri-derivatives, should be called ortho- and meta- derivatives respectively. This nomenclature, being founded on experiment, was independent of any theoretical considerations as to the so-called "position" of the substituted groups. At present, although all known facts are in accordance with the supposition that the six carbon atoms in benzene and its derivatives are united in a closed chain, we do not in the least know in what manner the atoms are united; for this reason the simple hexagon now almost universally employed to represent benzene, was preferable to the graphic formula consisting of 6 Cs, united in a hexagon by single and double lines alternately.

The President said they were all much indebted to Dr. Armstrong for the lucid manner in which he had discussed the relative value of the two graphic representations of benzene employed by Kekulé and by Ladenburg.

Dr. Odling said that it was the custom of the Society not to publish communications of a purely theoretical character, but he hoped that in this instance the publication committee might be induced to depart from the rule, so that they might have the benefit of perusing Dr. Armstrong's useful *résumé* in the Society's Journal. He quite agreed with the speaker that the evidence was overwhelming as to the existence of but a single mono-derivative of benzene of each kind; also in rejecting that form of expression for quinones which represented them as containing oxygen united with oxygen; it was in the highest degree improbable that this could be the case, considering how totally different they were from those bodies which like the peroxides were supposed to contain oxygen united with oxygen. With regard to the employment of the symbols 1 : 2, 1 : 3, etc., he thought them preferable to the terms ortho, meta, and para; as these were employed in very different senses: Körner, for instance, who might be regarded as the most prominent representative of aromatic chemistry, used them in a very different sense from that in which they were ordinarily regarded. Moreover, there were numerous benzene compounds which at one time had been regarded as ortho, but were now considered para or meta, and the reverse might be said of bodies formerly regarded as para or meta. For his own part he was in the habit of associating the various di-derivatives with the typical compounds resorcin, pyrocatechin and hydroquinone; for instance, those which could be converted into or were related to resorcin he distinguishedby the prefix reso- and so on.

Dr. Wright thought they ought all to be thankful to Dr. Armstrong for the trouble he had taken in collating facts relative to these two symbols. There was an objection to the use of the terms meta and ortho in connection with the benzene derivative inasmuch as they had long ago been applied to distinguish two of the phosphoric acids, the meta being obtained from the ortho acid by the abstraction of water; but nothing of the kind occurred in the case of the benzene compounds. He quite agreed with the speaker that these symbols should not be taken to represent any relative position of the atoms in benzene.

Dr. Odling said he might perhaps be permitted to remark that the term meta was first used by Graham to indicate that metaphosphoric acid still contained water, phosphoric anhydride being, at that time, regarded as the true acid; and he had advocated the view that those acids which had the full amount of base or basic water should receive the prefix ortho.

Mr. Kingzett made some observations on the benzene ring: he said that although for many purposes it was useful to regard the six carbon atoms in benzene to be united so as to form a closed chain, yet it could scarcely be said that the experimental proofs were absolute. On the other hand, he prefered to use line formulæ to the so-called ring formulæ, for while starting with certain bodies and operating upon them by definite means, we could predict in some measure the nature of the products, we still know little more than, that in such bodies as benzene, so many carbon are united with so many hydrogen atoms. Although with the doubtful exception mentioned by Dr. Odling, no isomeric monoderivatives of benzene had been obtained, yet it was not equally easy to substitute all the hydrogens in benzene as certain particular ones. Moreover, it must be remembered that whereas certain groups might replace hydrogen in benzene without distruction of the general structure, the products were often of a nature profoundly different to the original benzene, and even to comparable bodies in which the substituted groups was of a different kind. In connection with this subject, phenose or hexatomic benzene alcohol $C_6H_6(OH)_6$ presented some interesting characters. It was discovered by Carius, and might be regarded as benzene to which six hydroxyles had been attached; in fact, it was directly comparable to hexabrombenzene $C_6H_6Br_6$. Phenose appeared to be a true sugar, and undoubtedly differed from other sugars only in its constitution. The speaker had found that in certain reactions acetic acid could be substituted for sugar, and it was worthy of observation that if the formula of acetic acid be tripled, it is the same as that for sugar taken empirically. One conceivable formula for certain sugars was—

CH_2OH, CHOH, COH, COH, CHOH, CH_2OH.

and how far this represented the truth he and Dr. Hake had proposed to determine by ascertaining the extent to which these hydroxyles were removable. The speaker concluded by stating that in his opinion structure formulæ were to be accepted to a large extent as true only of bodies which were known to behave in particular ways in particular reactions. That is to say, the structure was rather a surmise from the reaction, and as the nature of the reaction varied with circumstances, so also the structural formulæ to be inferred might vary. In fact, it was absolutely impossible to write down a formula for a single substance and say that was its structural formula, harmonizing with all its known reactions; for teaching purposes, however, Kekule's system was useful.

Dr. Armstrong in reply to a question put by Dr. Odling, as to the difference in solubility in alcohol between ordinary potassic benzoate and that recently prepared by the action of alcoholic potash on benzoic aldehyde, first observed by Gregory, said that he did not know of any explanation of the fact. As regarded the constitution of phenose, it was not by any means satisfactorily established that it had the formula assigned to it by Carius.

Mr. Kingzett replied to Dr. Armstrong that Rosenthiel had investigated the nature of phenose, since the time of Carius's researches, and had somewhat confirmed the conclusions of the latter. For the speaker's argument, however, hexabrombenzene served all the purposes, of course, of phenose; and it was worthy of remark, that in the text-book of Dr. Armstrong on organic chemistry phenose was classed without apparent reservation among the sugars, and no doubt was there expressed about its formula.

The next paper was by Mr. W. H. Perkin, "On the Formation of Coumaric and of Cinnamic and of Other Analogous Acids from the Aromatic Aldehydes." The author, after adverting to a preliminary notice on the subject, read before the Society in 1875, gave a brief account of some of the numerous substances he had obtained. He found that on boiling benzoic aldehyde with acetic anhydride and sodium acetate, an action took place with formation of an acid, which after purification was found to be identical with cinnamic acid. When sodium propionate and propionic anhydride, were substituted for the acetate, phenyl-crotonic acid, $C_6H_5.C_3H_4.COOH$ was obtained. It crystallizes in fine colourless needles which melt at 82°-84°C. Phenyl-angelic acid, $C_6H_5.C_4H_6.COOH$, was prepared in a similar manner by the employment of butyric anhydride. It crystallizes in needles which melt at 101°C. With succinic anhydride, an acid was obtained having the same composition as phenyl-crotonic acid, but very different in properties; it has been named isophenylcrotonic acid. Experiments were made in a similar manner with other aldehydes, namely, cuminic, cinnamic, anisic and methyl-salicylic, which gave rise to sixteen other acids. It was found that the calcium salt of cumenylacrylic acid, obtained from acetic anhydride and cuminic aldehyde, when heated to 90°-100°C. absorbed an atom of oxygen, and was converted into the calcium salt of a new acid, which is now under investigation. Cumenyl-acrylic acid also, when treated with sodium amalgam in the presence of water, takes up a molecule of hydrogen, giving rise to a crystalline *hydro-cumenyl-acrylic acid*, which melts at 70°C. Cumenyl-acrylic acid when gently boiled undergoes decomposition, carbonic anhydride is eliminated, and a hydrocarbon $C_6H_4(C_3H_7)(C_2H_3)$, *isopropylvinylbenzene* is formed. It is an oil boiling at 195°-200°, and possessing a fragrant aromatic odour. The *methyl-paroxyphenyl-crotonic acid*, obtained from anisic aldehyde and propionic anhydride, under similar circumstances gave rise to anethol $C_6H_4(OCH_3)(C_3H_5)$, whilst the corresponding acrylic and angelic acids gave rise to the homologous compounds $C_6H_4(OCH_3)(C_2H_3)$ and $C_6H_4(OCH_3)(C_4H_7)$. By heating methylsalicylic aldehyde with acetic, propionic, and butyric anhydrides respectively, in presence of the corresponding sodium compounds, three acids were obtained, namely, *methyl-orthoxyphenacrylic acid* or *methyl-coumaric acid*, $C_6H_4(OCH_3)C_2H_2.COOH$ *methyl-orthoxyphenyl-crotonic acid* $C_6H_4(OCH_3)C_3H_4.COOH$, and *methyl-orthoxyphenyl-angelic acid* $C_6H_4(OCH_3)C_4H_6.COOH$. The methyl salt of an acid having the same composition as the first of these acids (methyl-coumaric acid) is obtained when the sodium derivative of coumarin, prepared by boiling it in alcoholic solution with sodium hydrate, is heated at 100° C. with methyl iodide. On saponifying the ether, it yields an acid isomeric with methyl-coumaric acid, and melting at 88°-89°. The author calls it a *methyl-orthoxyphenyl-acrylic acid*. This methyl salt when heated at 150° C undergoes isomeric change, and now, when saponified, yields an acid fusing at 182°-183°, identical in all respects with that obtained from methylsalicylic aldehyde and acetic anhydride. The fusible acid itself, also, when heated to its boiling point passes into the isomeric modification of higher fusing point. The author described numerous salts of the various acids also the iso-chlorides and the amides, and concluded with some theoretical considerations as to the manner in which the acids are formed in this reaction, and their probable constitution.

Communications, Letters, etc., have been received from Messrs. Clifford, Piper, Green, Warren, Brown, Chorley, Starke, Fairlie, Ellinor, Slipper, Reynolds, Smith, Long, Baker, Jevons, Rheum, Kino, Dispenser, Inquirer, Molar, Gelosa, D., Z.L.

INCOMPATIBILITY AS APPLIED TO MEDICINE.*

BY FRANCIS W. E. MOINET, M.D., F.R.C.P.E.,

Lecturer on Materia Medica and Therapeutics at the Edinburgh School of Medicine.

My reasons for choosing incompatibility as applied to medicine for the subject of a few remarks are twofold, viz:—first that there appears to me to be very frequently a good deal of confusion, or diversity of opinion, both on the part of prescriber and dispenser, as to what the term really means and to what it ought to be applied; and secondly, to notice briefly the causes of this confusion, and then to try if some conclusion can be arrived at to guide to a correct understanding of the term.

No doubt all are aware what the word means in common parlance, viz., opposed to, or incapable of combined or harmonious action, and the disagreeable results that sometimes occur, when, for instance, the tempers of two individuals possess this quality. Well, in chemistry the meaning is somewhat similar when the term is applied to two or more substances which are not capable of being united in solution without liability to decomposition or other chemical change, very often with the result that a precipitate is thrown down.

While then this is what is generally meant by incompatibility in every-day language and as used in chemistry, I wish to have it remembered that it is very often wrong when applied to medicine, because with the progress of chemistry and the advance of our knowledge of physiology and the action of medicines, if the word is to be retained, and I see no reason why it should not, its meaning must be extended and better defined, otherwise endless mistakes will be made and greater confusion arise in the future.

Another cause, to my mind, of this confusion, especially among students is, and it is one for which to a certain extent I must blame myself, that lecturers on materia medica seldom discuss the subject, on account of want of time,—at least I speak for myself, —and also that works on materia medica either pass it over entirely or treat it very cursorily and imperfectly, simply giving a list of the more important chemical incompatibles at the end of the notice of each drug, but not a word as to the *rationale* of their incompatibility. Besides it will be found that as a rule the majority of the incompatibles mentioned are never by any chance likely to be prescribed together on account of any fitness they have for each other in their therapeutical relation to meet the requirements of the physician; so that they are only apt to confuse the beginner, and even if he remembers them it is a needless waste of trouble. Students are thus left to shift for themselves as best they can, to trust to their memories, or to get some knowledge of the subject in their practical work; and although no doubt this knowledge is better than none, still it is meagre and unsatisfactory at the best, unless they can give the "reason why" of their opinions.

Some, on the other hand, understand the term in a purely chemical sense, which was the old method, viz., to condemn as incompatible all substances which form a compound insoluble in water. But this, as we shall see immediately, is too limited a view to take of the subject. Still I do not wonder that this remained the prevailing idea so long, and even yet continues to be so with some Because if the dispenser's knowledge is to be confined simply to the chemistry of materia medica, the preservation, purity, and preparation of drugs, as it long was, he naturally looks no further than presenting as nice a looking mixture as possible, taking no heed what are the probable objects for which it is to be given, or to fulfil what indication it has been prescribed, so long as it does not infringe the laws of his chemical knowledge. But now that more is expected from the dispenser of drugs, and rightly so I think, and as your own body have for some time believed and acted upon that belief, a knowledge of the action of medicine is required. Hence he must look beyond the bottle and consider if the mixture is incompatible with the known action of the ingredients. It is not necessary that you should know all the uses of a drug, or the diseases for which it may be ordered by the physician, but simply its physiological action and its effects in medicinal doses. And if the mixture is not incompatible with these, it is not incompatible at all in a therapeutical sense, which is the only incompatibility that we have to consider.

Thus it will be seen the meaning of the term is already extended. The chemical definition is no longer sufficient, because although chemical changes take place, it does not by any means follow that the efficacy of the prescription is impaired. The reason why chemical does not necessarily imply therapeutical incompatibility, is that we must take into account the solvent power of the gastric and other intestinal juices acting under the influence of vital force, which cannot be judged by the ordinary chemical laws as manifested in the laboratory of the chemist, as living beings can dissolve, appropriate, and circulate in their fluids substances which to ordinary agencies are most intractable and insoluble. So that, while in chemistry the term has a definite meaning about which there cannot reasonably be a difference of opinion, when applied to medicine the case is different, as it is not then simply a question of chemical ethics; it is not only the condition as to the solubility or insolubility of a medicine that has to be considered, although undoubtedly these are sometimes most important points, but the effect on its activity, that is its action on the animal economy. Hence the reason why the chemical definition is too limited. It may be, and is correct in some instances, that the condition interferes with the action of the prescription, but not in all, and even when it does it is, as it were, only by chance, as the definition does not imply it, nor does it logically follow. Neither can we expect it, as the definition was made without any reference to its application to medicinal compounds as affecting their activity. This is the reason why at the present day in prescription writing chemical incompatibility is so frequently disregarded and must be, and if we wish for examples we have them in plenty in the Pharmacopœia itself. Take for example Pil. Plumbi c. Opio, Lotio Hyd. Nigra and Lotio Hyd. Flava, Mist Ferri Aromat. Vinum Ferri, etc.; also many new compounds or salts are made by the action of incompatibles on each other, as by neutralizing acids with alkalies, and by decomposing salts by strong acids. These are a few instances of chemical incompatibility, and yet they

* Read before the North British Branch of the Pharmaceutical Society, January 31, 1877.

are advisedly made use of together, as thereby the action of the preparation is increased, or new compounds are formed equally or more active than the original substances. So that some prescriptions and preparations are framed designedly to take advantage of chemical incompatibility for the advantage of the patients. Thus a very common prescription is a lotion containing laudanum and subacetate of lead. Then again alkaloids and vegetable infusions containing tannin give precipitates, and for this reason such infusions are sometimes recommended as antidotes in poisoning with the alkaloids; but we know that the tannates are soluble in the gastric juices, and that in this condition their solubility is only a matter of time, their action being delayed only for a very brief space which is taken advantage of to get rid of the poison from the stomach. The tannates of iron are also soluble, but prescribing them in this form can easily be avoided without loss of activity. Then also albuminate of corrosive sublimate, which presents corrosive sublimate in the most insoluble form possible, and for this reason is the best antidote we have for it in case of poisoning with it, has been highly recommended for internal administration as being the preparation most easily borne by the stomach, and its action being mild and certain. So that it will be readily understood that a chemically incompatible mixture may be medicinally active because, although insoluble in the bottle, it may be dissolved in the stomach by the gastric juices, and that if new compounds are formed they may be equally or more active than the orginal substances. Hence before condemning a mixture whose components are chemically incompatible, we must ask ourselves the following questions:—

1. Whether the new product although insoluble in the phial may not be soluble in the gastric juices?

2. Whether as a result of a change, the new compound or compounds be equally active as a medicine?

3. If, in a case of decomposition, the products of exchange are equal in energy to the original substances?

As a general rule, however, we must carefully avoid the combination of substances which may produce unknown or ill-defined compounds or compounds different from those intended, or whose action is different; hence a knowledge of their composition and action must in every case direct us.

It will be seen then that the chemical definition of the term is not sufficiently comprehensive for our purpose, for the reasons I have mentioned, which permit so many exceptions.

But from what I have said it must be not for a moment inferred that I wish to underrate the importance of chemical incompatibility, only that it should be known definitely to what alone it ought to be applied. In point of fact that we should neither underrate, or overrate, but justly appreciate its significance, and a moderate amount of chemical knowledge is quite sufficient to enable us to do so, and prevent us falling into either extreme of avoiding all chemical incompatibles, or disregarding all; because in the former case we should greatly limit our resources in the treatment of disease, while in the latter we might be giving useless or even dangerous compounds. For instance, if we mix acids and alkalies in certain proportions when we wish the action of an acid or alkali, or give the caustic alkalies (Garrod) with preparations of belladonna, hyoscyamus, or stramonium, the effect is *nil*. On the other hand, we may have new compounds formed which we do not want, as calomel with iodide of potassium or hydrochloric acid would be converted, respectively, into the red iodide of mercury and corrosive sublimate; or by adding metallic oxide and acids, which form salts whose properties are often different from either the acid or oxide.

And while the older practitioners attached too much importance to this form of incompatibility, the new school is just a little inclined to rush into the other extreme. This is no doubt due to a kind of reaction which has of late years taken place, and like most reactions is a little apt to be carried too far, namely, to disregard chemical incompatibility almost entirely. This, I need hardly repeat is an error in the other direction, that ought to be most carefully avoided, as it is one fraught with danger to the patient. Thus, for instance, the soluble iodides are incompatible with alkaloids and substances containing them, because the alkaloids are precipitated, and the patient, instead of getting the dose which was intended, may get it all at once, and so serious consequences ensue, *e.g.*, the case related by Wood, in which death occurred from a prescription containing iodide of potassium and strychnine, all the strychnine being taken at the last dose.

This was due to chemical incompatibility, which in this case practically infers therapeutical incompatibility, as the dose was transformed from a medicinal to a poisonous one, and its action for a physician's purpose defeated, not to mention the effect on the patient and the consequence to the rash prescriber. Again in other cases, although the effects may not be so dangerous or startling, the patient may be taking some compound different from what was intended, or an inert preparation, and so if it does no bodily injury, at least it is wasting time and money which are important aids to recovery, and at the same time exposing the ignorance of the physician.

I need not take up your time with further examples of this form of incompatibility, as many will naturally occur to you, and the only thing to prevent us going to either extreme is a knowledge of the proper meaning of the term, based upon a knowledge of those branches of study viz., chemistry, materia medica, and therapeutics, which alone form the proper groundwork for the rational prescribing or dispensing of medicines. When, then, it gradually dawned upon the profession that the chemical definition of incompatibility was too meagre and far from satisfactory, an advance was made in the right direction, and a more comprehensive definition was attempted, termed medicinal incompatibility, viz., not suitable to be prescribed together without interfering with their chemical composition or medicinal activity. This definition is also, however, too absolute for our purpose, because, as we have seen, chemical does not necessarily imply therapeutical incompatibility; and secondly, that one substance may interfere with the medicinal activity of another, and so assist the action of the prescription instead of retarding it. This being one of the reasons for the combination of remedies, to lessen or to increase their action or to correct some disagreeable or hurtful property, or even to change their action entirely by the formation of new compounds. And while this certainly interferes with their activity, at least with one kind of activity, it does not necessarily defeat the purpose for which it was prescribed, provided always such results were calculated upon beforehand.

The next question is then, Can the action of remedies be interfered with when in combination in any other way than by what is due to opposing chemical properties? If not, chemical incompatibility when it defeats the purpose of a prescription would be the only form.

This, however, is not the case. So that we must, to understand the terms properly, see what a definition ought to embrace if it is a complete one and logically correct.

To do this we must look beyond the prescription and see for what purposes it has been written,—that is, its action. The neglecting to do this is one of the reasons that we hear the term incompatible so much more frequently employed by the younger members of our profession; but as with increase of knowledge and experience they begin to ask themselves the reason why of many of their former opinions as to incompatible mixtures, they find that they will not bear scrutiny, because they now bring to bear upon them not only their chemical knowledge, but also their knowledge of the action of remedies, and have two questions to answer instead of one, viz., If it is an instance of chemical incompatibility, is it also one of medicinal, or as it is sometimes called, physiological or therapeutical incompatibility? If not it cannot be fairly condemned, although in some cases without any sacrifice of its utility, the chemical incompatibility might easily have been avoided.

But although the ingredients of a mixture may not be chemically incompatible, yet their physical properties may be such as to interfere or defeat the intended operation, and that without any chemical change taking place. What, in fact, Dr. Paris calls an error in the mechanism of the prescription, and which has generally been regarded as more inconvenient than dangerous, more fatal to the credit of the practitioner than to the ease of the patient. But they are not always harmless.

Examples of this condition are not uncommon. Thus pills, in consequence of ill-assorted ingredients, may be so hard as to be perfectly useless, or substances may be ordered in pills, which will not retain their form, or mixtures may be given that will not pour out of the bottle, or substances may be ordered in powder which liquefy when triturated together, or liquids ordered of such different specific gravities that they separate into distinct layers on standing. Such then are a few examples of the condition, and which is certainly not free from danger. So that not only the chemical but also the physical properties of certain substances may be a bar to their action, either by not presenting them to the system in a condition favourable to their action, or in a condition not suitable for administration by preventing proper mixing of the ingredients and so altering the dose either to a smaller or larger one than is wanted; in the latter case with the chance of the usual effects of an over-dose. For these reasons a prescription or preparation may be an example of a form of incompatibility which may be termed pharmaceutical in contradistinction to chemical, and be due to the physical properties of the substances used.

But even supposing a prescription complies with the rules of chemical and pharmaceutical compatibility, there is another question which occasionally must be considered owing to the advance of our knowledge of the action of medicines, viz., their antagonistic action, which is so well marked, for instance, in the case of the action of atropine, the active principle of belladonna, and physostigmine, the active principle of calabar bean. It was first pointed out by Dr. Fraser that under certain conditions as to dose and time of administration the one would ward off or prevent the fatal action of the other, and for this reason their actions on the animal economy are said to be antagonistic or opposite, and so the full activity of either is prevented. This will be understood better if we look at the antagonism of atropine and physostigmine as seen in their action on the pupil.

Thus, the iris, which is a thin coloured membrane hanging behind the transparent cornea, and which gives colour to the eye, is perforated at its centre by an aperture, which aperture is circular, and is termed the pupil. The muscular fibre which composes the iris is arranged in two groups, one arranged in a ring round the pupil, which is the muscle that causes contraction of the pupil and diminishes its size; the other muscle has its fibres arranged at right angles to the former, and is termed the dilator muscle of the pupil. Now suppose we apply a little belladonna to the eye, what is the result? Dilatation of the pupil very speedily occurs, due to its stimulating the nerve fibres which supply the dilator muscle and paralysing the nerve fibres which supply the circular fibre of the iris or contractor muscle. If, on the other hand, we apply a little physostigmine to the eye exactly the opposite effect is produced, namely, contraction or diminution in the size of the pupil, due probably to its paralysing the nerve fibres which supply the dilator muscle and stimulating those which supply the contractor muscle. In this way their actions on the pupil are exactly opposite or antagonistic.

And what is seen to take place in regard to their actions on the pupil takes place to a certain extent in regard to their action on other parts of the nervous system.

Thus also with the action of aconite and digitalis on the heart, the one depresses and weakens its action, the other stimulates and strengthens its action, so that if given in certain doses and within certain limits of time, the one will restrain the action of the other, and the heart will remain unaffected. This antagonistic action is not due, remember, to any chemical change, but to their actions on certain parts of the nervous system being of an opposite nature, and so neutralizing each other; that is, what are termed the dynamical or vital properties of remedies, as distinct from their chemical or physical, are incompatible.

This then is an incompatibility of a third kind which although not so frequently met with as the others, must receive its due share of attention if we are to look at the subject in its completeness.

This antagonistic action, however, may be taken advantage of and be of service to the physician; as, for instance, in an overdose of aconite, which endangers life by its depressing action on the heart, by the timely use of digitalis a fatal result may be warded off.

A case was related in the *British Medical Journal*, December, 1872, by Dr. Dobie, in which recovery took place after the ingestion of one ounce of

Fleming's tincture of aconite due to hypodermic injection of digitalis.

Thus also chloral hydrate acts in cases of poisoning from strychnine. So that even this antagonistic action is not in all cases a barrier to the employment of such remedies together, as these combinations may be of great service by fulfilling indications in the treatment of disease, and examples are not infrequently met with in nature. This is one reason why in certain cases active principles do not always represent entirely the action of the crude drug. Thus rhubarb contains a purgative and an astringent principle, which principles are undoubtedly to a certain extent antagonistic in their action. But in this instance the astringent matter is only present in such a small proportion as to modify, not defeat, the action of the purgative principle or principles, and this combination renders rhubarb such a valuable remedy in certain cases, as its action is not apt to be severe. Take also a very common and useful prescription, laudanum and castor oil, where the same principle is made use of for the treatment of certain intestinal derangements.

So that you see that all rules apparently must have exceptions, and such is certainly the case with those regarding incompatibility. But looking at the subject as we have done, thus briefly, it will be understood that incompatibility may be of three kinds when applied to medicines, viz:—

1. Pharmaceutical.
2. Chemical.
3. Physiological, therapeutical or medicinal.

The first by reason of their physical properties; the second by reason of their chemical properties, and the third by reason of their dynamical or vital properties interfering with the action by which a prescription or preparation might be curative or salutary, its activity being lessened, increased, perverted or entirely annulled.

Or we may put it another way, namely, that the action of a prescription may be interfered with by pharmaceutical, chemical or physiological incompatibility, all of which propositions are included in the following definition:—

Not suitable to be prescribed together on account of their activity being interfered with by their *physical*, chemical or dynamical properties.

If then I have been successful in making the subject of incompatibility at all clearer, I hope at the same time that I have made it equally clear, that the only way either for prescriber or dispenser to avoid falling into the error of prescribing or dispensing incompatible mixtures is a knowledge of chemistry, materia medica and the action of drugs, otherwise it is impossible for him to understand the subject, as it ought to be understood by those who are licensed either to prescribe or dispense. And it is a knowledge for ignorance of which we can be justly held responsible, and a knowledge that is inseparable from the art of either prescribing or making a useful preparation.

The discussion which followed the reading of this paper will be found on p. 679.

PRESENCE OF CINCHONIDINE IN THE QUININE SULPHATE OF COMMERCE.

BY B. H. PAUL, PH.D.

The accompanying table gives the details of the results I have obtained in the analysis of nine samples of the quinine sulphate prepared by various manufacturers. The samples were in all cases tested to ascertain the amount of crystallization water by drying at 212° F. in a weighing glass capable of being perfectly closed as soon as it was removed from the steam-bath. If this precaution be taken the salt remains anhydrous, but if contact with the atmosphere be permitted some water is rapidly absorbed by the anhydrous salt.

The plan adopted for separating the cinchonidine sulphate was to recrystallize by dissolving four or five grams of the salt in 80 to 150 cubic centimetres of boiling water and after cooling to filter off the liquid, which was then shaken with sufficient ether to leave a distinct layer undissolved. On the addition of ammonia solution in excess, the alkaloid separated was in most instances only partially soluble in the ether; with the samples containing least cinchonidine the whole of the alkaloid was at first dissolved by the ether, but after the lapse of a few hours the cinchonidine was deposited in the form of crystals which were collected on a filter and weighed.

The quinine sulphate separated on cooling the hot solution was again recrystallized in the same way as at first, and the mother liquor was treated as before with ether and ammonia. In this way a further quantity of alkaloid insoluble in a moderate proportion of ether was obtained, and by repeating the recrystallization of the salt a third time another smaller quantity was obtained. The mother liquor obtained by a fourth recrystallization gave no evidence of cinchonidine so far as treatment with ether was capable of indicating its presence.

The first six samples were taken from sealed ounce bottles of which only No. 3 had been previously opened. In all these instances the amount of crystallization water was not much different from that normally appertaining to the salt, viz: 14·45 per cent. The smaller amounts of water in the samples No. 7, 8, and 9 were probably due to some degree of efflorescence, since these samples had been for some time exposed to the air. So that making allowance for this circumstance the proportions of cinchonidine sulphate in the original salt would be somewhat less than those stated as the result of analysis.

Apart from the loss attending the operation, the amounts of cinchonidine sulphate indicated by these results are to be regarded as in all cases minimum amounts inasmuch as some cinchonidine still escapes separation by ether.

No. 1. Contained 15·05 per cent. water.
Five grams taken—

1st	crystallization from 150 c.c. gave	·185	gram insoluble alkaloid	=	·214	gram dry cinchonidine sulp.	= 4·28 pr. ct.
2nd	" " 100 " "	·110	" " "	=	·127	" " " "	= 2·54 "
3rd	" " 100 " "	·050	" " "	=	·058	" " " "	= 1·16 "
4th	" " 100 " "	*nil*					—
Total		·345	insoluble alkaloid.			Dry cinchonidine sulphate	7·98 "
						equal to Crystallized salt	9·19 "

British Pharmacopœia test gave no indication of insoluble alkaloid.

No. 2. Contained 15·51 per cent. water.
Five grams taken—

1st crystallization from	150 c.c. gave	·255 gram insoluble alkaloid	=	·295 gram dry cinchonidine sulp.	=	5·9 pr. ct.
2nd „ „	100 „ „	·07 „ „ „	=	·081 „ „ „ „	=	1·62 „
3rd „	not continued					

Total ·325 insoluble alkaloid. Dry cinchonidine sulphate 7·51 „
equal to Crystallized salt. 8·64 „

British Pharmacopœia test gave no indication of insoluble alkaloid.

No. 3. Contained 14·9 per cent. water.
Five grams taken—

1st crystallization from	150 c.c. gave	·17 gram insoluble alkaloid	=	·197 gram dry cinchonidine sulp.	=	3·94 pr. ct.
2nd „ „	100 „ „	·007 „ „ „	=	·008 „ „ „ „	=	0·16 „
3rd „ „	100 „ „	·005 „ „ „	=	·0058 „ „ „ „	=	·12 „

Total ·182 insoluble alkaloid. Dry cinchonidine sulphate 4·22 „
equal to Crystallized salt. 4·86 „

No. 4. Contained 15·04 per cent. water.
Five grams taken—

1st crystallization from	150 c.c. gave	·15 gram insoluble alkaloid	=	·174 gram dry cinchonidine sulp.	=	3·48 pr. ct.
2nd „ „	100 „ „	·08 „ „ „	=	·093 „ „ „ „	=	1·86 „
3rd „ „	100 „ „	·025 „ „ „	=	·029 „ „ „ „	=	0·58 „

Total ·255 insoluble alkaloid. Dry cinchonidine sulphate 5·92 „
equal to Crystallized salt. 6·81 „

No. 5. Contained 14·2 per cent. of water.
Five grams taken—

1st crystallization from	150 c.c. gave	·039 gram insoluble alkaloid	=	·045 gram dry cinchonidine sulp.	=	0·9 pr. ct.
2nd „ „	100 „ „	·004 „ „ „	+	·0046 „ „ „ „	=	·09 „

Total ·043 insoluble alkaloid. Dry cinchonidine sulphate ·99 „
equal to Crystallized salt. 1·14 „

No. 6. Contained 15·15 per cent. of water.
Five grams taken—

1st crystallization from	150 c.c. gave	·13 gram insoluble alkaloid	=	·150 gram dry cinchonidine sulp.	=	3·00 pr. ct.
2nd „ „	100 „ „	·007 „ „ „	=	·008 „ „ „ „	=	0·16 „
3rd „ „	100 „ „	trace				—

Total ·137 insoluble alkaloid. Dry cinchonidine sulphate 3·16 „
equal to Crystallized salt. 3·64 „

No. 7. Contained 13·67 per cent. water.
Four grams taken and crystallized—

1st crystallization from	80 c.c. gave	·12 gram insoluble alkaloid	=	·139 gram dry cinchonidine sulp.	=	3·47 pr. ct.
2nd „ „	70 „ „	·04 „ „ „	=	·046 „ „ „ „	=	1·15 „
3rd „ „	70 „ „	·01 „ „ „	=	·011 „ „ „ „	=	0·28 „

Total ·17 insoluble alkaloid. Dry cinchonidine sulphate 4·9 „
equal to Crystallized salt. 5·64 „

No. 8. Contained 8·1 per cent. water.
Five grams taken and crystallized—

1st crystallization from	100 c.c. gave	·14 gram insoluble alkaloid	=	·16 gram dry cinchonidine sulp.	=	3·2 pr. ct.
2nd „ „	100 „ „	·035 „ „ „	=	·04 „ „ „ „	=	0·8 „
3rd „ „	100 „ „	·022 „ „ „	=	·025 „ „ „ „	=	0·55 „

Total ·197 insoluble alkaloid. Dry cinchonidine sulphate 4·55 „
equal to Crystallized salt. 5·24 „

No. 9. Contained 10·37 per cent. water.
Five grams taken and crystallized—

1st crystallization from	100 c.c. gave	·09 gram insoluble alkaloid	=	·104 gram dry cinchonidine sulp.	=	2·08 pr. ct.
2nd „ „	100 „ „	·095 „ „ „	=	·11 „ „ „ „	=	2·20 „
3rd „ „	100 „ „	·05 „ „ „	=	·058 „ „ „ „	=	1·16 „

Total ·235 insoluble alkaloid. Dry cinchondine sulphate 5·44 „
equal to Crystallized salt. 6·26 „

JAPANESE MEDICINE AND PHARMACY.*

The peculiar geographical position of Japan, together with its intimate and for many centuries exclusive intercourse with China, have been the means of transplanting many branches of knowledge and various useful arts from the latter country to the former; among these, Japanese medicine is entirely based upon Chinese authorities, and although European science, thanks to the enlightened liberality of the present Government, is gradually making progress, the bulk of the native practitioners still adhere to the old tenets.

Tradition speaks of a time when there existed a native Japanese system of medicine, but no traces have remained of it, and for more than 2000 years all medical and pharmaceutical knowledge of the Japanese has been derived from Chinese sources. The latter, contrary to what might be expected from the copiousness of literature in other branches, are exceedingly few and scant, and consist mainly of these two works:

1. The *Shookánron* ("Doctrine of the Febrile Diseases,") which was composed about 350 B.C., by Tchoochúke, the Chinese Hippocrates.

2. The *Kinki* ("Golden Chest"), which treats of all diseases excepting fevers.

But it must not be supposed that the Japanese practitioners were exempt from the natural tendency to opposition, which in more civilized countries has showered upon us a harvest of "pathists" too long to enumerate; on the contrary, in olden times already there arose a schism between the followers of the fever-theory of the Shookánron,† and the champions of the other school, which recognized both works. The former, who were specialists in our sense of the word, maintained that the treatment of all diseases, febrile or otherwise, may be learned from their authority, while the latter, being more progressive or liberal, acknowledged the authority of both, and even ascribed the authorship of the Kinki to Tchoochúke himself.

Besides these two principal works, the liberal school recommend a number of other Chinese books for the study of medicine, the importance or authority of which is considered to increase with their age. The principal ones are:

1. *Somon*, that is, "Catechism of Soko," an omniscient deity, who gives answers to questions put to him by Hoanti, the son of Hohi,‡ on human diseases. It is interspersed with philosophical, physiological, and anatomical disquisitions.

2. *Réissu* ("Holy Centre"), likewise very old, and of similar contents.

3. *Honzo*, a materia medica of more modern origin, about 200 years old; it treats of the remedies arranged according to the three kingdoms of nature, giving a description of their physical and external forms and characteristics, and an account of their therapeutic use. Besides those remedies, which are used in China exclusively, some others, not Chinese, are treated of in this work, as opium, asafœtida, gentian, sal ammoniac, etc.

4. *Ungekiron*, a treatise on pestilence, about 200 years old; of much inferior authority.

Chinese books of less age than about 200 years are looked upon as devoid of all authority, and in general no work is adopted as a standard until it has stood the test of time in China for several generations.

The introduction of European medical science into Japan, which met with but little success before the beginning of the century, may be said to have begun with the labours of Dr. von Siebold, who, with the consent of the Japanese Government, instructed a number of natives privately in natural history, and who also succeeded in introducing vaccination into Japan in 1824. His labours were continued by his successors at Desima until the Government established a regular medical schoo, at Nagasaki in 1857, which was followed by another at Ozaka in 1872; the latter, however, was afterwards incorporated with the medical department of the University at Tokio. But, although much progress has been made to disseminate European medicine among the medical practitioners of Japan, it is useless to expect much improvement until the learning generation shall have taken the place of the practising one.

It has been stated that the main source of knowledge of materia medica is the Honzo. But in reality there are three works, which supplement each other, and of which the first may be termed Honzo—κατ' ἐξοχήν.

1. *Hon-zo-ko-moku* (Chin. *Pun-tsao-kang-muh*).
2. *Hon-zo-ko-moku kei mi.*
3. *Yamoto-hon-zo.*

The first is originally a Chinese work, begun at the command of the Emperor Kea-tsing, by the celebrated Le-she-chin, and after his death completed by his son, in 1596. It is very voluminous, consisting of fifty-two portions, generally bound in forty volumes, with two or three volumes of maps. The first two parts contain an introduction and general practical rules on therapeutics: parts 3 and 4 give a general summary of remedies, part 5 describes various forms of water, part 6 those of fire, part 7 the earth, part 8 the metals and gems, parts 9 and 10 minerals in general, part 11 saline minerals and salts; parts 12 to 38 describe medicines derived from the vegetable, and parts 39 to 52 those derived from the animal kingdom. The maps contain about 1200 figures. It describes altogether 1890 remedies, and is said to be a compilation from more than 800 authors on materia medica and medicine, executed by order of the emperor, and, up to within a short time ago, the recognized official authority. The first Japanese edition appeared at Yeddo in 1714, being edited by Ina Wakasui.

The second of the above-named works, Hon-zo-ko-moku kei-mo ("The Honzokomoku's Obscurity Dispeller"), is a commentary on the first work, composed by the well-known Japanese botanist, Ono Ranzan, and published in 1804, simultaneously at Kioto and at Yeddo; again in 1847. His descriptions are remarkably accurate, and his work may be considered as a pharmacognosy of Japan. It consists of 48 parts, generally divided into 31 volumes.

The third work, the Yamoto-hon-zo was composed in 1709, by Kai-Bara, and printed in Kioto. It is a handbook of the natural history of Japan, and of purely Japanese drugs. It makes no allusion to therapeutics. It consists of sixteen parts in eight volumes, with a supplemental volume, and a volume of botanical plates, which, however, like those of the Hon-zo-ko-moku, are often very inaccurate.

The system of native medical education hitherto in vogue, and still followed in Japan, is based on a sort of apprenticeship; one class of pupils entering the house of their preceptor as "free" scholars, but paying for their education and support; another class entering the service of their preceptor, and for the sake of the instruction received or expected, doing all sorts of menial offices, as compounding medicines, bathing the sick, acting as errand boy or nursery-maid, etc. The "free" scholars may devote their whole time to study, generally pay an entry fee of ½ rio,* and offer presents every six months. All pupils must possess the necessary preliminary knowledge, which consists in being able to read and write Chinese fluently, to know Chinese history, and to be able to make prose and poetical compositions in Chinese. As all the standard medical works are written in Chinese, and only such a course of study as the above mentioned can give sufficient knowledge of this language, no student can be exempted from it. The pupil must be at least sixteen years of age when entering. He is at once given the

* From *New Remedies*, January 15, 1877.

† The translation of the Shookánron, without comment, would scarcely fill 100 octavo pages.

‡ The reputed founder of the Chinese empire.

* 1 rio = \$1.05; 1 rio = 4 bu (itzebu); 1 rio = 50 momme; 1 momme = 10 fun.

Shookánron for study, which, as before stated, is the exclusive authority of the Old School (Kohō), while the disciples of the New School (Kōsse, post mundane) have to study also the other standard works.

The practical or clinical instruction consists merely in the permission to be present during the consultations or visits of the teacher, who never gives explanations of his diagnosis, but whose manners, mode of manipulation, demeanour, and consolatory discourse, must be acquired by mute observation and unaided imitation. At the end of such a *séance*, the teacher dictates to one of the pupils, whose special duty this is, a number of receipts, with number and name of patient, into a large prescription-book, which is generally copied by all the pupils. The amanuensis also prepares every prescription, at which occasion he proceeds with a great deal of leisure, as it is considered more conducive to the reputation of the physician to have patients detained in his house for a long time, such as half a day or more. At the end of two years' instruction, the pupils are declared competent, when the "free" or paying scholars generally go to Tokio (Yeddo), or Kioto (Miako), or Nagasaki, for further study, while the "bonded" pupils have to give their services as assistants for another year to their instructors.

It would lead us too far to give here an account of their theories and speculations regarding the origin and division of diseases, or their explanation of the mode of treatment. Suffice it to say that their chief observations are made upon such symptoms as call for the employment of any of their four chief classes of remedies: diaphoretics, cathartics, emetics, and narcotics.

Most of their remedies are of vegetable origin, the most important, according to the Honzo, being the following:

Nindjin, a species of carrot, valued as a panacea, and sold at the rate of about eight dollars per ounce. It is cultivated in Japan, but, like many other remedies, must be sent first to China and then reimported, to be of value. It must be administered in very large doses, whence only the rich can afford to be "cured" by it.

Buschi, root of *Aconitum Chinense*, used in paralysis and generally all nervous diseases.

Natural pearls, whole or powdered, used in ophthalmic affections.

Bear's bile, considered nearly equal to nindjin, and very expensive.

Musk and *camphor*, important nervine remedies.

Goo, or dried bullock's brain; a favourite remedy in infantile convulsions.

Retengai, pieces of decayed human skulls, considered of value in the treatment of phthisis.

Tatsuno otoschingo ("Posthumous Son of the Dragon") are dried salamanders, being the principal remedy in infantile marasmus and diarrhœa.

Sad-juzu (*Atractylodes lancea*), and

Biaku-juzu (*Atractylodes nova*), are both much used as antifebrile remedies.

Kobusi (*Cyperus rotundus*), used as diaphoretic and antispasmodic.

Biwa (*Eriobotrya Japonica*), important prophylactic against summer complaints.

Nindoo (*Lonicera Japonica*), universal remedy against skin diseases. A decoction of it is used externally.

Botan (*Paconia moutan*) is considered abortive. It is, however, not used as such, but is forbidden to be eaten by pregnant women.

Boscho (*sodium sulphate*), used as cathartic.

Daio (rhubarb), the principal cathartic and laxative; termed "the king of all remedies;" only *daio* is believed to be powerful enough to expel all poisons from the body.

Kuatté (powdered flowers of a species of melon), used, in large doses, as emetic.

Mao, a graminea, used in decoction as diaphoretic.

Opium has been introduced in more recent times.

Much used are besides: *Hakko* (*Mentha piperita*), *Dsio* (*Melissa*), *Uikio* (*Pimpinella anisum*), *Seisin* (*Asarum Canadense*), *Intsin* (*Artemisia capillaris*), *Dokkatzu* (*Aralia edulis*), *Nikkei* (*Cinnamomum Loureiri*), etc.

The form in which remedies are exhibited is considered to be of great influence upon their effect. They are mostly compounded according to general directions contained in the Shookánron and Kinki, only modified by leaving out, substituting, or adding certain articles, for special purposes.

Decoctions are the most common form of administration; they are generally prepared by the patient or his attendants, from material furnished by the physician, and unless specially interdicted by the latter, always prepared with the addition of ginger, "which is considered to guide them to their appropriate place in the body." Other common forms of remedies are confections, prepared from honey and vegetable powders; suppositories, already recommended by the standard old authorities; powders, and pills; ointments, prepared from mutton-tallow, oil, and vegetable powders; and plasters, prepared from litharge, oil and turpentine.

Medicines are generally weighed, the more costly ones always; ordinary remedies are often measured out with little spoons. But this is always done in the physician's "dispensary." There are no apothecaries in Japan, only dealers in simple drugs, or certain standard compounds, which are sold to the people at large, or to physicians, who alone know how to compound a complicated recipe. The necessary remedies for sudden emergencies are carried by every practitioner in the *Inroo* ("stamp-keeper"), a box containing four compartments, and carried on a string fastened to the girdle over the right hip. In one of these compartments must always be contained a mixture termed *Kitzuke* ("recalling power"), consisting of storax, honey, musk, camphor, cloves, terra japonica, incense, etc. This is given in all dangerous attacks, as syncope, angina pectoris, convulsions, palpitations, etc. Another compartment contains dried bear's bile, which is also considered as highly effective in convulsions and other diseases. The other two spaces are filled according to the practitioner's own fancy.

The choice of remedies depends upon the result of the diagnosis. The latter is made chiefly from an examination of the pulse. A skilful physician is expected to correctly recognize and prognosticate the disease, without oral inquiries, merely from an examination of the pulse. The medical authorities contain a minute and detailed exposition of the variations of the pulse and its relations to various diseases, and show in this particular, as in many others, much relationship to the systems of medicine in vogue among the ancient Hindus and Greeks.

In the following we append a summary of the contents of parts 5, 6, 7 and 8 of the Japanese Pharmacopœia contained in the Honzo.*

Rain-water (especially collected during spring), lake-water, dew-water, moon-water (collected under the rays of the moon on a metallic mirror), hoar-frost water, snow-water, hail-water, ice-water (among other uses recommended, mixed with Ama-sake, for "Katzenjammer"), bambus-water, water drained through old roofs (considered poisonous, used as an antidote for mercurial poisoning, or against rabies), river-water, well-water (considered injurious, and avoided for the preparation of tea, which becomes dark coloured), well-water collected on the first day of the first month, or the second day of the second month, etc., sweet water from Mino and Omi, water containing bicarbonate of calcium (niyu ketsu), warm mineral water (no less than two hundred and forty-nine mineral springs are known to exist in Japan, some of these of considerable richness in important therapeutic constituents), sea-water brine (used in scabies), spring-water from rocks, putrid water collected about old posts,

* Cf. *Mittheil. d. Deutsch. Ges. f. Natur-u. Völkerkunde Ost-Asiens*, No. 3, Yokohoma, 1874.

water from corpses (collected by placing empty cups into the coffins, and withdrawing them after the decomposition of the cadaver (used internally in mania, and also externally), water through which snakes have passed, vinegar-water (prepared by allowing a decoction of millet and awa to undergo fermentation), condensed water (from rice-boilers), water boiled in copper kettles, grindstone-water, pigsty-water (antidote against poisons), water in which new-born infants have been washed, rain-water collected in empty bladders ("the patient must not know the *origin* thereof"—which caution we should imagine would be applicable to many other remedies in their catalogue), and various others. The succeeding part of the work contains an account of various forms of fire and agents for combustion: male fire (actual burning fire), female fire (all phenomena of phosphorescence, or luminousness without actual flame), fire produced by friction of wood (supposed to be only obtainable from *Retinispora obtusa*, or *Hinoki*, and *Meliosma rigida*, or *Yama biwa*), wood-charcoal, charcoal of various kinds of wood (much used in large lumps or logs, for the absorption of noxious vapours or effluvia in houses); moxa-fire (the leaves of *Artemisia Chinensis*, pounded and dried and placed upon affected portions of the body, where they are ignited; moxas are much in use as counter-irritants, and in rheumatic or gouty diseases); actual cautery (highly esteemed in rheumatism; it consists of round or square iron plates of about three square inches, with a central handle); lamp-fire, burnt wicks, native coal, petroleum (sekinoyu; besides the usual industrial applications, it is used for preparing a special kind of lampblack, which is said to give to the better grades of Japanese and Chinese India inks their peculiar lustre), soot. Then follow: sulphur (two, crude or sublimed), rock-crystals, amethyst, river sand, quartz, agate, chalcedony, opal, obsidian, pumice (decoction in diabetes), arrow-points from the stone period of Japan, and a number of petrefactions.

It would have led too far to mention all the diseases for which these various remedies have been used; but at a future occasion, should we find space to continue the *résumé* of the contents of the Japanese Pharmacopœia, we shall add the necessary therapeutical remarks, when deemed of interest.

ELIXIR OF MONOBROMATED CAMPHOR.*

BY M. DAMBIER.

The complete insolubility of monobromated camphor in water appears to forbid the idea of administering it in the form of a syrup. But in consequence of such a preparation being occasionally ordered in prescriptions, the author was induced to make some experiments that have led him to recommend an alcoholic syrup. 40 grams of powdered sugar are dissolved by the aid of heat in 60 grams of 56° alcohol, the solution filtered if necessary, and then 50 centigrams of monobromated camphor are dissolved by the aid of heat in the clear liquor. The preparation can be flavoured to suit the taste.

The readiness with which camphor and bromine combine to form a definite compound suggested to the author to try the experiment of effecting the combination in the presence of the syrup. The result, pharmaceutically, was not satisfactory, but the author states the therapeutic effects obtained with this syrup were such as to encourage him in prosecuting the investigation; at the same time he published his method of operating. 0·204 gram of camphor was heated until dissolved in a flask with about 8 grams of 90° alcohol, and into this 0·392 gram of bromine was poured, drop by drop. 100 grams of simple syrup were then added gradually, with agitation after each addition. The syrup became slightly turbid and reddish yellow towards the end of the operation. Upon applying heat the colour disappeared as the temperature rose, until at boiling it was perfectly limpid and colourless. As it cooled, however, it became slightly opalescent, and flocks of camphor floated on the top; upon agitating, these easily mixed with the rest of the liquid, or the liquid became again limped upon reheating it. The author seems to think that in this mixture there is no combination between the bromine and camphor, but that probably the camphor is held in solution by hydrobromic acid.

* Abstract from paper in *L'Union Pharmaceutique*, vol. xvii., p. 354.

A NEW APPLICATION OF THE DIALYTIC PROCESS.*

BY R. ROTHER.

In the article on "The inverse synthesis of the so-called tasteless iron compounds" (*American Journal of Pharmacy*, April, 1876), the writer pointed out the important fact that in particular cases of colloidal compounds the endosmotic current is the most prominent feature of the movement. On such occasions the inward course of the outer liquid appears to be the only force of the phenomenon, since exosmosis prevails so feebly that practically its effect reduces to zero. The rapidity of the endosmotic current gives promise that a new development of this interesting and remarkable process will lead to great advantages in numerous and important pharmacal operations. This peculiarity presents a new means of concentrating solutions where the absence of heat is not only desirable, but often imperative. In its practical bearing this method of transcendental filtration presents a wide range of application, which must be classified, however, as entirely distinct from the present sense, and the theoretical action in which the process is usually considered. The residue, technically termed the diffusate, is, according to the original idea of this process, a solution of the diffused substance. The residue of the new modification differs from the diffusate proper in the particular that it practically contains nothing originally introduced into the dialyser, but that it simply represents that portion of the original outer liquid which refused to pass inwards through the membrane. Therefore, according to the new construction, the process resembles filtration more closely than its primitive process from which it is derived. In some instances it is even more rapid than ordinary filtration. Absorption in this operation corresponds with volatilization in the usual method of concentration by the means of heat. As the action of heat produces undesirable and often destructive changes in many substances, even at the lowest possible degree, the process of dialytic filtration must naturally commend itself on all such occasions, where its application is available. If the point of a parchment dialysing cone containing a concentrated solution of a strongly colloidal substance be immersed in a dilute solution of a crystalloid, the superabundant water of the latter is more or less rapidly absorbed into the dialyser, leaving, after due action, the solution of the crystalloid in its utmost concentration. It is possible that this process may become useful in the industrial production of alkaloids, where in the usual method large volumes of water must be expelled by means of heat, the action of which, in many cases, greatly reduces the yield by the generation of inert modifications or worthless disruption products. This process, with its accompanying apparatus, is more congenial to the surroundings of modern pharmacal laboratories in which the routine is less interspersed with the manipulation of distrustful retorts, precarious capsules, and fuming crucibles of the empiric era. It would be hardly proper to designate this process by dialysis, since that term specifically denotes an operation not exactly similar. Absorption does also not strictly convey the true meaning of its action; however, in case the new process should prove itself of such general value as the first indications seem to promise, a more appropriate term will readily be found.

* From *The Pharmacist*, January, 1877.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 17, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE METRICAL SYSTEM IN PHARMACY.

THE fact that of all civilized nations those speaking the English tongue stand alone in their attitude towards the Metric System of Weights and Measures appears to be just now forcing itself upon the attention of the United States public, and especially upon our pharmaceutical brethren in that country. The subject appears likely to come before Congress in the present session, in connection with a petition that has received the signatures of upwards of eleven hundred leading men in all professions, so that the publication of the report of a Committee discussed by the American Pharmaceutical Association at its last meeting is very opportune. And as the movement that appears to be gathering force rather rapidly on the other side of the Atlantic cannot be without influence in this country, it may be as well to glance briefly at what is there taking place.

The report above referred to recommended among other courses an appeal to Congress for compulsory legislation on the subject, but the speakers in the discussion seem to agree that for this step the time had not yet arrived, and that it would be necessary first to further educate and familiarize the public mind as to the nature of the system; it was therefore referred to the Committee to report again at the next meeting. But some of the other parts of the report indicated the directions in which it was thought desirable that work should be done. It was proposed to appoint a standing committee of three members, whose duty it should be to invite the cooperation of other associations; to request authors of papers to adopt the metric system or else to add the metric equivalent to ordinary statements of weights and measures; to secure the teaching of the metric system and its inclusion among the subject matter of examination for admission and for graduation in schools of pharmacy; and to urge upon chemical and pharmaceutical manufacturers to aid by adding metric equivalents to the weights stated on the labels of their original packets and vials, and adopting at their earliest convenience metric instead of avoirdupois quantities in putting up their products in small original packets and vials. The report also stated that the method already adopted in the most advanced pharmacopœias was to employ parts by weight only, and that this plan had the advantage of being adjustable to any system and proportion of weights.

Of course the arguments are not all on one side, and many objections have been started that will have to be met. In fact, in 1870 the national convention for revising the United States Pharmacopœia gave definite instructions to the Committee to which it entrusted the work to abandon measures of capacity in the Pharmacopœia, and to express the quantities in all formulæ, "both in weight and in parts by weight." But the Committee found that this would "involve changed proportions in almost every formula" and that the carrying out of the necessary experiments "would entail so much expenditure of time, labour and cost," that it decided to disobey its instructions as impracticable. Thus this preliminary project, designed presumably to facilitate the introduction of the metric system, fell to the ground.

In order to attempt to combat the tendency of persons long accustomed to write or read prescriptions for liquids by measure to over-estimate the difficulty attending the use of terms by weight, Professor MAISCH, in an article written for the *Philadelphia Medical and Surgical Reporter*, and copied into this Journal (before, p. 352), pointed out that any difficulty was easily over come by bearing in mind the specific gravity of the liquid, and that by taking the ounce as 30 grams and multiplying that number by the specific gravity a result is obtained in grams of the metric system sufficiently approximate for practical purposes, the variation being quite within the limits of error in ordinary measurements of liquids. The conversion of solid grains into grams might also be effected with sufficient exactness, he argues, by dividing by 15.

The practicability of this suggestion has been disputed by Dr. BLODGETT, of Boston, on the ground that it would be a burden in prescribing and that probably few doctors would care to adopt so laborious a system. He adds that the impression most physicians follow in prescribing is that of the volume of the liquid, and asserting "that this principle finds a ready and simple application in the metrical system as employed in the larger universities and hospitals of Europe, where this system is in use, as well as in the hands of scientific men generally of those countries," expresses regret that Professor MAISCH has overlooked this fact.

Professor MAISCH, in a long reply read before the Philadelphia College of Pharmacy at its last meeting, admits that measures are at the present time more frequently employed than weights in chemical assays, but demurs to the discussion as to the use of the metric system in prescriptions being mixed up with the manner in which that system is employed in the arts and sciences. The latter part of Dr. BLODGETT'S allegation he completely denies, and proceeds to prove his proposition, that "the pharmacopœias of continental Europe and the prescriptions of physicians of those countries express all quantities by weight only, whether the material directed be solid or liquid." This he does very successfully by quotations from European pharmacopœias and standard works on pharmacy. The same proposition is true in reference to Mexico and Cuba, whilst the States of Southern America, having no pharmacopœias of their own, adopt those of other nationalities.

It is obvious that before much progress can be made in impressing Congress an agreement must be arrived at as to what is to be asked for. We learn that the movement has two very strong opponents in Washington, Professor HENRY, who is at the head of the Smithsonian Institute, and Professor PIERCE, who is chief of the United States Coast Survey. Moreover, the Chairman of the House of Representatives Committee on the subject is said not to have his interests enlisted on the side of the metric system. But as this gentleman is described with characteristic bluntness by Dr. SQUIBB as being put into that position because there was no other place for him, the place he wanted not being available, it is to be hoped that something may "turn up" more consistent with his tastes.

THE BRISTOL PHARMACEUTICAL ASSOCIATION.

THE Honorary Secretary of the Bristol Pharmaceutical Association has just issued an announcement of arrangements which not only must be received with satisfaction by its own members, but is likely to command the envious regard of those of kindred societies. The Bristol Library and Museum will be remembered by those who attended the Pharmaceutical Conference of 1875 as the institution in which the meetings were held; the Library contains more than 40,000 volumes of scientific and general literature, and the Museum ranks high amongst provincial museums. By the courtesy of the Council arrangements have been made under which all Members and Associates of the Bristol Pharmaceutical Association will be at liberty, upon showing a ticket, to study everything within its walls, with the exception of the contents of the news room. As, however, they will not be able to remove anything from the premises, an effort is being made to collect a small number of works on professional subjects to be placed in the same room, but to be available for home study. A collection of pharmaceutical objects is also being formed in the Museum.

As lectures upon chemistry and botany and laboratory instruction upon practical chemistry are now presented at the University College, Bristol, and at the Trade and Mining School, the Council of the Pharmaceutical Association does not itself provide or recommend any special course, but encourages students to attend those already provided by the offer of several prizes for competition during the coming summer.

The Council is also able to announce three occasional lectures to be delivered in the Inner Library of the Bristol Museum. The first of these, on "Chemical Synthesis," by Dr. W. A. TILDEN, was delivered on Friday of the present week, the second by Mr. H. S. THOMPSON, of University College, Bristol, on "Atoms and Particles," is to be delivered on the 16th of March, and the third by Dr. E. A. LETTS, of the same College, on the 20th of April.

MEETING OF THE TRADE AT EDINBURGH.

IN accordance with an announcement that has recently been circulated a meeting of pharmaceutical chemists and chemists and druggists was held on Tuesday evening, under the auspices of the Chemists and Druggists' Trade Association, at 5, St. Andrew's Square, Edinburgh. The objects of the meeting were to place before the chemists and druggists of the country a statement of the claims of the Association upon them, to urge the necessity for combination, as well as to consider whether a North British Branch of the Association should be formed and what support should be given to the Association from that district. The chair was taken by Mr. GEORGE BLANCHARD (of RAIMES, BLANCHARD and Co.), and we are informed that the number attending the meeting was between twenty and thirty, including deputations from other towns. The chief speaker was Mr. BARCLAY, of Birmingham, and the proceedings, which do not seem to have been very animated, were concluded within an hour. Reference was of course made to the correspondence published in the report of the Council's proceedings last week, and as will be seen by Mr. BARCLAY'S letter on another page, the assumed misconstruction of Mr. HAYDON will be explained by him next week.

SCHOOL OF PHARMACY.

THE Courses of Lectures on Chemistry and Pharmacy, and Materia Medica and Botany, in connection with the Pharmaceutical Society's School of Pharmacy, 17, Bloomsbury Square, will recommence on Thursday, March 1st. Students who have but a limited time at their disposal will find the ensuing five months to be a favourable time for studying at the School; for between the 1st of March and the 31st of July they will have the opportunity of not only attending in the Laboratory and at the usual Courses on Chemistry and Pharmacy and Botany and Materia Medica, but also the Summer Course on Systematic and Practical Botany, at the Royal Botanic Society's Gardens, in Regent's Park.

THE PHARMACY OF PRECIOUS STONES.

IT was only a few months since that Europeans who followed the trial of the Gaikwar of Baroda for attempting the life of the British Resident at his court, had an opportunity of speculating as to the poisonous properties that resided in diamond dust, which it was alleged was one of the means by which he hoped to attain his end. According to the *Pall Mall Gazette* this potentate, who has now retired from business, is still pursuing his researches upon the virtues of precious stones; but this time, as the experiments happen to be made upon a person for whom he has more love—himself—the gem is varied. Having a very high opinion of the medicinal virtues of the ruby his ex-highness is said to be now attempting to repair his constitution by a course of what possibly, in a lithic Pharmacopœia, might be termed Pulvis Rubini, which he takes sprinkled over cakes. Experiments are also being made with the powders of other precious stones, incorporated with confectionery, possibly as Trochisci. It is not surprising to learn that this kind of pharmacy, which is carried out by native cooks, is rather expensive. It is to be hoped, however, that the article supplied is of the "nature, substance, and quality" demanded by the purchaser, though in this country the presence of a compound of alumina in either food or drug would be certified as evidence of adulteration by some public analysts.

ETHER TIPPLING.

THE *Lancet* reports that the greater capability of ether to intoxicate at the same cost as compared with alcoholic liquids, is favouring its consumption in certain parts of the North of England, where a large amount of ether drinking at present goes on.

MEDICINE IN BURMAH.

IT is stated that in Burmah surgeons and surgical operations are unknown. Physicians, however, are divided into three classes,—those who treat diseases with mineral or vegetable medicines; those who trust chiefly to diet; and doctors who proceed by spells and incantations. Usually the "physician" is paid so much a visit, the fee ranging from eight annas (1*s*.) to five rupees (10*s*.). Sometimes, however, the system of "payment by results" obtains, and the Burmese witch doctor thus shakes hands with the South Kensington Science Teacher.

THE SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of the above Association will be held at 17, Bloomsbury Square, on Wednesday evening, February 28th, 1877, at eight o'clock (instead of on Thursday, the 22nd inst.), when a paper will be read by Mr. C. J. MEAD, on "The Radiometer—what it is, and a few facts connected with it."

MR. JAMES BAYNES, jun., Pharmaceutical Chemist, has been appointed Public Analyst for Hull.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

The fourth meeting of the present session was held in the Society's rooms, 119A, George Street, Edinburgh, on the evening of Wednesday, January 31. Mr. William Gilmour, President of the Branch, in the chair. A paper was read: "On Incompatibility as Applied to Medicines," by Dr. F. W. Moinet, Lecturer on Materia Medica, Edinburgh School of Medicine. At the conclusion of the paper a discussion took place, the chairman, Messrs. J. B. Stephenson, Howie, McAlley, and Mackay taking a part.

Mr. J. B. Stephenson referred to a case recorded in the *Pharmaceutical Journal* some time ago, illustrating the incompatibility of strychnine with alkalies, and mentioned that he had recently met with a similar case in a mixture which he had dispensed containing tincture of nux vomica and liquor bismuthi. In both cases the strychnine had been precipitated, and the last two or three doses, containing the whole of it, had caused decided symptoms of strychnine poisoning. He (Mr. Stephenson) had made it a rule, since this happened, to label every mixture containing these ingredients—"Shake the bottle."

Mr. W. L. Howie said that he had listened with much pleasure to Dr. Moinet, and would just allude to his remarks on lead and opium lotion. The doctor had said that "both the new substances formed had medicinal values," and he (Mr. Howie) feared this remark might lead some dispensers to omit filtration which he knew was a common practice. Such a lotion made with acetate of lead and laudanum would contain in solution acetate of morphia and excess of acetate of lead, while meconate of lead would be precipitated. He thought it desirable that the lecturer should indicate whether in his opinion this meconate of lead should be filtered out or allowed to remain in the lotion.

Dr. Moinet replied that because a medicinal agent was chemically insoluble, it did not follow that when taken into the stomach or applied externally it was physiologically inert. Very many such substances were soluble in the fluids of the stomach or were absorbed by the skin and the specific effects produced. He illustrated this by reference to tannate of iron, and this meconate of lead was another illustration. Yet the tannate was an extremely inelegant mode of exhibiting iron and should be avoided, since so many other salts were available; and while he considered meconate of lead in the lotion in question had medicinal value, he thought it would be better to so arrange the proportion of ingredients that no precipitate would be produced.

The Chairman (Mr. Gilmour) remarked that Dr. Moinet's paper was not only appropriate but practical and as much adapted to a medical audience as to a pharmaceutical one—for, considering the three different classes into which the doctor had divided the incompatibles, it was not an uncommon thing to meet with instances of each in prescriptions brought to the dispensary. In the case of one of the mechanical mixtures, for example, and especially of the mixtures that were even at the best disagreeable and ungainly, the endeavours of the dispenser to make it appear as elegant as possible, not only frequently ended in failure, but perhaps produced a mixture which, if the prescription were presented at another establishment, could not be imitated, and this not unfrequently was the cause of a little annoyance between customer and dispenser. Referring to the class of chemical incompatibles, Mr. Gilmour remarked that one of the most difficult points which the dispenser had often to determine as to the changes which took place in such mixtures was, Were these changes foreseen and intended by the prescriber? As an instance he referred to a prescription which he had frequently dispensed and which quite belonged to a class specially referred to by the doctor, viz., iron and certain vegetable infusions, only this prescription was tincture of iron and tannic acid, the product being a compound chemically and physically like writing ink. The principal difficulty here lay in the unseemliness of the mixture, but the case was even more grave and difficult with regard to the mixture referred to by Mr. Stephenson, where strychnine was precipitated by the action of liquor bismuthi on nux vomica. In this respect, he (Mr. Gilmour) fully indorsed Dr. Moinet's sentiments with regard to the responsibility both of prescriber and dispenser. It was not in the endeavour to avoid any of this responsibility, or out of any querulous spirit towards the medical profession that he had touched upon these points, but simply to show some of the difficulties which the conscientious and faithful dispenser had daily to meet and overcome. Mr. Gilmour briefly alluded to the third class of incompatibles where the number of ingredients made it difficult to note the chemical changes, or to imagine what the therapeutical action might be.

Mr. Mackay remarked that in his experience of prescriptions he had noticed a marked difference between those of English and Scotch practitioners. In the composition of his prescription, the English medical man studied taste and appearance as well as effect, while, on the other hand, the Scotch paid most attention to the latter; but he (Mr. Mackay) was glad to notice a marked improvement in this respect.

Dr. Moinet confirmed Mr. Mackay's statement in this respect, and in noticing Mr. Gilmour's remark about the number of ingredients, he stated that a prescription containing fifteen different articles had lately been brought under his notice.

On the motion of Mr. Stephenson, seconded by Mr. Mackay, a vote of thanks was awarded to Dr. Moinet for his interesting and instructive paper.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The fourth meeting of the session in connection with the society was held in the Manager's Library of Anderson's University. Mr. Daniel Frazer in the chair. After the usual preliminary business had been disposed of, the chairman called upon Dr. A. T. Machattie, F.C.S., etc., who delivered the second lecture of his short course on "Modern Chemistry."

After a short reference to the subject of his former lecture, more particularly with regard to modern views of the history of the earth, the lecturer proceeded to give a general sketch of the characters of the elementary bodies found on the earth, and already, to some extent at least, in the other members of the solar system. It was shown that various sciences are in some instances more interested in certain groups of elements than in others. Thus mineralogy must take cognizance of all. Geology is more occupied with those which occur widely diffused and in large quantity, as hydrogen, oxygen, carbon, silicon, sulphur, phosphorus, potassium, sodium, calcium, magnesium, and aluminum. Botany and zoology are again more interested with the characteristic elements of living beings, and so on. Some peculiar features of the principal elements of living beings viz.: carbon, hydrogen, nitrogen, oxygen, sulphur, and phosphorus were then referred to, as for instance, nitrogenous compounds, their instability, as evidenced in the protein group; their action on the animal system, as in the case of the alkaloids, prussic acid, etc.; their extreme decomposibility, as in guncotton, fulminates, nitro-glycerine, iodide and chloride of nitrogen, etc., etc.; their atomic complexity in the protein group, as affording immense possibilities of internal atomic change, without alteration of actual composition, thereby rendering these nitrogenous compounds eminently fitted for the various and constant changes in the organs of living beings. Under this head reference was made to the light which Graham's discovery of the colloid and crystalloid conditions of matter threw on many physiological problems, and a short description given of what was understood by the dynamical and statical conditions of matter. After a sketch of the general uses of the principal elements in the mineral, vegetable, and animal kingdoms, the lecturer concluded by stating that, at the last lecture, more attention would be paid to the individual characters of the elements than to their functions in nature.

At the close of the lecture, the President made a few remarks, and after some intimations had been made by the secretary the meeting was brought to a close.

LIVERPOOL CHEMISTS' ASSOCIATION.

The members of this Association held their thirteenth Conversazione on the 18th of January, at the Royal Institution, Colquitt Street. There was a large attendance, more than four hundred members and visitors (principally ladies) being present. A very excellent and interesting evening's entertainment was provided, and it has been pronounced the most successful conversazione yet held by the Association.

After the reception of the visitors by the President and Council, half an hour was devoted to a musical entertainment, which was ably rendered by some volunteers under the direction of Mr. John Hodgson. After this there was a promenade in the museums, where numerous objects of scientific interest were exhibited, to which the following gentlemen contributed:—Several members of the Microscopical Society of Liverpool; Mr. A. H. Samuel had charge of an exhibition of electrical instruments and appliances, and he ably explained the various experiments performed; Mr. G. F. Chantrell exhibited the patent electric pen; Mr. E. Davies, F.C.S., the spectrum of gallium, the new element; Mr. C. H. Stearn, an improved Sprengel pump (to which was attached a radiometer), invented by himself; Mr. J. T. Armstrong, F.C.S., a model geyser, and experiments illustrating ground air currents; Dr. Symes, specimens of toughened glass, the process of manufacture of which he popularly explained; Mr. Anden practically illustrated the art of chromo-lithography; Mr. A. H. Mason, F.C.S., exhibited vortex rings; Messrs. Symes and Co., chemical apparatus, etc. Messrs. Doulton and Co., art pottery; Messrs. Elkington and Co., works of art in electro-plate and bronze; Messrs. Abraham and Co., scientific instruments and electrical appliances; Messrs. Brown, Bell, and Barnes, photographic novelties; Messrs. Chadburn and Son, scientific instruments, graphoscopes, stereoscopes, etc.; Messrs. Austin and Co., magnetic indicators; Messrs. Fearnall and Co, model of the Minerva printing machine.

At nine o'clock the chair was taken in the lecture theatre by the President, Mr. A. H. Mason, F.C.S., who welcomed the guests in the name of the Council, and thanked those gentlemen who were assisting, for their liberal and voluntary aid. He spoke of the objects of the Association, and the work it had accomplished. He thought Liverpool was behind other large towns in her provision of such entertainments, and the large attendance present assured him that if the different learned societies of the town combined, and a substantial annual grant was made from the corporate funds, a highly scientific Conversazione might be held in some much larger building, which would be looked forward to by many by whom it would be appreciated. The President then introduced the lecturer, Mr. W. E. Bickerdike, F.C.S. (of Church), who delivered a popular chemical lecture on

"The Atmosphere," illustrated by numerous experiments, of which the following is a syllabus:—Introduction—Nature of the Atmosphere—An Ocean of Gas—Coloured Gases—Weight and Elasticity of the Atmosphere—Balloon Ascent—Principle of the Air Pumps—Barometer—Air, a vehicle for Sound—Organ Pipe with Hydrogen—Formation of Cloud and Dew—Chemistry of the Atmosphere—Composition of Air—Nitrogen Gas and its Properties—Oxygen Gas—Combustion—Burning of Metals—Spontaneous Combustion—Nature of Respiration—Carbonic Acid Gas—Vitiated Air—Trade Winds—Breathing of Plants—Ventilation—Healthy Dwellings—Conclusion. The experiments all proved most successful, and an admirable lecture was delivered; after which Mr. E. Davies, F.C.S., moved, and Dr. Nevins seconded, a hearty vote of thanks to the lecturer, which was carried with great acclamation.

During the promenade and reception the band of the 1st L.A.V. performed a selection of popular music.

The eighth general meeting was held at the Royal Institution, on the 1st inst. The President, Mr. A. H. Mason, F.C.S., in the chair.

Mr. Thomas Garside, F.C.S., read a "Report on a New Method for the Examination of Mixtures of Methylic and Ethylic Alcohols."

The method was suggested in the *Comp. Rend.*, and Mr. Garside had applied it successfully for the detection of methylated spirit in wood naphtha. He believed the latter was often adulterated and had found that an admixture of 10 per cent. rendered wood naphtha quite unfit for some of the purposes for which it was required. The process was practically demonstrated to the audience.

A discussion followed in which Messrs. Davies, Abraham, the President, and others took part, and an unanimous vote of thanks to Mr. Garside closed the proceedings.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The annual soirée of the above-named Association was held on Tuesday, the 30th ult., in the Town Hall, Birmingham, and there was a brilliant assemblage. The noble hall, which has just undergone complete redecoration internally, could scarcely be seen to greater advantage, the orchestra being beautifully decorated with flags and shrubs in pots, which relieved the scarlet and gold uniforms of a military band.

Hitherto, one of the attractions of the evening has been an exhibition of objects and works of art, illustrations of various processes of manufacture, etc. But by resolution of the Committee the exhibition was this year withdrawn, and every energy was concentrated upon producing a ball upon a grand scale. These efforts were rewarded by a select party of about 300 ladies and gentlemen, who spent a very pleasant evening, producing a good surplus to the funds of the Association.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The half yearly meeting of the members of the Association was held at the Rooms, Halford Street, on Tuesday, the 30th January last. A report was read in which the Committee stated that although unable, as upon some former occasions, to boast of distinctions won at Bloomsbury Square, the work accomplished had been thorough, there having been exhibited a decided desire on the part of the members to become proficient in the various branches of pharmaceutical education. The usual examinations had been held. The marks obtained indicated that the efforts of the teachers had been well appreciated. To excite special interest and diligence, three prizes had been offered for competition, the successful competitors being Messrs. Lewitt, Mason and Charlesworth. The number of ordinary members upon the books was reported to be thirty-one, and honorary, thirty-four.

Four special lectures had been delivered, one by Mr. F. T. Mott, F.G.S., one by Mr. Wells, and two by Mr. J. J. Edwards. The classes conducted by Messrs. Clarke, Hammond, Raynor, Garrett and Edwards had met thirty-eight times. The average attendance during the session had been ten, which was an improvement upon the past. The thanks of the Committee were tendered to Mr. Raynor for his presentation of microscopic slides.

The Report was unanimously adopted.

After the transaction of routine business the members proceeded to elect the committee for the ensuing session, with the following result: Mr. W. Hammond, President; Mr. T. C. Raynor, Vice-President; Mr. J. Garrett, Hon. Secretary; Mr. W. B. Clark, Treasurer; Messrs. C. B. Lomas, W. B. Baron, W. Mann.

The Treasurer's Report showed that the receipts during the half year had amounted to £22 19*s.* 7*d.*, and the expenditure to £11 15*s.* 8*d.*, leaving a balance in hand of £10 0*s.* 3*d.*, in the place of a deficiency of £1 3*s.* 8*d.* that existed at the commencement of the half year.

A programme of lecture classes, etc., extending to the end of July next was also presented.

The opening meeting of the seventeenth session was held on Tuesday evening, February 6, when the President, Mr. Hammond, delivered his inaugural address, at the close of which a unanimous vote of thanks was accorded to Mr. Hammond. Papers were then read by the teachers in chemistry, botany and pharmacy, on their respective subjects. A most excellent address was also given by Mr. W. Clark, and varied readings by Mr. Mann.

Proceedings of Scientific Societies.

NEWCASTLE-UPON-TYNE CHEMICAL SOCIETY.

At a general meeting of the above Society, in the theatre of the College of Physical Science, January 25, 1877, the President in the chair, the following paper was read by the Secretary:—

THE RETARDATION OF CHEMICAL REACTIONS BY INDIFFERENT MATTERS, ESPECIALLY GLYCERINE.

BY DR. G. LUNGE.

The observations described below were occasioned by a number of experiments made on behalf of the Swiss Government, for the purpose of discovering a more reliable method of "obliterating" postage stamps than those hitherto in use. Among the stamping inks I prepared with that intention, there were several with a basis of glycerine, and I soon observed that, if any acids were present in such mixtures, they comported themselves differently to colouring matters than if the same acids were used merely in dilution with water. This led me to make some experiments of a simpler nature, and, although I have been prevented by want of time from following them up very far, and from extending them to that point which a true scientific treatment would require, I venture to lay them in that incomplete state before this society in the hope that they may not be found quite uninteresting, and that perhaps someone else will take the matter up with more leisure than I have had at my command.

My principal experiments were made upon the behaviour of wrought iron (in the shape of wire nails) towards a mixture of glycerine and hydrochloric acid. The hydrochloric acid contained 26·1 per cent. of real HCl, and was mixed with an equal volume of pure syrupy glycerine. Check experiments were always made with the same hydrochloric acid, mixed with the same volume of water. Fuming hydrochloric acid can be mixed with glycerine easily in every proportion; nor does it act upon the latter chemically, at least not at the ordinary temperature, at which all my experiments were performed. Although the formation of monochlorhydrine would seem to be excluded by the very conditions of the experiment, I made sure of it by titrating the mixture before use, and, as may be imagined, I found its percentage of HCl exactly as calculated from the dilution, just as if the diluting fluid had been water instead of glycerine. The acid diluted with glycerine in many cases behaves precisely like that diluted with water; for instance, towards sodium carbonate, calcium carbonate, silver nitrate, sodium hyposulphite, solution of chloride of lime, litmus, etc.; at least, no difference could be noted in the preliminary tests, and it thus seemed unnecessary to make quantitative trials. A difference was, however, noted in the case of paper stained blue by ultramarine. Whilst a strip of it in the acid diluted with water is beginning to be bleached ten seconds after immersion, and has become perfectly white in thirty seconds, another strip, dipped in the acid diluted with glycerine, only begins to be bleached after the lapse of forty-five seconds, and is only thoroughly whitened in four minutes.

The difference is, however, much more decisive in the action of the two acids upon iron or zinc. A bright wire nail (weighing 0·4927 grm.) completely dissolved in 6 c.c. of the acid diluted with water in ten hours' time, apart from a small carbonaceous residue. On the other hand, a nail (weighing 0·4875 grm.) immersed in 6 c.c. of the acid diluted with glycerine weighed—

After 24 hours, 0·4200 = 86·2 per cent. of the original weight.
„ 3 days, 0·2764 = 56·6 „ „
„ 6 days, 0·1405 = 28·8 „ „
„ 14 days, 0·0065 = 1·3 „ „

The solution still contained free acid, and behaved in every respect like an ordinary acid solution of ferrous chloride; for instance, towards precipitating reagents.

In another experiment, there were immersed:—

(*a*) A nail weighing 0·385 grm. in 20 c.c. of acid diluted with water.

(*b*) A nail weighing 0·450 grm. in 20 c.c. of acid diluted with glycerine.

The evolution of gas (similarly to the previous cases) was much stronger in the case *a* than in the case *b*. After the lapse of three hours both test tubes containing the iron and acid mixtures were closed by gas delivery tubes, and connected with graduated cylinders inverted over a pneumatic trough. Eighteen hours later there had been collected from the tube *a* 74 c.c. of hydrogen gas, whilst the iron in it was completely dissolved. The experiment *b* was interrupted forty-four hours after the connection with the graduated cylinder, when only 52 c.c. of gas had been collected, and more than half of the nail was still left undissolved.

The action of the two acids on granulated zinc was much more rapid, but still showed a marked difference. 1 gram. of zinc, with 20 c.c. of acid and water, evolved 200 c.c. of gas in 1½ minutes; 1 gram of zinc with 20 c.c. of acid and glycerine took eight minutes to produce the same result. Other experiments, always with a similar result, were made with iron borings and hydrochloric acid; also with iron borings and sulphuric acid, diluted in one case with four volumes of water, in the other with four volumes of glycerine.

The cause of the retardation of the action upon metals in the case of acids diluted with glycerine can hardly be a purely chemical one, since on the one hand the glycerine is not acted upon, and since, on the other hand, it does not itself act either upon the reagents or upon the product of the reaction. The latter (ferrous chloride) is easily soluble in glycerine, as was proved by independent experiments, and it cannot, therefore, be presumed that the case is analogous to the insolubility of some metals in concentrated acids. Probably the real cause is—at least, partly—the viscosity of the glycerine, which is perfectly apparent even in the mixture with acids. The gas bubbles cannot liberate themselves very quickly from the iron, and thus prevent the contact between it and the acid. This assumption is supported by the fact, that the attack of acid upon iron is much more weakened by dilution with a solution of gum arabic than with pure water, as I found on trying it. But this explanation does not hold good for the retardation of the action of hydrochloric acid upon ultramarine, as well as in several other cases observed by me, and the following experiments do not in any way seem to be compatible with it. If fuming hydrochloric acid, diluted with the same bulk of water, be mixed with a little lamp-black (moistened with a drop of alcohol, to make the acid wet it), and if iron nails are immersed in the mixture, they are so little acted upon, that the evolution of gas is hardly perceptible at all; twenty-four hours after the nail looks exactly as it did at first. But if the mixture be now thrown upon a filter, and the same nail be placed in the acid running through the filtering paper, a strong evolution of gas commences immediately, and the nail is dissolved very soon.

The following quantitative experiments were made with a mixture of 50 parts of glycerine with 30 parts of fuming hydrochloric acid, and 3 parts of lamp-black. A nail weighing 0·536 grm. produced only after some hours a few minute bubbles of gas, and showed the following weights:—

After 3 days, 0·4780 = 89·2 per cent. of the original weight.
„ 6 days, 0·4001 = 74·6 „ „
„ 14 days, 0·2575 = 49·0 „ „

In another experiment, a nail of 0·5766 grm. weighed,

After 3 days, 0·5124 = 88·8 per cent. of the original weight.
„ 6 days, 0·4440 = 77·0 „ „

The experiment was then interrupted by filtering the mixture. In the filtrate, 92 per cent. of the acid could be proved analytically; the remaining 8 per cent. might easily have been lost by incomplete washing of the slimy carbonaceous residue; but in any case there was far more acid in the filtrate than sufficient for dissolving the nail, and, in fact, the same placed in the filtrate at once caused an evolution of gas, certainly only at a moderate rate, as explicable by the presence of glycerine, and by the large dilution with the washing water. Zinc behaved in exactly the same way towards the same mixture.

It does not seem impossible that this retarding action of indifferent substances may find a useful application, both for moderating chemical reactions in scientific operations and in technical operations on the large scale. It would give me great pleasure if this subject were pursued further by some one interested in it, and if a satisfactory explanation of that phenomenon were suggested.

Mr. J. W. Swan made some remarks on the behaviour in treating of a mixture of alcohol and glycerine, and promised a further communication on the subject.

The discussion of Dr. Lunge's paper was postponed till the next meeting.

Mr. B. S. Proctor exhibited a new form of washing-bottle for gases.

PARIS SOCIÉTÉ DE PHARMACIE.

A meeting of the above Society was held on the 8th of January, under the presidency of M. Marais.

M. Stanislas Martin presented to the Society a specimen of Mutambo bark, which he stated was much used in Brazil, and one of Timbo leaves.

A note was presented from M. Beniot, on "The Testing of Chlorate of Potash," the process being based on the conversion of protosalts of iron into persalts by chlorate of potash in the presence of strong hydrochloric acid.

M. Planchon presented a specimen of Hoang Nau, said to be prescribed by the Chinese missionaries against hydrophobia and leprosy. M. Planchon remarked that the bark was very bitter, and had many points of resemblance to false angustura bark; he thought it was probably derived from a strychnaceous plant.

A report of a committee was read proposing that the prefect of the department should be requested to name four streets in Paris after the celebrated pharmacists, Serullas, Gaudichaud, Pelletier, and Caventou.

M. Poggiale gave a sketch of some of the memoirs that had been recently presented to the Academy of Sciences.

Croton Oil Pencils.—M. Limousin read a note upon the employment of croton oil pencils in the treatment of scurf of the head. The pencils are prepared according to the following formula:—

Cacao Butter.	1 part
White Wax	1 part
Oil of Croton	2 parts

Melt the cacao butter and wax by the heat of a water-bath in a small glass flask; then add the croton oil and carefully cork the flask. When the mixture commences to solidify pour it into moulds and put in a cool place.

The pencils are small cylinders, 8 or 9 millimetres in diameter. To prevent volatilization of the acrid principles of the oil they are either covered with pure tinfoil or kept sheltered from the air in metallic cases. It was stated that although the pencils only contain 50 per cent. of croton oil, the revulsive action is much more energetic than when the oil is applied in its natural state, whilst the locality of its action can be more exactly limited.

Parliamentary and Law Proceedings.

Poisoning by a Vermin Killer.

The Deputy Coroner for Brighton has held an inquest at the Sussex County Hospital, on the body of Thomas Wood, who committed suicide by poisoning himself. The landlady of the Rock Inn deposed that she heard a noise in the deceased's room, and on going up found that the door was locked on the inside. The door was broken open, and deceased was found undressed and in bed, and appeared to be in convulsions. After waiting a little while, and finding that he did not get any better, Dr. Scatcliffe was sent for, who ordered his removal to the hospital. The glass and powder produced witness found on the washstand. A letter from deceased to his parents was found, stating his intention of committing suicide, and he had made an entry of his own death in his diary.

Mr. T. Jeeve, chemist, 88, St. James's Street, deposed that he sold a threepenny packet of Battle's vermin killer to the deceased. It contained strychnine.

William Field, senior pupil at the hospital, said that he saw the deceased when he was brought to the institution, and in reply to witness he said he had taken the strychnine in mistake for a seidlitz powder.

Mr. H. Neale Smith, the house surgeon at the hospital, stated that the deceased died about an hour after his admission. Shortly before his death he complained of intense pain in the stomach, and died in a spasm. From a *post-mortem* examination that he had made, he found that the whole of the organs—with the exception of the lungs, which were slightly congested—were healthy, and from the symptoms witness was of opinion that death resulted from poisoning by strychnine.

The jury returneda verdict, "That the deceased committed suicide, but that there was not sufficient evidence to show what was his state of mind."

Poisoning by Santonin.

An inquest was held at Manchester, on Thursday, Feb. 8, by the City Coroner (Mr. E. Herford), on the body of John M'Guinness, aged five years and three months.

The mother said the deceased had been troubled with worms, and on Saturday night, about 10 o'clock, she sent an elder boy to Mr. Sherratt, druggist, 222, Queen's Road, for some worm lozenges. He brought back the lozenges and a powder. Witness was lying on the sofa and the deceased was given the lozenges by his brother, Shortly after, witness went out of the house on an errand. and on returning after an absence of five minutes she found the deceased very ill. A doctor was sent for: The child died in about half an hour afterwards.

Thomas M'Guinness, 17 years of age, son of the last witness, said his mother sent him to Mr. Sherratt's for either lozenges or a powder. Witness first asked Mr. Ramsay, the assistant, for a powder. When he got home, he found his brother lying on the sofa, and his grandmother said he had better give the deceased the powder, and he did so, with about the third of a lozenge. In about a quarter of an hour after the deceased commenced "shivering," and a doctor who was called in administered some medicine.

Mr. A. Ramsay, assistant to Mr. Sherratt, said the last witness asked for a worm powder for a boy five years old. Witness mixed a powder containing a grain of calomel and a grain of santonin. In taking down the bottle containing the latter, he accidentally let it fall, and it broke into pieces. He picked up with a knife sufficient to mix with the calomel. The boy was also served with a pennyworth of worm lozenges. On Monday, Dr. Walker, who had attended the deceased, called at the shop and questioned witness respecting the composition of the powder sold for the child M'Guinness, who he said had died from all the symptoms of poisoning by strychnine. Witness heard nothing of any strychnine getting into the bottle of santonin. Dr. Walker said that the powder was bitter, but calomel and santonin were not bitter. Dr. Walker tasted the powder and found it bitter. Dr. Walker was afterwards ill. Witness, who also tasted the powder, took precautions against anything serious by taking some medicine.

Mr. W. Sherratt said that his assistant told him of Dr. Walker's visit to the shop. Witness called upon him and found him suffering from all the symptoms of poisoning by strychnine. Dr. Walker stated that he had tasted the contents of witness's santonin bottle, which must have contained poison. Dr. Laing and witness did all they could for the sufferer, and during the evening it was found that the symptoms of poisoning had disappeared. All the poisons in the shop were kept separate in a cupboard. Witness had looked at the contents of the santonin bottle and had found crystals which were not santonin. There were strychnine crystals in the santonin in the bottle produced, Witness could only suppose that the wholesale vender had by mistake supplied witness with strychnine instead of santonin.

Dr. Walker said the deceased, when he saw him, was suffering from poisoning by strychnine. He saw no indications of carelessness either on the part of Mr. Sherratt or his assistant.

The jury returned a verdict to the effect that the deceased had been accidentally poisoned by the powder, in which strychnine had been accidentally mixed.—*Manchester Courier.*

Suicide of a Chemist and Druggist.

An inquest was held at Maryport, on the 31st ult., touching the death of Mr. Isaac Elliot, aged 41 years, chemist and druggist.

A servant to the deceased deposed that on the previous evening he came home the worse for drink, and shortly afterwards was found on the floor, unable to speak. Her mistress at once sent her for a doctor.

Mr. James Little said that when he was fetched by last witness he found Mr. Elliot quite insensible; his eyes were fixed, the pupils dilated, and he was in a state of coma. He was just dying when Dr. Pearson arrived. Saw Dr. Pearson pick a bottle off the floor, which he produced. The stopper was out of the bottle. The bottle contained prussic acid diluted; it was four per cent. strength, and that was quite sufficient to destroy life. He believed it was one of deceased's own bottles taken out of his shop. Half a teaspoonful would destroy life in from two to ten minutes. Saw deceased on Tuesday morning at the Athenæum; he seemed then to be in a low, desponding way. He always had the appearance of a man who was in the habit of suffering from depression.

John Elliot said deceased was his brother. Last saw him alive about ten minutes past eleven o'clock on Tuesday night in Crosby Street. He was coming from his shop, and going in the direction of his own house. Asked where he had been that time of night, and he said he had been at the shop. Witness said, "It is rather late to be at the shop at this time of night." He replied, "Yes; I have been for a bottle," and showed it to him. It was about the size of the one produced. Did not ask him what he was going to do with the bottle. He asked witness to go home with him, and he replied, "No, it is far too late; it is time we were both in bed." Bade him good night and they parted.

The jury immediately returned a verdict of "Died from taking prussic acid while suffering from temporary insanity."—*Carlisle Journal.*

Review.

Proceedings of the American Pharmaceutical Association at the Twenty-Fourth Annual Meeting, held in Philadelphia, Pa., September, 1876. Also the Constitution, By-laws, and Roll of Members. Philadelphia: Sherman and Co., 1877.

The arrival of the American 'Proceedings' before the issue of the British 'Year-Book,' the meetings of the two Societies having been held in the same month, is certainly a feather in the cap of the Transatlantic Association, although the delay in this country is due to so unavoidable a cause as the regretted indisposition of the editor. In any case, however, the issue so promptly of this volume, containing upwards of 900 pages, rather larger and about half of them printed in smaller type than those of the 'Year Book,' would be creditable to the proverbial smartness of our American brethren. In the amount of matter it contains it is stated to be the largest volume yet published by the Association.

An engraved portrait of the late Mr. John Milhau, a former president of the Association, adorns the volume as a frontispiece, and there are also three fairly executed lithographic plates, representing the *Rheum officinale*, *Eriodictyon Californicum*, and a group of vesicating insects, besides several wood engravings inserted in the text. The book may be described as being divided into two portions, the first half consisting of a series of reports presented to the Association at its meeting at Philadelphia, and the other mainly of the papers then read and the subsequent discussions. Thus there is the report of the Committee on the Drug Market, including a sketch of a proposed modification of the tariff, which, by the way, would still leave tartaric acid, for instance, chargeable with a duty of 15 per cent., calomel with 30 per cent. of its value, sponges with 20 per cent., cod-liver oil 20 per cent., gallic and tannic acids one dollar per lb., santonin three dolars per lb., salts of strychnia one dollar per ounce, etc. There are also reports of a Committee on Adulterations and Sophistications, one on Metric Weights and Measures, and another on the Legislation of the year. The report of the Executive Committee includes obituary notices of members deceased during the year.

But the most important and lengthy report is that by Mr. C. Lewis Diehl, upon the Progress of Pharmacy from July 1, 1865, to June 30, 1876. This report, corresponding to the first part of the British 'Year-Book,' extends over 368 pages, and contains an immense number of abstracts, many of them, we are glad to note, culled from our own pages. Although these abstracts are almost invariably condensed, they appear to represent well the gist of the originals, whilst the space thus gained allows the report to cover a very wide ground. They are grouped under the main divisions of Pharmacy, including Apparatus and Preparations; Materia Medica, including (*a*) Vegetable and (*b*) Animal Drugs, classed under their natural orders; Inorganic Chemistry and Organic Chemistry.

The report on the progress of pharmacy is preceded by an introductory chapter, which in our opinion is hardly so successful. It appears to aim at making a reference to almost all the subjects of the report; hence in some places approximating to a catalogue, and introducing a bewildering multitude of materials beyond the power of the reporter to disentangle. For instance, after the separation of cotoin from coto bark by Jobst has been mentioned on p. 33 it is again referred to on p. 49; a similar remark may be made as to the principles of dita bark, and also as to Tiemann's researches on vanillin; whilst Buchheim's and Dragendorff's researches on ergot are separated from Tanret's by several pages, including the section on inorganic chemistry. It is also rather late in the day to quote in such a summary, without any qualification, Dr. Peckholt's belief that the *Serronia Jaborandi* Guill., is "*the* true Jaborandi;" nor did we expect to find this plant classed under Rutaceæ in the report, as it belongs to the Piper family. We note an interesting remark of the editor upon the statement of Mr. Jackson that American ginseng (*Panax quinquefolium*) is always rejected, to the effect that its price rules high in the Southern and Western States, and that this is doubtless due to demand for export to China. But might it not also be due partly to a consumption by the Chinese immigrants in the States themselves? Mr. Diehl also contributes a useful list of about a hundred and fifty books and pamphlets on pharmacy and the collateral sciences, published in Europe and America during the year, which must have cost him considerable trouble to compile.

The papers read at the Philadelphia meeting were valuable and interesting, and occupy a considerable space in the volume; some of these we shall take the opportunity of reproducing. Last, but not least, there is an appendix consisting of a report of a committee on the Centennial Exhibition. We cannot congratulate the committee, however, on clearness of arrangement; for instance, bitter barks from Cape Colony, castor oil seed from British Guiana, and arrowroot from Bermuda, all occur under the heading of Fungi from New Zealand. But this report contains much curious information, especially that referring to the Chinese, Turkish, and South American exhibits of materia medica. Some of this also we hope to be able to pick out and string together for a future number of this Journal. Meanwhile we content ourselves with merely quoting the statement that the manufacture of alkaloids by Messrs. Jobst of Stuttgart amounts to 33,000 lbs. annually. On the whole, this new volume of the 'Proceedings of the American Pharmaceutical Association,' is a valuable contribution to pharmaceutical literature.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Questions and Answers on Materia Medica, Medicine, Midwifery, Pathology, and Forensic Medicine, for the Use of Students Preparing for Examination. By W. Douglas Hemming, M.R.C.S., etc. London: Baillière, Tindall and Cox. 1877. From the Publishers.

Osterferien in Ligurien. Von F. A. Fluckiger. From the Author.

Anthracen: its Constitution Properties, Manufacture, and Derivatives, including Artificial Alizarin, Anthrapurpurin, etc., with their Applications in Dyeing and Printing. By G. Auerbach. Translated and Edited from the Revised Manuscript of the Author, by William Crookes, F.R.S., etc. London: Longmans. 1877. From the Publishers.

The Combined Note Book and Lecture Notes for the Use of Chemical Students. By Thomas Eltoft, F.C.S., etc. London: Simpkins, Marshall and Co. 1876. From the Author.

Obituary.

JOHANN CHRISTIAN POGGENDORFF.

On the 25th of January, Dr. Johann Christian Poggendorff, the well-known Professor of Physics in the University of Berlin, died in that city. The deceased was born in Hamburg, on the 29th of December, 1796, and had therefore just completed his eightieth year. Like many other celebrities in the department of the exact sciences, Poggendorf began work in a pharmacy, which he entered at the age of sixteen, and where he continued eight years. Upon leaving the pharmacy he entered the University of Berlin, where he gave himself up exclusively to the study of chemistry and physics, and, whilst still a student, published his first paper, 'Physisch-chemische Untersuchungen zur nähern Kentniss des Magnetismus der Voltaischen Säule,' and this title gives the key-note to those of nearly 150 papers attributed to him in the Royal Society's catalogue. In 1824, he undertook the work of editing the *Annalen der Physik und Chemie*, of which he lived to receive the jubilee volume. In 1834, he became Professor-Extraordinary of Physics in the University of Berlin, a post that he held at the time of his death; he also received the degree of Ph.D. In 1839, he was elected a Member of the Berlin Royal Academy of Sciences, and in 1844 the degree of M.D. was bestowed upon him by the University of Konigsberg. Besides his original papers already referred to, and numerous translations that he made for the *Annalen*, he assisted Liebig in the preparation of the first volume of the '*Handwörterbuch der Chemie*,' and in 1863 issued his '*Biographisch-literarisches Handwörterbuch zur Geschichte der exacten Wissenschaften*,' a large volume containing biographies, and illustrating the writings of scientific men of all nations and times.

Notice has also been received of the death of the following:—

On the 26th of December, 1876, Mrs. Susan Durant Kelley, Chemist and Druggist, Saltash, Cornwall. Aged 61 years.

On the 8th of January, 1877, Mr. William Nowers, Chemist and Druggist, Green Street, Kent. Aged 61.

Notes and Queries.

[537]. DRY ROT.—I should feel indebted for any information respecting the prevention of dry-rot in the woodwork of dwelling houses.

MEMBER.

[538]. TOOTH STOPPING.—"MOLAR" would feel obliged for a recipe for a non-expensive metallic tooth stopping, that thoroughly hardens.

[539]. ESSENCE OF MUSK.—I should feel much obliged if any reader would furnish me, in the next issue of the Journal, with a formula for making Essence of Musk in which the empty pods are utilized.

D.

SYRUPUS MATICO ET CORT. GRANATI.—According to Perret (*L'Union Pharm.*), this syrup is one of the surest and most effective astringents against dysentery, cholera morbus, acute diarrhœa, etc. It is employed either pure or diluted with water.

Fol. Matico	partes	20
Cort. Granati	„	120
Aquæ bullient.	„	1,200
Sacchari	„	2,000

The matico and pomegranate are infused with the boiling water, and allowed to stand, well covered, for twelve hours. The infusion is then filtered, and the sugar dissolved therein. Dose, a tablespoonful to a wineglassful.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

CHEMISTS' TRADE ASSOCIATION

Sir,—I fear from remarks I have heard, that the correspondence, published in last week's Journal may give rise to a feeling in the minds of some persons that a spirit of antagonism exists on the part of the Secretary and Executive of this Association to the Pharmaceutical Society.

The correspondence of Mr. Haydon was misconstrued; an explanation was given in my address last evening, at Edinburgh, which, with your permission, will appear in next week's Journal.

The resolution passed at the last Council Meeting, I take to be quite satisfactory, and a sufficient reply.

It seems almost superfluous to reiterate that no feeling exists on the part of the executive of this Association but one, namely, that the Pharmaceutical Society and the Trade Association should help each other and act harmoniously together.

THOMAS BARCLAY.

Newcastle-upon-Tyne, Feb. 14, 1877.

MILK OF SULPHUR.

Sir,—I feel that chemists carrying on retail business with a desire to do so creditably and reputably have much to thank Dr. Redwood for, on account of the common sense manner in which he has treated the milk of sulphur question, and they ought thoroughly to appreciate the skill he has displayed both in the oral evidence he has given when required, and in the exhaustive letter published in the Journal of February 3. I should like you to repeat two sentences of his letter which require the careful consideration of the favoured chemists who are not called upon to retail small parcels of drugs and chemicals or supply the numerous wants of the poorer class of the British public. He says: "In a class of men differing so greatly as do chemists and druggists in the circumstances under which they are placed, and the nature of the duties they are called upon to perform, it is necessary for individuals among them to be careful how they judge and may be disposed to condemn those differently circumstanced from themselves. The qualifications required for conducting a druggist's business in some localities are very different from what they are in others."

Mr. Chipperfield, in his letter of 23rd January, says: "I deny emphatically that there is a great and continuous demand for the genuine old milk of sulphur, and assert most positively that the reverse is the case." An *ipse dixit* is not of much use in an argument, unless well supported by facts, and I put mine against his, and "emphatically declare that there is a great and continuous demand for the genuine old milk of sulphur," and support it by facts coming under my own observation and experience. I assert that I have tried to sell sulph. præcip. in lieu of lac sulphuris, and my customers have continuously brought it back to me because it was not so white as they had usually been supplied with, and they could not so easily mix it with water, milk, or treacle. If I wish to retain my customers, I must sell them lac sulphuris, and I concientiously believe I supply to them what they ask for, and what they wish to have, and in so doing I am not deceiving them nor pandering to the weak fancies of people, who are, as Mr. Chippendale euphoniously expresses it, "exceptionally benighted."

I keep, as I think every chemist should do, Sulph. præcip. B.P., in stock, to use or sell if required, and 1 lb. of this preparation in my business will last out 1 cwt. of the milk of sulphur; and if any physician should, through inadvertence, write lac sulph. in a prescription, I should presume that he intended "sulph. præcip.," and dispense it accordingly; but with the "benighted public" the rule would be different—in each case I should supply what was wanted.

In this week's Journal, in addition to Dr. Redwood's masterly letter, we have Mr. Symons' very sensible and gentlemanly rejoinder to Mr. Brown, and considering that it comes from a "benighted" place like Barnstaple, it will bear comparison with the bold self-asserting effusion from "enlightened" Southampton. Another correspondent also turns up in my friend Mr. George Meo, who says, "Depend upon it, the lawyers will make very short work of the appeal;" and from the context of his letter one may suppose he means that the Runcorn decision will be confirmed. Well, we all know the glorious uncertainty of the law, but while the matter is *sub judice*, we can only hope that common sense and law will both be on the same side, by which of course I mean *my* side of the question. I cannot see with Mr. Mee that coffee and chicory mixture and milk of sulphur run *pari passu* with each other. Coffee and chicory are two different products—one a berry, the other a root—and were usually sold as pure coffee though mixed, but milk of sulphur is sold for what it is, a manufactured chemical containing sulphur and sulphate of lime. Mr. Mee likes his coffee and chicory mixture, knowing what it is, and enjoys it; and my customer takes his milk of sulphur, and though he may not swallow it with the same gusto that Mr. Mee does his chicory-coffee, yet when he takes it for certain ailments to which he is subject, and finds himself benefited thereby, he is satisfied with what he has purchased.

London, Feb. 6, 1877. JAMES SLIPPER.

Sir,—Is lac sulphuris and sulphur præcipitatum the same? Yes. Because lac sulphuris was a pharmacopœial name in 1721, and the formula was sulphur, one part, quick lime or salts of tartar, three parts; boil with sufficient water to dissolve the sulphur, filter while hot and precipitate with dilute vitriol. Then comes the 1746 Pharmacopœia, which orders to be used sulphur and quick lime. Boil, filter, and precipitating with dilute vitriol as before. The name given with the formula is sulphur præcipitatum, and at the end of the book is this important item :—"We change the name from lac sulphuris to sulphur præcipitatum." I have had the Latin Pharmacopœias from the library, and can swear that this is a correct rendering of the words employed by the compilers. These are the points which make lac sulphuris and sulphur præcipitatum the same. The process yielding a contaminated product is identically the same in both Pharmacopœias.

In the 1746 Pharmacopœia the name is changed from lac sulphuris to sulphur præcipitatum. The 1721 process is optional, and with salt of tartar would give a tolerably pure sulphur, the quick lime would be identical with the 1746 process. Surely the friends of contaminated milk of sulphur will soon see the errors of their ways.

Now, Mr. Editor, you will remember we had this subject on the carpet at Birmingham, when our noble friend, Mr. Bird, made a long defence of his opinions. But judgment is not given on opinions generally of interested (pecuniarly) persons, doing drugs wholesale amongst small shopkeepers; judgment is given in accordance with facts. Usage is a plea—some say it has been customary, and, therefore, not right to stop the sale. We do not wish to stop the sale of contaminated milk of sulphur as such; but like the grocer with mustard and coffee: if he sells a mixture of mustard and farina, he must label it a condiment; so with chicory and coffee, he must put on a label to the effect that it is sold as a mixture of chicory and coffee. This applies equally to contaminated milk of sulphur. Now this is the point, if the contaminated be demanded by the purchaser, the retailer must label it, "Milk of sulphur, with a variable quantity of sulphate of lime;" or, "This is sold as a mixture of sulphur and sulphate of lime," which the purchaser will not object to if he really requires the contaminated lac sulphuris. I have just a nut for some of our friends to crack. Of course, no one would think of doubting in these times of enlightenment, that chemical processes are carried out with chemical skill, and upon such grounds I would ask whether one part of sulphur and three parts of quick lime, boiled together in sufficient water and filtered while hot, the solution of sulphur thus obtained would be constant in its proportions of sulphur and lime? If either were in excess would not the filter remove most? Then, on the addition of dilute vitriol, how are we to account for the discrepancy of 30 per cent. sulphate of lime in some samples, if they are all made according to the 1721 formula? I think there ought not to be such a difference if they are made in accordance with the 1721 directions. It has been stated that this contaminated lac sulphuris is a by-product, and manufactured at mineral naphtha works, and is obtained thus: Into the vessel from which ammonia has been drawn, a variable amount of sulphur is put in while the contents are hot (the contents of the vessel); first, lime, into which is put sulphate ammonia; when the ammonia has passed off there remains sulphate and excess of lime, which, on addition of sulphur, forms the contaminated lac sulphuris. When an apprentice I know we used to get this article from the same place we got mineral naphtha.

Having written the former portion of this letter more than a week ago, I am glad to resume it after reading the long letter from our worthy and esteemed friend, Dr. Redwood, about whom I would not say an unkind word, for I am sure he is held in the greatest esteem by most of us, and I have felt great reluctance to have to say I differ with our friend. I think if my letter be carefully read we shall not be wanting to find that Dr. Redwood has not touched the true legal point at issue. I would draw Professor Redwood's attention to the 1746 London Pharmacopœia, which he has only half quoted, as also yourself, Mr. Editor, although at Birmingham I drew your attention to the fact, and as the legal Pharmacopœias are in Latin, and copies in the library—if I make a wrong statement in effect, I ask you to put me right, my papers are stowed by, and I, not knowing where to look for them, have to quote from memory. In the Appendix to the 1746 P. L. we find in the list of changed names (old names) lac sulphur changed to (new names) sulphur præcipitatum.

This, if correct, for which I vouch, all legal difficulties are at once settled. Sulphur præcipitatum, synom. lac sulphuris. In selling contaminated lac sulphuris it must be labelled, "Milk of sulphur, with a variable quantity of sulphate of lime;" or, "This is sold as a mixture of milk of sulphur and sulphate of lime." The time has now come that articles must be called by their names, in order to the proper carrying out of the Adulteration Act.

Wicker Pharmacy, Sheffield, G. ELLINOR.

Sir,—Notwithstanding the lengthy communication of Professor Redwood, and the ingenious way in which he handles the question, I am still of opinion that "lac sulphuris" should not contain any admixture of calcium sulphate.

It would only be wasting time and occupying your valuable space were I to dilate more fully upon the subject at present, seeing we shall not have long to wait till the sessions, when the appeal case, so well known as the "Runcorn," will be heard.

Throughout the letter of Professor Redwood, no mention is made of 'Gray's Supplement,' where, in common with every work on materia medica that I have consulted, "lac sulphuris" is given as the synonym of precipitated sulphur. I think this is to be regretted, as Professor Redwood stands alone on this point—so far as authors are concerned; but I am happy to say he is still one of England's brightest ornaments, the difference nevertheless.

Why an article should be made simply to please the ignorant customers of a few chemists and druggists I am at a loss to know, seeing there is only a difference of three pence per pound between pure precipitated sulphur and the adulterated milk of sulphur. In the drug trade, as in every other, I should advocate purity in all articles as far as possible, and I do not see why milk of sulphur should be an exception.

Mr. Symons is a very funny opponent. I am glad, for his sake, his communication was "cut down and mollified," since my porcupine might have been as bristling as his own.

In discussion we should always attack men's views, and avoid offensive expressions.

I must, Mr. Editor, thank you for the impartial manner in which you have acted, and permit me also to say I feel under a debt of gratitude for the space allotted to my communications.

HY. BROWN, L.R.C.P., L.R.C.S., etc.

Northallerton.

Sir,—Upon reference to several old Pharmacopœias I find for many years there were only two kinds of sulphur used in medicine and pharmacy, the one, lac sulphuris, being generally prescribed for internal use, whilst for external use the flowers of sulphur (sublimat. sulph.) was ordered. At that time lac sulphuris was directed to be prepared with crude sulphur, quick lime, potass subcarbonate, and then precipitated with sulphuric acid (dilute), which not only precipitated the sulphur but also sulphate of lime. It continued to be made in this way for many years, and was looked upon by the faculty as the most reliable and useful preparation of sulphur. Subsequently the formula was altered on account of the great percentage of sulphate of lime, hydrochloric acid being ordered instead of sulphuric. Royle's 'Materia Medica' (1868) in describing "Sulphur præcipitatum—lac sulphuris or milk of sulphur" is very decisive in ordering its preparation with hydrochloric acid; it goes so far as to say "This preparation has been nearly out of use of late years on account of two thirds by weight of that sold in the shops having consisted of sulphate of lime" and it then goes still further, saying "Sulphuric acid may be fraudulently substituted for hydrochloric." The present Pharmacopœia does not mention the old milk of sulphur (prepared with sulphuric acid) at all, the presumption being that the compilers of that work looked upon sulphur præcipitatum as the true lac sulphuris, which without doubt is meant and has been recognized by men of eminence in the medical world as the only milk of sulphur. It may be argued that the milk of sulphur prepared with sulphuric acid is more beneficial in some cases. Perhaps so; we will take it for granted it is better for certain complaints; but why should we use it in all cases. Certainly the sulphate of lime is injurious in the majority of them. If sulphate of lime is such a good dilutant of sulphur, why should not doctors write a prescription, "Sulphur pure, 1 part, sulphate of lime, 2 parts?" Then the medical man, chemist and patient, would know what was meant. Surely if a customer asks a chemist for three ounces of milk of sulphur, the chemist is morally and legally bound to supply the milk of sulphur prepared according to the most approved authority, and not supply him with one ounce of sulphur, and two ounces calcium sulphate.

Some people may say, "But I like it better made the old way, it mixes more readily with water, it does this, and does that." My answer is, would a grocer who sold coffee with an amount of chicory mixed therewith be amenable to the Adulteration Act, if he could prove that chicory made it more agreeable to the taste, and made a much better infusion than it would without the admixture? If he was not, then the Adulteration Act would be a farce and a dead letter, for who could not find some one to endorse the most fanciful opinion as regards taste; and in conclusion I say so long as the present Adulteration Act preys upon tradesmen, it ought above all things to apply to drugs, on the purity of which at times so much is at stake.

W. P. B.

A New Form of Competition.

Sir,—I shall be obliged if you can spare me space to draw the attention of the trade to a growing habit amongst a certain class of wholesale houses of interposing between the retailer and his customer: I mean by their putting up ordinary simple medicines, such as syrups, pills, etc., and introducing these semi-proprietary medicaments directly, or indirectly, to the medical profession accompanied by notes, circulars, testimonials and other semi-quackish methods, stating that A.'s x-y cod liver oil, or B.'s pil. x+y+z or C.'s syrup x_4+y_2, and so on, is ever so much better than anybody else's; and further, in order to ensure the only pure and correct thing, these preparations must be designated by their respective hieroglyphics, whenever the prescriber may require such a preparation or drug.

It is no uncommon matter, nay, it has become almost a regular thing of late, to find prescription after prescription disfigured by such unprofessional characteristics.

Every dispenser must feel, if he has a spark of manly feeling in him, that it is a gross insult to his capacity and ability (to say nothing of the dishonesty indirectly often imputed to him on the printed labels, etc., that purchasers must be careful that the orthodox seal or label is on the package) to have a prescription left with him to dispense containing only ingredients that he is as fully able to compound accurately and with as pure materials as A., B. or C., but which he is instructed by the prescriber to obtain from these pushing men, at no small cost, inconvenience and perhaps delay. I cannot conceive a greater indirect censure upon the examinations of the Pharmaceutical Society than these proceedings carry with them. Surely men who have passed their examinations (and they are now sown broadcast over the country) ought to be considered equal to all ordinary emergencies, ought to be able to compound simple remedies, ought to be able to discriminate between pure and worthless drugs and chemicals; but if not, and if these specialists are needed, what a comment upon the results of our examinations

The remedy for this unhealthy state of things, for such an innovation on the just rights of the dispenser and retailer is unhealthy, is fortunately in the hands of the latter; they very nearly always have the ear of neighbouring prescribers, and if they will only make good and judicious use of the opportunities open to them, and if a determined face were set against this modern practice, which can but degrade the pharmacist in the eyes of the medical profession, the evil would soon be stamped out; the wholesale men, A., B. or C., would speedily find their best interests in directing their enterprise towards their best friends—the retailers—by offering their goods in the usual way of trading, and not interfering between the retailer and his customer, — an occupation foreign to a wholesale transaction,—whilst the minor makers of simple specialities would speedily be atrophied off the stage.

If after so many years of downright hard honest work, and if after so large an expenditure of money the Pharmaceutical Society has not succeeded in creating a class of men thoroughly able to accomplish all the work required by the medical profession, without having perpetually to fall back upon special makers of simple remedies, it is quite clear there must have been a tremendous miscarriage of effort. But, sir, I am bound to say, and to say it distinctly, that no such miscarriage has occurred, that hundreds of men, aye, and the great majority of men now practising pharmacy, are well able to do all that can possibly be required of them, and there is consequently not the smallest need for a class a specialists, whose avocation if once fairly established must necessarily result in the degradation of our class, and deprive the intelligent, qualified and competent man of his legitimate position and emoluments.

I am far from discouraging legitimate enterprise, but the operations above alluded to are, in my opinion, neither legitimate nor necessary.

In re, e re.

Nux Vomica Bark.

Sir,—A good deal of interest having been shown at the evening meeting, on Wednesday last, as to the nature of the alkaloid or alkaloids present in nux vomica bark, I shall be glad if you will allow me to state that, having, a short time since, through the kindness of Messrs. P. Squire and Son, acquired a supply of this now rather rare bark, I hope before long to be able to give some definite information on the subject, which has for some time past been of considerable interest to me.

Taunton, Feb. 11, 1877. W. A. Shenstone.

A Gum Query.

Sir,—About eighteen months ago I wrote you, and sent a sample of a white gum arabic which yielded an extraordinarily viscid mucilage. You replied that you had tried the sample and found nothing amiss with it, so I concluded the fault to have arisen from the presence of a small quantity of a gum allied to tragacanth, which occurred only in certain portions of the bulk, and that which I sent you was free from it.

In the *Pharmaceutical Journal*, of July 29, 1876, a correspondent, under "Notes and Queries," notices the same thing, and puts the question, "Has anyone noticed a sample of gum which makes a mucilage more like white of egg?" but no one replied.

A lozenge manufacturer some time since offered a sample of good Turkey gum (of which I enclose a portion) remarkably free from brown pieces, at a low price, because they were over stocked (8*d* per lb.). This I find is precisely similar to that which I wrote you about before. Thinking it might be caused by the presence of a small quantity of an ally of tragacanth, I picked out from the bulk 2 drs. of those pieces which were quite transparent, or exhibited any abnormal appearance, and labelled it "False Acacia;" also I picked out 2 drs. of the most genuine looking, "opaque from numerous minute cracks," and readily crumbling between the fingers, and labelled it "True Acacia." To each of these samples 3 drs. of water were added and stirred repeatedly. This experiment proved that both gums were identical. Both appear to dissolve completely (hence not bassorin or cerasin), but the "False" showed the characteristic viscidity first; in neither does it appear until after from eight to twelve hours, and still continues to develop till twenty-four or thirty-six hours, although apparently it had previously completely dissolved. So tenacious was the mucilage that on attempting to lift the stirring rod out, the whole might be raised (pot included), and would only slowly fall! It agrees with the B. P. "characters and tests;" the "Adulterations and Substitutions" of Pereira's Materia Medica, would not detect it, and yet it is quite distinct from the ordinary kind. Commercial travellers and wholesale houses know nothing about it. It certainly deserves investigation, and I should be glad to receive information on the subject.

75, *High Street, Barnstaple.* R. H. PARKER.

"APPEAL TO THE BENEVOLENT."

Sir,—Will you allow me again to announce the additional subscriptions that have been received since my last communication of the 27th ult., in response to my appeal which appeared in the *Pharmaceutical Journal* of the 13th ult.?

	£	s.	d.
Already acknowledged	12	5	6
Blandford, B. M.	0	5	0
Watson, Mr. R. W. (Sheffield)	0	10	6
Davey, A.	0	10	6
Snelgrove, Mrs. Holland Park, per Mr. C. J. Mead	2	2	0
Smith, Mr. W. H. (Brighton)	0	5	0
Erdington, J. S.	0	5	0
Hills, T. H. (London)	1	1	0
Williams, J.	1	1	0
Frazer, D. (Glasgow)	1	1	0
Stevens and Richardson, Messrs.	1	1	0
	£20	7	6

The amount required being about £70, further contributions will be thankfully received by Mr. Bremridge or myself. W. D. SAVAGE.

WATER FLEAS.

Sir,—Allow me to supplement Mr. Macadam's interesting paper on the Water Flea (*Daphnia Pulex*), printed in the Journal of the 3rd inst., by a few remarks on its interest as a microscopic object. Both the *Daphnia* and its congener, the *Cyclops quadricornis*, abound in every clear pond or pool in this part of the country during the warmer months, and a bottle of water taken from either, at the proper time, will doubtless contain many, which may be readily seen by the unaided eye. The daphne may be known by its somewhat circular form and the steadiness of its movements. The cyclops by its parsnip or pear-shaped body, and the rapidity with which, by sudden jerks, it propels itself through the water.

If one of the former be taken up by a dipping tube and the tube held vertically for a few seconds, the daphne will sink to the bottom of the fluid and may then, with the drop of water containing it, be readily deposited on the bottom of the animalcule cage. The cover should then be cautiously put on so as to fix without crushing the little crustacean. A most interesting and instructive object is then at hand.

The paddling of the gills (both feet and lungs to this creature) causes a constant current of water to flow past and aerate the body, bringing also a never ending supply of food to the mouth; any tit-bit being caught and swallowed, all else abruptly rejected. The extreme transparency of the carapace, and in fact of the whole body, enables us distinctly to see the various physiological operations, which, on a larger and more complex scale, are carried on within ourselves. The pulsation of the rudimentary heart; the circulation of the nutritive fluid (or blood) over the body generally, and through the antennæ; the deglutition of the food and its active digestion in the œsophagus (with some of the rotiferæ or wheel animalcules, infinitely smaller than our daphne, the food is pounded and crushed by two mighty bones placed like anvil and hammer in the gizzard); the passage of the food along the alimentary canal, and the excretion of the fæcal matter. This and much more in a creature for which the head of a pin would afford good standing ground. Possibly also in others one thousandth or one ten thousandth part the size, for our daphne is truly a giant among the diminutive host. Its one eye or cluster of ocelli turns as it were on a pivot, and the movements of the muscles effecting this may be watched with interest.

To our astonishment we are also admitted to the sight of generations yet unborn, for within the eggs, contained on back, under the shell, of the female, the spasmodic attempts of the pre-infantile daphne to stretch its limbs are, to say the least, amusing to witness.

33, *Norfolk Terrace, W.*, A. P. BAKER.

"*Kino.*"—*Hashish* is the Arabian name given to the dried tops of the *Cannabis Indica*, gathered some time before the seeds come to maturity. See *Pharm. Journ.* [3], vol. iv., p. 696. It is used for smoking, and is also made up with flour and other substances into a kind of sweetmeat.

"*Starke.*"—A person who has only passed the Assistant's examination at Apothecaries' Hall cannot legally "keep an open shop for the retailing, dispensing or compounding poisons," or "take, use or exhibit the name or title of chemist and druggist, or chemist, or druggist." The registration clauses of the Pharmacy Act do not apply to the business of wholesale dealers in supplying poisons in the ordinary course of wholesale dealing.

C. Chorley.—"Wild cherry bark, bruised, two ounces; proof spirit, twenty ounces: digest for fourteen days, express and filter; or the tincture may be better prepared by displacement or percolation.

"*Extract.*"—See *Pharm. Journ.* [3], vol. i., p. 863; vol. iii., p. 104.

"*Rheum.*"—See *Pharm. Journ.* [3], vol. iii., p. 212.

"*Alpha.*"—See vol. vi., p. 921, and the present vol., p. 289.

B. Clifford.—Ganot's 'Physics' (Longmans); Deschanel's 'Natural Philosophy' (Blackie).

"*Alpha.*"—We should recommend you to test the strength of the solution or get some person to do it for you.

W. H. S.—See the note on p. 676.

F. L. P.—There is no such name on the Register of Chemists and Druggists.

"*Pharmaceutical Student*" is referred to the rule respecting anonymous communications.

"*Quære.*"—No.

"*Apprentice.*"—See Wanklyn's 'Milk Analysis," published by Trubner and Co.

"*Gelosa.*"—Obviously no person who is not a Member is entitled to represent himself as such. We have consulted the Calendar and do not find your name in the list of Members.

T. L. Edden.—(1 and 3) *Fumaria hygrometrica*; (2) *Tortula intermedia*; (4) Either *Weissia microstoma* or *viridula*: it is impossible to say with certainty until the capsule is mature. (5) *Tortula muralis.*

W. B. Jevons.—Apply to the Secretary of the Apothecaries' Company.

"*Inquirer.*"—Squire's formula for cold cream is as follows: white wax, 1; spermaceti, 1; oil of almonds, 6; rose water, 9; otto of rose to perfume it. Melt together, by means of a water-bath, the oil, spermaceti and wax, then gradually add the rose water and stir till cold.

"*A Dispenser.*"—The B. P. acid should be used.

"*An Old M.P.S.*"—If possible, consult the prescriber.

R. H. M. (Sunderland).—Only the Commissioners of Inland Revenue can give a decisive answer to your question.

"*Pinus.*"—(1) We cannot say. (2) No.

"*Geiger.*"—We should think not.

T. Stokoe.—The best plan is only to keep such stock in proportion to the demand for it as will allow of its frequent renewal.

W. T. H.—(1) Church's 'Laboratory Guide for Agricultural Students' (Van Voorst). (2) No.

Errata.—In Mr. Yewdall's letter on p. 648, col. 1, line 29, for "having" read "have." In the following letter the sentence with respect to the hours of Sunday trading in Glasgow should stand, "The Sunday hours in the better class establishments are from 9 a.m. to 7 p.m., closed during the hours of church service."

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Pitman, Mr. Wilkinson, Dr. Lindsay, Brummagem, Chemist, H. H. S., J. B.

"THE MONTH."

The medicinal plants in blossom this month are exceedingly few in number. Although the hedges in the country are looking all the brighter for the drooping yellow catkins of the hazel and the purple tinted ones of the alder, and although snowdrops, periwinkles and primroses are peeping out here and there, with an occasional sprinkling of the golden blossoms of the lesser celandine, yet there are at present only two wild plants in flower which we can claim for medical botany; these are the elm and the sweet violet.

The blossoms of the *Ulmus campestris*, L., are usually developed most freely on the topmost branches, and it is only rarely that they are found within reach of the hand. On this account the little bud-like tufts of flowers are often mistaken for opening leaf-buds. If one of these tufts be pulled off, it will be found to consist of about twenty-six small flowers, each one with a scaly bract at its base, the whole number being supported on a very short general peduncle, so that the inflorescence has upon close inspection the appearance of a small umbel. The flowers however do not, as in the true umbel, open centripetally, but irregularly, as if the inflorescence were a condensed umbellate cyme. Each little flower consists of a pale green funnel-shaped calyx, divided above the middle into five parts, which are tinged towards the tips of a pinkish purple colour, and are fringed, as well as the bracts, with a row of delicate unicellular hairs. The five stamens are twice as long as the calyx, and consequently protrude beyond it. The anthers, at first pinkish, become soon afterwards of a dark purple colour. The ovary is crowned with a bifid stigma, and ultimately forms the curious almost circular, pale, winged fruit (samara) which a month or two later strews the lanes and covers the ground with what at first sight looks like a shower of broad deciduous bracts.

The violet (*Viola odorata*, L.) is such a common flower that it does not generally receive the attention from the young botanist which its peculiarities deserve. The young leaves afford an instance of involute vernation, and the base of the plant presents creeping stems which illustrate the stolon. The calyx consists of five spurred sepals, and the corolla of five unequal petals, only the lower one of which is spurred. The five sessile anthers have each a brown membranous appendage at their apex, and two of them have spurs which project into the spurred petal. The stigma is beaked. The appendages of the anther have a curious purpose. As the flower hangs down they are closely applied to the style, forming a sort of bag in which the pollen is confined and prevented from falling on the stigma of the flower. An interesting account of the object of this singular arrangement will be found in Sir John Lubbock's 'British Wild Flowers in Relation to Insects,' p. 61. In May and June the violet produces flowers very different in appearance from those now to be seen; they are small, closed and almost apetalous, but nevertheless produce seed freely. On the flower stalk of the violet may be seen two minute bracts, which might be easily overlooked by a casual observer, yet these bracts afford a means of distinguishing one species from another; thus there is another species of violet in blossom this month which is quite odourless (*Viola hirta*, L.), in which these bracts are situated below the middle of the flower-stalk, while in the sweet scented violet they are above the middle. The latter differs also from the hairy violet in having downward hairs on its leaf-stalks, while the hairy violet has spreading hairs. It is commonly reported that more syrupus violæ is made from pansy flowers than from violets. Besides the larger size of the flower of the pansy it differs from the violet in having a hollow rounded stigma.

At Kew the only plants in blossom in the economic house are the *Drimys Winteri*, which is still blooming most luxuriantly, and the kola nut plant with its small green unisexual flowers. In the winter garden, however, there may be seen a small buchu plant (*Barosma crenulata*, Hook.) in flower. In habit this plant closely resembles the pretty *Eriostemon*, whose white starlike blossoms form so pretty an ornament to greenhouses at this season of the year. A figure of the plant is given in part iii. of Bentley and Trimen's 'Medicinal Plants;' the leaves in the Kew plant are not erect as represented in that drawing, but spreading or even slightly recurved. The structure of the flower is rather curious. In size and in general appearance it slightly resembles that of the stitchwort (*Stellaria Holostea*, L.). The five stamens are alternate with the petals and at first spread horizontally on a level with them. One by one the stamens become erect and after shedding their pollen bend backwards and become recurved between the petals and below their level. During this process the filaments elongate so that the young stamens may be known by their shorter filaments. Alternately with these five perfect stamens are five abortive filaments (staminodes), which, being exactly underneath the five projections of the carpels, appear to belong to them, and it is only when they are depressed with the point of a pin that they are seen to be distinct and to arise from beneath the carpels.

In the Cactus house, a specimen of *Aloe plicatilis*, Mill., may be seen in blossom. This is one of the species from which an inferior kind of aloes is made in South Africa. The flowers are of the usual tubular type found in most aloes, but are rather paler in colour than in several other species, and the spike consists of but few flowers. The blossoms are about 1½ inch long, and are of an orange yellow tint. The stem is repeatedly branched in a forked manner, and has a corky cracked surface. The branches terminate in a dense tuft of succulent leaves arranged in two opposite rows. The leaves are obtuse, convex, below, from 8-12 inches long by about 1 inch broad, shaped somewhat like a paper knife, and slightly curved upwards, those in the centre of the tuft being longest, so that each tuft looks like a slice taken out of the centre of a large onion. It will thus be understood that the appearance of the plant differs much from that of *Aloe ferox*, Lam., and *A. arborescens*, DC., in which the tapering leaves form rounded tufts like the common yucca. There may also be seen in blossom now the *Plumbago rosea*, L., the roots of which are used in India as a vesicant. Its long spikes of rose pink salver-shaped flowers, with the calyx covered with short glandular hairs, enables it to be easily recognized.

In the grounds, the periwinkle (*Vinca minor*, L.) may be seen in blossom in shady places; this plant as well as the larger species (*V. major*, L.) was used in Gerarde's time as a hæmostatic, and has lately been brought into notice again for the same purpose. The curious stigma in the flower is worthy of observation; the style readily separates from the apex of the ovary, and then exactly resembles in shape one of the round brushes used for blackleading fire grates. This appearance is due to a shortly stalked tuft of hairs placed in the centre of the circular stigma.

Here and there throughout the grounds may be seen also the yellow funnel-shaped flowers of *Forsythia suspensa,* an oleaceous plant, the capsules of which are used by the Chinese as an alterative and emmenagogue. The roots are said to be slightly poisonous and to possess antifebrile properties.

The Botanical Gardens at Regent's Park present at present nothing worthy of special remark; the mezereon and star anise plants still remain in full blossom, and the almond (*Amygdalus communis*, L.) is just opening its flowers. At Kew the latter is already in full blossom.

The almond tree is one of the prettiest objects in the suburban streets of London in the early spring, when its leafless branches are covered with delicate pink flowers. The blossom presents no remarkable features. The petals are very fugacious, falling soon after the flowers are gathered. The stamens are about thirty in number, and are attached to the tube of the calyx; the flower-stalks are surrounded with scaly bracts. The flowers of the bitter almond are more rarely seen in London. Its flowers are larger than those of the sweet variety and of a white colour, the base of the petals only being pink. It was most probably this variety to which the poet Moore alluded when he spoke of—

"The silvery almond flower
That blooms on a leafless bough."

Although the almond flowers profusely, its fruits are only sparingly developed in this country. A few produced last year may, however, still be seen on some of the almond trees at Kew.

The Cornelian cherry (*Cornus mascula*, L.) is now just coming into bloom in the Regent's Park Gardens. The flowers, which are small, greenish yellow, and, like most plants of the Cornaceæ, four-parted, are arranged in small umbels proceeding from the joints where the leaves of the last year have fallen off. The ovary is inferior, and the style surrounded by a small cup-shaped disk. The flowers are used by the Turks in diarrhœa, and from the acidulous astringent fruits, which are of a cornelian colour and about the size of an olive, a decoction is made which is employed for a similar purpose. From the wood the Turks are said to obtain the dye for their red fez.

In the drug market during the last month *Xanthium spinosum* has made its appearance, a drug which it will be remembered has been recommended as a preventive of hydrophobia. We noticed in one of the daily papers a few days ago, that several people had been bitten by a mad dog, and had been taken to the London Hospital. There is therefore an opportunity for its value, if any, to be tested.

Coca leaves, jaborandi, and boldo still figure at the sales. We have also noticed copalchi bark (*Croton niveus*, Jacq.), which has appeared under the name of white bark. It bears some resemblance to cusparia bark, and has indeed been sold for it on former occasions when it appeared in this country. From that bark it differs in exhibiting, where denuded of its white soft outer coat, an appearance of having been rasped. Under a lens this is seen to be owing to a number of minute oblong pits which cover its surface. It is remarkable for containing an alkaloid which gives the same reaction as quinine with chlorine and ammonia. It does not, however, form a compound similar to herapathite with iodine. Another bark, offered under the name of black bark, appears to be that of some species of *Exostemma.* It is rather thin, flattened, and very hard. With the aid of a lens its transverse fracture appears resinous and stratified.

Under the name of genocardium oil we have seen a white fatty substance, imported from Bombay, which seems to be the oil obtained from the seeds of *Gynocardia odorata*, R. Br. In India it is known as Chaulmugra oil and forms one of the most valued native remedies in leprosy and skin diseases; it is official in the Indian Pharmacopœia as an alterative tonic, and is certainly worthy of trial in this country.

A sample of remarkably fine sagapenum has been shown to us by Messrs. Hearon, Squire and Francis, which is almost unique. It occurs in the form of distinct tears varying in size from a pea to a hazel nut. Some of the tears have seeds and fragments of umbels attached to them; this seems to indicate that these tears must have been produced on the flowering portion of the plant. The drug was imported from Bombay, and we believe only one case was in the market. Neither Hanbury nor Pereira notice a variety of this kind, but some similar tears are in the Museum of the Pharmaceutical Society; they were presented by Messrs. Corbyn and Co., and are believed to be about 150 years old. About six cases of spurious buchu (*Empleurum serrulatum*, Ait.) have lately been offered for sale in London. These leaves may be distinguished from the narrow-leaved buchu (*Barosma serratifolia*, Wild.), which they much resemble in shape, by their having the tip of the leaf sharply pointed, where as in the buchu it is blunt and has an oil gland exactly in the apex. The buchu leaf is figured in Bentley and Trimen's 'Medicinal Plants,' part vi. The taste and odour of the leaves are different from those of true buchu. Bellerica myrobalans, the fruit of *Terminalia bellerica*, Roxb., has been offered at Exeter for sale as galls. This is rather a dangerous substitute, since these fruits have been known to produce symptoms of narcotic poisoning. They may readily be distinguished from galls by sawing them open, when they are seen to be fruits and to contain seeds instead of insects; externally, also, they taper at one end. From Cork we have a specimen of Asarabacca leaves and flowers, supplied instead of *Chimaphila umbellata*, Nutt., whether by accident or ignorance it is impossible to say. A case of Nepaul aconite root (*Aconitum ferox*, Wall.) lately opened proved to contain a large quantity of the dried dung of some animal, which was probably used in drying the root, and afterwards packed in to make up deficiency of root, since it only occurred in one case out of several.

These instances show that it behoves both the wholesale and retail druggist to thoroughly examine all their goods. The arrival of aconite root from Japan, as noticed at the last evening meeting, may be welcomed as a herald of competition. The aconite root which at present comes into this country is disgracefully bad, and is usually composed in large quantity of old and comparatively worthless roots, with a large proportion of stem attached to them, and is also occasionally adulterated with other roots. The Japanese article is clean, of good quality, and should the examination of its active principle prove it to be as active as the European aconite, it will insure its good sale, and cause it to replace the very inferior drug at present supplied from the continent.

Professor Xavier Landerer, of Athens, has found that oil of *Satureia Thymbra*, Sibth. (?) is a prompt remedy against toothache, applied either as oil or by chewing the leaves of the plant. It is curious to remember this in conjunction with the fact that carbolic acid, oil of cloves, and a number of benzene derivatives act in the same way, for it would appear to indicate in common with other observations that physiological action is related in some very definite way to the chemical constitution of bodies.

Since our last monthly article, Dr. Burdon Sanderson's paper on "Contagium Vivum" has made its appearance, but there is little in it that is at all new to science. He reviews the various theories relative to disease, and says that "contagium vivum" derives its power of producing disease by reason of the life which enters into its nature, and which has been derived from the living body. He views all infectious material as derived from infected bodies, and argues that no fortuitous agglomeration of atoms could produce "contagium vivum." This "vivum" is compared to ferments which produce change while remaining themselves unchanged, and it is pointed out that contact, in the ordinary sense, is not necessary for contagion; it is enough that there should be a simple transfer of substance from one body to another.

The points of similarity of Dr. Sanderson's theory with that held by Liebig are at once evident; but Liebig had, we think, a better appreciation of the nature of "contagium vivum." He did not place it outside the list of ordinary substances; it was enough for him to know it was subject to the same laws as all other substances. In the present day medical men are as a body, owing to their non-acquaintance with chemical science, considerably behindhand in some respects: the sooner they abandon extravagant hypotheses regarding vital force and are content to accept matter and force as the two factors of all things, the sooner we shall advance in our knowledge of disease and our power to prevent contagion. While speaking of this matter we may mention that on February 8, Mr. Kingzett delivered a lecture before the Society of Arts, in which he described the antiseptic and other properties of the solution obtained by the atmospheric oxidation of turpentine in the presence of water.

Water is a subject which at all times commands considerable attention, and during the past month it has received even more than usual, and this in various directions.

At a meeting of the Physical Society of London, on January 20th, Professor Guthrie read a paper on the state in which water exists in jellies, and exhibited a number of india-rubber balloons filled with water, to illustrate the nature of jellies. When a jelly sets, he said, "it is assumed that the solid matters collect in the form of cells containing liquid, which burst on the application of heat." By weighing at intervals one of the india-rubber bags (as exhibited) he has determined that evaporation takes place from its surface; thus, one which weighed initially 749·4 grms., in the course of twenty-four hours lost 0·95 grm.

This subject is of extreme interest from the contrast presented by such water to that of crystallization. Chemically speaking, there appears to be no difference between the state in which water exists in crystals and in colloids, except that these represent the extremes of a series. In both cases the water is in combination, not merely associated with the material forming the body of the crystal or the colloid, as it exists, say, in cold flour paste. If this paste, however, be boiled, then the water combines with the substance, and the mass sets more or less on cooling. A good instance of the colloidal stat of water is presented, for example, by the brain and other animal tissues. This presents a solid mass, from which not a drop of water can be squeezed out, and yet it contains more than 80 per cent. of water which is in a state of combination with the principles that enter into the constitution of the brain. The fact that Professor Guthrie's balloons lost water by evaporation from their surfaces does not prove that the water was not previously in combination with the other substances. Crystalline substances often present similar experiences; indeed, Professor Church and others have shown that many definitely crystalline substances give off water in mathematical amount, under various conditions of temperature and pressure. Thus in some cases crystals lose water *in vacuo* and will lose a further definite quantity on exposure to a temperature of 100° C. Some again, lose a definite amount on mere exposure to the air, and this, again, differs at times from that quantity which is lost by drying over sulphuric acid.

What then is the difference between the states of water of crystallization and water of colloidation? The only difference appears to us to be of the nature of degree rather than of kind. One may imagine that a substance which has the power to arrange itself from a state of fusion or solution into one where the material exists in a glometrical form around certain axes, is capable of combination with water only in definite proportions, and it may be, even, that the water lost by such crystals *in vacuo* is referable to a certain axis, and one distinct from that which furnishes the water dispelled by a temperature of 100° C. Such crystalline substances have low atomic weights compared to colloid bodies, as a rule. Colloid molecules have weights ranging up to hundreds and thousands compared with hydrogen as unity, and such bodies are rarely, if ever, crystalline. It is such substances which seem to have the power of combining with an almost indefinite proportion of water. Starch and the forms of albumen are examples of such bodies, and at least there can be no doubt that the large amount of water associated with various states of these substances is as distinctly in chemical combination as the water of crystallization of sodic sulphate. The nature of the combination is, it must be admitted, little understood; the same however is to be said of water of crystallization.

The subject of water analysis has lately received some attention from Mr. M. F. Anderson, L.R.C.P., who, writing to the *Sanitary Record*, disputes the correctness of the results obtained by Wanklyn's ammonia process. His experience is that the dangerous elements of bad water do not yield ammonia by Wanklyn's process, but nitro-oxides. That is to say, in the distillation process, employing permanganate of potash, some nitrogen is often oxidized and remains behind, instead of passing over as ammonia. He arrived at these conclusions by estimating the organic nitrogen by Wanklyn's method. This done, he finds that if the residue from this last operation be submitted to the process for estimating nitrates and nitrites, such an amount is found present that the difference between it and the true figure for these bodies represents the nitrogen oxidized by the permanganate of potash. To this startling statement Mr. Wanklyn speedily replied to the effect that Mr. Anderson's results were incompatible with the researches published in 1868 by him (Mr. Wanklyn) and his colleagues. As for the so-called source of error, he explains it as a mistake on the part of Mr. Anderson, who has obtained his results not unlikely by employing permanganate of potash containing much nitrates. As nitre is employed in making permanganate of potash, Mr. Wanklyn's explanation is probably the correct one, bnt at the same time the point is undoubtedly worthy of absolute corroboration one way or the other.

To one statement of Mr. Anderson we must certainly take exception. He states that it is hard to conceive albumen to be of so dangerous a character when present in waters as is ordinarily supposed, and further states that gelatin is not albumen, although in Wanklyn's process it is determined as such. True it is, and rightly so. Gelatin is one of the forms of albumen and no substance more readily undergoes processes of decay and putrefaction, and therefore while to such processes we refer the sources disease, we must consider the presence of these substances in drinking water as decidedly dangerous.

Mr. Wanklyn has himself overstepped, in our opinion, the safe limit of inferences to be drawn from the analysis of waters, and this in rather an unfair manner. In a paper which he read at the Glasgow meeting of the British Association on the influences of the mineral substances present in drinking waters on the health of the community, he attacked the Taunus water, on the score that it contains nearly 100 grains of calcic carbonate and 200 grains of sodic chloride per gallon. London drinking water contains only from 13 to 20 grains of carbonate of calcium per gallon. The author of the paper said that until we had more knowledge regarding the influences of the mineral substances contained in waters on the health of those consuming them, we should avoid as far as possible waters which depart in composition from those ordinarily accepted as standards. Nevertheless he did not adduce a single fact to show that such mineral substances are injurious. On the other hand, as Dr. Carr pointed out, they are often highly beneficial, and it is remarkable that the Kentish children are almost universally possessed of straight limbs and good bones, a state of things most probably referable to the hard water consumed in Kent.

A man would not consume ordinarily more than one or two bottles of Taunus water per day, and hence the quantity of carbonate of calcium thus introduced into the system is practically but little, and even that, we are disposed to think, becomes calcic chloride in the stomach and is chiefly eliminated in the same state in the urine. If any be assimilated it is an useful food, we contend, even for fully grown men, whilst as for salt our daily dinner experience proves its value as a food. Those who prefer Apollinaris water may take it, but others will probably continue to consume Taunus water in spite of the soap-bubble which Mr. Wanklyn has blown with it.

Speaking of sensations, we are reminded of one which has been recently got up about condensed milk, the chief facts of which we give here. Dr. G. Griffiths, in a letter to the *Daily Telegraph* (January 24), called attention to what he termed the extremely deleterious nature of condensed milk, which, according to him, ruins the health of infants fed upon it, and is competent, he goes on to say, to produce diarrhœa and a sort of diabetes. Of course this letter has elicited some discussion in the medical world, and Dr. Griffiths has been unanimously "sat upon." Many of the medical men who have replied to his letter state that they have actually prescribed condensed milk in cases of diarrhœa, and have never even heard of diabetes as resulting from its use. It is scarcely necessary to add that the whole thing was an instance of the kind of sensational humbug too often experienced in the medical world.

A curious case of lead poisoning has been recorded by Dr. de Loos, in the *Weekblad van het Nederlandsch*, etc. It was brought about by the consumption of vegetables that had been grown on a piece of land where twelve years previously had stood a white lead factory. Some of the vegetables yielded lead on incineration, a statement of more than ordinary interest, since it raises the question whether the lead was in chemical combination with the principles entering into the constitution of the vegetable tissue —a combination similar to that in which copper is known to exist in the body and in the colouring matter of the feathers of the plantain-eater.

In a paper read before the Chemical Society of Berlin, on January 15, S. Bogusky and N. Kajander, gave the results of their investigation upon the action of a number of acids upon Carrara marble. The paper had for its leading idea the rapidity of the evolution of carbonic anhydride and in the investigation five acids were employed, viz., hydrochloric, nitric, hydrobromic, formic, and acetic acids. The authors state that the first three of these acids obey a fixed law to the effect that the quantities of carbonic anhydride evolved in an unit of time are inversely proportional to the molecular weights of the acids. Formic and acetic acids, however, failed to show this regularity of action, apparently, as the authors state, in consequence of a physical change in the surface of the marble.

The communication is especially interesting, bearing as it does on the question of the time required for chemical action, and the meaning in nature of the relative weights of molecules. This is a subject which hitherto has commanded but little study at the hands of chemists, while it richly deserves serious investigation and would probably well repay workers in this direction. Without pausing to consider the well-known researches of Gladstone, Harcourt and Esson, and others on this subject, we may say that no method of inquiry in chemical science is calculated to throw so much light upon the nature of the chemical elements. We believe that useful and interesting results would be obtained by an investigation in which it was attempted to determine in what relation the atomic weights of metals stood to their chemical reactions, using on the one hand comparable salts or oxides, and a substance common to all on the other hand. Thus, when lime is added to chloride of manganese, chloride of calcium is formed, and protoxide of manganese is precipitated; the same is true of baryta and strontia, and it would be important to determine the amount of chloride of manganese decomposed by these various oxides and their hydrates under exactly parallel conditions, that is by using a definite amount of the chloride, and equivalent quantities of the oxides, etc. As in CaO, BaO, and SrO, the molecular weights differ only as regards the metal in each case, any difference in the results which might be obtained in the experiments indicated would, if the conditions observed in each case could be rendered absolutely parallel in all respects, be referable to such differences in the atomic weights of the metals. Or a similar series of experiments might be made with profit upon the various carbonates of the earths and sulphate of manganese.

We leave this interesting subject to direct attention to a paper also recently communicated to the German Chemical Society by E. Erlenmeyer. In this research the author has hit upon a simple method of preparing the alkaline cyanides as follows: potassic ferrocyanide (K_4FeCy_6) is fused with metallic sodium, when a colourless fluid mass is obtained, which, when poured off from the metallic iron that is also formed and allowed to cool, forms a snow-white mass containing 40 per cent. of cyanogen in combination with the alkaline metals. The reaction may be expressed as follows:

$$C_{12}N_{12}Fe_2K_8 + Na_4 = 8\,KCN + 4\,NaCN + Fe_2$$

The increasing employment of the vapour of nitrite of amyl in some spasmodic affections, and as an antidote to the action of chloroform, renders the administration of such a quantity only as is safe a matter of great importance, since a dose of vapour from five drops may save life, whilst that from twenty may destroy, or at least endanger it. With the view of having a safe quantity only ready for an emergency, it has been suggested to have four or five drops sealed up in a glass capsule, which may be readily broken in a piece of lint or the corner of a handkerchief, and the nitrite thus applied to the nostrils for inhalation. The suggestion has been carried out by Messrs. Allen and Hanbury.

APIOL.*

BY E. V. GERICHTEN.

During the preparation of oil of parsley by distillation of the seed with water, the so-called camphor of parsley or apiol separates gradually in fine needles. Homolle gave the same name to a mixture of different bodies obtained as a green-brown oil, by extraction of parsley seed with alcohol and ether, and the use of litharge; this is the "apiol" that has been recommended as a substitute for quinine in therapeutics. The author prefers that the name "apiol" should be confined to the crystallized volatile oil, which can also be obtained direct from the seed by extraction with alcohol, distillation, and digestion of the residue with ether, the apiol passing into solution whilst apiin remains undissolved. The author's experiments were made with apiol prepared by the latter method.

Apiol forms very long, white, efflorescent needles, having a faint smell of parsley. It melts at 30° C., boils about 300° C., and has a specific gravity of 1·015. It is not soluble in water, but readily so in alcohol and ether. When melted, apiol requires weeks or even months to become perfectly solid, but from solution in alcohol the original crystals can be easily obtained. The analytical results of various chemists find their simplest expression in the formula, $C_{12}H_{14}O_4$ (corresponding to $C=64·8$ per cent.; $H=6·3$ per cent., $O=28·8$ per cent.). By action of nitric acid upon apiol Martius obtained neither oxalic nor picric acid; Rump, on the contrary, obtained both acids. Lindenborn simply oxalic acid, no picric acid, and a yellow resinous body, which slightly deflagrated when heated on platinum foil, and appeared to be a nitrogenous body without acid properties. Sodium does not attack melted apiol. Concentrated sulphuric acid dissolves apiol with a blood red colour, and from this solution water separates a brown body, which dissolves in alkalies with blue-green colour that gradually passes into a dirty-brown. According to Lindenborn, a crystalline body cannot be obtained in this way. Strong aqueous potash solution does not attack apiol. But when heated twelve hours with alcoholic solution of potash, and water then added, rhombic scales, having a mother-of-pearl lustre, gradually separate; these can be purified by recrystallization from alcohol. No other special decomposition product was detected. The new body melts at 53·5° C., and solidifies again at 46° C.; it is not soluble in water, but readily soluble in alcohol and ether. It is not attacked by aqueous solution of potash. By careful oxidation with chromic acid, handsome acicular crystals, and with potassium permanganate scales are obtained; neither of these bodies have been further examined. The body obtained from apiol by alcoholic potash gives with chloroform and strong sulphuric acid at first a beautiful red-violet colour, gradually becoming green. It gave upon analysis in three experiments: $C=64·9$, $65·6$, $65·8$, $H=5·6$, $5·4$, $5·5$. When boiled with dilute nitric acid, it reacted energetically forming a yellow solution, from which when diluted with water and cooled there separated yellowish white crystalline flocks, oxalic acid remaining in solution. The flocks recrystallized from alcohol in beautiful long brilliant yellow needles, almost insoluble in hot water, and soluble in alcohol and ether. The crystals melted at 114° C., the fused mass rapidly solidifying again. In boiling potash solution, it dissolved gradully with an intensely purple-red colour; but was again completely precipitated from the solution in yellow flocks by carbonic acid. Nascent hydrogen (sodium amalgam) coloured the potash solution.

* Berichte d. deutsche chemisch. Gesellschaft, 1876, p. 1477.

REACTIONS OF SALICYLIC ACID.

The following list of reactions for salicylic acid is quoted in *New Remedies* from an article by Dr. Richard Godeffroy in the *Zeitschrift* of the Austrian Apothecaries' Society:—

1. Salicylic acid, heated above its melting point, sp into *carbon dioxide* and *phenol*:

$$C_7H_6O_3 = CO_2 + C_6H_6O.$$

2. On distilling salicylic acid with excess of lime, *calcium carbonate* is formed and *phenol* distils over:

$$C_7H_6O_3 + CaO = CaCO_3 + C_6H_6O.$$

3. If salicylic acid is heated with *amylic alcohol* (fusel-oil) under pressure at 250° C., it splits likewise into *carbon dioxide* and *phenol*.

4. *Sodium-amalgam*, acting upon an acidulated solution of salicylic acid, which must be constantly kept acid, transforms it into *salicylous* acid:

$$C_7H_6O_3 + H_2 = C_7H_6O_2 + H_2O.*$$

5. Sulphuric acid dissolves salicylic acid without colour, and forms from it two isomeric *sulpho-salicylic* acids.†

6. On heating salicylic acid with dilute sulphuric acid and manganic oxide, *formic acid* is produced which may be distilled off.

7. Dilute sulphuric acid and potassium chromate likewise convert salicylic acid into *formic* and *carbonic acids* (Kraut).

8. On heating a mixture of sulphuric acid, wood-spirit

* Sodium-amalgam in contact with water takes oxygen from the latter to oxidize the sodium, and hydrogen is given off; the latter being in a nascent condition, *reduces* the salicylic acid by taking from it a portion of its oxygen to form water

† Ira Remsen, *Sill. Journ.*, 6.

(methyl alcohol), and salicylic acid, an agreeably aromatic liquid distils over, which is *methylic salicylate*.

9. Concentrated nitric acid converts salicylic acid at the common temperature into *nitrosalicylic acid*, $C_7H_5(NO_2)O_3$; dilute nitric acid produces the same result by heating.

10. Fuming nitric, or a mixture of concentrated nitric and sulphuric acids, converts salicylic acid, under violent reaction, into *picric acid*, $C_6H_3(NO_2)_3O$, and *carbonic acid*.

11. Chlorine and bromine produce *substitution products*.

12. Iodine acts upon a watery solution of the acid only when heated; if melted with dry salicylic acid, it produces *iodized substitution products* and a red amorphous body.

13. Warm hydrochloric acid dissolves considerable quantities of salicylic acid; on cooling or on dilution with water it separates again in brilliant white fine needles (Godeffroy).

14. Potassium chlorate and hydrochloric acid convert it into *chloranil* (tetrachlorchinon), $C_6Cl_4O_2$.

15. On heating salicylic with aqueous hydriodic acid to 280° C., *phenylic ether* and *carbonic acid* are formed.

16. On distilling it with phosphorus pentachloride, *chlorosalicylchloride*, $C_7H_4Cl_2O$ is formed.

17. If phosphorus trichloride be added to a mixture of salicylic acid and anilin, *salicylanilide* $C_6H_5NH(C_7H_5O_2)$ is produced.

18. Iodine and mercuric oxide acting on salicylic acid produce *iodized substitution products*.*

19. On mixing salicylic acid (3 mol.) with glucose (1 mol.), pouring over them a large excess of concentrated sulphuric acid, and gently warming, a fine blood-red colour is produced; this colour disappears after a while, and the mass turns brown and finally black.†

20. Caustic potassa solution dissolves salicylic acid readily; the solution soon turns brown in the air.

21. Watery solution of salicylic acid and its salts is coloured intensely violet by ferric salts. This reaction is so delicate that Aug. Vogel‡ has proposed it as a substitute for alkaline sulphocyanides as reagents for ferric compounds. In strongly acid solutions, however, this reaction does not take place. H. Weiske employs it as an indicator in alkalimetry.§

On evaporating the intensely violet solution containing salicylic acid and a ferric salt to dryness, the colour disappears entirely; but the least quantity of water restores it (Godeffroy).

22. Salicylic acid mixed with cupric sulphate and caustic soda solution produces a solution of an intensely bluish green colour, from which even a large excess of alkali fails to precipitate any cupric oxide.‖

23. Solution of sodium salicylate forms a grass-green liquid with cupric sulphate solution.¶

24. Silver nitrate produces a white precipitate in solutions of alkaline salicylates; but no precipitate in solution of salicylic acid.

25. Lead acetate behaves like the preceding.

26. On mixing a hot saccharated solution of simple calcium salicylate, Ca $(C_7H_5O_3)_2$, obtained from calcium carbonate and aqueous solution of the acid, with a boiling solution of caustic lime in saccharine water, a heavy crystalline precipitate of so-called *neutral calcium salicylate*, $CaC_7H_4O_3$, almost insoluble in water, is produced.**

27. If a solution of salicylic acid is boiled with a solution of potassium ferrocyanide, *hydrocyanic acid* is produced, and the liquid becomes turbid. This reaction is very delicate, and permits the detection of very small quantities of salicylic by means of the reagents for hydrocyanic acid (Godeffroy).

28. On boiling a solution of salicylic acid with a solution of potassium permanganate, the characteristic colour of the latter is immediately destroyed, and *carbonic acid*, *phenol*, and *brown hydrated manganic oxide* are produced.

* P. Weselsky, *Wien. Ber.*, 69, ii., 832.

† T. L. Phipson, *Chemical News*. 28, 13.

‡ *Pharm. Zeit. f. Russl.*, 1876, 398, fr. *Neu. Rep. f. Pharm.*

§ W. Weith, *Ber. d. Deutsch. Chem. Ges.*, 1866, 342. See *New Rem.*, v., 137.

‖ *Zeit. f. Anal. Chem.*

¶ Hager, *Pharm. Centrallh.*

** Limpricht, *Organ. Chem.*, 1862, 904.

CHLORAL WITH SOLID FATS.*

An anonymous writer in the *Med. and Surg. Rep.* says, as a therapeutic agent, chloral has become so popular that its range of application is as diversified as any drug or chemical of a century's standing; but its nature has not been sufficiently studied to construct formulæ readily that furnish preparations easily dispensed and always praiseworthy; on the contrary, formulæ are written which furnish not only inelegant, but almost incompatible preparations. A case in point is its combination with solid fats. It is a matter oftentimes overlooked, if not entirely unknown, that chloral hydrate is a solvent for fats, so much so, that solid fats become liquefied by contact. Hence, it is not advisable to prescribe, for instance, chloral with lard, simple ointment, or even with simple cerate, in a very large proportion. With oleum theobromæ it forms an unctuous mass, which furnishes a very creditable preparation dispensed as an ointment; but to make from this combination a suppository, is almost an impossibility. Still less possible is it to make a suppository containing, with chloral, one of the solid extracts, which must previously be moistened with a little water to make it miscible with the solid fat, as a drop of water increases enormously the fluidity of the oleaginous mixture. The writer has made a number of experiments as to the best excipients, and finds that equal parts of spermaceti and oleum theobromæ have the advantage over any other. In a suppository containing ten to twelve grains of chloral this is about the proper proportion. Deviating from this strength, the proportion of spermaceti must be increased or diminished accordingly. Vaseline and paraffin, using three of the former to two of the latter, make a very good base, but it does not melt as nicely into an unctuous mass as does the former.

NOTE ON THE ADMINISTRATION OF PHOSPHORUS.†

BY EDWARD R. SQUIBB, M.D.

It must be now admitted that phosphorus in its separate and elementary condition produces effects upon the animal economy which are not only different in degree, but also different in kind from the effect of phosphoric acids or any oxides of phosphorus. If the evidence for this statement does not yet amount to a demonstration, it is still entirely sufficient to justify the admission, and much too strong to be be disregarded. The deductions from Wegner's‡ researches alone, which have not been discredited, nor much weakened by his opponents—and which are mainly the results of improved and closer investigation of points well studied by his predecessors—are quite strong enough to be received as established for the present time. Mr. J. Ashburton Thompson§ gives useful testimony and much information upon the subject tending to the same conclusion. Indeed the entire drift of the medical literature of the past ten years has tended strongly in this direction, and has at the same time accu-

* From *New Remedies*, January 15.

† Read before the American Pharmaceutical Association. From the 'Proceedings.'

‡ 'The Influence of Phosphorus on the Organism.' An Experimental Study by George Wegner. See Virchow's *Archives* for 1872, vol. lv., p. 11.

§ 'Free Phosphorus in Medicine.' By J. Ashburton Thompson, Surgeon at King's Cross, etc. London, 1874.

mulated a large amount of important experience and information too voluminous even for abstract here. Lemaire, besides his own work, summarizes the observations of Béhier, Lecorché, Dujardin-Beaumetz, Desnos, etc., and an abstract of his conclusions is given in the "Bulletin Générale de Thérapeutique" for September, 1875. Any one who may desire to follow the subject up to the most recent conclusions will find a very numerous and instructive series of papers and abstracts in the journal just referred to, and in the London *Practitioner*; and a good bibliography at the end of Mr. J. Ashburton Thompson's book.

A very much condensed summary of the present state of the therapeutics of phosphorus may be useful here, even though very imperfect. A very brief synopsis of the conclusions of Lemaire and the French authorities who preceded him may be given with the remark that the French are eminently conservative in regard to medication by phosphorus. Lemaire says, in substance, that in paralysis consecutive to acute diseases, or to "ataxo-adynamic" fevers; or in paralysis connected with alteration of the blood, as chloro-anæmia; or with diminution of the mass of blood, as from hæmorrhages, phosphorus has no special applicability; it is merely a tonic, or a stimulant of uncertain effect. Neither in cold paralysis, nor in hysterical paralysis, nor in that from cerebral softening, or from cerebral hæmorrhage, or from cerebral tumour, when these occur to any considerable extent. But if the clot be small, and the disturbance in the brain-substance not too great, phosphorus seems to hasten the cure even when the paralysis may have continued for a year. And in case of syphilitic tumors it may hasten the cure after the specific treatment shall have been successfully used. In old paraplegias it is useless; but in those of recent occurrence which may be incomplete and not dependent upon profound lesion, it seems to have a favourable influence. In recent cases of progressive locomotor ataxy where the affection has not become general it appears to be useful, sometimes in ameliorating the symptoms, and in certain cases arresting the progress, but it never cures. In flashing or shooting (fulgurant) pains it is very uncertain; and in impotence is very variable in effect, seeming only to strengthen the patient. In sclerosis and in lead poisoning it is entirely useless, but seems useful in poisoning from bisulphuret of carbon and from mercury. Its use in muscular paralysis of the eye, in incomplete amaurosis, and in amblyopia is so uncertain as to need farther observation, In sterility it gives uncertain results, and when useful it is sometimes long after the medication. Phosphorus, then, seems to be a stimulant and a tonic to the nervous system, and to be capable of benefiting some of the more profound nervous affections which it cannot cure. It should be used in all such affections only after the acute symptoms have given place to the chronic condition, and all active irritation has disappeared, and never during inflammation, fever or cerebral excitement. This rule is absolute, and when disregarded the condition will be made worse, even to a fatal termination.

The more effective applications of phosphorus seem to be to the functional derangements of the nervous system which are of an adynamic character, or, where organic or structural changes are slight, are temporary in character, or are just commencing. Structural changes which are preceded by functional disorder, or which produce functional disorder before the changes are fully established, and which are of a slowly progressive character, as, for example, those which arise from perverted nutrition, seem often to be within the entire control of phosphorus when skilfully applied.

But perhaps the most successful of all its applications is to that large class of cases wherein nervous power is used faster than the material for it is supplied, or to the condition which results in nervous exhaustion before the occurrence of serious structural change. Functional derangement is the effect of structural change as a cause. But structural changes differ in locality, in extent, in kind, and in degree. The remedial agency of phosphorus appears to apply most successfully to those changes which are general and not local, which affect the whole nervous system equably; changes of a kind which involve the relation of inferior supply to superior demand before the integrity of the tissues are seriously or profoundly invaded, or invaded to such a degree as to make retrogression very difficult. Tonic, sometimes to the extent of stimulation, and alterative from depressed conditions toward those of general health, it seems in the lower animals, at least, to have the special effect of increasing the gelatinous and bony structures (Wegner). It appears also to have a special therapeutic effect in some forms of neuralgia (Thompson), adynamic melancholia, in the nervous strain from overwork, and the nervous depression resulting from over-excitement. In this latter class of cases there appears to be nothing so generally successful in permanently but slowly relieving the prominent symptom of insomnia.

Phosphorus should be used with great caution, but not with timidity, and those who are afraid of it should let it alone rather than add to the large stock of so-called experience which has accumulated from imperfectly observed phenomena in its timid and unskilful application. It is dangerous only in the sense that all potent agencies are dangerous, because power to do good involves necessarily the same power for harm. The important peculiarity in regard to phosphorus, however, is that its poisonous effects from medicinal doses are remote, slow, and insidious; and and when allowed to go to an extent which does not appear very grave, the condition is irremediable. It is, except in small doses, cumulative in its action; and as for some uses it is given in increasing quantities, it should be suspended for a few days at the end of ten or twelve days, and then be resumed in smaller dose and increased as at first with the same watchful care. At the very first appearance of the slightest gastric derangement, such as gastralgia, vomiting or diarrhœa, it should be suspended, and be either abandoned, or resumed in smaller doses with increased watchfulness. The necessity for care is in proportion to the dose. From $\frac{1}{100}$th to $\frac{1}{40}$th of a grain three or four times in the twenty-four hours may be given for weeks and months even, without any extraordinary care; and although such are the doses most frequently required and used, they are not large enough for some of its uses. Doses as large as $\frac{1}{8}$th of a grain have often been reached, but $\frac{1}{12}$th is considered to be about the largest safe dose, whilst $\frac{1}{20}$th to $\frac{1}{30}$th of a grain need rarely be exceeded in the most active treatment to which phosphorus is applicable. These doses apply to the substance when in solution in cod-liver oil, where it is in its most effective and most uniform condition for use. When used in the solid form, however finely divided, or however combined, much larger doses are generally tolerated, but explosion in the effects much more liable. Doses of phosphorus in the solid form up to 3 grains have often been given without serious consequences. But acute poisoning and death rapidly follow the ingestion of larger doses, and often occur from much smaller quantities down to half a grain, and this in divided doses. The general drift of the best observations seems to show that the use of phosphorus in the solid form should be abandoned, because the dose has to be larger, and the results are uncertain and treacherous, because more or less of the solid substance may be dissolved in the primæ viæ, or more or less may pass off in an inactive condition, according to the condition of the stomach and the character of its secretions and its contents at the time of administration. In Continental Europe the common dose to begin with is a milligram, equal to $\frac{1}{60}$th of a grain, and this is given three to five times daily, and increased to say 5 milligrams, equal to $\frac{1}{14}$th of a grain. The dose and effects of phosphorus differ very much with the form in which it is given, and the causes of this have not been satisfactorily investigated. It seems to have been pretty clearly shown by Devergie, Solon, and Thompson, that its solution in vegetable oils is liable to develope poisonous properties, which render these variable and unsafe; and its is supposed that this is due to the formation of hypophosphorus acid, by a reaction between the phosphorus and certain elements of the oils, under the influence of light, air, and moisture. And even the method by superheating the oils before using them as solvents does not seem to render them unobjectionable. This excludes olive and almond oils, cacao butter, etc.

Solutions in alcohol, ether, chloroform, carbon disulphide, etc., though very easily made, are variable and constantly changing by reason of the volatility of the solvent, even though glycerine be added, while the pungency of the liquids, and the impossibility of diluting them with less pungent liquids without precipitating the phosphorus, render them difficult to administer. When such solutions are evaporated off in the formation of pills from them, oxidation of the phosphorus is unavoidable, and the lower poisonous oxide most likely to be formed. Beside, pills made by evaporation of the solvent have the disadvantages of those made from the subdivision of the solid phosphorus. A solution in resin is not very difficult to make, and affords a dry powder which may be dispensed easily, with the desired accuracy. But it is doubtful whether the same chemical change does not occur here that is known to occur with oil of turpentine, rendering the phosphorus comparatively inert. Besides, the resin is more or less difficult of solution in the stomach, and may, under conditions which are not improbable, carry the phosphorus through the alimentary canal without effect. Zinc phosphide, which at first appeared to offer a means of medication equal to free phosphorus, has not confirmed the expectations from it, while it is very difficult to make and control, difficult to know when well made or not, difficult to keep, and sometimes dangerous. From all that has been written upon the subject, it seems to be pretty well established that phosphorus should only be given in solution, and that the solvent used should be bland and not volatile, and should be capable of protecting the substance from oxidation for a reasonable length of time when kept from light and air. Such a solvent has been found in cod-liver oil, and the testimony in regard to the solution in cod-liver oil is, up to this time, so favourable as to indicate that all other preparations should be abandoned. It is, therefore, the object of this note to show that a definite uniform solution of phosphorus in cod-liver oil may be easily made and easily managed, so as to give an opportunity to the physician and pharmacist to use it with great accuracy and safety by ordinary extemporaneous prescription, allowing the physician to change his dose and mode of administration as each case may require in its different conditions and stages. This should put medication by free phosphorus under the same conditions for accurate administration and accurate observation with other potent remedies, and would enable physicians sooner to determine its true position and more accurate value in the materia medica by bringing it within their entire control and responsibility.

(To be continued.)

EARLY CLOSING AMONGST CHEMISTS AND DRUGGISTS IN NOTTING-HILL AND BAYSWATER.

A conference of chemists and druggists in the above districts was held on Thursday evening, February 15, 1877, in St. John's College, Moscow Road, Bayswater, under the presidency of Professor Redwood, for the purpose of considering what steps should be taken to shorten the present long hours of business.

The conference was opened by Mr. Henry Long, who stated at some length how the present movement had originated through the instrumentality of the Early Closing Association, which had again come into their neighbourhood, and, not being satisfied with the present state of things, had exercised its influence to form a committee, who hoped to carry out the object in view. For that purpose the meeting of that evening had been called, and Professor Redwood had been invited to preside.

The Chairman (Professor Redwood) then addressed the meeting and reviewed the whole question in a lengthy speech. He thought the subject demanded the serious attention of every one present. The Early Closing Association had effected great good in many directions, and he congratulated it upon the improvements already made. He called attention to the very exacting requirements from chemists and druggists, how they were liable to be called upon at all times, and the necessity of continual study. Modern education brought fresh knowledge, and therefore it was necessary that they should have sufficient time to keep up with that knowledge. He thought, therefore, it was their duty to reconcile the hours of business to the wants of the trade, and that duties which might be done in the day should not be carried on into the night. They should relieve those engaged in the business of that slavish application which distressed both body and mind. Great responsibility attached to pharmacists in dealing with deadly poisons, which must involve a great strain upon the mind. This being so, it called for a reduction of the present hours. The hours had been reduced in other trades, whilst in this that demanded so much study and attention an assistant was liable to be called up in the night, and had to work on Sunday. Now, how was this to be remedied? In the establishment in which he was first engaged in London, the hours were then from 7 a.m. to 10 and 10.30 p.m. But that same establishment now closed at 7 and 8, and the proprietor (Mr. Hills) assured him that the alteration had been effected by gradually initiating the public and medical profession into the change. If the gentlemen present did the like they would find that the work would be much better done in shorter hours. It had been found so in the city, in the banks and other large establishments, and he felt assured that if they reduced their hours of business they would reap great benefit in doing so. In conclusion he said he could not too earnestly recommend the subject to their serious consideration. The Chairman then called on Mr. Shirley to move the first resolution.

Mr. J. G. Shirley then moved and Mr. W. Matthews seconded the following resolution:—

> "Resolved, that in the opinion of this meeting, the hours of business which have hitherto prevailed amongst chemists and druggists are unnecessarily prolonged, and beyond what the public convenience requires, and this meeting believes that by a reduction of the hours the best interests of the employers and the employed would be promoted."

Mr. J. R. Faulkner moved and Mr. R. A. Johnson seconded the second resolution—

> "Resolved, that in order to promote an earlier hour of closing amongst chemists and druggists, this meeting recommends that a representative meeting of the chemists and druggists of the metropolis be convened."

Mr. H. Long moved and Mr. C. Butler seconded the third resolution—

> "Resolved, that the best thanks of this meeting be and are hereby given to the Early Closing Association for its valuable services in promoting the present movement and the cause of early closing generally."

Mr. W. Smith then moved and Mr. Horncastle seconded—

> "That the best thanks of this meeting be given to Professor Redwood for his kindness in coming to preside over it, and for his able conduct in the chair."

Several speeches deprecating the present protracted hours of business followed the resolutions. The Chairman then briefly returned thanks, and the meeting separated.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 24, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, *17, Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BENEVOLENT FUND DINNER.

A LARGE proportion of our readers who watch with special interest the proceedings of the Council in relation to the Benevolent Fund will doubtless have made a note of the resolution passed on the 7th inst., that a Public Dinner should be held in aid of it next May. The appropriateness of this resolution at the present time will become apparent if it be borne in mind that ten years have elapsed since the last similar effort in aid of the Fund was made, and that ten years is the period during which Firms are entitled to votes on account of donations. The votes accruing for such donations made in 1867 have now therefore lapsed.

At the date of the last Dinner only two annuities had been granted and the Fund was only applicable for the relief of persons who were or had been connected with the Pharmaceutical Society. The provisions of the Pharmacy Act, 1868, have since then thrown open the benefits of the Fund to every Chemist and Druggist on the Register. The number of persons eligible for relief has therefore been increased from about 2000 to nearly 14,000, or sevenfold; and the number of annuitants, each receiving £30 a year, has increased from two to twenty-three. The net amount in aid of the Fund produced by the Dinner in 1867 was £1611 15*s.* 2*d.*; it does not, therefore, require a very abstruse calculation to ascertain what is the proportionate amount that should now be subscribed to meet the altered circumstances and increased liabilities of the Fund. It will be seen that in the item of annuities alone the expenditure has increased from £60 to £690, whilst the number of applications for assistance is unhappily largely increasing.

The fact that the administration of the Benevolent Fund of the Pharmaceutical Society is conducted almost free of expense will commend itself to the consideration of every business man, and it is a fact that the only charge on the Fund, on account of management, is for printing and for the paper and postage stamps actually used. It is not within our knowledge that there is a similar charity in existence from which so large a proportion of the amount originally subscribed reaches the hands of those for whom it was specially intended. We therefore, hope that when the list of stewards is issued it will be found to be thoroughly representative of all the interests connected with pharmacy.

POISONING OF PHEASANTS BY YEW LEAVES.

IN a letter to the *Field*, Professor TUSON recently stated that while examining a number of pheasants suspected to have been poisoned, he failed to detect any poison by the ordinary chemical tests, but in the craw and gizzard he found fragments of yew leaves and was therefore disposed to attribute the poisoning to this cause. Professor TUSON's letter prompted a communication from Mr. COSENS, of Cwm, stating that on more than one occasion he had met with similar cases, but in his experience the fragments of leaves contained in the crops and gizzards of the birds were always those of Irish yew alone, and the birds were found dead close by the only two Irish yews in the wood, through it abounded in the English variety. Mr. COSENS therefore suggested whether perhaps pheasants might feed with impunity on the common yew, but not on the Irish variety. Unfortunately for this theory, Professor TUSON is able to say that the leaves found in the birds examined by him were those of the Irish yew. We are glad to note that Professor TUSON has undertaken to investigate the whole subject of poisoning by yew.

FIRE AT A COLLEGE OF PHARMACY.

WE regret to learn that on the 22nd ult., the Massachusetts College of Pharmacy sustained a very severe loss by fire. It appears that the lectures have been delivered, since the beginning of the present year in the third floor of a building belonging to the municipality of the city of Boston, who had generously given the accommodation to the College. The second floor was unoccupied, and the ground floor was used as one of the city ward-rooms. The fire appears to have originated in the overheating of some hot air pipes immediately over two furnaces in the basement and spread rapidly to the lecture room, where it destroyed all the cases containing the specimens of drugs and chemicals with which the room was fitted. The total loss to the College is estimated at about 3000 dollars, which is but partially covered by insurance. But the Boston pharmacists do not appear to have considered the disaster an overwhelming one, as it did not prevent them from holding a "banquet" in connection with the annual meeting of the local association two days afterwards.

A TRIAL OF XANTHIUM SPINOSUM.

SOME experiments recorded in the *Archives Vétérinaires* appear to demonstrate, what has been feared from the first, that *Xanthium spinosum*, which has already begun to figure in the brokers' catalogues, will have to be dismissed to the limbo of unsuccessful specifics against hydrophobia. The experiments were made in the chemical school at Alfort, by MM. TRASBOT and NOCARD. Eleven dogs were carefully innoculated with saliva from another suffering from hydrophobia; to six of these were administered doses of xanthium in proportion to their weight, whilst the other five were left to the unrestrained virulence of the saliva. The first dog to show signs of madness, on the thirteenth day after innoculation, was one of those to which xanthium was administered, and it died on the fourteenth day, after having taken 125 grams of the powder. During the next fifty days, seven more dogs died, but without presenting hydrophobic symptoms sufficiently decided to be taken into account. On the eightieth day another dog died with all the symptoms of hydrophobia. This beast had been bitten also by the first dog that died, therefore although it weighed only 4·5 kilograms, had had 10 grams of xanthium powder administered to it daily for twenty-five days after innoculation. The experimenters therefore express an opinion that *Xanthium spinosum* has not the property of curing hydrophobia or of preventing its development after either artificial or natural innoculation.

DEATH OF PROFESSOR CARSON.

IN the American journals just received is recorded the death, on the 30th December, of Dr. JOSEPH CARSON, the President of the last convention for the revision of the United States Pharmacopœia. Dr. CARSON was formerly Professor of Materia Medica in the Philadelphia College of Pharmacy and afterwards held a similar appointment in the University of Pennsylvania. For nearly fourteen years—from 1836 to 1850—he was the Editor of the *American Journal of Pharmacy*.

THE Deputation appointed by the Council in November last to wait on the Commissioners of the Treasury in reference to the application of the penalties recovered under the Pharmacy Act had an interview with the Secretary to the Treasury, Mr. W. H. SMITH, on Monday, the 12th inst. We understand that the result of the interview has been favourable.

THOSE pharmacists who have been in the habit of using Messrs FINZEL's sugar crystals will be sorry to read the announcement that the extensive sugar refining establishment at Bristol is to be closed after this week. The cause of the stoppage, according to the *Echo*, is attributed to the scarcity of the raw material and the influence of the French drawback system. It is said that two thousand workpeople will be affected by this decision.

Transactions of the Pharmaceutical Society.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING JANUARY, 1877.

	£	s.	d.
Abington, Herbert J., Ringstead, Thrapston	0	5	0
Ackerman, Henry, Redcliff Hill, Bristol	0	10	6
Ackerman, Theophilus, Redcliff Hill, Bristol	1	1	0
Allen, John, Shortlands View, Hyde	0	2	6
Askew, Hugh de Bosco, Washington Street, Workington	0	2	6
Atkinson, S., Market Place, Doncaster	0	10	0
Baigent, W. H., Shefford, Beds.	0	10	6
Bancks, Alfred, Guisborough	0	10	6
Bartlett, Herbert, 132, Seymour Place, Bryanston Square, W	0	5	0
Beard, Thomas W., Walmer	0	10	6
"Belvidera"	0	5	0
Bessant, F. R., 105, High Street, Oxford	0	10	6
Billing, Thomas, 86, King's Road, Brighton (1876-77)	1	1	0
Bird, Matthew M., Blandford	0	5	0
Blayney, Joseph J., Haslingden	0	5	0
Booth, John, Heckmondwike	1	1	0
Bourdas, Isaiah, 7, Pont Street, S.W.	1	1	0
Bourdas, Isaiah, jun., 48, Belgrave Road, S.W.	1	1	0
Bowerbank, Joseph, Cockermouth	1	1	0
Brodie, Robert, 253, Crown Street, Glasgow	0	5	0
Campbell, E. K., 12, Montague Place, Hackney Wick	0	2	6
Capes, J. H. C., 162, Walmgate, York	0	5	0
Chapman, Richard J., Chipping Ongar	0	10	6
Chase, Thomas, jun., 162, Broad Street, Birmingham	1	1	0
Cheverton, George, Tunbridge Wells	1	1	0
Clayton, Francis C., Birmingham	1	1	0
Cockton, John, Maryport	0	5	0
Coldwell, David B., 86, Queen's Road, Peckham	0	10	6
Cole, Alfred C., Lee	1	1	0
Cooper, Frederick A., 17, Market Place, Cockermouth	0	2	6
Covell, W. M., 302, Mare Street, Hackney	1	1	0
Critten, Robert P., High Street, Southwold	0	2	6
Deane, H. and Co., Clapham Common, S.W.	1	1	0
Denston, J. T., Kettering	0	5	0
Dickins, Rowland, Aylesbury	0	5	0
Downing, Frederick, 1, Victoria Parade, Torquay	0	2	6
Drake, William, Wyke, Bradford	0	5	0
Drawbridge, Joseph G., 57, St. James' Place, Liverpool	0	10	6
Druce, George C., 6, Drapery, Northampton	0	5	0
Dyer, Henry, Trowbridge	0	10	0
Edwards, Charles, Castle Street, Shrewsbury	0	5	0
Elliott, George, 50, Park Street, Walsall	0	5	0
Ellis, Bartlet, Banff	0	10	6
Feaver, Samuel, Truro	0	10	6
Fitch, Robert O., Well Street, South Hackney	0	10	6
Forbes, James W., 51, Great Moor Street, Bolton	0	10	6
Forrest, Richard, 20, Cork Street, Bond Street, W	1	1	0
Gadd, Charles, 1, Harleyford Road, Vauxhall	0	10	6
Gadd, Robert, 1, Harleyford Road, Vauxhall	0	10	6
Gibson, Atkin B., High Street, Grantham	0	5	0
Gibson, John B., High Street, Grantham	0	10	6
Gostling, T. P., Diss	0	10	6
Greenish, Thos., 20, New Street, Dorset Square, N.W	1	1	0
Grindell, John, 60, Paragon Street, Hull	0	10	6
Gudgen, Frederick G., Turnham Green	0	2	6
Gwatkin, James T., 49, Grand Parade, Brighton	0	10	6
Haddock, James, 24, Queen Street, Bedford, Leigh	0	5	0
Ham, John, Nether Stowey	1	1	0
Hannah, Charles, 86, New Bond Street, W.	0	5	0
Hannah, John, Market Street, Abergele	0	5	0
Harding, R. O., 29, Belvedere, Bath	0	10	6
Harrington, Allen, Needham Market	0	10	6
Heathcoat, Thomas, 30, Downs Park Road, Hackney	0	10	6
Hooper, Bartlett, 43, King William Street, E.C.	1	1	0
Hooper, Leonard, 43, King William Street, E.C.	0	10	6
Hopkin, W. K., 16, Cross Street, Hatton Garden, E.C	1	1	0
Howard, George, 15, Royal Hill, Greenwich	1	1	0
Humby, Lewis W., Warminster	0	5	0
Hunt, Charles, 29, Chapel Street, S.W.	0	10	6
Huskisson, H. O., 77, Swinton Street, Gray's Inn Road, W.C.	1	1	0
Ingall, Joseph, Ashford	1	1	0
Inkley, Jesse, Watling Street Terrace, Wilnecote	0	5	0
Jackson, Thomas, 43, Great Ducie Street, Strangeways, Manchester	0	10	6
Jeeves, T., 88, St. George's Road, Brighton	1	1	0
Jefferson, Thomas, Church Street, Lower Edmonton	0	10	6
Jessop, Jonathan, 11, Corn Market, Halifax	0	10	6
Jones, Alfred, Victoria Road, Scarborough	0	5	0
Jones, Henry S., 139, Fulham Road, S.W	0	5	0
Jones, Michael, Flint	0	10	6
Jones, Morgan H., Briton Ferry	0	5	0
Jones, Thomas, 87, High Street, Putney	0	5	0
Keightley, Joseph, High Street, Tunstall	0	10	6
Kernot, Dr., 5, Elphinstone Road, Hastings	0	10	6
Langdon, F. B., 1, Devonshire Villa, Pennycomequick	0	5	0
Lewis, Edward P., 96, Oxford Street, Sydney, N.S.W	0	10	0
Macintosh, A., 21, Montague Street, Rothesay	0	5	0

	£	s.	d.
Mc Intosh, John, 237, Maida Vale, W.	0	2	6
McMillan, James, 194, Hawk Hill, Dundee	0	5	0
Maitland, John, 10, Chester Place, Hyde Park, W	1	1	0
Manning, Thomas D., Yeovil	1	1	0
Maskery, Samuel, West Derby, Liverpool	1	1	0
Millais, Thomas, St. Heliers, Jersey	1	1	0
Millidge, Thomas E., Tonbridge	0	10	6
Moore, John, 4, Blackheath Road, Greenwich	1	1	0
Muskett, Chas., Diss	0	5	0
Newzam, Henry S., 40, Theberton Street, Islington, N	0	10	6
Oldfield, Henry, Market Street, Hyde	0	10	6
Osborne, George C., Dispensary, Northampton	0	5	0
Palmer, Robert, 35, Ovington Square, S.W.	2	2	0
Paget, John, Loughborough	0	5	0
Parsons, William, St. Mary Street, Portsmouth	0	10	6
Payne, Sidney, Wallingford	1	1	0
Peacock, George, 4, Napier Road, Kensington	0	5	0
Peat, Walter, Trinity Lodge, Fareham	0	10	6
Peel, Alfred, 129, Dulwich Road, Herne Hill, S.E	0	5	0
Pilley, Henry Thomas, 9, Bargate, Boston	0	5	0
Pilley, Samuel, 9, Bargate, Boston	0	5	0
Powell, Edward, 95, High Street, Winchester	1	1	0
Powell, Edward F., 95, High Street, Winchester	0	10	6
Power, Edward, Walton-on-Thames	0	10	0
Pratt, Richard M., Otley	0	10	6
Preston, W. L., Dalton-in-Furness	0	5	0
Ragg, W. W., Edmonton Green	0	5	0
Richardson, Edward, 152, Clifton Terrace, Bradford	0	10	6
Ringrose, George, 123, St. Georges' Street, East	0	10	6
Robinson, William, Main Street, Cockermouth	0	5	0
Robson, Thomas, 4, Victoria Road, Brighton	0	10	6
Rose, Alfred, 441, Edgware Road, W.	0	10	6
Rouse, F. J., High Street, Clapham	0	10	6
Rubie, James T., 19, Bernard Street, Southampton	0	10	6
Rutter, Edmund Y., 5, Bonchurch Road, North Kensington	2	2	0
Sadgrove, A. A., Clitheroe	0	5	0
Samuel, Edward, Mussoorie, India	0	10	6
Samuel, James B., Mussoorie, India	0	10	6
Sandford, George Webb, 47, Piccadilly, W.	2	2	0
Savage, W. D., and Son, Brighton	1	1	0
Scruton, Peter D., Collingham	0	5	0
Seaman, J. Saunders, Marlow	0	5	0
Shaw, Alexander H., 13, Lower Hillgate, Stockport	1	1	0
Shearcroft, Walter F., 7, Market Place, Spalding	0	2	6
Skoulding, William, Wymondham	0	5	0
Slade, John, Tenbury	0	5	0
Sloper, F. E., 96, Oxford Street, Sydney, N.S.W.	1	0	0
Smart, John, St. Nicholas Cliff, Scarborough	0	10	6
Smith, Tenison, Ryde	1	1	0
Smith, Thomas W., St. Nicholas Street, Diss	0	5	0
Smith, W. L., Charterhouse, E.C.	0	10	6
Smithurst, John, Broad Street, Nottingham	0	5	0
Spencer, Charles, Gravesend	1	1	0
Squire, James, 41, Queen Street, Oxford	0	5	0
Stannard, Frederick J., Broad Green, Croydon	0	5	0
Stoneham, Philip, 45, Craven Road, W.	0	10	6
Storrar, David, 228, High Street, Kirkcaldy	1	1	0
Tame, Thomas, Market Place, Trowbridge	0	2	6
Taylor, George S., 13, Queen's Terrace, St. John's Wood	1	1	0
Thomas, S. C., 5, Albion Terrace, New Fletton, Peterborough	1	1	0
Thompson, George A., 31, London Street, Norwich	0	5	0
Thring, Edmund J. H., The Halve, Trowbridge	0	5	0
Thrower, E. A., Diss	0	10	6
Trotman, Alfred C., 16, Cambridge Street, Hyde Park, W.	0	10	6
Turner, George, Honiton	0	10	6
Turner, John, Aylesbury	0	5	0
Wallis, George, Star Street, Ryde	0	2	6
Wallis, John T. W., 78, Essex Road, Islington, N.	0	5	0
Watson, Robert Wm., 22, Angel Street, Sheffield	0	10	6
Watts, Alfred, 19, Hazlewood Crescent, W.	0	5	0
Whaley, Edward, Kingston-on-Thames	1	1	0
White, Edward A., Mayfields	0	5	0
White, James W., 52, Royal York Crescent, Clifton, Bristol	0	10	6
White, John D., 7, Guildhall Square, Carmarthen	0	10	6
Whitelaw, James, 364, St. George's Road, Glasgow	0	10	6
Wiggins, Henry, 236, Blue Anchor Road, S.E.	0	10	6
Wilkinson, Thomas, 270, Regent Street, W.	1	1	0
Wilkinson, William, 2, Gluman Gate, Chesterfield	0	5	0
Wills, G. S. V., 4, Barkham Terrace, Lambeth Road	0	10	6
Williams, John, 16, Cross Street, Hatton Garden, E.C	1	1	0
Wilson, C. F., 22, Liverpool Road, Stoke-on-Trent	0	5	0
Wisken, R., 35, Loughborough Road North, Brixton S.W.	0	2	6
Woodman, George, Basingstoke	0	5	0
Woods, William, Plymouth	0	10	6
Wright, Alfred, 441, Strand, W.C	0	10	6
Wright, George, Derby Road, Burton-on-Trent	0	10	6

Donations.

	£	s.	d.
A Friend	3	6	0
Norwich Chemists' Association, the late, per W. J. G., Butler, Treasurer	10	17	0
Churchill, W. J., 46, New Street, Birmingham	0	10	6
Lacey, Samuel, 62, Vassall Road, S.W.	1	1	0
Smith and Co., 132, Borough, S.E.	5	5	0
Wright, Conrad W., Marlborough Hill, Bristol	1	1	0

Provincial Transactions.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

A meeting of the pharmaceutical chemists and chemists and druggists of Edinburgh and district was held on the evening of Tuesday the 13th inst., at St. Andrew's Square, Edinburgh, for the purpose of hearing addresses on the claims of this Association on chemists and druggists. Mr. George Blanchard occupied the chair, and upwards of thirty persons were present. After the Chairman had made some introductory remarks he called upon Mr. Barclay, of Birmingham, to address the meeting.

In the course of a lengthy speech Mr. Barclay referred to the correspondence which appeared in the *Pharmaceutical Journal*, between the Secretary of the Association and the Secretary and Registrar of the Pharmaceutical Society. There seemed to be a feeling, he said, that there was a little *animus* existing in the minds of some of those who were at the head of this Trade Association, in reference to the Pharmaceutical Society. He could not understand why such a feeling should exist, and he felt sure that none connected with the Trade Association had done anything to warrant it. Every action of theirs was scrutinized, and if there appeared to be anything that could be laid hold of it was pointed out with great glee. The Law Committee of the Trade Association assumed that the Pharmaceutical Council would examine the evidence, as it is supposed they do in all cases, as through the Registrar they are the only prosecuting party, and if they considered it all that was necessary, the question was, Would they instruct their solicitor to go forward and prosecute? The reason the question was put was this: Mr. Haydon was not a paid agent of the Pharmaceutical Society, and therefore they wished to know whether the Council would make use of the evidence of the Trade Association in obtaining a conviction. Mr. Bremridge's answer was to this effect: "I have further to say that any evidence of infringement of the Pharmacy Act, 1868, forwarded to me, will be submitted to the Council." Now would they, he asked, take that to be an answer? The Law Committee of the Association, through Mr. Haydon, said, in answer to that communication, that the reply was not satisfactory, and then the Secretary of the Pharmaceutical Society wrote, on his own responsibility, and asked for particulars of the cases. Mr. Haydon had previous instructions to obtain a reply to the original question before forwarding particulars, and consequently replied that his instructions prevented his complying with Mr. Bremridge's request. The result had been that they were blamed by some members of the Pharmaceutical Council, who had also remarked "to think that they should go forward and prosecute at the dictation of this Trade Association." He could scarcely understand how any men could take that position, as the Council, and the Council only, were responsible to the public and the chemists of the country for such prosecutions, and it was but a poor tribute to the common sense of the Trade Association to think they should ask such a thing. However, if the Law Committee of the Association had stated the matter a little more fully it would have saved trouble and at the same time if the Pharmaceutical Council in their reply had done the same thing they would have understood each other better. It should, however, be mentioned that the resolution of Mr. Bottle was perfectly clear, and this was passed without any further light on the subject. If this had been sent in reply to the first letter of the Secretary of the Association much of the correspondence would have been avoided. The Trade Association acted in no officious spirit, but to make things work as smooth as possible; they were all desirous of promoting the best interests of the chemists of the country and had the same goal in view.

The proceedings were terminated by the passing of a resolution approving of the objects of the Association, and a vote of thanks to the Chairman.

At a meeting of the Law Committee of the Chemists and Druggists' Trade Association, held on Friday, the 16th inst., the following resolutions were unanimously passed:—

"That the Solicitor be instructed to defend a member of the Association in an action commenced against him under the Medical Act, 1815, and to take such means for that purpose as he shall think fit."

"That the Secretary be directed to acknowledge the resolution passed by the Council of the Pharmaceutical Society, at its meeting on the 7th inst., which clearly answers the question put by the Secretary of the Association in his letter of November 27, 1876, and at the same time to inform the Council that the previous letters of this Committee have been misunderstood as this Committee had no intention of forcing upon the Council any cases, but simply of supplying, as they stated, such evidence as the Council might deem necessary if the Council on its part was willing to make use of the same."

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, February 13, 1877, Dr. J. H. Gilbert, F.R.S., Vice-President, in the chair. The names of the visitors having been announced, and the minutes of the previous meeting read and confirmed, the names of Messrs. A. Angell, F. W. Young, E. W. Napper, and H. G. Stacey, were read for the first time. Messrs. Michael Conroy, Arthur Pearson Luff, John Angell, Joshua Bardsley, Matthew Algernon Adams, and Peter Townsend were balloted for and duly elected after their names had been read the third time.

The Chairman, in accordance with the bye-laws, announced the proposed changes in the council and officers of the society for the ensuing year. It was proposed to elect Dr. J. H. Gladstone as President in place of Professor Abel, who retires. The Vice-Presidents are Mr. Field and Dr. Roscoe, in place of Mr. Longstaff and Dr. Gladstone. The other members of council are Messrs. Lowthian Bell, C. E. Groves, W. N. Hartley, T. Hyde Hills, and G. Matthey, in place of Messrs.. D. Campbell, J. Dewar, F. Field, N. Story Maskelyne, and W. Valentin.

The first paper was by Dr. A. Dupré, "On the Estimation of Urea by Means of Hypobromite," the object of the communication being to describe a form of apparatus which could be conveniently worked, and such modifications in the preparation of the hypobromite solution as to prevent the escape of any bromine vapour, so that the process might be used in the wards of a hospital. The apparatus consists of a crucible inverted in a tall cylinder of water, and connected by a side-tube with the generator by means of a long piece of caoutchouc tube. The generator containing the proper quantity of hypobromite is a bottle closed by a vulcanized cork, through which passes a short tube to connect it with the burette, and also having a small test tube attached to it to contain 3 c.c. of the urine under examination. After the cork has been firmly inserted, the urine is mixed with the hypobromite by gently shaking the generator. The latter is briskly agitated for a short time, and then plunged into cold water. After allowing the apparatus to stand a few minutes to cool the gas to the same temperature as the water, the level of the liquid inside and outside the burette is made the same by raising the latter, and the reading of the gas taken and also of the thermometer. The necessary quantity of hypobromite is easily prepared by pouring into a stoppered cylinder enough caustic soda solution (100 grains to 250 c.c. of water) to fill it up to a 25 c.c. mark on the side, introducing a thin sealed tube, containing 2·2 c.c. of bromine, and agitating briskly, so as to break the thin tube. The amount of nitrogen given off is found to be 91 per cent. of the total quantity in the urea, and the burette may be so graduated that it gives readings of the percentage of urea at the normal presence and temperature.

The Chairman said they were much indebted to the author for facilitating the process of the estimation of urea, one of the most important in hospital practice, as showing the amount of nitrogen eliminated by the renal organs. Although urea represents nearly all the nitrogen in the urine of the human subject, this was not the case with the ruminants.

Dr. C. R A. Wright remarked that in some experiments on this method of determining urea, made in his laboratory, by Dr. Blackley, a slightly higher percentage of nitrogen had been obtained, about 93 per cent. The apparatus described by Dr. Dupré possessed considerable advantages over those of Russell and West and of Dr. Blackley, as there was no danger of spilling the corrosive hypobromite solution if ordinary care were taken; at the same time in agitating the generator the latter might get heated, and thus increase the reading.

Professor Hartley suggested the substitution of a gutta percha tube, for holding the urine in the generator in place of the fragile glass one.

The next communication was on "A New Carbometer for the Estimation of Carbonic Anhydride," by Mr. S. T. Pruen and Dr. G. Jones. It is somewhat similar to Scheibler's "calcimeter," consisting of two equal graduated glass tubes filled with water, on the surface of which a layer of oil floats, and connected with each other by a piece of caoutchouc tubing. One of these is raised or lowered automatically, the other is fixed and connected at its upper extremity with the generator by means of india rubber tubing, a chloride of calcium tube being interposed between the generator and the measuring tube. The generator consists of a small flask, in which a weighed quantity of the carbonate under examination is placed, together with a small gutta percha tube containing hydrochloric acid. The decomposition is effected in the usual way, and the evolved gas measured, the barometric pressure being taken, and the temperature observed by means of a thermometer in the measuring tube. Tables of data for the necessary corrections accompany the paper. The authors state that it is more convenient than Scheibler's apparatus, as it is less cumbersome, the tubes do not require refilling or emptying, and it is self-acting.

Mr. Warington observed that there was a source of error in the Scheibler instrument which also attached to this apparatus, namely, that the correction to be applied for the carbonic anhydride dissolved by the hydrochloric acid was the same, whatever the percentage of carbonic anhydride, whereas if there were much air and comparatively little carbonic anhydride in the flask at the close of the experiment, the hydrochloric acid would absorb but little of the carbonic anhydride, whilst if the air were rich in carbonic anhydride, the acid would absorb more of the latter.

Dr. Dupré called attention to the fact that although the gas was dried by passing over the calcic chloride, it must become moist by contact with the moist sides of the measuring tube, to which Dr. Jones replied that it was found practically that the film of oil prevented the gas from coming into contact with the water and thus becoming moist.

The next paper was "On the Influence exerted by Ammonium Sulphide in Preventing the Action of Various Solutions on Copper," by F. W. Shaw and T. Carnelly. Clean pieces of copper foil of known surface were coated with a thin film of sulphide by immersion in dilute ammonium sulphide, and subsequently thoroughly washed. The results of the action of distilled water and of various solutions on these as compared with similar pieces of clean copper are given in a series of tables, from which it appears that the film of sulphide does not lessen the action of distilled water, but, on the contrary, increases it, both at the ordinary and at elevated temperatures; this is due to the oxidizing action of the air, as shown by the results obtained in closed flasks, completely fitted with water that had previously been well boiled. In the case of saline solution the film of sulphide lessens the action on the metal; the salts experimented with being potassic nitrate, sulphate, and carbonate, sodic chloride, nitrate, and carbonate, magnesic sulphate, and ammonic chloride, nitrate and sulphate.

The Chairman having thanked the authors, the Secretary read "An Experimental Inquiry as to the Changes which occur in the Composition of Waters from Wells near the Sea," by Mr. W. H. Watson. The well examined was about nine feet deep, the bottom being twenty-four feet above the level of the sea, and was situated at Braystones near Whitehaven, about half a mile distant from the sea. Determinations of the chlorine were made each day, the water being collected at about 10 A.M., and the results are given in a table. The amount of chlorine varied from 5·95 to 17·50 grains per gallon, whilst the other constituents, such as sulphates, remained almost constant. The author considers the variations observed in the water of this well situated in an alluvial soil to be due chiefly, but not entirely, to the weather, as from the nature of the intervening strata, it may be directly subject to infiltration of sea water.

Mr. F. Maxwell Lyte said that he had examined the mineral water at the Source de Salut Bagnières de Begorre during many years, and had found that from October to December an extraordinary change took place in the nature of the water, as it became sulphurous, and the quantity of salts in it increased. It was probable that the deep spring was sulphurous, but became altered by the infiltration of other springs near the surface, which after the droughts of summer partially dried up; thus the supply of oxygen being partially cut off the spring resumed its sulphurous character.

Mr. C. E. Groves remarked that springs in alluvial soils near the sea might derive much of their chlorine from the acid driven over the land in stormy weather, and which, settling on the land, was washed in along with the surface water by subsequent rains.

The Chairman, in thanking the author, said it was necessary to know all the circumstances connected with the well before the source of the large amount of chlorides in it could be definitely accounted for.

"On the Solvent Action of various Saline Solutions on Lead," by Mr. M. M. P. Muir. The author, from an examination of the action of various saline solutions on lead, infers that in the first place a soluble salt of lead is produced, which by the action of carbon dioxide, absorbed from the atmosphere, is slowly converted into hydrocarbonate, in which form it is to a greater or less degree precipitated. In certain solutions, especially those containing ammonium nitrate and calcium chloride, the formation of the soluble lead salt proceeds more rapidly than its precipitation as hydrocarbonate, although after long periods the latter action preponderates. Lastly, carbonates reprecipitate the soluble lead salt in the forms of hydrocarbonate as fast as it is produced. A table showing the solubility of lead hydrocarbonate in the saline solutions examined is appended to the paper.

The Chairman having thanked the author, two other papers were read by the Secretary, the first being a preliminary notice on "The Derivatives of Di-isobutyl," by Mr. W. Carlston-Williams. The di-isobutyl employed in the investigation was prepared by the action of sodium on isobutyl bromide, and boiled at 109° C.; submitted to the action of chlorine, it yielded a liquid possessing an odour resembling that of the orange, and consisting of a mixture of iso-primary and iso-secondary octylic chlorides, boiling at 170° to 180°. The mixed chlorides, heated with potassic acetate and acetic acid at 200°, yielded besides the octylic acetates, an octylene, boiling at 122°, and which had a specific gravity of 0·7526 at 16°. The mixed acetates boiled at 193°–205°, and by treatment with potassic hydrate, were converted into a mixture of the primary and secondary octylic alcohols, boiling at 175°–187°, the quantity of which was too small to permit of any attempt at separation. It was, therefore, oxidized by potassium dichromate and sulphuric acid, when it yielded iso-caprylic acid and an acetone, which on further oxidation split up into acetic and carbonic acids. From these results it would seem that the secondary alcohol is isopropylisobutylcarbinol,

$$CH(CH_3)_2{\cdot}CH(OH){\cdot}CH_2{\cdot}C(CH_3)_2,$$

whilst the primary alcohol may be represented by the formula:—

$$CH(CH_3)_2{\cdot}CH_2{\cdot}CH_2{\cdot}CH(CH_3){\cdot}CH_2(OH).$$

The isocaprylic acid is an oily liquid, somewhat resembling valerianic acid in odour. Its silver salt is slightly soluble in boiling water, and is deposited on cooling in minute tooth-shaped crystals; the barium, lead and zinc salts are amorphous, but the calcium salt is characteristic, crystallizing in plates radiating from a central point. It is less soluble in hot than in cold water, so that on raising the temperature of a solution saturated at 15° to 36° C. the salt is precipitated.

"Notes on Madder Colouring Matters," by Dr. E. Schunck and Dr. H. Roemer. The first of these describes a method of detecting small quantities of alizarin in mixtures of alizarin and purpurin by exposing the solution of the substance in caustic alkali to the air until it has become almost colourless; the purpurin is thus decomposed, and on agitating the acidified solution with ether the alizarin is taken up and may be recognized in the usual manner by its absorption spectrum. The second note is on "Purpuroxanthic Acid, a colouring matter found in commercial purpurin," from which it was separated by boiling it with alum liquor, precipitating by hydrochloric acid, and extracting the precipitate with alcohol; a residue containing alumina was left which gave purpuroxanthic acid by crystallization from alcohol mixed with a little hydrochloric acid. This acid may also be obtained from the alcoholic mother liquor obtained in crystallizing commercial purpurin, by evaporating them, boiling the residue with water and adding hydrochloric acid to the filtrate, which throws down the impure purpuroxanthic acid as an orange precipitate. It is purified by boiling it with baryta, which dissolves the impurities and leaves the acid as a baric salt. Purpuroxanthic acid, $C_{15}H_8O_6$ or $C_{14}H_7O_4$,COOH, crystallizes in yellow lustrous needles or scales, which are easily soluble in alcohol and acetic acid, and far more so in boiling water than most madder products. It melts at 231°, and at 232°–233° C. decomposes, giving off carbonic anhydride, and leaving purpuroxanthin, $C_{14}H_8O_4$, no other substance being produced. Purpuroxanthic acid dyes alumina and iron mordants orange and brown respectively, but the colours are very fugitive.

The Chairman, having thanked the authors, adjourned the meeting until Thursday, 1 March, when there will be a lecture by Professor T. E. Thorpe, "On the Theory of the Bunsen Lamp."

SOCIETY OF ARTS.

Zinc White as Paint, and the Treatment of Iron for the Prevention of Corrosion.*

BY PROFESSOR BARFF, M.A.

White Lead.

Some years ago, when I first had the honour of delivering a course of lectures before this Society, my subject was artists' colours and pigments. In those lectures I pointed out very earnestly the great objection I had to white lead as a pigment for artists. The following reasons which I then assigned for its disuse I have still

* From the *Journal of the Society of Arts*, February 16, 1877.

further confirmed by long experience. First, white lead is discoloured by sulphuretted hydrogen, which is known as foul air. In small quantities sulphuretted hydrogen changes the tint of white lead to that of a dirty brown colour, and in larger quantities it blackens it completely. It is manifest that such a pigment ought never to be employed where the permanency of a delicate tint is desired and where foul air can have access to the painting in which it is employed. Another reason I then explained was, that oil with which lead is ground up is decomposed, first, by the action of the oxide of lead in the white lead, forming a lead soap known as lead plaster; and further, after the lapse of a long time, an interchange takes place between the acids of the oil and the acid of the carbonate of lead; take for example the oleic acid and the carbonate of lead forming oleate of lead, which is, in fact, lead soap. I shall presently show you a specimen of lead soap, and you will be able to distinguish the difference of opacity between it and lead paint; therefore, if lead paint, that is, carbonate of lead, loses its opacity, it loses that quality for which it is so much valued. It is true that a saponification of the oil by the oxide of lead and the carbonate of lead gives to the paint at first a quality for which it is much valued; and this quality consists in the facility with which the workman can lay it on, and make it cover the ground which it is intended to conceal. But this very change, which in the first instance is an advantage, brings about future calamity, for the saponification increasing, the transparency of the pigment also increases, and so at last that which it was intended to conceal, again reveals its existence through it. I do not intend this evening to enter upon the subject of white lead manufacture. I have, on one or two occasions, very fully explained it in this room, and other gentlemen in treating on subjects in which it occurs have also treated its manufacture in an exhaustive manner. It is enough for me to remark that wherever white lead comes in contact with the digestive organs of a human being, whether it be by passing in a state of fine division into the mouth, and thence out, as it must do, without excessive precautions, into the system—in places where white lead is manufactured and ground—or through the carelessness and want of cleanliness of painters, who eat their meals with hands sullied by noxious materials, so that it passes into their system, it produces the same disease, which is known by the name of "lead-poisoning." Experience tells us that many, even most, men will for temporary ease run the risk of future pain and calamity. It is all very well to say that precautions are taken to save men from the consequence of their carelessness and indulgence. Similar precautions are taken in coal-mines, which if attended to would prevent the awful calamities which so frequently result from their neglect. We must not content ourselves with these precautions when we can, if we choose, do away with the danger altogether. It is clear we cannot give up the use of coal, but now we can give up the use of white lead in those employments where it is injurious to the health of the employed; and nothing but a miserable prejudice, and what is worse, a miserable clinging to commercial interests, can stand in the way of this reform, which, I believe I can show you to-night, will not require any sacrifice on the part of those who use this material for the decoration, cleaning, and beautyfying of the houses in which they dwell. I have to introduce to your notice a zinc pigment, which possesses nearly, if not quite, as good a body as the best white lead, and which will neither turn brown nor blacken by the action of foul air, nor will it become semi-transparent, as I have already shown you white lead does.

The processes of its manufacture have been patented, and it is now being made on a large scale for the inventor, Mr. T. Griffiths, of the Silicate Paint Company, Liverpool. It has for its basis the white sulphide of zinc, a precipitate well known to chemists in their analysis, but one which usually presents a most dingy and uninviting appearance in the test-tube. It was found, however, that this precipitate, properly treated, possessed what painters term "body," and the problem to be solved was, how to prepare it pure in tint. Like most important inventions, the first laboratory experiments were disappointing and unsatisfactory. It was attempted to precipitate pure sulphate of zinc by pure sulphide of sodium. But it was found that, even after several crystallizations, the zinc sulphate still retained sufficient impurities to injure the brilliancy of the white, and the sulphide of sodium was liable to the same objections. For a time this was abandoned. Sulphuretted hydrogen was tried, the zinc solution being made alkaline as it became acid. It is well known to chemists that zinc frequently contains traces of cadmium, which it is very difficult to remove. The cadmium at once showed itself in this method, being precipitated as a yellow sulphide. Of course, the cadmium might have been easily removed by saturating the acid zinc solution with the gas and filtering from the precipitate thus formed; but the process had the great objection of being too expensive for large manufacture. Sulphide of calcium was found to answer well as a precipitant; but, for some unexplained cause, the product lacked "body." It was determined to try sulphide of sodium on a large scale, no attempt being made to purify the zinc solution, and the sulphide of sodium only being allowed to deposit such solid matters as did not remain in solution. Strange to say, the zinc sulphide precipitated was perfectly white, and the original impurities remained in solution. The washed and dried precipitate, although having better body than ordinary zinc white, still fell far short of white lead in this quality, and calcination was resorted to to remedy this. The result was satisfactory as regarded body, but the pigment acquired a yellow tint, which could not be removed; besides this, it acquired a degree of hardness which necessitated much grinding to make it fit for use as paint. If the particles of zinc sulphide could be kept asunder in the process of calcination, this might be remedied. Sulphate of barium promised well for this purpose, and it was accordingly tried. Zinc sulphate was first precipitated by sulphide of sodium, and to the mixture was added a certain proportion of chloride of barium. The resulting precipitate of sulphate of barium was intimately mixed with the first precipitate of sulphide of zinc, and the washed precipitates were subjected to a red heat for several hours in a reverberatory furnace. On examining the product it was found to be excellent as regards body, far better than the sulphide of zinc alone, in fact quite equal to while lead, and the tint was pure. These results were most satisfactory, and it was clearly shown that sulphate of barium was far from being detrimental, and therefore could not be looked upon as an adulterant. One quality was still wanting, "softness." The product, when ground with oil, did not work kindly under the brush, but had a tendency to drag and become streaky. Many remedies were suggested to obviate this, but for various reasons had to be rejected. It was found, however, after much experimentation and research, that magnesia in small quantity imparted this quality of softness to the pigment and caused it to unite kindly with oil. This admixture was effected in the precipitating vats along with the sulphide of zinc, and no doubt saponification is brought about between the magnesia and the oil similar to that produced by white lead and oil, but not to the same extent, and thus ease in working is imparted to the paint. This pigment is now being manufactured on the principles I have described, such small modifications only being introduced as the growing knowledge of the peculiarities of the process suggest.

Iron.

While experimenting, two or three years ago, with my friend, Mr. Hugh Smith, on different methods for preventing incrustation and corroding of steam boilers, I was led, through the failure of all the processes employed, to believe that, if it were possible to convert the surfaces of iron plates into the magnetic, or black oxide of iron, in such a manner that the particles of black oxide formed in the position of the original particles of iron could be rendered perfectly adherent to the iron surface, which does not become peroxidized, and perfectly coherent with one another, the object would be effected. I do not intend to enter into the chemistry of the oxidation of iron to its full extent; it would take too much time, and it would rather tend to confuse than to enlighted those who are not well up in their chemistry, and would raise questions which would bring on prematurely a collision with the views of some of my brother chemists, which collision, under suitable circumstances, at some future time, not very remote, I look forward to with considerable satisfaction, as it will be the means of solving many phenomena which have never yet been explained. A piece of dry iron, its surface being polished, may be exposed for any length of time to dry air without rusting, but it begins to rust at once as soon as the slightest moisture comes in contact with it. We have to consider only two oxides of iron: one containing 56 parts by weight of the metal to 16 parts of oxygen, and the other containing twice 56 parts of iron and three times 16 parts by weight of oxygen. We speak of these oxides as the protoxide and sesquioxide, or as ferrous and ferric oxide.

Immediately the protoxide is formed, it being more moist, it unites with oxygen and becomes gradually converted into the ferric oxide. Now, let us suppose a moist iron plate to come into contact with oxygen. It is clear that the protoxide will be first formed, and this rapidly becomes converted into the higher oxide. Now, suppose you take a solution of the salt of the higher oxide and put into it metallic iron, in time, the air being excluded, this higher salt will become converted into a salt of the lower oxide. Let us now see how this bears upon the rapid oxidation of iron in the presence of moisture. We have seen that when oxygen comes in contact with moisture the first oxide is formed and becomes rapidly oxidized into the higher one. But this higher oxide is in contact with metallic iron, which will reduce it to the lower oxide, thus becoming oxidized by the oxygen which it has taken up from the higher oxide. You will now see clearly how it is that iron rusts throughout its whole substance with such rapidity, for the oxide of iron serves as a carrier for atmospheric oxygen to the iron to almost any depth. There is another oxide of iron, called the black or magnetic oxide, containing three times 56 parts by weight of iron and four times 16 parts by weight of oxygen. Some chemists consider this oxide to be a sort of mixture of the two others, and they call it ferroso-ferric oxide; whether this be the case or not does not matter to us this evening. But it is a most important point for our consideration, that this oxide undergoes no change whatever in the presence of moisture and atmospheric oxygen. Nor does any temperature to which it can be exposed, in any of the ordinary uses to which iron is applied in the presence of moisture, either decompose it or produce its further oxidation. In every school where chemistry is taught, in the most elementary lecture on hydrogen the pupils are told that if they pass steam over red-hot filings contained in an iron tube, they will be able to collect and burn hydrogen gas at the opposite end of the tube to where the steam enters. For a long time it was thought that the particles of black oxide formed by this decomposition of the steam were pulverulent, and could not be made to cohere into a solid mass. The result of a considerable number of experiments has been to prove that they can be made not only coherent amongst themselves but adherent to the body, and that both these produce a proper formation of this black oxide on the surface of iron plates; for, as I will show you later on, the oxidized surface of the iron resists for a long time, and more effectually, the rubbing with emery paper, than does the simple metallic iron itself, and that there is a very manifest difference between the ease with which a sharp rasp is able to cut away the surface of the iron, and the difficulty with which this black oxide is removed from the surface by that same instrument. The method which long experience has taught us is the best for carrying out this process for the protection of iron articles in common use, is to raise the temperature of those articles, in a suitable chamber, say to 500° F., and then pass the steam from a suitable generator into this chamber, keeping these articles for five, six, or seven hours, as the case may be, at that temperature in an atmosphere of superheated steam. I will presently call your attention to the diagram of the furnace and muffle which I have employed in all our later experiments, and in which all the specimens before you, which will be alluded to in this paper, were prepared. Differences of temperature are employed where different objects are to be obtained. If it be wished to act upon surfaces of polished iron or steel, it is desirable to let the temperature remain at 500° F., until the operation is completed. Articles coated in this way will not resist the action of continued moisture such as has prevailed for the last two months, when exposed out of doors; but they will resist the action of any amount of moisture with which they may come in contact in a house or building; and the reason of this will be very obvious, because only a thin film of the iron on its surface is transformed into the black oxide. This I will explain more fully to you, when I call your attention to individual specimens. At a temperature of 1200° F., and under an exposure to superheated steam for six or seven hours, the iron surface becomes so changed that it will stand the action of water for any length of time, even if that water be impregnated with the acid fumes of the laboratory. Before calling your attention to our failures and successes as they lie before you on the table, I will just allude to a few of the uses to which this process may be, as I consider, successfully applied—to water-mains, also to water-connecting pipes, as well as to the water-pipes used inside the house, which, in this case, would supplant their leaden predecessors. In this hall of hygiene, these words will, doubtless, sound as sweet music to the ears of many of those who have honoured me with their attendance this evening. The greatest objection to the use of iron pipes for the supply of water in houses hitherto has been this, that by rusting they caused the first quantities of water drawn off in the morning to be dirty and turbid; now this will be entirely prevented, if the pipes be first exposed to the treatment which I have just explained to you—of course gas-pipes could with advantage be similarly acted upon—and as the surface, when oxidized, is harder than the natural surface of the iron, the friction of large bodies of water through the pipes, and the friction necessarily employed in fixing them in their places, would be much better resisted than by the untreated iron itself. I cannot over-estimate the advantages which the employment of this process must confer on architects, who will be by it enabled to employ iron, whether wrought or cast, much more largely, not only in the decoration but in the construction of their buildings. Last summer I was at a very large house in the country, where the entrance portico, some twenty feet high, was being painted and decorated, when one of the large plaster ornaments of the ceiling broke away from its holdings, and would have fallen to the ground except that it was caught by a workman. This ornament weighed not less than twenty-five pounds, and if it had fallen from this height upon the workmen below it must have killed them. The ornament had been there many years, and was fixed up in the best method possible, it being supported and secured by iron rods. On examination I found that these rods were rusted through completely to the very centre. I need not make any comment upon this, since I have been able to introduce you to iron treated in such a way that it will never rust. Of course if the process will answer for architectural ornaments, it will answer for statues, so that iron may be used instead of bronze, which will materially lessen the cost of casting statues, both in the material and in the expense of making the moulds. You well know that when a tinned saucepan is allowed to get dry on the fire and burns, as the servant calls it, that it is rendered useless until it is tinned again. Now, if such a saucepan be treated by the method I recommend it may be allowed to get red-hot without suffering injury, for the protection on its surface is produced at a red heat. We have experimented on some screws, hinges, locks, keys, bolts, with complete success. It has been suggested to me that the iron nipples used in gas-lights would not corrode, and would, therefore, be more useful, if submitted to this action of superheated steam. Wherever iron is used, railings, street gas-posts, iron safes for keeping documents fire-proof and thief-proof, the framework of filters, tanks, cisterns for domestic and other uses, iron employed in the erection of temporary buildings—which, I flatter myself, if treated by this process, would become permanent buildings—all these, and many other applications of iron to the arts, would immensely gain by being submitted to this oxidizing action. I think I need hardly take up your time by enumerating other applications for the preservation of iron, for it appears to me that they would be commensurate with most of the uses to which iron is applied, save and except those where friction—such as that to which rails and iron wheels are exposed—would necessarily wear away the coating, as they wear away the material itself. I am happy to see a namesake of mine here present this evening, who will tell you that he is carrying out a process for the manufacture of peat into charcoal by the action of super-heated steam, and that he is enabled, by super-heated steam alone, to raise the temperature of his chambers to a red heat, quite sufficient to effect his carbonizing process. I will now call your attention to the specimens here before you, and to a description of the furnace which we employ, and I shall be most happy to explain, on being questioned, any parts of my process which may appear to be obscure, and to answer, if I can, any objections which you, gentlemen, in the interests of science, will feel it your duty to bring against it.

Parliamentary and Law Proceedings.

Personation at the Preliminary Examination.

At Bow Street on Saturday, the 17th inst., Andrew Ritchie Hunter, recently a clerk in the Savings' Bank department of the Post Office, was charged on a warrant, before Mr. Flowers, with aiding and abetting one John Thomas Falkner Colegrove, against whom a warrant was granted but who was not then apprehended, with procuring his registration under the Pharmacy Act. Mr. Straight appeared on behalf of the Pharmaceutical Society. It appeared that Colegrove having been doubtful as to his success in passing the Preliminary examination, the prisoner, a young man who had gained prizes and medals for having passed educational examinations, undertook to offer himself as J. T. F. Colegrove for the Preliminary examination of the Society which was to be held at Cambridge in October last. He wrote various letters in the name of Colegrove to the secretary of the Society respecting the forms of application, etc., necessary for the examination, and subsequently wrote, on the 2nd of October last, to the head of his office to excuse his attendance as he was ill, and took the opportunity to go to Cambridge, and underwent the examination by papers. He wrote again afterwards to know the result of his examination, and was informed that he had passed. The letters written in the name of "Colegrove" were identical in handwriting with that of the prisoner written to the head of his office, excusing his attendance on the ground of illness. The prisoner, on being apprehended by Detective Swanson, did not deny the charge. Mr. Straight said that the Pharmaceutical Society had acted upon the information contained in an anonymous letter received upon the subject.

Mr. Bremridge, the secretary of the Pharmaceutical Society, was examined shortly, and, after formal evidence from another witness, the prisoner was remanded.

On Monday last John Thomas Faulkner Colegrove was charged on a warrant before Mr. Vaughan with falsely procuring his registration under the Pharmacy Acts. Detective-Serjeant Andrews, Scotland Yard, deposed that after receiving the warrant for the apprehension of the prisoner he went to Liverpool, and from thence to Stamford, where he found him acting as manager to a Mr. Reeves, chemist. In answer to witness, the prisoner said he passed an examination in December last of the Pharmaceutical Society, but made no reply to a question put respecting the Preliminary examination at Cambridge. Witness took him to the station, and on the way to London the prisoner said, "I have regretted ever since I did it. It was very foolish of me. I passed my Minor examination so well, and also obtained two medals from the South London School of Pharmacy for proficiency, that I now feel I could have passed my Preliminary examination. My object was to save time." The prisoner also said that Hunter had passed for him. After some formal evidence the case was adjourned until Saturday (to-day), when Hunter will be again brought up. The question of bail was deferred.

Copper in Preserved Peas.

At Marlborough Street Police Court, on Monday, the adjourned summons against a number of foreign provision dealers in Soho for selling French preserved peas, alleged to be adulterated with copper was again before Mr. Knox. Mr. Philbrick, Q.C., attended, on behalf of the Strand Board of Works, to prosecute: Mr. Edward Lewis for the defence. Mr. Lewis asked the magistrate to give his decision in the case of Louis Barron, which had been fully argued on the last occasion, before proceeding with the other cases. It was understood that the matter stood over for the magistrate to consider his decision. Mr. Knox said the matter had been practically exhausted in Barron's case; but it would be the better course to take another case, as he understood many scientific persons were now prepared to give evidence. The evidence for and against Barron was so evenly balanced that he should adjourn that case *sine die*, and Mr. Lewis, if he thought fit, could apply for a *mandamus* to compel him to give a decision. Mr. Lewis was not desirous of taking such a course, alhtough he confessed to some disappointment in not having a decision as anticipated. It was then arranged that the summons against another defendant named Detmar should be taken. Formal proof having been given of the purchase of a tin of Brant's French preserved peas, Mr. Piesse, official analyst for the Union, stated that he had analysed the sample of peas submitted to him, and found 0·56 of a grain of copper. On the application of Mr. Lewis the certificate of the Government analyst at Somerset House was produced. From the certificate it appeared that the quantity of copper found in a similar sample of peas from the same tin was returned at 0·23. Mr. Lewis pointed out that in the case of Barron the Government analysis had found much less copper than Mr. Piesse had declared to be present. And in the present case there was a great disparity between the result of the analyses of the Government analyst and that of Mr. Piesse. The summons against another of the defendants, William Lingner, was taken. Mr. Philbrick said the proceedings were taken under the Sale of Food and Drugs Act, 1875, in respect of a tin of preserved peas sold by the defendants to the inspector appointed by the Board of Works, Strand Union, and which on being analysed were found to contain copper to the extent of ·088 of metallic copper, equal to 2¼ grains of sulphate of copper. The amount of copper might be small, but it was sufficient to be dangerous. Mr. F. Taylor, inspector to the Strand District Union, and Mr. Piesse, analyst to the Strand District Board of Works, gave evidence in support of the summons.

Dr. Conway Evans, M.D., medical officer of health, said he had been in practice for upwards of twenty years, during which time he had held several important appointments. He considered that the larger quantity of salt of copper spoken of in a 11d. tin of peas, if eaten daily or repeatedly, would be injurious to health and would produce chronic poisoning, but many persons might eat a quantity of these peas several times without apparently suffering any injurious effects, the period varying in accordance with difference of vigour, age, health, etc. Two or three doses might affect some persons and not others. From fourteen to fifteen grains of copper were sometimes given as an emetic, and sometimes in ague or chronic diarrhœa one-eighth to three grains were given as a tonic. It was a well known medical fact that in respect of some poisons—such, for instance, as mercury—certain persons were peculiarly susceptible to their influence, and it was possible that these peas containing copper, if swallowed by persons ignorant of their own susceptibilities, might, even in a single dose or a few doses, lead to injurious consequences. He believed copper was more fatal in a smaller dose than salt of lead. The heightening the colours of preserves with copper was once a common practice. Cases of poisoning by copper were formerly very common, but copper utensils in cooking had given place to tin and iron saucepans. Such cases were of rare occurrence. Pure metallic copper he believed to be harmless, but it was dangerous when in contact with other substances and when dissolved.

Mr. Philbrick here read the symptoms of chronic poisoning by copper; they were very slow and insidious, as described by Tardieu.

Dr. William Guy, M.B., F.R.C.P., and Vice-President of the Royal Society, said that cases of poisoning by copper had occurred in which the quantity swallowed must have been small. He had studied the question of poisons particularly. The fact of a trace of copper in the human body would not prove its existence in a poisonous form. He had made inquiries for Government into the effects of poisoning in certain trades. Palsy followed from poisoning by copper. Two cases had come under his knowledge of poisoning by green paper in a room. The poisoning, in his opinion, came from the copper, not the arsenic. Salts of copper he considered more poisonous than lead. The small quantity of copper contained in the peas in question from France might prove injurious, and slowly undermine health. On a nervous person copper was more likely to produce dangerous symptoms than on any one else. With regard to the presence of 3·6 of copper, if taken one-third at a time it would not affect a healthy person, and if repeated in small doses it would, in his opinion, be ultimately injurious to health. He considered that any article containing the amount of copper spoken to by Mr. Piesse should not be allowed to be sold for one moment. Sulphate of copper in its virulence ranked fourth in the class of poisons.

Dr. Charles Tidy, M.D., Professor of Chemistry and Medical Jurisprudence, and Medical Officer of Health for Islington, gave similar evidence. He had studied poisons, had experimented on fresh peas and pods, and found not even a trace of copper. If copper—that is, sulphate of copper—were constantly taken to the extent of the amount of copper found in the French peas it would be injurious to health.

Dr. Auguste Dupré, Ph.D., F.R.S., Lecturing Chemist at the Westminster Hospital, and President of the Society of Analysts of Great Britain stated that copper was present in traces only in animal and vegetable tissues. The quantity of copper found by Mr. Piesse was far beyond that quantity normally in any vegetable.

Dr. Grey said he considered the sale of an article containing such a quantity of copper as that found in the French peas ought not to be tolerated. Small doses of copper were more dangerous than large ones, as the latter would cause vomiting. The defendant said the peas were sent to him as quite natural peas.

Mr. Jenkins said the defendant had been convicted of a similar offence.

Mr. Knox said that, having been informed that the defendant has been before convicted for selling peas injurious to the public health, he saw nothing to cause him to mitigate the fine, which, he believed, went up to £50. He did not want to be oppressive, but the heads of the chemical and analytical kingdom had said there was not only a traceable quantity of copper in the peas, but a dangerous quantity.

Mr. Philbrick said the prosecution was instituted for the public benefit, and not with the view of punishment. The defendant said he did not sell three dozen tins in a year, and would discontinue the sale.

Mr. Knox, after cautioning the defendant and expressing a wish that publicity might be given to the fact that persons would not be permitted to bring to this country goods deleterious to the health of the inhabitants, and that in future real and substantial fines would be inflicted, fined the defendant the nominal fine of 1*s*. and £5 5*s*. costs.

Mr. Detmar having wished his case dealt with, he was similarly fined, and the other cases were adjourned.—*Times*.

Poisoning by Alcohol.

On Tuesday the 13th inst. Mr. Fullagar held an inquest at Eastbourne on the body of James Mason, 38, lodging-house keeper. The deceased went into the Sussex Hotel bar with two men, named Sims and French. There they met a man named Joshua Hatton, who treated them to a pint of raw whiskey. No sooner was it served than Mason drank off half of the liquor, the other men, Sims and French, drinking the remainder. Another was served, whereupon Hatton remarked, "I'll bet you two to one you don't tip that as you did the other." "I'll have you," said Mason, and he drank off more than he had previously done at a draught. He died the next morning, as the medical evidence showed, from alcoholic poisoning, and a verdict was returned accordingly. The jury said they wished to express very severe reprehension at the conduct of Hatton, and to suggest that the management of the bar of the hotel should be conducted more cautiously for the future as to the sale of spirits, but the Coroner did not record their representation.—*Times*.

Poisoning by Carbolic Acid.

The *British Medical Journal* mentions a case of death from poisoning by carbolic acid that has taken place at Liverpool. The deceased is said to have been an assistant in a druggist's shop, and to have drunk the carbolic acid in mistake, thinking it was a cough mixture.

Robbery at a Wholesale Druggist's.

At the Guildhall Police Court, on Friday, the 16th inst., John Okill, a carman, and William Osborne, a packer, both in the employ of Messrs. Battley and Watts, wholesale druggists, of 32, Lower Whitecross Street, were charged, on remand, with robbing their employers, and Dan Farrant, a linseed crusher, of Baron Street, Pentonville, and John Purser, a packer, living at 9, Manor Road, Bermondsey, were charged with receiving those goods well knowing them to have been stolen. On a previous occasion it was shown that the prisoners Okill and Osborne were suspected at the latter end of last year, and were watched by direction of Detective-Sergeant John Moss. They were then found to be in continual communication with each other. Detectives Henry Taylor and Frederick Downes watched them incessantly until the 8th inst., when Okill and Osborne were seen to lead the horse and cart out of the prosecutors' yard into Hanwell Street, Jewin Street, and, leaving them there, go into a public-house. They came out, and Okill drove the cart into Baron Street, got down, and went into Tarrant's warehouse. He came out, gave the carman money to get some beer, and as soon as he had gone into the public-house, took a parcel out of the cart and carried it into Tarrant's warehouse. Taylor and Downes followed him in, and saw him hand the parcel to Tarrant, who put it on a shelf. An officer searched the rooms of the house, 10, Baron Street, where he found 7lb. of Turkey rhubarb, 21lb. of tartaric acid, 21lb. of tartrate of soda, and other things, which were of a nature similar to those in the stock of Messrs. Battley and Watts. The prisoners were again remanded.

Review.

THE COMBINED NOTE-BOOK AND LECTURE NOTES, for the Use of Chemical Students. By THOMAS ELTOFT, F.C.S., etc. London, 1876. Simpkin, Marshall, and Co.

According to the author's preface, this small book was written with the view of assisting the chemical student in his home work, so that while knowledge may be acquired, it may be had without cramming. As might be expected, this attempt on the part of Mr. Eltoft has proved successful, for he has had considerable experience as a teacher of inorganic chemistry in colleges and schools. So far as we know, the book is quite novel in its construction.

The first eight chapters are taken up with information regarding the chemical elements, nomenclature and graphic formulæ, and observations on the formation of certain compounds, and the properties of gases. Then comes a note-book consisting of some eighty pages, so arranged that the student while following the lecturer may fill up with his notes spaces left opposite to certain headings. These headings relate to the occurrence, preparation and properties of bodies, together with the form of apparatus to be employed in studying, and the analytical tests which are characteristic of substances.

Following the note-book are eleven other chapters concerning the elements and their combinations, all reactions being represented by equations. Opposite the equations there are blank spaces for the student to fill up with the written meanings of the equations, and so forth.

Finally, there is given a series of tests for the principal acids.

Such a book as the one of which we are writing, may be made extremely useful in science classes where students have but few leisure hours to devote to their studies, for it must be admitted that the mere mechanical work incidental to study, is ordinarily very great, and in this instance much of this is obviated by the plan of the book.

In short as an adjunct to a text-book, it may certainly be recommended with safety, and Mr. Eltoft may be congratulated on having devised an ingenious means of helping students to obtain information.

BOOKS, PAMPHLETS, ETC., RECEIVED.

VISIONARY RHYMES, OR THE TUNINGS OF A YOUTHFUL HARP. By J. J. BROWN. Glasgow: J. Reid. 1876. From the Author.

LA VÉRITÉ SUR LE PRÉTENDU SILPHION DE LA CYRÉNAIQUE (*Silphium Cyrenaicum* du Dr. Laval); CE QU'IL EST; CE QU'IL N'EST PAS. Par F. HERINCQ. Deuxième édition. Paris: Lauwereyns. 1876. From Dr. Méhu.

AIDS TO BOTANY. By C. E. ARMAND SEMPLE, B.A., etc. London: Baillière, Tindall and Cox. 1877. From the Publishers.

Notes and Queries.

[537.] DRY ROT.—Prevention: Convert the surface of the dry timber into coal either by heat or sulphuric acid. Destruction: Diluted sulphuric acid, solution of sulphate of iron (ten per cent.), acidum pyrolignosum.

[538.] TOOTH STOPPING.—Non-expensive metallic tooth stopping. Amalgam of mercury and copper. Take one part of sulphate of mercury, one part of copper in fine powder, rub it well together with a little warm water; when the amalgam is formed wash well and remove the surplus of the mercury by pressing it through chamois. Expensive metallic tooth stopping and much preferable: Take pure gold, pure gelatine, one part of each, pure silver, two parts, melt, and when refrigerated reduce to powder by means of a file; wash well, and dry. In the moment of using it, add sufficient mercury to form a plastic mass.

[539.] ESSENCE OF MUSK.—Tinctura moschi e vesicis:—

R. Vesicæ moschi concisæ, partem unam.
Spiritus diluti,
Aquæ destillatæ, ad partes viginti quinque.
Digestione fiat tinctura.

Should be used only in perfumery.

H. W. L.

[540.] PRESERVATION OF MUSHROOMS.—Does any reader know of a good method of preserving mushrooms for scientific purposes? Plaster of paris answers well only for agarics.

H. W. LANGBECK.

PUMPKIN SEEDS.—A recent investigation of pumpkin seeds, which are largely used in Russia as a vermifuge, has enabled Kopylon to affirm (*Pharm. Zeitsch. f. Russland*, xv., 513) that they do not contain an alkaloid. Neither has he been able to confirm the presence of the crystalline glucoside reported by Dorner and Wokkowitsch. The oil obtained from the seeds by pressure was found to consist of glycerides of palmitic, myristic and oleic acids. Oil extracted by ether contained also free fatty acids.

A GUM QUERY.—Mr. Parker will find a description of the gum he speaks of (see p. 687) in Hanbury's and Flückiger's 'Pharmacographia,' p. 210, note 3. To my knowledge it has been in the market for at least the last eighteen months, and there seems no reason to doubt that it is a genuine gum arabic.

CHARLES EKIN.

"CARBOLATE OF IODINE" (Dr. Percy Boulton's formula, from *The Pharmacist*.)—

Tinct. Iodinii Comp.	fl.ʒ j.
Acid. Carbolici	♏ vj.
Glycerinæ	fl.ʒ j.
Aquæ	fl.ʒ v.

M.

The solution soon loses its iodine colour, becoming clear and colourless. It is used for inhalation.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

The Milk of Sulphur Question.

Sir,—As the purely commercial and common-sense aspect of the milk of sulphur question seems in danger of being overlooked amid the amount of historical and scientific information its discussion has called forth, let us suppose an analogous case in a different trade.

Say that one of those virtuous individuals who are morbidly sensitive about having things called by their right names, orders from his tailor a pair of doeskin trousers. Finding that he gets cloth, not skin, he prosecutes the maker for fraud, as the garment is not of the nature and quality demanded. The defendant denies fraud, pleads trade usage and common custom, alleging that garments made of real skin, although not unknown, are seldom wanted, and that he could not reasonably be expected to know that his customer wanted something different from the material usually called doeskin, no special intimation to that effect having been given.

Plaintiff produces in court works on natural history and dictionaries to show that doeskin means or ought to mean the skin of an animal, and maintains that had the real skin been the cheaper of the two, it would have been supplied.

Can there be any doubt that in such a case a magistrate would at once admit the plea of trade usage and common custom, and dismiss the action, telling plaintiff that if he wanted real doeskin, he should have taken care to say so?

Plaintiff would also probably receive a hint from defendant, that if he did not apologize and moderate his expressions about fraud, a civil action for damages might be found necessary to teach him proper respect for conventional terms. Substitute for "doeskin" in the above, the words "chamois skins," and the analogy will be equally exact.

Now, the Runcorn milk of sulphur case differs from the supposed one only in the greater strength of the defendant's position, for he can plead the authority of the London Pharmacopœia for his preparation, besides the trade usage and common custom of more than a century and a half. An authorized preparation may be faulty, in the opinion of some, but it cannot be called adulterated, when the presence of certain ingredients is a necessary result of the process prescribed.

If our Runcorn friend maintains firmly that milk of sulphur was asked for and supplied, and that if the purchaser had wanted pure precipitated sulphur he should have said so, a magistrate will have some difficulty in finding a reason for convicting.

Indeed, if any wrong has been done, the druggist is the person aggrieved, as he is made the victim of something very like a fraud, when advantage is taken of the double meaning of a word to prosecute him for selling adulterated medicines.

As to the relative therapeutic value of the two preparations known as milk of sulphur, that has really nothing to do with the point at issue.

The continued popular demand, however, for the old lac sulphuris extending over many generations, coupled with the fact that where the so-called pure has been offered it has been generally rejected, and that persistent attempts to sell only the pure precipitate have resulted in diminution or entire loss of trade in the article, seem to indicate that the common milk possesses some special advantages over the so-called pure.

As a case in point, to show that popular tradition is sometimes right when scientific authority is wrong, let us remember the strong condemnation passed by Dr. Paris in his 'Pharmacologia' upon Friar's balsam. He states, "that with respect to the use of this preparation as a styptic, the public have fallen into a serious error; fresh wounds it must necessarily injure," etc. This severe sentence must certainly have prevented many medical practitioners from using it: indeed its employment has been long regarded as decidedly unprofessional. Now, however, working their devious way through carbolic and salicylic, to benzoic acid, the profession are beginning to recognize the fact that the despised Friar's balsam combines the antiseptic and air-and-germ-excluding advantages which they have been searching to attain by other and less efficient means.

In conclusion, let me express a hope that common sense may be allowed to play its part in our trade as in others, and that our Yorkshire and Lancashire brethren may continue to sell their popular medicine labelled by its proper name, milk of sulphur, without any puzzling intimation that it is not something else, and relegate giving the information that it contains calcium sulphate to the time when it shall be considered proper to label the familiar cream of tartar as "acid potassium tartrate," or "hydropotassic tartrate," or when carbonate of soda shall be commonly asked for as the "disodic carbonate."

Alex. Kinninmont.

Glasgow.

Sir,—Surely it is high time that the discussion upon milk of sulphur was brought to an end.

After Dr. Redwood's exhaustive letter, I cannot understand how there can be two opinions upon the legal bearing of the case.

In 1721 an article containing sulphur and sulphate of lime was introduced into the Pharmacopœia under the name of lac sulphuris. In 1746 an altered mode of preparation was ordered, and to the article prepared under the new process was given the name of sulph. præcip., the chemical composition of the two substances remained more or less the same.

In 1789 the mode of preparing sulph. præcip. was altered, and an altogether different product was the result; this contained no sulphate of lime, but consisted of pure sulphur, and since that time sulph. præcip. has remained of the same chemical composition, and has been recognized as such, both by chemists and medical practitioners, and has been quoted as a distinct article in wholesale druggists' price lists.

Since previous to 1746 no article has been officially recognized by the name of lac sulphuris, so that instead of remaining an officinal preparation, the preparation of 1721 containing sulphur and sulphate of lime became an article of commerce, and is recognized as such at the present time, and by many is highly appreciated, in fact much more so than its more aristocratic descendant sulph. præcip.

No preparation not identical in chemical composition with that of 1721 has a right to usurp the title of lac sulphuris, and surely 150 years' possession ought to establish a right to the title.

Now, Sir, the difference of opinion upon the case seems to arise from the fact that some of your correspondents aim at acting up to a high standard of pharmaceutical morality (a very laudable aim), and owing to the favourable circumstances under which they are placed, they have no difficulty in carrying out their own exalted views, and consequently scorn to sell a contaminated article (during an experience of twenty years I cannot remember ever having sold the old-fashioned lac sulphuris); these should remember that there are others of their brethren who are less favoured, and have to meet the commercial requirements of an altogether different class of patrons, many of whom when they ask for their pennyworth of milk of sulphur would express dissatisfaction at being supplied with a new fashioned article, and only those with a poor class of customers know how obstinate they are in their ideas.

In conclusion, milk of sulphur is an article identical in chemical composition with the preparation of 1721; the advanced pharmacist may supply sulph. præcip. if he pleases, but to prosecute a chemist for strictly supplying the article asked for simply because it is not an officinal preparation, is an act of monstrous oppression.

Jas. Swenden.

Darlington.

Sir,—So much has been said and written of late respecting this article, that the following fact may be of interest to your readers generally. Some years ago, a military officer of high rank called upon me with a prescription for an electuary, composed of precipitated sulphur and confection of senna, and which he said had recently been dispensed in a distant part of the country, but that very much to his surprise and annoyance, it had quite a different effect to that intended. This in my opinion was caused by the use of the impure milk of sulphur, containing as it does 50 per cent. of sulphate of lime, for when the prescription was made up with the pure precipitated sulphur, the effect was, as desired, laxative. I may add my testimony also, as a pharmaceutical chemist of thirty years' standing, that I never found the impure article inquired for by my customers.

A PUBLIC ANALYST.

North Wales, Feb. 20.

Sir,—To my mind it is really amusing to see the manner by which Mr. Ellinor seeks to establish a complete identity between what he himself in effect so tacitly admits as two distinct articles.

The reasoning process which he employs to arrive at this may be likened to the idea that, under certain circumstances, truth and falsehood are alike; and that that circumstance in respect of the two articles, lac sulph. and sulph. præcip., consists in the indiscriminate use of either name to express both, or, in other words, something after the fashion of expressing things in terms such as contained in the following sentence:—"That black is white, and blue no colour at all."

I think by the mere rule of priority, without mentioning others, that no preparation of sulphur has so clear a title to the name lac sulph. as the preparation of the 1721 Pharmacopœia, and as that name has nothing at all in it, as representing it chemically, more than of an ideal character, I can therefore see no harm why it should not be retained and solely applied to the article containing sulphate of lime as well as in contradistinction to the present uncontaminated sulph. præcip.—leaving full liberty of action to all chemists to supply that which they in their consciences think the best, medicinally.

As to the name sulph. præcip., which it appears the compilers claimed in a subsequent Pharmacopœia to that of 1721, for a preparation which, though obtained by a somewhat altered process to that of that date, but which nevertheless yielded a result identically the same; of that and the appropriateness of the name applied I will leave for Mr. Ellinor to judge and to speak of how far he thinks such a name does constitutionally represent the article in question; and also as to whether he would not think that such a preparation as that of the present Pharmacopœia a far better claimant for the name than one which he himself must know, by virtue of the very process ordered to be employed, to yield the contaminated product.

I really think then that it is a great pity to see that there should be so much conservatism about this name, lac sulph., especially with those, like Mr. Ellinor, who, while advocating with such apparent consistency the necessity of calling things by their proper names, should, as it appears to me, retain in this case, and that for no other purpose than that of trade, such fancy, meaningless and unscientific name as lac sulph. to express an article which cannot be better and more truthfully represented under any other name than that of precipitated sulphur.

Now, if there was any rule by which we could classify chemicals like plants, then I should say, speaking for myself personally, as regards this preparation, lac sulph., about which so much difference of opinion exists, that it would in such case most certainly take its place under the head "sulphur," merely as a species or variety, and as such must, like all other nearly related things, have a name assigned to it, to wit, lac sulph. or some other; but distinguish we must whereinsoever they differ as regards the process and the legitimate result yielded; and therefore as regards the processes of the 1721 and 1746 Pharmacopœias on the one hand, and the process of the present Pharmacopœia on the other, I cannot for myself recognize any other identity between them than this, viz., that of their possessing some, still not all the characters in common of the pure precipitated sulphur, and for this reason ought to be different in name as they are in kind.

A. P. S.

February 19, 1877.

SANTONIN.

Sir,—Seeing the case of poisoning by santonin reported in your Journal of last week, I beg to call attention to the following paragraph, taken from *The Druggists' Circular* (New York) of this month:—

"*Dangers from Santonin.*

"In using santonin, it is well to bear in mind that comparatively small doses have produced convulsions of a somewhat grave character. A German paper lately reported a case in which poisonous effects were produced in a child two years old by the ingestion of so small a dose as a grain and a half. Convulsions commenced in the face and extended to the extremities, while the respiratory action was greatly impeded. Under warm baths, enemata and artificial respiration the patient recovered. The physician in charge of the case then instituted a series of experiments on the lower animals, and found that chloral and ether inhalations controlled the convulsions produced by santonin. He naturally argues that the same treatment should be pursued in the human subject when a poisonous dose is taken."

In this case the symptoms described bear a very close resemblance to those of strychnia poisoning, and the antidotes found to be useful in cases of overdoses of santonin are similar to those generally recommended for strychnia. As no chemical analysis, proving the presence of strychnia, appears to have been made in the Manchester case, is it not possible that this may be a true case of poisoning by santonin, and not by strychnia, as supposed?

368, *Clapham Road.* A. RIVERS WILLSON.

[*** The evidence given was distinctly to the effect that the santonin was mixed with crystals of strychnine.—ED. PHARM. JOURN.]

F.C.—Several recipes for this preparation have already been given. See vol. vi., p. 598.

C.J.H.—Questions such as you have sent, involving in an answer the recommendation of a particular firm, are inadmissible to these columns.

T. Martin.—The Pharmacy Act, 1868, does not apply to Ireland.

W. L. Yates.—It would be unsafe to do so without the permission of the Inland Revenue Commissioners.

J. H. Talbot.—The only persons who can authoritatively answer your question are the Inland Revenue Commissioners.

C. F. Jarvis.—We believe so. Apply to the Secretary of the Apothecaries' Company.

"*Picroglycion.*"—We think in such a case a pharmacist is justified in acting according to his discretion, and is not bound to give his reasons to his customer.

"*Beta.*"—(1.) *Pharm. Journ.* [3], vol. ii., pp. 21 and 41. (2.) Semolina is the large hard grains of wheat flour, retained in the bolting machine after the finer flour has passed through. Manna Krout is a granular preparation of wheat, deprived of bran.

J. Cock.—A series of articles on the subject are in course of publication in the *Echo*, and could probably be obtained by applying at the office, Catherine Street, W.C.

H. de Styrap.—We cannot say. We doubt whether such a substance is imported as an article of commerce.

R. Stinton.—The quantity is usually about 60 per cent.

"*Syrupus.*"—(1) *Tortula muralis, β. rupestris*; (2) *Bryum capillare*; (3) *Tortula convoluta*; (4) Send a better specimen; (5 and 6) *Hypnum serpens*; (7) *Hypnum velutinum*; (8) *Hypnum confertum.* There is no book such as you require at present.

J. B.—The decomposition cannot be prevented. Dilute before mixing the ingredients.

J. Wingrove.—When "Liq. Arsenic." is ordered Liquor Arsenicalis, B.P., should undoubtedly be dispensed, not Liquor Arsenici Hydrochloricus.

"*Beta.*"—The answer to your question is to be found out by experiment, which we would recommend you to undertake for yourself.

Felix Stevens.—We understand it is expected that the Year-Book of Pharmacy will be published at the end of the month.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Heynes, Mr. Wingrave, Mr. Munday, Mr. R. Williams, Mr. S. Taylor, Gnol, G. W. G., W. H. S., A. P. S., F. J. K.

CHRYSOPHANIC ACID AND ITS SOURCES.

BY W. LAUDER LINDSAY, M.D., F.L.S., F.R.S.E.

If it be of any consequence to procure this acid in quantity for use in the treatment of skin or other diseases, there is a much more plentiful and much cheaper source of supply than any of those mentioned by recent writers in the *British Medical Journal*. No doubt it occurs in medicinal rhubarb, Goa powder, and senna leaves, as various writers in the said journal point out. These articles, however, from which it is produced by chemical means, are of foreign growth, are scarce in the drug market, and are, therefore, more or less costly. On the other hand, the acid is to be found in, and may be extracted with ease, I have every reason to believe, from, an indigenous plant that occurs literally everywhere, the cost of which is simply that of collecting and cleaning it. I allude to the common yellow wall *lichen*—the *Physcia parietina*, L., of botanists. To chrysophanic acid the said lichen owes its beautiful colour, as do certain other lichens, such as *Placodium elegans*, Link, and *Chlorea vulpina*, L. So abundant is it in the first-named lichen, which has been its usual source of supply to chemists, and so long has it been known to chemists as one of the products of that common lichen, that it has been more familiar to them as Parietinic, than as chrysophanic acid—synonyms being Parietin and parietic acid—all so named from the specific designation of the lichen, *parietina*, wall-growing. The very abundance of *Physcia parietina*, on walls, on rocks and stones of all kinds, on house roofs, gate posts, fences, trees, and shrubs in all the three kingdoms, and all the lowland parts of them, and the care and cheapness with which it may be collected, may, however, operate to its disadvantage. For about a quarter of a century I have been pressing on the attention alike of chemists, pharmaceutists, and physicians, as eminently deserving their attention, *the medicinal products derivable from lichens*, and I have done so in vain. The same kind of neglect has been shown as regards the products of the fungi and algæ, as well as of our highest forms of vegetation that are *indigenous*, and apparently because they are so. Indubitably the proverb that "Far away fowls have fair feathers" is as true of fashions in medicine as of fashions of other kinds. Products appear to be valued because they are *foreign*, and the more foreign and rarer the better; while our own plentiful, cheap, otherwise worthless, or at least non-utilized plants, phænogamic as well as cryptogamic, are neglected, nay, despised. Pliny reproved *his* countrymen for neglecting what was near and pursuing what was distant.—"*Proximorum incuriosi, longinqua sectamur.*" But the reproach is quite as applicable to ourselves, to our day and generation, as to the countrymen and contemporaries of Pliny. In short,

> "'Tis *ever*: What's within our ken,
> Owl-like, we blink at, and direct our search
> To farthest Inde in quest of novelties,
> Whilst here, *at home*, upon our very threshold,
> Ten thousand objects hurtle into view,
> Of interest wonderful."

Now the fact is that our own indigenous lichens abound in products that have been, or might be, used in medicine: some of them as substitutes for, or rivals to, such substances as quinine and salicin. Not only do they give us starches and mucilages, alcohols, and other products, which, however serviceable to man, are non-medicinal, or may be so considered; but lichens yield also—to the ingenuity of the chemist—acid or other principles that are tonic, febrifuge, antiperiodic, astringent, anthelmintic, or purgative, just as they furnish also a series of splendid dyes that continue to stand their ground against the aniline colours of recent introduction. In connection with these valuable dyes, and also with their use as food for man or other animals, lichens have been made the subject of repeated investigation by chemists, chiefly continental. In this country, Dr. Stenhouse, of London, and Dr. Schunck, of Manchester, both Fellows of the Royal Society, have distinguished themselves by their researches on lichen products of the *tinctorial* class. Little, however, has been done in reference to the use of lichen products in *medicine*,* though not a few monographs of a general kind have been published, chiefly in Germany, Sweden, or other continental countries. As much, perhaps, is known of parietinic, now described as chrysophanic, acid as of any other lichen product that has been used, or that has been proposed for use, in medicine. Its application to the treatment of skin diseases would appear to be comparatively recent, but it is far from being the most important application that may be made of it. Many years ago it was brought forward as a rival of quinine; and it has yet to be decided, indeed, what are its curative virtues, if any, whether externally applied or internally administered.

Much of what we know of the nature and properties of parietinic acid is unquestionably due to its brilliance as a colouring matter. Our present knowledge amounts mainly to the following:

The name "chrysophanic acid" was given it by Rochleder and Heldt, the German chemists who first properly studied its composition. In so far, however, as it is better known generally as a product of Russian and East Indian rhubarb, the acid in question has also been denominated *Rhéin*, or *Rheic acid*, and *Rhabarbarin*. There is a substance known as *Rheumin* and *Rhubarbaric acid*, as well as *Parmelia yellow*, which may or may not be identical with chrysophanic acid. For *Physcia parietina* is described as containing *two* yellow colouring matters, one of which is non-crystallizable (W.).

The composition of chrysophanic acid, according to different chemists, is—

$C_{10}H_8O_3$ (Rochleder and Heldt).
$C_{10}H_8O_6$ (Pereira).
$\left.\begin{matrix} C_{10}H_4O_3 \\ C_{40}H_{16}O_{12} \end{matrix}\right\}$ (Gregory).

Its general characters are these: It occurs in golden-yellow crystals (Gregory), but Pereira describes the pure acid as *granular* and not crystalline. With solution of ammonia or potash it yields a splendid red colour. Its salts, while red in solution, are blue or violet when dry (Gregory). If the potash solution be evaporated to dryness, the red changes to violet and blue. Chrysophanic acid, therefore, is, from one point of view, a *yellow* colouring matter,

* I introduced a short section on the "*Medicinal Substances*" they yield, in a paper on "The Economical Applications of British Lichens," published in the *Phytologist*, vol. i., new series, 1856, p. 187.

from which is derived a secondary *red* dye, known as Parmelia red (W.)

Among the synonyms of chrysophanic acid, I find "usnic acid," just as "parietine" is given as a synonym of Usnic acid. In both cases there is probably mistake or confusion—as usnic acid, which was also examined and described by Rochleder and Heldt, occurs in a different series of lichens. It may, however, occur sometimes in the same lichens with chrysophanic acid. So far as *colorific* properties are concerned, its character is similar to that of chrysophanic acid. The latter acid is also liable to be confounded with Vulpinic acid, which occurs in two of the same lichens that contain chrysophanic acid—*Chlorea vulpina*, and *Physcia parietina*: in which case it is at present impossible to determine the part played by vulpinic acid in the vivid coloration of the lichen thallus.

Those who desire information concerning parietinic acid in particular, or the medicinal products of the lichens in general, may consult the following works, some of which give full references to monographs on these subjects, mostly published in Germany.

I. Lindsay: 'Popular History of British Lichens,' 1856; pp. 80—4, 91—93, 125—6, 129, 131, 137, 142, 145, 148, 152—3, 155—9, 164—5, 168, 175, 183, 200, 208—210, 229, 267, 269, 273, 297, 320.

II. Krempelhuber: 'Geschichte und Litteratur der Lichenologie,' vol. I., 1867; pp. 579—589, and 595—602. Vol. III., 1872; pp. 52, 54, 99, and 101.

III. Gregory: 'Handbook of Organic Chemistry,' 1856; pp. 351, 353, 356—362, 455.

COMPARATIVE EXAMINATION OF THE MORE IMPORTANT COMMERCIAL VARIETIES OF GALBANUM AND AMMONIACUM GUMS.*

II. AMMONIACUM.

BY EDWARD HIRSCHSOHN.

(*Continued from page* 614.)

5. *Chemical Composition.*—The first chemical analyses of Persian ammoniacum were made by Cartheuser, Neumann and Löseke. Braconnot, Buchholz, Calmeyer and Hagen also examined this gum resin. They found its composition to be as follows:—

	Braconnot.	Buchholz	Calmeyer	Hagen.
Resin	70·0	72·0	53·0	68·6
Gum	18·4	22·4	37·2	19·3
Gum-like substance, insoluble in water and alcohol	4·4	—	—	—
Glutinous Matter	—	1·6	—	5·4
Extractive	—	—	—	1·6
Water	6·0	—	—	—
Loss	1·2	—	—	—
Volatile Oil and Loss	—	4·0	—	—
Volatile Oil	—	—	—	2·8
Woody Fibre and Sand	—	—	7·8	2·3

* From a memoir for which the gold "Suworow" medal has been awarded by the Medical Faculty of the University of Dorpat. (*Pharmaceutische Zeitschrift für Russland*, April 15, 1875, p. 225).

All authors agree that the resin is reddish. Berzelius states that it melts at 54° C.; Vigier at 45° C. It smells like the gum resin and is tasteless. An alcoholic solution of the resin gives no precipitate with acetate of copper (Vigier). It is easily soluble in alcohol and in fixed and volatile oils, but only partially in ether. Sulphuric acid also dissolves it, from which solution it is again precipitated by water. With caustic alkalies it forms a turbid and very bitter solution. Johnston found its composition to be $C_{20}H_{24}O_3$. By fusion of the resin with potassium hydrate Hlasiwetz and Barth obtained resorcin.

The gum has always been described as similar to gum arabic.

The volatile oil is colourless, lighter than water, and has a strong ethereal odour and bitter taste. From the gum resin Martius obtained 1·1 per cent., Hagen 3·84 per cent., and Vigier 1·8 per cent. of its weight of an oil that was considered to be sulphuretted, because it had the property of blackening silver. Moss, however, in examining Persian ammoniacum for sulphur obtained negative results. By treatment of the gum resin with solution of chloride of lime it is coloured orange yellow.

African ammoniacum has been examined by Moss, and the results were published in this Journal in 1873.* He found the composition to be—

Resin	67·760
Gum	9·014
Water and volatile oil	4·290
Bassorin and insoluble matter.	18·850
	99·914

According to Moss the resin is reddish brown shining, and so soft as to receive readily and retain for some time the impression of the finger nail. It shows a wavy fracture, and possesses to a small degree the peculiar odour of the crude drug, but no taste. It melts at 38·5° C., dissolves readily, acquiring a red colour, in solutions of fixed alkalies and in oil of vitriol, especially with a gentle heat. The gum was similar to that from Persian ammoniacum. The gum resin upon incineration gave 13·47 per cent. of ash, consisting of calcuim carbonate, sand, iron, oxide, alumina, and a trace of calcium sulphate.

6. *Description of the sorts examined by the Author.*

A. Persian Ammoniacum.

1. Ammoniacum in granis from the collection in the Pharmaceutical Institute, Dorpat. Variously formed grains, attaining 8 centimetres in length, brittle, reddish yellow, opaque, with a waxy appearance. Fracture vitreous. Smelt faintly of ammoniacum.

2. Ammoniacum in granis. The same colour, but rather lighter, and similar to the preceding.

3. Ammoniacum in granis, from Hamburg, 1873. Variously formed pieces, attaining 2 centimetres in length; colour as No. 2, fracture vitreous; not brittle, but could be cut with a knife.

4. Ammoniacum in granis, from the Lucæ collection. Small granules, the size of peas; of a gamboge yellow colour; fracture waxy yellow, mixed with white.

5. Ammoniacum in lacrymis, from the same. Tears the size of lentils, of a gamboge-yellow colour; fracture the same colour, brittle; smell very weak; mixed with fruit and pieces of stalk.

6. Ammoniacum in globulis, from the same. Similar to No. 3, but somewhat darker.

* Vol. iii., p. 742.

7. Ammoniacum in globulis, obtained through Dr. Méhu of Paris, 1874. Like No. 3.

8. Ammoniacum in massis, from Hamburg, 1874. Irregularly formed masses of various sized tears agglutinated together; colour light reddish yellow; fracture milk white, vitreous; mixed with variously coloured small stones.

9. Ammoniacum in massis, from the Lucæ collection. Reddish-green masses of agglutinated granules, the contour of which gave to the fracture a marbled appearance.

10. Ammoniacum in massis, from the same. Similar to the preceding; colour from reddish yellow to dirty brown.

11. Ammoniacum in massis, from the same. Composed of umbelliferous fruits, small angular pieces of brittle, yellowish-red resin, small stones, and pieces of stalk.

12. Ammoniacum in massis, from a Dorpat pharmacy. Like No. 9.

13. Ammoniacum in globulis, from a Dorpat pharmacy. Variously formed pieces, some as large as an apple; part like No. 3, and part consisting of angular moderately soft masses, mixed with small stones and fragments of stalk, of a uniform dirty brown colour, and presenting a wax-like appearance on the surface of the fracture.

14. Ammoniacum in massis, obtained from Apothecary Osse, in Astrachan, and purchased by him from Persian traders. Various sized masses, containing throughout large fragments of stalk; here and there marked with white veins, and black spots sometimes of earth.

15. Ammoniacum in massis, from Apothecary Osse, Astrachan. Like No. 14, but wanting in the milk white veins, whilst the earthy portions often amounted to half of the mass.

16. Ammoniacum in massis, from the Dorpat collection. Principally angular masses, containing thin stalk fragments, interspersed with milk-white particles; also agglutinated or single granules, almost orange coloured, with a milk-white fracture.

17. Ammoniacum depuratum, from the Dorpat collection. Honey-yellow, agglutinating, easily triturated mass, having a weak smell.

18. Ammoniacum in massis, obtained through Dr. Méhu, from Paris, 1874. Like No. 9.

19. Ammoniacum in massis, from the same. Angular, tolerably hard, light brown pieces, frequently shining on one side, interpersed with a few very thin stalk fragments, and very many small milk-white angular particles, giving to it the appearance of porphyry.

B. African Ammoniacum.

20. Obtained from Mr. D. Hanbury. Large, compact, heavy masses, formed of agglutinated tears of a soft gum resin; the tears are dull white or yellow, occasionally brown to blackish, contaminated with much earth and vegetable matter. Smell peculiar, almost recalling baked apple and lavender.

7. *Behaviour with Reagents.*—Upon adding a drop or two of concentrated sulphuric acid to a small fragment previously moistened with alcohol, the Persian ammoniacum gave a yellow-brown and the African a red-brown solution. Upon the addition of water the Persian solutions threw down a flesh-coloured precipitate, and the African a dirty violet precipitate. Hydrochloric acid used in the same way gave no particular reaction (differing from galbanum and sagapenum). Chloride of lime solution coloured all the samples (except No. 20) citron yellow, which colour passed gradually into a more or less intense orange (distinguishing from galbanum).

8. *Distillation with Water.*—By the distillation of 300 grams of No. 13 with water, in the manner described under "Galbanum," no oil was obtained; the distillate smelt strongly of ammoniacum and was faintly acid, but gave no reaction worth mentioning.

9. *Mineral Constituents.*—The gum resin (as under "Galbanum") incinerated gave the following results:—

No.	Description of Ammoniacum.	Per cent. of Ash.
1.	In granis, from Dorpat Institute.........	2·29
2.	„ „ „ „ „	2·59
3.	„ „ „ Hamburg, 1873	2·02
8.	„ massis, from Hamburg..................	14·30
12.	„ „ „ Dorpat pharmacy	2·98
14.	„ „ „ Astrachan	7·94
15.	„ „ „ „	16·88
17.	„ „ „ depuratum	3·51

The composition of the ash was similar to that from galbanum, and showed by its percentage that the collection had not always been carefully made, or that there had been probably an intentional mixture with sand.

10. *Moisture.*—An estimation of the moisture, by loss, gave the figures in the following table.

No.	Description.	Moisture. Per cent.	Per cent. soluble in Petroleum.	Ether.	Alcohol.	Water.	Residue. Per cent.
1.	In granis, Dorp. Inst. .	2·65	3·32	65·65	1·78	51·78	4·82
2.	„ „ „ „ .	1·72	3·46	63·42	1·96	18·88	10·49
3.	„ „ Hamburg . .	0·81	6·68	66·66	3·02	19·71	2·62
4.	„ „ Lucæ . . .	2·65	2·59	53·28	1·82	18·59	20·07
5.	„ lacrymis, Lucæ . .	2·14	3·28	51·83	3·29	18·64	20·97
6.	„ globul., Lucæ . . .	1·10	8·93	69·16	2·79	19·99	3.03
7.	„ „ Paris . . .	0·84	3·40	69·22	4·09	18·85	3·59
8.	„ massis, Hamburg .	2·17	5·71	50·21	1·61	16·35	23·95
9.	„ „ Lucæ . . .	2·75	8·42	62·16	2·78	19·27	9·62
10.	„ „ „	2·89	2 85	53·54	2·98	20·85	18·44
11.	„ „ „	3·27	5 34	47·12	1·89	14·17	30·21
12.	„ „ Dorp. Pharm.	2·44	2·51	67·03	2·84	21·07	3·61
13.	„ „ „ „	1·89	2·95	50·88	2·77	17·12	24·89
14.	„ „ Astrachan .	1·38	3·74	48·86	1·90	14·38	29·74
15.	„ „ „ .	1·81	3·65	47·91	3·21	11·85	32·57
16.	„ „ Dorp. Inst. .	2·58	3·92	57·78	2·64	18·95	14·18
17.	„ „ depur . . .	2·24	1·43	57·79	4·59	23·79	10·16
18.	„ „ Paris . . .	2.18	3·90	59·30	2·99	25·74	6·89
19.	„ „ Paris . . .	3·09	2·78	52·50	2·35	20·09	19·19
20.	„ „ African, Hanb	2·89	2·38	61·04	1·90	9·7	21·07

11. *Treatment with Petroleum Spirit.*—Treated with petroleum as described under "Galbanum," residues were obtained, the percentage quantities of which are shown in the table. All the liquids, as also the residues,—with the exception of No. 20, which was slightly yellow,—were colourless, and had a decided smell of ammoniacum. The almost perfect volatilization of the residues when heated to 120° C. indicated that they were derived from essential oils. The residues from Nos. 2, 6 and 7 amounted to from 0·3 to 0·8 of the gross weight of the drugs; the residues did not redissolve in petroleum spirit. Chloral and chloral hydrate gave with the residues from Persian ammoniacum a faint green colour and with that from African ammoniacum a light brown.

The testing of the petroleum spirit residues for sulphur, by deflagration with pure saltpetre, always gave negative results.

Treatment with Ether.—The ethereal solutions gave upon evaporation residues of resin, the percentage weight of which is shown in the table. The resin was yellow to dark brown and brittle, with the exception of No. 20, which was softened by the heat of the hand. The melting point for Nos. 1 to 7 was estimated at 45° C.; for Nos. 10, 11, 12, 14 and

15 at 42°; for Nos. 7, 8 and 17 at 45°; for No. 19 at 50°; and No. 20 at 35°.

Concentrated sulphuric acid dissolved the resin with a yellow colour; alcohol (95°), chloroform, glacial acetic acid and amylic alcohol dissolved it readily; carbon bisulphide and benzin only partially; solution of ammonia took up the greater part (differing from galbanum) and coloured the residue yellow. Potash and soda solutions also dissolved it, especially when heated, forming then an almost blood-red solution.

The resins gave no reaction for sulphur when deflagrated with saltpetre. The alcoholic solutions of the resins gave precipitates with sugar of lead and acetate of copper. Silver nitrate was only slightly reduced after thirty-six hours. When boiled with water the resins coloured it yellow and gave it an acid reaction, with the exception of No. 20, with which the water remained colourless. Neither by dry distillation nor by treatment with hydrochloric acid could umbelliferon be obtained from the Persian resin (differing from galbanum); but the African resin gave a large quantity of umbelliferon both by dry distillation and by treatment with hydrochloric acid.

The yellowish solutions from the Persian resins were coloured red violet by perchloride of iron and orange yellow by solution of chloride of lime; sugar of lead, while decolorizing the solutions, gave a yellowish precipitate. The author found by experiments with solutions of phloridzin and phloretin that a body similar to them had been removed from the resin by the water. African ammoniacum did not contain this body, but yielded umbelliferon instead. The alkaline (soda) solutions of the resins, when decomposed with chloride of barium, behaved like those of galbanum.

13. *Treatment with Alcohol.*—The experiments were made as described under "Galbanum," and gave the results stated in the table. The alcoholic residues were coloured like those from galbanum, but were not perfectly soluble in cold alcohol though soluble in warm. Water dissolved the larger proportion, the more or less coloured solutions behaving like those from galbanum; perchloride of iron however gave with them, No. 20 excepted, a wine-red mixture, from which a red body was deposited after some time. Fehling's solution was reduced and yeast liberated carbonic acid. The residues therefore contained a kind of sugar.

14. *Treatment with Water* gave the results shown in the table. These residues behaved towards reagents and polarized light like those obtained from galbanum. In this case also water extracted an inactive mucus and a body resembling dextrin.

15. *Insoluble Residue.*—The residues left undissolved after these successive treatments are given in the table. In Nos. 1 to 4, 6, 7, 10, 12 and 18 the insoluble residues consisted only of a substance analogous to bassorin; in the other sorts it varied with the nature of the impurities. Starch could not in any case be detected. In Nos. 1 to 4, 6, 7 and 18 *débris* of cells was clearly seen under the microscope.

All the samples of Persian ammoniacum in massis contained more or less fragments of stalks and fruit, but the grains contained fruit only. No root fragments were found in any sort.

(To be continued.)

ELIXIR OF MONOBROMATED CAMPHOR.

BY I. MUNDAY.

Some time ago, at the request of Dr. E. Warren Bey, I tried several experiments to obtain an elixir of the above, and succeeded in making one containing one per cent. of monobromated camphor, being double the strength of the formula published in *L'Union Pharmaceutique*, an abstract of which was given in the *Pharmaceutical Journal* of the 17th February.

Instead of sugar I use glycerine, which I find suspends it much better when mixed with water; in fact, in certain proportions the mixture is perfectly clear, whilst with sugar there is a film formed on the glass. The formula I use is as follows, which contains one per cent.

Monobromated Camphor . .	30 centigrams
Alcohol at 90°.	12 grams
Eau de fl. de Oranger . . .	8 „
Glycerine	10 „

Mix the alcohol, glycerine and orange flower water together and dissolve the monobromated camphor by aid of a gentle heat.

14, *Rue de la Paix, Paris.*

NOTE ON THE ADMINISTRATION OF PHOSPHORUS.*

BY EDWARD R. SQUIBB, M.D.

(*Concluded from page* 696.)

It is so very difficult to prevent phosphorus from oxidation when in contact with substances containing oxygen, and when in contact with substances which contain no oxygen so difficult to prevent its combination with other elements which impair or destroy its activity, that it is not easy to understand how it can ever reach the circulating fluids of the body as free or uncombined phosphorus. Yet that it does so seems now pretty well established; and if it does so, a solution under the protective agency of a combination with oil-globules which, by emulsion in the intestinal tract, pass into the chyle, is the most rational. Whether its ultimate effect in the tissues be as phosphorus, or as phosphoric acid, must still be very doubtful, when it is remembered that before reaching the tissues it is aerated in the lungs. That "phosphorus can never be effectively employed but in its free and most active state" (Thompson, p. 9) is abundantly disproved by the experience of this country, and especially by the systematic observations in large hospitals for the insane (see especially a paper on "The Physiological Action and Therapeutic Uses of the Acidum Phosphoricum Dilutum," by Judson B. Andrews, M.D., assistant physician in the New York State Lunatic Asylum, published in the *American Journal of Insanity*, for October, 1869).

In regard to the specific action of phosphorus upon the bones, Wegner says: "For the therapeutic application it is in general more advisable to make use of the phosphorus in substance than the phosphorous or phosphoric acids; if any considerable action is to be developed by the two latter preparations, they must be used in doses which, in animals at least, disturb the digestive apparatus to a high degree."

The officinal (U. S. P.) dilute phosphoric acid is very efficient in doses of 20 m. = 1·25 c.c. to 30 m. = 1·875 c.c., given three times a day. Such doses contain, the first about 0·65 gr. = 45 milligrams, the second about 0·98 gr. =

* Read before the American Pharmaceutical Association. From the 'Proceedings.'

68 milligrams, of phosphorus. The equivalent doses of uncombined or free phosphorus would be about $\frac{1}{60}$th to $\frac{1}{40}$th = 1 to $1\frac{1}{3}$ milligrams. Therefore the quantity of phosphorus given in the condition of phosphoric acid is nearly fifty times greater than when given as free phosphorus, to produce an equivalent therapeutic effect—provided the effect be the same—and not eight hundred to one thousand times greater, as in Wegner's experiments on the lower animals to obtain his effects upon the bony tissues. This part of the subject is much in need of closer investigation, and it is hoped that Dr. Andrews, or some other careful observer who may be equally familiar with the uses and effects of phosphoric acid, will compare it with free phosphorus, and give the results to the profession, when some means of accurate dosing of free phosphorus is afforded, as by the object of this note.

Referring, then, to the numerous authorities for what has been written on the subject of the effects and modes of administration of free phosphorus, it is here proposed to dismiss all the formulas for its administration, except that which up to this time may be conceded to be the best, namely, its solution in cod-liver oil, and to so formulate and elaborate this mode of administration that it may afford a safe and uniform practice as a basis for more accurate observation, and a more exact experience, and may enable the physician to prescribe, and pharmacist to dispense the substance accurately and conveniently in any dose, as with other articles of the materia medica, the object being to get the phosphorus into the stomach without oxidation, and yet in a condition to be all readily absorbed and active. A secondary object is to administer it in such a variety of forms as may adapt it to different conditions of stomach and palate, and render it as little disagreeable as may be consistent with the primary object of keeping it free from oxidation and active.

Solution of Phosphorus.

Take of Phosphorus, well dried	. . .	1 part.
Cod-liver Oil	. . . . . .	99 parts.

Put the cod-liver oil in a bottle which will be about three-fourths filled by it. Fit two corks to the bottle, set one aside and fit the other with two small glass tubes, one short and the other to reach to very near the surface of the oil when the cork is in the neck of the bottle. Then pass a current of dry carbonic acid (carbon dioxide) into the bottle, through the longer tube, for about fifteen minutes, or until the air is all driven out and replaced by the gas. Counterbalance a vessel of water on a good scale, and weigh into it the phosphorus, which has been cut into as large and as few pieces as possible, under water, in another shallow vessel, having one or two small pieces of phosphorus in excess of the exact weight required. Then put ice into the water with the weighed phosphorus, and set it aside for half an hour. Next, counterbalance a dry capsule, and add to the counterbalance the exact weight of phosphorus required. Chill the capsule well by immersion in ice-water, dry it, and replace it on the scale. Then take the pieces of chilled phosphorus from the ice-water, one at a time, dry them rapidly with a soft absorbent towel, or with good bibulous paper, and place them in the chilled capsule on the scale, until the exact weight of dry phosphorus is obtained. Then remove the perforated cork from the bottle, drop the pieces of dry phosphorus rapidly into the oil, and put in the unperforated cork which had been fitted and set aside. Set the bottle in tepid water, and warm the water until the phosphorus melts, and shake the mixture until the phosphorus is entirely dissolved, keeping it at about the same temperature till the solution is effected. Remove the longer tube from the perforated cork, and replace it with a siphon, the short leg of which shall reach to the bottom of the bottle, and then replace the cork in the bottle of solution. Connect the india-rubber tube of a self-regulating reservoir of carbon dioxide to the short tube of the cork, and put the pressure of the resovoir on to the bottle. Fit the end of the long leg of the siphon with a short piece of india-rubber tubing, and the other end of this tubing with a piece of small glass tubing about 2 inches (=5 centimetres) long, and put a pinch-cock upon the india-rubber tubing, the bottle being placed upon a stand some 6 inches (=15 centimetres) high. Then carefully open the pinch-cock and suck over the solution so as to fill the long leg of the siphon. Finally, by means of the siphon and pinch-cock, fill the solution into dry ground-stoppered bottles of not more than one fluid ounce (=30 cubic centimetres) capacity, allowing the carbon dioxide to fill the bottle from the drying apparatus of the reservoir as the solution is drawn out. In filling the bottles, the glass tube should pass to the bottom and the bottles be filled as full as is safe, leaving the least practicable room for air, and they should be at once tightly stoppered and be kept in a cool, dark place. The writer has found no way of avoiding oxidation and the formation of a pellicle, except by the use of carbon dioxide as above described, and no better way of accurately weighing and drying the phosphorus than that described. In all attempts to do without chilling, some fragment or the whole took fire before it could be properly dried and got into the oil.

This solution of phosphorus has the sensible properties of the cod-liver oil from which it is made, except that a slight odour of phosphorus is superadded, and the oil should be as limpid, as bland, and as free from odour and taste as possible, and must be entirely free from rancidity. When exposed to the air, it emits white vapour in small amount, and becomes covered with a dark-brown pellicle. This pellicle protects the oil below it from rapid change. In dispensing the solution from a one-ounce bottle, this pellicle forms after the first portion has been taken out, and increases in quantity to the last. It generally adheres to the sides of the vial, the oil from below breaking through it at each dispensing. No part of the pellicle should ever be dispensed. Nor should the last half drachm of the vial be used. The solution should be dispensed and the dose be calculated always by weight. It is one per cent. solution, and therefore each 100 grains contain 1 grain of free phosphorus.

Each minim weighs 0·88, or seven-eighths of a grain, and therefore represents 0·0088 grain of phosphorus.

This solution might perhaps be improved by previously decolorizing and deodorizing the cod-liver oil by filtration through carefully prepared animal charcoal; and also perhaps by adding to the oil say one-twenty-fifth of its weight of stronger ether, to give an atmosphere of ether vapour in the dispensing bottle for protection against air and oxidation. The writer has not had time to try these, but should they prove practically advantageous, he intends to adopt them in the preparation.

ADMINISTRATION OF THE SOLUTION.

Perhaps the best and most simple means of giving the solution is by a further definite dilution with cod-liver oil. If, as is not unfrequently the case, small doses of phosphorus are indicated in conditions which require cod-liver oil, or in cases primarily needing phosphorus wherein cod-liver oil would be a useful adjuvant, the following dilutions would be convenient:

Counterbalance a bottle containing a pint of cod-liver oil, and then pour into the oil 64 grains or 4 grams of the solution. This gives a dilution containing about $\frac{1}{50}$th of a grain or $1\frac{1}{3}$ milligrams of phosphorus in each half fluidounce or 15 c.c. of the mixture. A dose of two fluidrachms or $7\frac{1}{2}$ c.c. of this dilution, representing $\frac{1}{100}$th grain of phosphorus, given immediately after each meal, is very effective, and not very liable to interfere with digestion.

Four fluidounces of cod-liver oil weigh about 1700 grains or 110 grams. If to this be added 64 grains or 4 grams of the solution, each fluidrachm of the mixture represents $\frac{1}{50}$th grain or $1\frac{1}{3}$ milligrams of phosphorus. One, two, three, and four fluidrachms of this dilution severally represent the range of doses in which phosphorus is required, namely: $\frac{1}{50}$th, $\frac{1}{25}$th, $\frac{1}{16}$th, and $\frac{1}{12}$th grain, when active medication by phosphorus is indicated.

Mr. George C. Close, an able pharmacist of Brooklyn, makes an admirable emulsion of cod-liver oil, which is quite well adapted to either of these dilutions. The writer is indebted to Mr. Close for the following formulas and directions, which will be found very useful. The formula for an emulsion of cod-liver oil simply is as follows:

Take of—
Cod-liver Oil . 4f℥ = 1700 gr. = 120 c.c. = 110 grams.
Glyconin, . . 9ʒ = 540 gr. = 35 grams.
Arom. Sp. of Ammonia . . 1ʒ = 4 grams.
Sherry Wine . 20ʒ = 77·76 grams.
Tincture or Essence of Bitter Almonds.
(1 part Oil of Bitter Almonds to 64 parts Alcohol), 2ʒ = 7·78 grams.

Put the glyconin in a mortar and add the oil to it very slowly, triturating the mixture actively and constantly. The success of the emulsion depends upon the skill with which the first small portion of the oil is rubbed up with the glyconin, therefore the oil must be added in very small quantity and very slowly at first. After the oil is all in, add the other ingredients in the order in which they are named. In the large and successful use of this emulsion half an ounce of the sherry wine has often if not commonly been omitted, and the same quantity of diluted phosphoric acid substituted. The dose of this emulsion is from a dessertspoonful to a tablespoonful. Jamaica rum or brandy may be substituted for the sherry wine when preferred. Of all modes of giving cod-liver oil this is perhaps the least objectionable to most persons.

In using this formula as a vehicle for giving free phosphorus, the solution of phosphorus is made a part of the cod-liver oil. For example, take half the quantities of the formula, and for this four fluid ounce emulsion take 770 grains of cod-liver oil, and 80 grains of solution of phosphorus. Then a teaspoonful dose will represent $\frac{1}{40}$th grain of free phosphorus. Thompson says that oil of peppermint covers the taste of free phosphorus better than anything tried by him.

The glyconin which is so useful in emulsifying oils is made as follows:

Take of the yolks of eggs, carefully excluding the white, four parts; glycerin, concentrated and odourless, five parts. Beat or whip well the yolks of eggs in the usual manner, and pour the liquid into a bottle, add the glycerin and shake them well together. This glyconin keeps well for an indefinite length of time. It was introduced from French pharmacy many years ago, and as an emulsifying agent and preservative of emulsions, deserves to be better known. Emulsions made with it by ordinary skill and according to the above-given directions, never separate. If they separate it is for want of proper care in the commencement of introduction of the oil.

This solution of phosphorus may also be given in the form of a pill; and whether in pill, or the powder to be mentioned hereafter, it is always as a solution that it is given, since the solvent does not evaporate but remains to hold and protect the phosphorus. The formula for pills is as follows:

Take of the
Solution of Phosphorus, Magnesia, Powdered Soap, of each . . . 1 part.
Stronger Ether . . . . 2 parts.

Weigh the magnesia, powdered soap, and stronger ether in this order into a counterbalanced mortar. Stir the mixture until the powders are thoroughly wetted with the ether; make up the weight again by a little stronger ether to compensate the loss by stirring, and then weigh in the solution of phosphorus. Rub the whole together until the ether has all evaporated, and then divide the mass into pills, whose size shall be adapted to the dose of free phosphorus required. Dispense the pills in a vial into which a drop or two of ether has been dropped, to furnish an atmosphere of ether vapour for the better protection of the pills, and if any powder be used let it be magnesia. The pills should not be made in large quantity, nor be kept longer than a few weeks, as it is impossible to know how long the phosphorus will remain in a free state under the varying conditions to which such pills are subjected.

If the ingredients of the formula be taken so that each part represents 100 grains, that is, 100 grains each of the solution, magnesia, and powdered soap, and 200 grains of stronger ether, and if the mass be then divided into 100 pills, each pill will contain the $\frac{1}{100}$th of a grain of phosphorus, which would be the smallest usual dose. Such doses, taken three times a day, would require 33 days to use the 100 pills, and this is probably quite as long as they should be kept. The more common dose is $\frac{1}{50}$th of a grain, and then two pills would be taken at a dose, and the prescription would last seventeen days, and the pills would more surely remain in a proper condition.

Such pills, if it be desirable, may be dipped in a warm solution of 1 part gelatine in 16 parts water, and be dried in the usual way; and although this covers the odour of phosphorus, it is doubtful whether the coating is of much use as a protection against change.

The use of the ether in this formula is to drive out the air occluded in the powders, and supply its place with a substance which will not oxide the phosphorus; and if the formula be properly managed no white vapours are seen during the manipulation, nor in the vial in which the pills are kept, whether the pills be coated or not. As an experiment, a mass made as above directed was left exposed in the mortar for forty-eight hours without apparent change of colour, and without visible vapour, and the writer then took many doses of the pills made from it without eructations, or other digestive disturbance, the dose being $\frac{1}{33}$rd of a grain of phosphorus.

These pills are not luminous when broken open in the dark, because the oil protects the phosphorus from oxidation as well in the pill as in the bottle. The value of this common test for phosphorus pills is much overrated, since the shining in the dark shows oxidation of the phosphorus rather than protection, and a broken pill which does not shine in the dark may be either devoid of free phosphorus or may have it present in full proportion, but protected against oxidation. Again, the change which takes place in a broken pill may occur more slowly in an unbroken one.

This solution of phosphorus may also be given in capsules, and this method of giving it would be convenient and easy if it was practicable to get capsules, any large proportion of which were perfect enough to hold liquids. As a fact, however, they are so imperfectly made, as now sold, that but a very small proportion of them can be used for liquids, unless the plan of doubling the capsule be adopted by slipping one size moistened with water into the next larger size.

In dispensing this solution in capsules, the capsules can be conveniently and accurately filled by means of a 60 minim pipette, or by a cubic centimetre pipette. The pipette filled at the lower end by a piece of india-rubber tubing, and a piece of glass tubing drawn to a small orifice, with a pinch-cock upon the rubber portion. The upper end of the pipette is furnished with a piece of india-rubber tubing for suction. The whole being held upright in any convenient stand, the bottle is held so that the fine point dips into the solution. The pinch-cock being held open the solution is sucked into the pipette up to the top of the graduation, and the pinch-cock then closed. Then, by means of the pinch-cock, one or more minims may be rawn into each capsule. As each capsule is filled the dge of the cover is dipped into water before being put n. This seals the body and cover together, so that no akage ever occurs at that point.

Another way in which the solution is accurately, cononveniently, and easily dispensed, is in the form of a hoist powder.

If the solution be dropped upon any dry powder, and e rubbed up therewith, the air which the powder conains very rapidly oxidizes the phosphorus, as is shown y the copious white vapour given off, and by change in olour of the powder. But if the air be first driven out f the powder, the solution may be incorporated without ght or vapour or change of colour—the unmistakable igns of oxidation. This interstitial air is best driven out y ether. And the powders best adapted to the purpose re precipitated calcium carbonate, or precipitated calcium hosphate.

Counterbalance a one-ounce, wide-mouth bottle, fitted ith a good cork, and weigh into it 140 grains = 9·1 rams each of calcium carbonate and stronger ether. ork the bottle, shake it, and then add 5·3 grains = 3·24 rams of solution of phosphorus. Again cork the bottle, nd having shaken well, empty the contents into a ortar, and shake out all that can be shaken from the ottle into the mortar. Allow the bottle to stand unorked, that a portion of the ether may evaporate off. riturate the contents of the mortar until nearly all the ther has evaporated, and a damp powder remains. At he very first sign of white vapour, or before any vapour ccurs, transfer the damp powder by means of a spatula ack to the bottle, cork and shake it well, and then eigh it. The whole contents of the bottle should now eigh about 200 grains = 12·96 grams, that is, 140 parts alcium carbonate, 50 parts solution of phosphorus, and 0 parts ether, and this contains $\frac{1}{2}$ a part of phosphorus. f this powder 10 grains is equal to $\frac{1}{40}$th grain of phoshorus, 8 grains equal to $\frac{1}{50}$th, and so on. This powder ay be put into capsules, or better, into cachets or wafers, hus affording a good method of administration to those ho particularly dislike the odour and taste of cod-liver il. This powder appears to keep pretty well, that shown erewith having been made nearly a month. The porion made with calcium phosphate has, however, changed olour within the past few weeks. From being quite hite it now has a brownish tinge, a sure indication of hange. As the powders are not intended to be kept, ut must be made for each prescription, this is a matter f small importance. About twenty minutes of time is equired to make the powder properly, and the pharacist will not be likely to succeed well the first trial. ut when successfully done it will be found an excellent ethod of giving free phosphorus. Both powders, but pecially the calcium carbonate, have a tendency to comine with and neutralize any small proportions of the arious oxides of phosphorus that may form, and this is he reason for selecting these powders. Organic powders o not answer.

There are many patients whose stomachs will not olerate free phosphorus in any form, and a few that ccept it for a few days only; and much harm is often one by pushing it in such cases. If commenced in small oses, and never given on an empty stomach, but always fter a meal, it then disagrees, either by producing eructations to an injurious extent, or by interfering seriously with digestion, it should be abandoned, and be substituted y phosphoric acid; and this is no doubt the better agent or phosphorus medication in a large class of cases.

There are many patients, also, that cannot tolerate od-liver oil even in the smallest quantity. Such, too, had better be treated by phosphoric acid, for it has been pretty clearly shown that the solutions in vegetable oils, even when the oils are superheated beforehand, as well as the solutions in alcohol, ether, chloroform, carbon disulphide, etc., or in mixtures of these with or without glycerine, are liable to such changes as always to prevent accuracy in medication, and often to produce toxic effects. Even the solution in cod-liver oil has as yet not been tried long enough, nor with sufficient care and accuracy in its preparation or administration to justify the statements made in regard to it, and it is the object of this paper to place this solution under known conditions, favourable to accurate use and observation.

HYDROBROMIC ACID.

In answer to several inquiries to which the appearance of "hydrobromic acid" in prescriptions has given rise recently, we quote the following extract from an article by Dr. J. Milner Fothergill, which was published in the *British Medical Journal* for July 8 last:—

"The formula for the production of the acid in quantities of two quarts, is as follows. Dissolve ℥ x, ʒ vj., gr. xxviij. of bromide of potassium in four pints of water, then add ℥ xiij., ʒ j., gr. xxxvij. of tartaric acid. The bitartrate of potash is precipitated and the hydrobromic acid remains in a clear, bright, almost colourless fluid, possessing an acid taste and the ordinary acid properties as well as the peculiar properties of bromide of potassium, as compared with any other salt of potash.

"The accuracy of this last statement may be challenged by some readers; I will, therefore, briefly relate the conclusions arrived at after a twelve months' experience of the drug. It certainly does prevent the occurrence of headache, after each dose of quinine, in those who before had to desist from taking quinine for that reason. It is, perhaps, not invariably successful, but its power is very marked. It also prevents the fulness felt in the head by some persons, especially those labouring under cerebral anæmia, after doses of iron. It is also useful after nervous conditions, and, with quinine, is excellent in those cases when there is much nervous exhaustion from excessive indulgence in tea or in alcohol—this having been tried in a case of nervous excitability and sleeplessness where there had been much resort to chloral hydrate.

"In forms of excited action of the heart, connected with general nervous excitability or nervous exhaustion, hydrobromic acid is most useful; given with quinine (of which it is a capital solvent) and digitalis, it gives better results than bromide of potassium and digitalis" * *
"In all hysterical conditions connected with ovarian excitement, it seems to have all the properties of bromide of potassium. It is equally useful in the vomiting of pregnancy, and seems to exercise quite as powerful an influence over acts of reflex origin as does the bromide. It is especially adapted for the relief of menorrhagia associated with sexual excitement, and is even more effective here than the bromides themselves. It is also of use in whooping-cough, and combines conveniently with quinine, forming an effective measure in this troublesome affection; with spirit of chloroform and syrup of squill, it forms a most agreeable cough mixture of no mean potency. It is also of use in case of cough of reflex origin. When there is gastric irritability, it is the most useful of all acids, possessing the usual properties of acids generally and of the bromine as well.

"The dose of the acid, prepared as above, is one drachm as a full dose. Half a drachm is the dose I ordinarily employ. Hydrobromic acid has the further advantage of not producing the troublesome eruption so often the result of doses of the bromide of potassium, at least so far as my experience has yet extended. There are many qualities about this acid to render it a useful member in our therapeutical armamentarium. Dr. Wade* states that it is useful in the treatment of fever. It would seem the acid *par excellence* when there is much cerebral excitement in pyretic affections; but of this I have no personal experience."

---

* *Peninsular Jour. of Med.*, February, 1875.

THE CHINESE KNOWLEDGE OF COD-LIVER OIL AND IODINE.*

BY J. DUDGEON, M.D., ETC., PEKIN.

In the Chinese Materia Medica no fewer than thirty-one different kinds of fish with scales, and thirty-seven without scales, are mentioned. Among so many, it would be strange if certain therapeutic virtues belonging to some had not been discovered. The cod is not known in Chinese waters, so far as I am aware, and no oil is extracted from the livers of fishes. The Chinese, however, have found out that the use of fish and fish oil—particularly shad—is of service, and especially in consumptive cases. Phthisis is believed to be infectious. They account for it on the hypothesis that at the moment of death a worm is expelled, which enters the bodies of those in attendance, through the breath. To stamp it out, therefore, the patient, while yet alive, is sometimes put into a coffin, and buried or thrown into a river. This notion among the people is another way, most probably, of asserting the hereditary nature of any malady. The distinguished author (Lishechen) of the Puntsao or Chinese Herbal, who wrote over two centuries ago, mentions a case of this sort, as reported in another work, where several persons were so affected. The young lady in this instance was found floating in her coffin, in one of the great rivers, by a fisherman, and being taken on board and fed on shad, she recovered, and afterwards became his wife. Here we have the germ of our present cod-liver oil treatment. This fish is said to possess insecticidal and anthelmintic properties, and this is the Chinese *rationale* of its use in phthisis. For a similar reason it is also prescribed in fistula in ano, hæmorrhoids, etc. Oil of this fish if said to be a most certain cure in pityriasis versicolor, the cure being effected instantaneously with one application.

This same Herbal mentions various species of seaweed as possessing strong and well-known therapeutic properties, and of special value in the dispersion of hard tumours—goitre, for example. They have long been acquainted with the general virtues of the various species of *Laminaria*, and these varieties are mentioned as occurring along the coast of the Eastern Sea, the coast of Corea, and the Malayan Archipelago. The great Herbal speaks of seven chief species. The people in the maritime provinces of China eat seaweed plentifully, both medicinally and as a vegetable food, besides using it as a manure; in this custom resembling the inhabitants of our own Hebrides. It is prescribed alone, chiefly in the form of tincture, its saltish taste having been first washed away, or it is mixed up with other medicines in various prescriptions. Chinese books speak in the most positive manner of the discutient properties of seaweed. Of one sort, it is said that tumours as hard as stones can be softened and removed by it. The uses to which the various kinds of seaweed are put correspond with our own uses before the discovery of iodine. It is prescribed also as a diuretic, and its efficacy in demonology is highly extolled. (The Chinese in medicine, as in everything else, unite sober fact with childish fable, science with sorcery.) It is especially recommended in enlarged testicle and in all sorts of hard, cold, chronic tumours that never suppurate. It is said to cause penile erection. In glandular swellings it is ordered to be sucked or chewed. From the Chinese practice, the following questions suggest themselves:—Considering the high price of iodine and its preparations, and the disagreeableness and occasional indigestibility of cod-liver oil, which has been supposed to owe a part, at least, of its virtue to the presence of preparations of iodine and cognate principles, would it be advisable and advantageous to introduce a tincture and a powder of laminaria into our public dispensaries, poor houses, etc.? Is the Chinese contra-indication of fatty things well founded? After a course of iodine or its preparations are other diseases more easily induced?

* From the *Medical Times and Gazette*, February 17, 1877.

ASPARAGIN IN SWEET ALMONDS.*

M. L. Portes, in a paper published in the *Répertoire de Pharmacie* (1876, p. 641), announces the discovery of asparagin in sweet almonds. He noticed a peculiar crystalline crust to form on the outside of peeled almonds placed in absolute alcohol, and made a systematic series of experiments to ascertain the nature of the substance, as follows: 11,380 grammes of sweet almonds were divided into four portions, three of which were blanched, while one was left unblanched. They were then treated in the following manner: 500 grammes were placed in absolute alcohol, another 500 gm. in alcohol of 90 per cent., 250 gm. were placed in ether, and 8,000 gm. (unblanched) were put in alcohol of 90 per cent. At the same time 100 gm. of the skins, or testæ, were macerated in a fifth flask of absolute alcohol.

On the first day nothing particular was noticed in the first flask, but on the second day some crystalline grains, resembling sand, were observed to form on the kernels and walls of the vessel; two days afterwards these crystals became more numerous and settled to the bottom, while nothing similar was observed in the other vessels until the fifth day, when the same substance began to make its appearance in the second flask, increasing gradually in quantity as in the first. At the end of a week the contents of the fourth flask exhibited the same phenomena, but the crystals were much larger and less numerous. In the third and fifth flask, however, no change was observed, even after the lapse of a month.

It would therefore appear that strong alcohol, on penetrating through fresh, sweet almonds, eliminates from them a crystalline substance, which seems to reside almost exclusively in the cotyledons. It was further ascertained that dilution of the alcohol retards the appearance of the crystals, and that when alcohol of 60 per cent. is employed their formation is entirely prevented. Now, as subsequent examination proved these crystals to be insoluble in strong alcohol, the question arose, how alcohol could extract the substance from the kernels. The author's explanation appears to be the most plausible and rational one. He assumes that as the alcohol gradually makes its way into the interior it encounters and becomes mixed with the natural liquids of the kernel, and by displacing them causes them to pass outwards. This cellular sap, then, encountering a great mass of alcohol as yet unaltered and absolute, becomes mixed therewith, and as the crystallizable matter which the sap contains is insoluble in the menstruum, it becomes slowly deposited in a crystalline form upon the exterior of the kernels and upon the walls and bottom of the vessel.

After the formation of the crystals appears to be completed, if the whole be thrown on a strainer, and the crystalline substance be dissolved out by boiling water, a magnificent crop of crystals, resembling candied sugar, will be obtained on cooling or slightly concentrating the solution.

This substance was found to be but little soluble in cold water; easily soluble in hot water, hot dilute alcohol, ammonia, acids and acid solutions; insoluble in strong alcohol, ether, and fixed oils. These properties, together with its elementary constitution ($C_4H_8N_2O_3$, H_2O), and its crystallographic character, prove the substance to be asparagin.

IODIDE OF STARCH AS AN ANTIDOTE.*

Dr. Bellini, Professor of Toxicology at the Royal Institute at Florence, recommends iodide of starch as a valuable antidote in poisoning by alkaline and earthy sulphides, caustic alkalies and ammonia, and the vegetable alkalies. In poisoning by alkaline or earthy sulphides, he thinks it preferable to all other antidotes; in poisoning by caustic alkalies, it is applicable when acid drinks are not at hand.

* From *New Remedies*, January, 1877.

The Pharmaceutical Journal.

SATURDAY, MARCH 3, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, *17, Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE INLAND REVENUE COMMISSIONERS' REPORT.

THE Nineteenth Report of the Commissioners of Inland Revenue, for the year ended March 31st, 1876, has recently been presented to Parliament, and as usual with such documents it contains many interesting items. From it we learn that the quantity of spirit charged with duty during that year amounted to 31,219,042 gallons, or upwards of 500,000 gallons in excess of the previous year. The returns of the quantities of home-made spirit retained for consumption as beverage in the United Kingdom shows an increase of 1·61 per cent. This increase appeared in the returns to be confined to England and Ireland, and by far the larger portion to be due to the latter country, the excess in consumption in Ireland beyond that of the preceding year being upwards of 400,000 gallons, or nearly 10 per cent. As regarded Scotland the returns showed an apparent falling off in the consumption of nearly 2 per cent., or 133,636 gallons. This was startling, and led to inquiries which showed that in Scotland a very large quantity of the spirit methylated was foreign spirit which had been charged with and paid duty to the customs, and which formed no part of the spirit charged by the Inland Revenue, although the whole quantity methylated is deducted from the spirit thus charged. So that on the whole it may be concluded that there was no real decrease in consumption of home-made spirit in Scotland. There has, however, been a continuous though slight falling off in the consumption of British spirit within the current financial year, 1876-7.

In the estimated consumption per head of all kinds of spirit in the United Kingdom England stands the lowest, the proportions being, England 1·114 gallons, Ireland 1·384 gallons, and Scotland 2·346 gallons. On the other hand the beer drinking capabilities of Englishmen are shown by an average consumption of 43 gallons of malt liquor per head, against 12 gallons per head drunk by Irishmen, and 14 gallons per head by Scotchmen.

During the currency of the licences for the year 1875, the latest included in this report, 152 distilleries in the United Kingdom used 882,679 quarters of malt, 112,808 quarters of unmalted grain, 3829 cwts. of sugar, and 120,799 cwts. of molasses in the production of 36,897,936 gallons of spirit. The quantity of plain foreign spirit entered for home consumption was greatly in excess of the preceding year, and came almost exclusively from Germany, from whence it has recently been imported at such low prices and of such good quality as to alarm the British distillers. On the other hand the quantity of British spirit exported shows little fluctuation, the average during tha past ten years being only 1,440,165 gallons. One beet-root distillery which had ceased working was in operation last year. The whole of the roots used were grown by the proprietor of the distillery, and the yield per ton was about the average.

Five cases of illicit distillation of cider dregs in the West of England were reported; this practice is said to prevail there when cider is plentiful, but there is no reason to think that it is on the increase.

As an instance of the close supervision that is necessary to prevent the Revenue from being defrauded it is stated that in certain warehouses a practice had become largely developed of racking spirits from one set of casks to another, and removing the emptied casks to other premises, where by the introduction of water the spirit absorbed by the wood was extracted and sent into consumption. This spirit, therefore, escaped payment of duty, and, although it might be supposed by those unacqainted with the scale on which bonding is carried on that this was a trifling matter, it was so far from being the case that in one warehouse alone it was estimated that the duty thus lost to the Revenue amounted to not less than £13,000 per annum; and in addition to this there was the further charge upon the Revenue of the salaries of officers employed in the superintendence of such extensive racking operations. In fact the extracting of spirit retained in the wood of casks is reported to be rapidly becoming a branch of trade, and stills are being erected for the purpose of recovering the spirit from the "grog" thus obtained.

The quantity of spirit methylated during the year ended March 31st, 1876, was 82,679 gallons. Nearly two thousand gallons of wood naphtha, intended for this purpose, were condemned by the Chemical Department as unfit for use. Some of it had been so highly purified and altered by chemical treatment that it was no longer capable of rendering spirit of wine sufficiently nauseous to prevent its improper use. A smaller quantity was found to contain 30 per cent. of ethylic alcohol, and turned out to be methylated spirit that had been distilled off from "finish." The quantity of purified naphtha imported from the continent has largely increased during the last few years, it being now largely used as a solvent in the place of methylated spirit. The imports amount to about 4,000,000 gallons per annum, of which only about 100,000 gallons are used for methylating spirit.

Numerous prosecutions are also reported to have been instituted for the sale as "finish" of methylated spirit which contained either no gum resin at all or a quantity far below the required amount of three ounces per gallon. The comment of the Principal of the Laboratory upon these cases is confirmatory of what has already been pointed out in this Journal. He says that the evidence revealed the fact that many makers of "finish" only add to the methylated spirit the exact quantity of gum resin required to be in solution, without taking any special trouble to get it dissolved. As commercial gum resins are not completely soluble in spirit, it is evident this quantity would not be sufficient, even if such care were exercised; but, in fact the spirit not being stirred or agitated to promote the solution of the gum, the greater part of it remains undissolved at the bottom of the vat. The number of licences issued to retailers of methylated spirit was 3552.

The licences to vend patent medicines issued numbered 15,022,—13,957 in England and 1065 in Scotland—and produced a revenue of £3798. The value of the stamps for patent medicines issued reached £117,649, being an increase of £8412 on this branch of revenue in the preceding year.

One curious point in connection with patent medicines had to be decided. In certain localities taraxacum root is sold mixed with coffee, and the mixture is recommended as yielding a beverage possessing medicinal as well as nutritive properties. Under the Chicory Duty Act this might have been allowed, subject to the same regulations as to payment of duty as are applicable to chicory. No duty, however, is paid upon this taraxacum, and the Commissioners felt it would be difficult to bring so common a weed under excise regulations. They therefore had to determine whether or not to treat taraxacum as an adulterant when found with coffee. It was eventually decided not to interfere with the sale of mixtures of coffee, chicory, and taraxacum, "if manifestly intended for a medicine, and properly labelled as such, by having a patent medicine stamp on each package, whether recommended for the cure of disease or not." But the substitution of roasted acorns for coffee, under the name of "pelotas" or surrogate coffee, not, we presume, exciting any therapeutic faith, was promptly stopped, and the manufacture has been transferred to Antwerp.

Another body used as an admixture with coffee that has been under the consideration of the Commissioners, is sugar, it having been represented that its presence during the operation of roasting preserved the aroma, and ultimately produced a more agreeable infusion. Having ascertained that not more than 3 per cent. of sugar would be requisite, the Commissioners decided not to interfere with this practice by the coffee roasters. A sample of "essence of coffee" examined in the Laboratory, proved to consist entirely of burnt sugar and roasted rye.

During the year five cases of disputed analysis were referred to the Chemical Department for fresh analysis, under the provisions of the Sale of Food and Drug Act. In two of these cases, one of whiskey said to be adulterated with wood naphtha and one of butter said to contain foreign fats, the conclusions of the Department differed from those of the local analysts, but in both cases the magistrates adopted them as conclusive.

In concluding our notice of this report we would remark that a false economy appears occasionally to lead to the rejection of lime and lemon juice. In some of the strongest samples, in respect to citric acid, hydrochloric acid is met with, and this is attributed to the use of casks which have previously contained salt provisions and have not been sufficiently purified. It was held that the juice being intended for use as an antiscorbutic, the presence of salt in it, even in very small quantity, is objectionable and sufficient to condemn the juice.

FORMATION OF A LOCAL ASSOCIATION AT CREWE.

A MEETING at which the whole of the chemists and druggists of the town were present, was held at the Castle Hotel, Crewe, on Thursday, the 22nd of February. It was convened for the purpose of giving the chemists and druggists of the locality an opportunity of coming to an arrangement to close their establishments at an earlier and more uniform hour than has hitherto been the practice. Mr. BAYLEY was voted to the chair, and a resolution was agreed to to the effect that half-past eight should be the closing hour, commencing on Monday, March 12th. After a little discussion a motion was submitted and passed that a Society, to be called the Crewe Chemists and Druggists' Trade Society, should be formed, of which Mr. McNEIL was elected Secretary and Mr. BAYLEY Chairman. It was also decided to adopt a price list and to use the recognized trade mark, viz. Mel Boracis. May we hope that this is only the thin end of the wedge and that the new Society will be able, after a time, to secure a still further reduction in the hours of labour?

THE EVENING MEETING.

THE next Evening Meeting of the Pharmaceutical Society, will be held on Wednesday, the 7th inst. A paper on a "New Source of Borax" will be read by Dr. PAUL, and one on the "Action of Chlorine upon a Beam of Light, and on the Preparation of Liquid Chlorine," will be read by Dr. A. SENIER. The chair will be taken at half-past eight o'clock.

FROM a telegram which appeared subsequently to the time of the last number of this Journal being sent to press, we learn that Messrs. FINZEL's Sugar Refinery at Bristol is closed for a few weeks only, as usual at this time of the year, for repairs.

IN the paragraph relating to the poisoning of pheasants by yew leaves, on p. 697, the last sentence but one should read, "Unfortunately for this theory, Professor TUSON is able to say that the yew leaves found in the birds examined by him were *not* those of the Irish variety."

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

February 21st, 1877.

Present—Mr. Williams, President; Messrs. Allchin, Benger, Carteighe, Corder, Gale, Hanbury, Haselden, Linford, Martindale, Moss, Southall, Taylor and Umney.

Dr. Greenhow was present on behalf of the Privy Council.

MAJOR EXAMINATION.

Six Candidates were examined. *Four* failed. The following *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Jones, George Marsh ....Sheffield.
Littlewood, John Oscroft ......Sutton-in-Ashfield.

MINOR EXAMINATION.

Fourteen Candidates were examined. *Seven* failed. The following *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Ashburner, Isaac ....Broughton-in-Furness.
Avison, David ....Wakefield.
Bullen, George William ..... Newark.
Campbell, Charles ....Hull.
Gutheridge, George Frederick, Falmouth.
Hall, Edward ....Norwich.
Sykes, Henry ....Huddersfield.

February 22nd, 1877.

Present—Mr. Savage, Vice-President; Messrs. Allchin, Benger, Carteighe, Corder, Gale, Hanbury, Haselden, Linford, Martindale, Moss, Southall, Taylor and Umney.

Dr. Greenhow was present on behalf of the Privy Council.

MAJOR EXAMINATION.

Five Candidates were examined. *Two* failed. The following *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Babb, James ... .Taunton.
Glover, William Kensit ....Aberdeen.
Peat, Joseph.......................Workington.

MINOR EXAMINATION.

Seventeen Candidates were examined. *Six* failed. The following *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Arblaster, Charles ....Birmingham.
Atwell, Benjamin Arthur ......Wincanton.
Batchelor, Alfred Ernest.........Fareham.
Cullingford, Louis James ......Bletchingley.
Francis, Rawson Parke ....Diss.
Hulland, Charles Richard ......Bath.
Mence, William Cookes ....Royston.
Peirson, Henry.....................Banbury.
Russon, Samuel Tonks ....Birmingham.
Shenstone, James Chapman ...Colchester.
Shilton, James ....Sutton Coldfield.

February 23rd, 1877.

Present—Mr. Williams, President; Messrs. Allchin, Benger, Carteighe, Corder, Gale, Hanbury, Haselden, Linford, Martindale, Moss, Southall, Taylor and Umney.

MINOR EXAMINATION.

Nineteen Candidates were examined. *Eight* failed. The following *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Allsworth, Norman ....Havant.
Dixon, Herbert.. ....Retford.
Edwards, Frederick William ...Bradford.
Fletcher, Redfern..................Newcastle-on-Tyne.
Gibbs, John ....Worcester.
Gregory, Frank....................Tunbridge.
Matthews, James Wavell ... ..London.
Rickarby, Arthur George ......Bromley.
Southee, William Jennings......London.*
Squire, Frederick John Cripps Plymouth.
Taylor, Charles Edward ....Lancaster.

MODIFIED EXAMINATION.

Two candidates were examined, *both* of whom passed, and were declared qualified to be registered as Chemists and Druggists:—

Oates, Edward Brooke...........Dewsbury.
Smithyman, Joseph ....Dudley.

PRELIMINARY EXAMINATION.

The undermentioned Certificates were received in lieu of the Society's examination:—

Certificate of the College of Preceptors.

Evans, Thomas Fryer ....Manchester.

Certificate of the Royal College of Surgeons of England.

Furmston, William Arthur......Wycombe.

Certificate of the University of Durham

Todd, Matthew James............Sunderland.

Certificates of the University of Oxford.

Crispe, James Herbert ....
Watts, Arthur Rugg ....Shaftesbury.
Wimpenny, John McMillan ...Waterloo.

EXAMINATIONS IN EDINBURGH.

February 22nd, 1877.

Present—Messrs. Ainslie, Borland, Gilmour, Kemp, Kinninmont, Stephenson and Young.

Professor Maclagan was present on behalf of the Privy Council.

MINOR EXAMINATION.

Eleven candidates were examined. *Three* failed. The following *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Brown, Robert ....Leith.
Cassels, David Malloch ....Lanark.
Crook, Charles William Wallace Plymouth.
Dawson, Theo. Matthew Francis ...Hull.
Green, George ....Horncastle.
Keith, Alexander Reid ....Arbroath.
Mackenzie, George Grant ......Invergordon.
Stewart, Duncan ....Crieff.

MODIFIED EXAMINATION.

One candidate was examined, and failed.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The fourth general meeting of this Association for the present session was held in the library on Tuesday evening, January 23rd, the chair being occupied by Mr. George Gell. After the minutes of the previous meeting had as usual been read and confirmed, Mr. Pick (of the firm of Smeeton and Pick) and Mr. Prust were duly elected members. A paper on "Volumetric Analysis in Pharmacy," of which the following is a *résumé* was then read by Mr. E. O. Brown.

In opening the subject a few general remarks were made in relation to chemical analysis, to the effect that it is divided into two main branches, viz., qualitative analysis which has to do with the finding out and recognizing elementary bodies, and with the methods of separating them from other substances with which they may be mixed or combined, and quantitative analysis which relates to the quantitative determination of a simple substance, or the relative proportions of simple or elementary substances, that may exist in a compound body. Two ways in which bodies may be quantitatively determined were then noticed, viz., gravimetrically *i.e.*, by weight, or volumetrically, *i.e.* by measure; the term by measure here implying that the weight of the substance is determined from the quantity by measure of the test solution used; or in other words the measure of the test solution required to convert a substance from a definite and known state to another equally definite state becomes a basis for calculating the amount of substance sought. Some of the conditions necessary for the successful application of volumetric analysis were then mentioned, such as the preparing of a test solution of known chemical power, and the using of accurately graduated vessels for measuring the test solutions. The completion of the reaction between the test solution and the substance sought must be apparent to the eye, or capable of being made so by the use of a suitable indicator. This may be by the ceasing to fall of a precipitate, as in the determination of bromide of potassium by nitrate of silver; or when chromate of potassium is used as an indicator, the appearance of the red chromate of silver marks the completion of the reaction, and the various ways in which the ending of reactions may be made perceptible were then noticed. The instruments and apparatus necessary for the conduction of volumetrical operations were next taken into consideration, also the relative utility of the metrical and British system of weights and measures. Volumetric analysis in its direct application to the testing of pharmaceutical preparations was next noticed, and also some of the preliminary operations necessary in preparing substances for the direct application of the test solutions. The estimation of some of the more important preparations of the Pharmacopœia was then practically demonstrated and the paper brought to a conclusion by a few remarks on the methods of calculating the percentage composition of the substances tested from the results so obtained.

The fifth general meeting was held in the library on Wednesday evening, February 14th, the President, Mr. Yewdall, occupying the chair. After the election of Mr. Harrison of Headingley as a member, Mr. Freshfield Reynolds occupied the evening with "Brief Notes on New Remedies." The subject was dealt with in a conversational manner and amongst the various drugs to which allusion was made, the following passed under review, and fine specimens were exhibited upon the table; viz., salicin and salicylic acid, boldo, jaborandi, rhamnus frangula, gelsemium sempervirens, eucalyptus globulus, guarana, coca leaves, ailanthus glandulosa, araroba or Goa powder, monobromated camphor, gurjun balsam, etc.

A cordial vote of thanks was passed to each author at the conclusion of the meetings.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION.

The second ordinary evening meeting of the session was held in the Memorial Hall, on Wednesday, February 21st, Mr. W. S. Brown, President, in the chair.

Messrs. Pontifex and Wood, of London, exhibited a set of pharmaceutical apparatus consisting of a copper boiler, tinned copper evaporating steam-pan and tin condensing worm; the working of the apparatus being explained by a gentleman who attended on behalf of the firm.

A paper was read by Mr. A. N. Palmer on—

Bisulphite of Lime and its Use in Brewing.

After some preliminary remarks the writer said that although the name Bisulphite of Lime was one that could by no means be brought into agreement with current chemical theory and nomenclature, it was, at the same time, a name that expressed well enough the fact that in the substance so called, lime was contained in presence of excess of free sulphurous acid. It was prepared on the large scale, by passing sulphurous acid gas into water having lime suspended in it until the lime was dissolved or the clear liquid had reached the required specific gravity. It was in fact a solution of sulphite of calcium in free dilute sulphurous acid. This was its composition when freshly prepared, but, no sooner was it made than it began to absorb oxygen from the air, so that it was impossible in practice to find a sample which did not contain sulphate of calcium as well as sulphite. Bisulphite of lime as met with in commerce varied, in respect of its important constituents, within not very wide limits. In the following table are given the percentages of the sulphurous acid gas (SO_2) and (in five of the cases) of the lime (CaO) that the writer had examined at various times. "A" was obtained from a wholesale druggist. B, C, D, and E were obtained from four different makers of bisulphite, and F, G, and H are distinct samples supplied by a fifth maker.

	Sp. gravity.	Lime.	Sulphurous Acid Gas.
A	1·056	—	4·45
B	1·070	2·38	5·38
C	1·060	1·96	4·73
D	—	2·241	5·779
E	1·070	2·39	5·82
F	1·060	1·78	4·76
G	1·048	—	3·90
H	—	—	5·46

Only of samples D and E were complete analyses made the results of which analyses were then given.

Bisulphite of Lime "D."

Sulphate of Calcium	·337 per cent.
Sulphite of Calcium*	4·508 „ „
Sulphurous Acid†	3·877 „ „
Water	91·278 „ „
	100·000

Bisulphite of Lime "E"

Sulphate of Calcium	·25 per cent.
Sulphite of Calcium‡	4·90 „ „
Sulphurous Acid§	4·11 „ „
Water	90·74 „ „
	100·00

Bisulphite of calcium was preferred by brewers to a solution of sulphurous acid capable of yielding an equal percentage of sulphurous acid gas, because in the first place the former was more stable than the latter, and because secondly its sulphurous odour was much less pronounced. The employment of sulphite of calcium rather than of sulphite of potassium or of sodium was due to its becoming transformed by oxidation in the beer to sulphate of calcium,—a substance whose presence in their brewing-water brewers always desired; while the use of bisulphite or of a solution of calcium sulphite in sulphurous acid was explained by the comparative insolubility of that sulphite in the brewer's worts.

The writer then described in some detail the uses to which among brewers bisulphite of lime is put, and the methods of its application. Beer, both in the process of its production and in the finished state, was liable to certain changes injurious to its character and quality, which, it was believed, could be absolutely prevented by the employment of bisulphite of lime. This was the case both

---

* Containing 2·774 per cent. SO_2
† „ 3·025 „ „ „
‡ „ 2·61 „ „ „
§ „ 3·21 „ „ „

when those changes were directly referable to the albuminoid substances of the beer, and when they were more properly expressed as the oxidation of the alcohol of the latter into acetic acid. The bisulphite of lime had of course an affinity for oxygen superior to that which alcohol or any other substance present in the beer had, so that whatever oxygen was absorbed went to that and not to these. By the use of bisulphite moreover, in his "working squares," the brewer could bring the fermentation process completely under his control. By the addition of this agent to a fermenting fluid, either the rate of fermentation could be diminished or the process stopped altogether.

It was also stated that when the primary fermentation with yeast was completed and the beer racked off into casks, many brewers were accustomed to add a further quantity of bisulphite of lime. The difference between beer which had been treated in this way and the same beer unbisulphited was said after a few days to be very apparent. When the former was sparkling, sweet and full-bodied, the latter might be quite flat, sour and thin. In beer in which the primary fermentation was completed, in fact, not all the substances in the original wort were fermented that were capable of fermentation. The beer contained these residual substances as well as a good many yeast cells. Fermentation thus went on more or less slowly in the casks, the beer diminishing in gravity and body, through the conversion of the extract-giving and toothsome sugar into thin and unsubstantial alcohol. Now the addition of bisulphite retarded this change and spread it over a longer time. Besides this, it prevented any such absorption of oxygen as would issue in the acetification of the alcohol of the beer. When properly applied and in due proportion, the sulphurous smell of the bisulphite was not perceived in the beer to which it was added. Indeed in the very act of working its effect it became transformed by absorption of oxygen into odourless products of change. These products—sulphate of calcium and free sulphuric acid—remained in the beer. As to the former of them, the formation of this substance in the wort during the process was positively advantageous if there were any grounds for the belief, widespread among brewers, that water containing a good deal of calcium sulphate was better for brewing than water similar in other respects, but lacking this ingredient. On the other hand, the fact, that, the use of bisulphite of lime, during and after the actual brewing-process, meant the presence in the finished product of about $1\frac{1}{4}$ grain of free sulphuric acid to the pint seemed generally ignored.

The writer in conclusion, referred to the use of bisulphite of lime for keeping such of the brewers' utensils as were not in constant use sweet and free from fustiness, as well as for recovering casks that had become partially "diseased."

After a short discussion, Mr. Payne proposed and Mr. Johnson seconded a vote of thanks to Mr. Palmer for his interesting paper. A cordial vote of thanks (moved by the chairman and seconded by Mr. Woolley) to Messrs. Pontifex and Wood for having gone to the trouble and expense of sending the apparatus for exhibition was also carried.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

A meeting of the chemists and druggists of Newcastle-on-Tyne, Gateshead and district, was held on Thursday, February 16, 1877, at 7.30 p.m., in the long room, Neville Hotel, Newcastle-on-Tyne, in support of the Chemists and Druggists' Trade Association. Mr. Barnard S. Proctor presided, and there were upwards of forty persons present.

The Chairman, in the course of his remarks, said, fifty years ago there was no organization in the trade at all, but legislation of a troublesome character from time to time made its appearance, and the members of the trade were called together for self-protection and defence; meetings were held, but the temporary organization fell into decay again. This had been repeated more than once by the time the Pharmaceutical Society was formed. It originated out of troublesome legislation, but the wise men of that day saw that it was desirable to have a permanent organization of the trade, and they saw very wisely that the best foundation for a permanent organization was that they should work for the educational development and progress of the trade at large. They based their Society upon this point, because this was the object which would always be before them and which would invariably deserve their best efforts to promote. This was the reason the Pharmaceutical Society lived; it met a great want and a want that still continued to exist. After the Pharmaceutical Society was established, other organizations sprang up, and many died because they were based upon theoretical grounds, their want did not exist—in fact, they were born before their day. Besides local associations a united association came into existence; it sprang upon the theoretical ground that the Pharmaceutical Society was not doing what it ought to do; it sprang up in opposition to the Pharmaceutical Society, and it died because it had not a good work to do. He did not say it did no good; he believed it did a certain amount of good. Then the Co-operative Drug Society sprang up to give the trade the benefit of wholesale as well as retail profit without working for it. He did not say there was no profit in the wholesale trade, but he did not see any reason why the retail men should expect to get this profit without working for it, and it died because of its unreasonableness in this respect. Now they had a trade organization which afforded, among other objects, protection against co-operative traders selling and dispensing scheduled poisons; this was not a prominent object but it was one of the objects, which, together with others, their friends the deputation would explain to them, had brought this Association into existence, and if they felt satisfied with these reasons then it would be their duty to support this Association. He had alluded to a number of organizations which had failed, but besides those, he must allude to one which had succeeded, and succeeded immensely—he referred to the Pharmaceutical Conference, which originated some years ago. At the time there was a strong feeling that the Conference was got up in opposition to, and was destined to work not in harmony with the Pharmaceutical Society; this proved an entire mistake. It has been proved by experience that the Pharmaceutical Conference covered ground which the Pharmaceutical Society had not covered, and could not so well cover. It was still doing a good work and living, thriving, and prospering amazingly. The Pharmaceutical Society had also done much for the trade, but it had not done everything, and there was still much to be done. The most serious question arose as to whether the organization now proposed to be promoted could do, or would do, or would be more likely to do the work which the Pharmaceutical Society had failed to do. There most certainly was work to do. It remained for them to see whether the Pharmaceutical Society or the present organization would do the best or be most willing to do the work which yet remained to be done. He thought perhaps there was work for both to do. He would call upon the Secretary of the Association to state what he desired upon the point, and to give them more light in regard to this subject.

Mr. Haydon explained the history, aims, and objects of the Association.

Mr. Barclay then addressed the meeting on behalf of the Association, his arguments being substantially the same as have been reported on other occasions.

Mr. Councillor Owen considered the meeting was an indication that the chemists of the neighbourhood were really in earnest upon this matter. In recent days he had never seen such a large and capital meeting of the trade. Mr. Barclay had properly said that there must be united action between his Association and the Pharmaceutical Society, and unless they could see a fair chance of this union between the two societies he thought it was possible they might meet the same fate as some of the associations referred to by the chairman. He then moved a resolution approving of the formation of the Chemists and Druggists' Trade Association, and pledged the meeting to support the same.

Mr. Nicholson (Sunderland) seconded the motion, and said that they in Sunderland fully appreciated the advantages of the Association. He had no idea of the Association for one moment clashing with the Pharmaceutical Society, or he would never have joined it, because he belonged to the last-named Society, and he believed there was work for them both to do; and if properly conducted, they could both be worked together for the general advantage of the trade. The members of the Pharmaceutical Society could all become members of the Trade Association; they would then have the working of the Association in a great measure in their own hands. It would then rest with themselves whether or not the two societies should clash.

Mr. Mays (Shields) said he did not see why the societies should clash with each other, for like Mr. Nicholson, he was connected with both. He was sorry this milk of sulphur business had created so much stir, for he did not think it was worth it; he did not see why the public should not have the article they wanted.

Mr. Sharp (Sunderland) thought there was no fear of the two societies clashing. Their duties were essentially different, those of the Pharmaceutical Society being educational and those of the Trade Association being devoted to trade matters. In Sunderland they felt strongly upon trade matters, and they often held meetings on one point, that of juries. He thought they could fairly take credit that they were the first to agitate upon that matter as a public body. As a pharmaceutical chemist it did not affect him, but he sympathized with his brother chemists, numbers of whom he knew to be men who could ill afford to leave their business to attend juries.

Mr. Simpson said he had his own feelings in reference to this matter. His notion was, that after a little excitement and enthusiasm this Association would die out. There was not sufficient work in the trade for the continuance of a Trade Society. It was entirely different to the Pharmaceutical Society, which had a progressive work before it.

The Chairman said he would heartily rejoice when there was nothing left for the Association to do. He hoped they would hear something more of the opposition side.

Mr. Hall agreed with the Association in all its bearings. It was, in his opinion a most desirable institution to have. He urged the expediency of their banding themselves together.

Mr. Hogg (Shields) also spoke in support of the Association and urged that it was necessary to have protection. The Pharmaceutical Society did not serve all their purposes—it did not protect them in their trade, and he thought it quite time some society should be formed to look after these things He had great pleasure in supporting the resolution, and he hoped it would be unanimously accepted.

The Chairman then put the resolution to the meeting, and it was carried without a single dissentient.

After votes of thanks to the chairman and the deputation, the meeting terminated.

A general meeting of the chemists and druggists of Liverpool, Birkenhead and district, was held at the Royal Institution, Colquitt Street, Liverpool, on Friday the 23rd inst., at 3 p.m. About fifty persons were present.

Mr. John Abraham presided, and the President, Vice-President and Secretary of the Chemists and Druggists' Trade Association attended as a deputation from the Association.

The Chairman in opening the proceedings said he consented to take the chair, because he thought the members of the deputation were entitled to their best consideration, not only on account of the importance of the mission on which they came but also on account of their personal character. He asked for them the most favourable hearing, at any rate their most attentive hearing, and he hoped the meeting would carefully consider their propositions and debate them fully and freely. He must say he came to the meeting with somewhat mixed feelings. It had been supposed that the new Association which the deputation represented was somewhat antagonistic to some other societies previously existing. In the first place it had been supposed by some that it was antagonistic to the local society, that it was calculated to render the local society unnecessary, and that it would cease to exist. He must say he should very much regret that such should be the case. The local society was carried on at almost a nominal expense, it had done in the past, he thought, very material good, and if gentlemen were not pleased to come together and see what they could do for the common welfare a few times in the year he could only say they must be somewhat wanting in a sense of their own interests. The local Association had produced a very favourable influence upon the hours of business and he believed had greatly relieved some of the members and their families, and he quite expected that in the progress of the Society it would effect a further reformation in that direction, for he believed the long hours of business which prevailed in certain parts of the town were entirely unnecessary, and occasioned a great sacrifice of health and comfort on the part of the conductors of the business, and was of no advantage to the public or to the individuals. It had been supposed by some that the new Association would be antagonistic to the Pharmaceutical Society. He should very much regret if such was found to be the case, and he could not imagine that it would be so. The deputation would, no doubt, be able to satisfy the meeting upon this point. The Pharmaceutical Society was an organized body, with a Council elected in a manner in which every member had a voice, and it ought to be a true representation of the best interests of the chemists and druggists of the country. If it was not so it was the fault of those individuals who elected them. The Trade Association aimed at being a great body notwithstanding, but unless it was very extensively supported it could hardly be of the use which its promoters expected it to be. It must not only have a respectable income, but it must have very considerable influence, and he trusted that influence would be exerted in such a manner as to carry public feeling with it. Although it was a trade association he trusted it would not be found to be an association of trade interests against the public interests. He trusted it would be a protective association, and that it would be carried on with reference both to the most enlightened consideration in respect of economical and moral principles. The Association, he was sure, would not defend any man who wilfully and knowingly sold adulterated articles. He hoped it would claim to do nothing which interfered with that freedom of commerce which was one of the established principles of the age. He thought upon that point there was the most danger of disappointing many of its members. They had no right to expect any monopoly or any exclusive privileges, except such as were necessary for the public protection, and he was persuaded that if they sought such, they would be disappointed. The feeling of the age was altogether in a different direction. He trusted that the Association would be conducted in such a manner as to obtain the public confidence, as in the main the Pharmaceutical Society had done. He would now ask them to hear those gentlemen who had been deputed to attend the meeting.

Mr. S. U. Jones said the chairman in his opening remarks had clearly laid down, as nearly as possible, the views of the Committee of the Association, and what they really wished to do. They did not wish to create any monopoly serviceable to only one part of the community, they wanted to organize an extensive association to protect themselves when they were attacked from any quarter whatever. They had not the slightest idea of interfering with either the privileges or objects of the Pharmaceutical Society; he honoured that Society for what it had done, and for its Council he had the greatest possible respect. He should be sorry to say anything which would in any way annoy the members of the Pharmaceutical Council; when he appeared before that Council not long since he explained to them, and he thought to their satisfaction, that the Trade Association had no feelings whatever antagonistic to the Pharmaceutical Society, and he was treated with the greatest possible respect by the members of the Council then assembled. He thought, however, there were many things which the Trade Association could take up that could not be so properly or so easily dealt with by the Pharmaceutical Society. He might instance, in that respect, the prosecutions in the milk of sulphur cases under the Adulteration Act, and the prescribing cases at Nottingham; these were pure and simple cases of prescribing. They could, however, have no sympathy with men who wilfully broke the law, but men who endeavoured honestly and fairly to carry on their business should be protected by the Association. They had sent cautions to several persons on no account to prescribe out of their own shops, not to visit patients, or to take them into a back room which had the least resemblance to a surgery. They were prepared to take up simple cases of prescribing and have the matter settled in a proper and legal manner, and if the decision was adverse they should certainly appeal to a superior court. As to the local society nothing was farther from the mind of the Trade Association than to interfere with it in any way.

Mr. Haydon then explained the history, aims, and objects of the Association. In the course of his remarks he said that under the Adulteration Act when an official had made a purchase of a drug or preparation for analysis, he was bound to offer a third portion of the article purchased, duly sealed, to the vendor. He further impressed on the meeting the necessity of chemists invariably accepting this portion; it frequently happened they would refuse it, saying they had more in stock, but he wished to remind them that a sample not bearing the official seal of the inspector was of no value for an analysis to be submitted to a court of law. Three chemists were recently summoned before the Salford magistrates for selling balsam of copaiba said to be adulterated. Only one of these gentlemen accepted the sealed portion offered by the inspector; this on analysis was found to be pure, and the solicitor of the Association had been instructed to defend in this case.

Mr. Barclay next advocated the claims of the Association.

Mr. Turner moved a resolution approving of the formation of the Chemists and Druggists' Trade Association, and pledged the meeting to support the same by every means in its power.

Mr. Tanner seconded the resolution.

Mr. John Shaw said he had much pleasure in supporting the resolution. The formation of the Association commended itself to his views as being the best that could be done under existing circumstances. He hoped for the best results from the visit of the deputation to Liverpool. There had been several prosecutions in Liverpool under the Pharmacy Act, in some of which fines had been imposed and in others the business had been sold. He did not think the Pharmaceutical Society had neglected such cases on proper representations being made.

Mr. Mason said he had great pleasure in supporting the resolution; he had always strongly advocated the desirability of forming a trade association. With regard to the adulteration prosecutions at Salford he knew that the firm who sold the balsam of copaiba in one of these cases had had the article examined, and that it had been found to be pure.

The resolution was then put to the meeting and carried unanimously.

The proceedings concluded with a vote of thanks to the chairman.

THE REGISTERED CHEMISTS' ASSOCIATION OF LIVERPOOL.

The Annual Dinner of the above Association was held at the Adelphi Hotel on Friday, February 23, at 6.30 p.m., the chair being occupied by the President, Mr. John Abraham, and the vice-chair by Mr. Alfred Redford.

After the usual loyal toasts, the President proposed the toast of "The Registered Chemists' Association of Liverpool," coupling with it the name of the Hon. Secretary. This was followed by the toast of "The Chemists and Druggists' Trade Association," coupling with it the names of Messrs. S. U. Jones, Barclay, and Haydon. The Vice-President proposed the toast of "The Liverpool Chemists' Association," to which Messrs. A. H. Mason and Thomas Williams responded. Mr. J. A. Turner proposed "The Pharmaceutical Society," coupling with it the name of Mr. John Shaw. Mr. Hocken proposed "The Registered Chemists of Liverpool and Suburbs," to which Messrs. Fingland, Dickins, and Parkinson responded. The President next proposed "The Registered Chemists of Birkensend and District," to which Mr. A. Stewart responded. "The Wholesale Trade" was then proposed by Mr. Fingland, responded to by Mr. Barclay. Mr. S. U. Jones, of Leamington, proposed "The health of the President" which was warmly received. During the evening recitations were given by Mr. Alfred Tanner and Mr. Henry Jackson, and some good songs by Mr. A. H. Mason.

MEETING AT ABERDEEN.

On Tuesday night, February 20th, the chemists and druggists of Aberdeen held a conversazione in the Music Hall Buildings, the company, numbering between 200 and 300. Mr. James Paterson, wholesale druggist, occupied the chair.

The Chairman in opening the proceedings said: "Allow me to express the pleasure I feel in presiding on the present occasion, and at seeing such a large gathering. In these days, such meetings have come to assume the character of regular institutions among us, and, when well conducted, are calculated to be very beneficial. Our meeting to-night, if we manage to carry it out in the spirit in which it has been conceived, will, I trust, be both useful and instructive. I am glad that so many of the masters have taken an interest in the meeting, because the opportunities of social intercourse have a sweetening tendency. I have a kindly recollection of our society's annual dinner, and always regret that it was allowed to become defunct, believing that these meetings largely tended to harmony and good feeling. There will be the less to regret, however, if some such meeting as the present come in its place. A homely social meeting, such as this, must tend to bind master and assistant more closely together, and increase their mutual respect for each other in their different positions, and to foster and keep alive that kindly interest in each other, instead of the feeling which, in our day, is fast becoming traditional, that the relation of master and servant is on both sides merely a question of somehow doing so much work for so much pay." The chairman then expressed a hope that the meeting might result in some steps being taken for maturing a scheme for giving systematic instruction to the assistants with a view to enabling them to pass their examinations in pharmaceutical subjects at the end of their apprenticeship. After the passing of the Pharmacy Act the society did as far as in them lay to provide such a training; but somehow it was not taken advantage of. Wherein lay the cause of failure he knew not. This he could say, it was a fair and honest attempt on the part of the society to grapple with the subject. The feeling in the society now was, that it rested with the young men to take the initiative, and he was sure that, although a considerable amount was spent in that attempt in vain, they would be quite willing to lend a hand to any well-considered and feasible plan for carrying out this object. The necessity for some such scheme being carried was increasing daily. He was, therefore, the more anxious to take the opportunity of this gathering to impress upon them its importance with all earnestness. So far as his acquaintance among the young men went, they quite saw the necessity of studying, but yet he found a strong tendency to put the evil day as far off as possible, always postponing the time till they gathered a little more experience. The only remedy for this hesitancy was to institute a course of thorough and systematic training some time during the course of the apprenticeship, to enable them to obtain that mastery of the subject and confidence in themselves necessary for creditably meeting the examiner. "You will find," he said, "in after life, that the training thus given will be of immense advantage to you, not only as regards the technical knowledge acquired concerning your business, but in the mental training it gives, and will repay its acquisition at the cost of some present income. Now, while you are young, is the only time you can aquire such training successfully. If the opportunity is let slip, very probably it may never come to you again, and if it does, it will cost you the expenditure of far more time and labour than if acquired in youth. You know your own feelings in regard to these matters better than any members of the society can. You have the advantage of seeing wherein their scheme failed, and I sincerely hope that these few remarks may be the means of awakening a fresh interest in the matter, and that you will manage to bring it to a more successful termination than the last. The other point, on which I hope this meeting may ripen opinion upon, and which has a pretty close relation to the other subject spoken of, is the shortening of the hours of business. There can, I think, be no two opinions as to its desirability in the interest both of master and assistant. That an hour could be gained in the evening without either injury to business or inconvenience to the public, I have no manner of doubt. I have never heard any argument against it that has not been applied in almost every business into which early closing has been introduced, and yet the evil results somehow never follow. The gain to the masters would be greater than they think. In the conduct of a drug business there is, if not at any time a very strong, at least there is a constant and long-continued, although perhaps unconscious, mental strain, to which relief to the extent I have indicated would be felt, when fairly tried, to be a very great boon. Such has been my experience. When shorter hours were first introduced in the wholesale trade, I cannot say that I felt personally any necessity for relief; yet I am now sensible of the benefit it confers, and am satisfied that others feel the same. If our young men are to undergo the training necessary now for entering fully on the business, I think some shortening of the hours must be made, so that they may go to their studies with something of vigour and freshness left in them to digest and assimilate what they are being taught or are reading. It seems to me that this is a matter very much in your hands. Were a spirit of study and inclination to it shown, so that the master would feel with some degree of certainty that the time so gained would be well spent, this, I am sure, would go a long way to its being granted. You have every inducement to study. In subjects cognate to your daily business—such as chemistry, electricity, and others, in which much has been done—lie vast and unexplored fields, affording you ample scope both for instruction and amusement of a high and elevating character, and to the patient worker will one day open up secrets that will be for the benefit of mankind, and certainly not without considerable pecuniary advantage to the individual."

An excellent concert by amateur ladies and gentlemen was then given, and after the concert the company adjourned to the ball-room were supper was served, after which the circular room was thrown open for the inspection of a number of beautiful microscopic objects, which were laid out on tables, under the charge of Drs. Cameron and Simpson. The microscopes and the objects were kindly lent for the occasion by Professor Struthers, Mr. Clark, Old Aberdeen, and Mr. Lees, curator of the museum. Mr. George Miller, Sandilands, enhanced the exhibition by an appropriate display of interesting chemical products. After an hour's conversazione, the company repaired to the ball-room, where, to the music of an excellent band, the "dance gaed through the lichted ha'" very pleasantly for several hours.

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

A meeting of this College was held on the 16th of January, Mr. Dillwyn Parrish presiding. Mr. A. W. Miller read a paper on—

Adulterations.—The author stated that Oregon balsam of fir (so-called) appeared in the New York market several years ago. Professor Maisch then examined it, pronounced it to be of suspicious appearance, and raised the query: "Is such an article known on our Pacific coast, and if so, what is its source, and how is it obtained?" This inquiry can now be answered by stating that the article in question emanated from St. Louis, Mo., where it was manufactured by carefully melting two parts of the finest select white rosin with one part oil of turpentine. A small amount, generally about one ounce to five gallons, of oil of wormwood was subsequently added, this having been found to be most efficacious in completely disguising the ordinary terebinthinate odour. The "balsam" was then shipped to a prominent New York broker, who succeeded in selling considerable quantities of it, as the genuine article happened to be at that time unusually scarce and high-priced.

Sulphate of quinia, put up in the usual style of the American manufacturers, has heretofore been regarded as being above reproach. Even the lately much abused dealers in pure essential oils of New York contented themselves with operations in Pelletier's French quinia. The author's information is to the effect that a year or two ago in one of the Western cities the labels of American manufacturers were deliberately soaked off, after which an admixture of salicin was introduced. The label was then replaced and the article disposed of. Another somewhat more enterprising dealer in the same city had muriate of cinchonine manufactured on his own premises, and used this to adulterate sulphate of quinia to a large extent. In this case the preparation was put up in tin cans, without bearing the name of any manufacturer.

Italian essential oils, chiefly lemon and bergamot, were imported by a Western druggist to the extent of 100 cans in one lot. They were opened, sophisticated to an enormous extent, and again closed with false seals and brands.

While in the East, the adulteration of cream of tartar is almost entirely confined to grocers and spice mills, in the West the wholesale druggists also seem to indulge extensively in this fraud.

The labels and wrappers of English calomel have been successfully imitated in the West, and large amounts of this pseudo-imported chemical have been there disposed of.

Professor Maisch expressed satisfaction in having the source of Oregon balsam of fir cleared up. He stated that his previous experiments had convinced him that it was a fictitious combination of rosin and turpentine, but that he had not been able to recognize the flavouring ingredient. Professor Maisch remarked that years ago itinerant vendors had sold either pure salicin or mixture of salicin and quinia in proportions adjusted to the price realized, in various sections of the United States, under the garb of pure sulphate of quinia. He also spoke of the occasional adulteration of balsam of copaiba with castor oil, which is not very readily recognized, both being soluble in alcohol. Professor Wayne had suggested the use of petroleum benzin, as this dissolves copaiba quite readily, but castor oil very sparingly. This test is, however, fallacious, as mixtures of equal parts of castor oil and copaiba dissolve freely in benzin. A more reliable method is to distil off the essential oil, and then to examine the residue. Pure copaiba makes a transparent mixture with aqua ammoniæ, while castor oil will be indicated by a soapy appearance.

Professor Maisch read a lengthy paper on the use of the metrical system in prescriptions. He exhibited copies of the Greek and Mexican pharmacopœias; of the new appendix to the 'Swiss Pharmacopœia;' of 'Dorvault's l'Officine' and of the pharmaceutical journals 'Revista Pharmacia' and 'La Emulacion,' in all of which weights are employed, as indicated in the paper.

Mr. James T. Shinn desired to know what means were adopted in Europe in order to dispense with the use of graduated measures in prescriptions. Professor Maisch informed him that a special scale, one beam of which is often furnished with a rider, is usually reserved for this purpose. After the vial has been tared, the prescribed liquids are then weighed directly in it.

A communication from Mr. Hans M. Wilder was also read, advising a recalculation of the pharmacopœia quantities into parts by weight, and suggesting that it be left optional with physicians to prescribe either in grams alone or by grams and cubic centimeters, just so that they indicate it plain and legible. He called special attention to the necessity of great care in the marking of the decimal point, the position of which may often be a matter of life and death, as far as the patient is concerned. Professor Maisch stated that the same subject would claim the attention of the New York College of Pharmacy that week. Dr. Pile expressed a fear that it would prove difficult for physicians to adjust their doses by weight, on account of the differences in the specific gravity of liquids. Professor Maisch replied that practically only three classes of liquids deserved consideration in this connection, namely, water, syrups weighing one third heavier, and oils weighing one-tenth less than water; with most tinctures and fluid extracts, if prescribed as if they were of the same specific gravity as water, the difference would hardly be greater than the increase in bulk by dissolving solids, which physicians have very generally overlooked, but in those cases, where great exactness is desired and the precise size of the patient's teaspoon or tablespoon is known, the difficulty can be overcome by the addition of an adjuvant to make up a designated quantity. In answer to an inquiry, Professor Maisch stated that several American medical societies had recently advised their members to use the metric system in prescribing.

Mr. James T. Shinn thought that the looseness of physicians in the matter of doses justified the retention of the present system of measuring liquids as a matter of convenience. Professor Maisch regarded the appliances for weighing in pharmacies as productive of far more accurate results than the present means used by druggists for measuring. He considered the uniformity of the metric system all over the world as the most important argument for its introduction. Even in comparatively narrow glass tubes there is so much liability to error in reading off the space occupied by the liquid which is measured, that in analytical work a special indicator is made use of so as to reduce the apparent variation to its minimum. This error is enormously augmented in proportion as the diameter of the surface of the liquid increases. Mr. E. M. Boring alluded to another error due to capillary attraction in tubes of narrow diameter.

Mr. A. W. Miller suggested that physicians might write a formula for one single dose, leaving the adjustment of the diluent to the pharmacist, in order to make up the conventional teaspoon or tablespoonful dose. The physician could then readily prescribe any convenient number of doses by the usual subscription: *Misce tales doses no.——*. All the much dreaded labour of calculation and adjustment would thus be thrown on the druggist, who has certainly more leisure to do it carefully and accurately in the seclusion of his prescription department than the physician at the bedside of the patient.

Professor Remington referred to the action of the last committee on the revision of the Pharmacopœia, who had received positive instructions to abolish all measures of capacity, but on account of the obstinacy of some of their members, retained the majority of them. He saw no possible way of evading the issue, and therefore advocated taking the step at once, and doing it completely, without resorting to any half-way measures. He thought it wrong to wait for physicians to make a beginning. Professor Maisch enumerated the various nations who had adopted the metric system for use in medicine, showing that it was already in use on nearly the whole continent of Europe, in all of civilized America, excepting the United States and Canada, and in the empire of Japan. According to information obtained by him from the medical attachés of the Japanese Commission during the late Exposition, the entire system of medical and pharmaceutical instruction in Japan is modelled after the German method; they even use the same Latin terms, and pronounce them in accordance with the usage prevalent in Germany, and use the French weights exclusively.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of the above Association was held at 17, Bloomsbury Square, on Wednesday evening last, when a paper entitled "The Radiometer: What it is and a Few Facts connected with it," was read by Mr. C. J. Mead. The author, after a brief description of the radiometer as first constructed by Mr. Crookes, and some of its subsequent modifications, proceeded to recapitulate the theories that have been put forward in explanation of its movements, and the experiments by which they were supported. Mr. Crookes at first thought the motion of the arms was due to the direct influence of a property equally present in radiant heat and light, and which he termed radiation. Mr. Callado, however, noticed that the arms of a sensitive radiometer exposed to moonlight concentrated by means of lenses did not rotate. The light from phosphorescent powders was also found to be without effect. Neither was the movement caused by the blue flame of a Bunsen burner accelerated when the flame was rendered luminous. A radiometer subjected to the influence of an atmosphere, the temperature of which was higher than that within the bulb rotated until an equlibrium was established between the temperature inside the bulb and that immediately outside, and upon the source of heat being removed rotation took place in the reverse direction until the equilibrium was restored. In fact Mr. Crookes' later experiments have led him to the conclusion that the rotation is due to the internal movements of the molecules of unequally heated residual gas in the imperfectly exhausted bulb. The author concluded by pointing out the possible utilization of this instrument as a photometer and in other ways. The paper gave rise to considerable discussion at the close which a vote of thanks to the author for his interesting paper was unanimously passed.

Parliamentary and Law Proceedings.

The Charge of Personation at the Preliminary Examination.

At Bow Street, on Saturday, February 24, John Thomas Faulkner Colegrove was charged, on remand before Mr. Flowers, with procuring his registration under the Pharmacy Act by false representation; and Andrew Ritchie Hunter, formerly a clerk in the Savings Bank Department of the General Post Office, was charged as aiding and abetting, and the two defendants were for the first time also jointly charged with conspiracy. Mr. Douglas Straight, instructed by Messrs. Flux and Co., appeared for the Pharmaceutical Society. Mr. Straight commenced the proceedings by reading some letters and papers found in the possession of Hunter. Two were from a person (whose name was not mentioned) asking Hunter to pass the Preliminary examination for a friend, and saying that £10 would be given him, as that was his charge. A letter was also found on Hunter coming from and signed by Colegrove on the back of which were several signatures showing that some one had been practising an imitation of Colegrove's name.

Mr. Straight applied for an adjournment until Tuesday, in order that a warrant might issue for the arrest of the person who appeared in the correspondence read as introducing Colegrove to Hunter. The application was granted.

On Tuesday, the 27th, the prisoners were again brought up, and John Hinks was included in the charge. The letters previously referred to were read and evidence was given showing that Hinks had been in communication with Colegrove, and that he had that morning given himself up to the officer holding the warrant against him. The prisoners were then fully committed to take their trial at the Central Criminal Court. The defendants were admitted to bail.

Poisoning by Laudanum.

An inquest was held on Tuesday by Mr. H. S. Wasbrough, coroner for Bristol, on the body of Mr. John Cecil Wayet, aged 20, a medical student at the Bristol Royal Infirmary, who was found in a dying state in his room at that institution early on Monday morning. It was stated that the deceased suffered greatly from neuralgic pains, and that he must have taken an overdose of laudanum to obtain relief. Mr. Wayet was considered one of the most promising pupils in the infirmary. He was a son of the Rev. Field Wayet, rector of St. Stephen, Bristol.

The jury returned a verdict to the effect that the deceased came by his death through an incautious use of laudanum.

Review.

Handbook of Rural Sanitary Science, Illustrating the best Means of Securing Health, and of Preventing Disease. By C. F. Gardner; William Berry, L.R.C.P. Edin., M.R.C.S. Eng.; C. N. Cresswell, Barrister-at-Law; and Thomas Hennell, Assoc. Inst. C. E. Edited by Loby Marsh, M.D., M.R.C.P. London, M.R.C.S. England. Smith, Elder and Co. London: 1876.

The editor of this book offered, in 1875, a prize for the best essay on rural sanitary science, for which a number of gentlemen competed. The prize was secured by Mr. Gardner, and his essay is printed in full in the first five chapters of the work under review. The other essays were arranged for publication by the editor, and constitute the remaining three chapters, besides which the editor himself contributes some notes at the end of the book.

Notwithstanding the editor's attempt to prevent repetition of matter in the various essays as now published, there is a deal of it, and as the thesis by Mr. Gardner is undoubtedly the best we shall almost confine our attention to this part of the production.

After some introductory matter, the reader is led to look somewhat deeply into the sanitary aspects of rural districts, and a report by Bishop Frazer is quoted to show how necessary it is that we should not be deluded by the outside appearance of things. The cottages which, surrounded by pretty gardens and entwined by honeysuckles and roses, stand out like so many Elysian abodes, are generally ill constructed, and contain pregnant sources of disease. Thus it is related that in some, "one small chamber with the beds lying as thickly as they can be packed" serves as the sleeping apartment for "father, mother, young men, lads, grown, and growing-up girls." From such facts the author proceeds to show how utterly impossible it is that under such conditions people can live in a healthy and moral way. But, notwithstanding the truly repulsive facts which are given in this part of the work, we cannot by any means regard this state of things as universal, and indeed our experience would teach us that it is decidedly a state of exception, and we would go farther and submit that, as a rule, the English country folk are both clean and moral.

After enumerating the dangers to health of drinking impure water and breathing vitiated air, matters which are confirmed by various quotations from the reports of Mr. John Simon, it is laid down as a general rule that dryness and well-ventilated rooms are powerful means to prevent and retard such diseases as consumption. It is pointed out that the pecuniary loss to nations by reason of poverty and sickness is so great, that economists should be the most earnest sanitarians.

The second chapter is chiefly concerned with buildings, and the purity of air in or about them, and there is given valuable information regarding the best soils or foundations on which buildings should be erected. In connection with this subject it is pointed out that in damp districts it is a most useful measure to provide for a play or current of air beneath the ground floor of habitations.

Persons are warned against the use of arsenical wall papers; but in connection with this subject we are surprised to find no mention of the plan of varnishing wall papers, a plan which we think exceedingly good, and even economical in the long run. Varnishes are made with turpentine, and this substance here plays the same part as it does in wooden hospitals, and by its slow oxidation gives rise to influences which are most useful in preserving health. Not only so, but varnished walls or wall papers admit of ready and complete cleansing.

In treating of water-closets and so forth, the siphon trap is considered to be the safest and the best to employ, but as regards the dissemination of noxious gases into the atmosphere—anywhere out of the house—we do not quite agree with our author. From what is known of endemic disease, it is plausible that its communication takes place through the agency of actual matter, and from what we know it appears that this may take so finely divided a form as to float about in the atmosphere. When, therefore, we diffuse we by no means destroy, and in our opinion the only true safeguard consists in prevention by the judicial use of substances able to prevent the spread of disease. Cesspools are wisely condemned in this book, and earth-closets are recommended where water-closets are impracticable. Of the latter kind the tumbler closet, which is an automatic instrument, receives the greatest share of praise.

Mr. Gardner makes some useful observations on the subject of speculative building undertakings, and points out that while on such a wide scale the only object of the builder is to erect that which will sell, we cannot expect to get houses provided with the necessary accommodations for securing health, although a sham kind of comfort provision may prevail, and here it is that some kind of legislative interference is urgently required.

Where flowers are kept, either in houses or gardens, it is recommended that among them at least sweet smelling ones should be preferred. These sweet smelling ones are oil-secreting plants, and these oils generate peroxide of hydrogen (not ozone), which is a powerful disinfectant.

The third chapter is chiefly taken up with considerations on the disposal of sewage and the pollution of rivers.

It is asserted that the fertility of a farm depends in no mean measure upon the quantity of live stock kept upon it; but that while nearly one third of the live stock of this country is mankind, and while, therefore, we should anticipate on every ground a superiority in man as a manure-producing animal, it is not the case really. It is true that we do not make the most of ourselves, and further true that a certain branch of industry is therefore not carried to its possible extreme, but it is all the same in the end: we may not appreciate it sufficiently, although Liebig and others have so strongly dwelt upon the balance of things in nature. All animals consume oxygen and carbohydrates, and all excrete carbonic acid, water, and other products of life not so ultimate in their nature; time, however, is the factor which will bring about their decomposition into ultimate products, such as carbonic acid, etc., which serve for plant life in their turn, etc. It is possible for man to interfere, control, and quicken natural processes, but whether he does so or not, it is the same in the end. Do not let it be understood, however, that we shut our eyes to the necessity of a proper interference or a wise control; but what we do feel strongly is, that while it is attempted to realize large profits from such undertakings, so long will the attempts fail.

As regards the disposal of sewage, for country districts the plan of intermittent downward filtration is strongly recommended: the necessity for intermittent filtration being, that the whole process is essentially one of oxidation, and therefore the earth must be allowed from time to time to assimilate fresh oxygen; if not, the process becomes one of filtration only, and the object is not to be attained in this way.

The supply and storage of water constitutes the subject-matter of the fourth chapter, and the doctrine that water having been once in mixture with sewage is unsafe for human consumption, is laid down with emphasis. There are given some exceedingly useful observations on the utilization of water streams by means of reservoirs and a system of distribution; and after dilating on the use of the underground water bed, Mr. Gardner passes on to advocate a system of storage of rain water. It is proposed to effect this by constructing tanks on the roofs of houses, and when we consider that we have on an average an annual rain fall of thirty-two inches, we are struck with the fact that in this way a quantity of water of great use for cleansing and other purposes could be readily obtained. But we cannot go so far as the author does, in recommending the erection of such tanks on the tops of churches, etc.: "a thing of beauty is a joy for ever."

In the fifth chapter there are remarks on sanitary legislation and administration, in which the Public Health Acts of 1872 and 1875, and the Alkali Acts, occupy considerable attention.

As already pointed out, the remaining chapters are occupied with matters which have previously received attention, but we would remark that while in the essay by Dr. Berry (sixth chapter) it is strongly recommended that the Government should cause investigations into the nature of disease to be conducted, there is no mention of the researches which have been for a number of years conducted in various physiological and chemical departments under the medical officer of the Privy Council.

The notes furnished by the editor are thoughtful and suggestive, but do not call for special observation.

In conclusion, we take this opportunity as a seasonable one for offering an opinion on the kind of qualifications that officers of health should possess. Most of our medical officers are incompetent to properly discharge their duties as health officers, and this by reason of their education. It is, however, a chemical officer rather than a medical one who is required, for the knowledge that is mainly requisite is one of physiological and pathological chemistry in all its branches; and be it remarked that this is a science in regard to which most medical men are profoundly ignorant. Most of them know nothing about it, and but few know little, and we are convinced that so long as this branch of chemistry is suppressed in the hospitals and medical schools, so long will the present state of things continue. Whether officers of health should henceforth be chosen from the ranks of medical men is matter of opinion, but for our part we believe the duties could better be discharged by chemists. Yet it is not to be denied that chemists are as a body unacquainted with certain phases of knowledge which are equally valuable; in fact, the branch of physiological chemistry is greatly neglected even by them. What is wanted is a new class of men; the special faculties called into play by the duties of a health officer are ones which have not hitherto been associated, but which have been divided and kept distinct in the professions of chemistry and medicine.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

Botanical Prize for 1878.

Sir,—As the season is close at hand when the Silver Council Medal is offered for the best Herbarium of British plants collected by students of pharmacy, I should like to make one or two suggestions concerning the regulations under which these herbaria are formed. I have before me a copy of the *Pharmaceutical Journal* for April 29th, 1876, page 875, where there is an article headed "Botanical Prize for 1877." I will treat each paragraph of this article in the order in which it stands.

On paragraph I., I have no suggestions to make.

Paragraph II. runs thus: "The collections to consist of British flowering plants and ferns, obtained in a wild state, and arranged according to the natural system; the collections to be accompanied by lists, arranged according to the same system, with the species numbered." In place of this I would suggest the following modification of it, viz., "The collections to consist of British flowering plants, ferns, lycopodiums, equisetums and charas, obtained in a wild state and arranged according to the natural system, following the nomenclature, sequence and numbering of the last (7th) edition of the "London Catalogue of British Plants" (published by Messrs. Hardwicke, 192 Piccadilly, price 6*d.*), the collections to be accompanied by copies of the catalogue with marks placed before the names of the plants contained in the herbaria, and the total number of species collected to be written at the end of the catalogue." My reason for adding the lycopodiums, etc., is that these plants are almost invariably treated of in books on flowering plants and are included in the London Catalogue. I think the advantage of using a standard list will be apparent to all. In the first place it will do away with all difficulty as to which plants are to be considered as species and which are to be treated as varieties, and will place each student on a similar footing; for under the present system the student who followed Bentham could only collect one Rubus and call it "Rubus fruticosus," where another who followed Hooker could collect some thirty or forty species which would all come under "Rubus fruticosus" in the former work; these remarks apply to numberless cases including the water buttercups, roses, willows, etc. In the second place for purposes of comparison, it will be a great advantage to have all the collections arranged by the same standard and in the same order. In the third place, the London Catalogue is a fair compromise between the views of different authors as to species and varieties and has been compiled with very great care and consideration, and by following such a list the student is not confined to any one work but in cases of difficulty can make use of the descriptions of various authors in determining his plants.

Paragraph III. runs thus: "The collector to follow some work on British Botany (such as that of Babington, Hooker, or Bentham), and to state the work which he adopts. The name of each plant, its *habitat*, and the date of collection to be stated on the paper on which it is preserved." In place of this I would suggest the following:—"The collector to consult such works as 'English Botany,' 'Babington's Manual,' 'Hooker's Student's Flora,' or 'Bentham's Handbook,' etc., and to state which works he has consulted. The name of each plant, its *habitat*, and the date of collection, and its number in the London Catalogue, to be stated on the paper on which it is preserved."

Paragraph IV. runs thus: "Each collection to be accompanied by a note containing a declaration signed by the collector, and certified by his employers, or a pharmaceutical chemist to whom the collector is known, to the following effect:—'The plants which accompany this note were collected by myself from wild plants, between the first day of May, 1876, and the first day of June, 1877, and were named and arranged without any assistance but that derived from books.'" Here I would make no alteration but would add at the end "and other herbaria." This I consider a most important addition, for it is practically impossible to determine many species from books only without the aid of authentically-named specimens for purposes of comparison, and if it be objected that this would give students living in large towns where there are good public herbaria, advantages which country students could not always obtain, I would reply that it is but a small set-off against the great advantages a country student has, who can run out whenever he has a spare half-hour and get a box full of plants, over one who lives in a large town and can only collect in his occasional half-holidays, or his summer vacation. The former can dry his plants at his ease and need not collect many at a time. The latter has to collect as many as he possibly can whenever he gets a chance, and often returns home with so many new specimens that he is quite bewildered as to how to dispose of them and get them named before they fade. When competing for this prize myself I often returned from a long day's walk thoroughly tired and had to sit up till one or two in the morning naming and drying my findings.

On paragraphs V. and VI., I have no remarks to make.

In paragraph VII. I certainly think the age ought not to be limited to twenty-one. What the limit of age should be is of course a matter of opinion. But as the Minor and Major examinations cannot be passed until that age is attained, I certainly think it a great pity to take from students the inducement to collect plants, and study botany in the most practical and thorough manner, whilst they are preparing for their examination. Collecting plants also takes them into the open air, and compels exercise, which is certainly a most important thing to those who are reading hard for an examination. If I may suggest what would appear to me to be a suitable limit as to age it would be twenty-four.

I must apologize for the great length of this communication but could not compress what I wanted to say into a much smaller compass.

FREDERICK J. HANBURY.

Plough Court, Lombard Street, E.C.,
February 27, 1877.

EDINBURGH CHEMISTS TRADE ASSOCIATION MEETING.

Sir,—The notice which appeared in the Journal last Saturday week, regarding a meeting held in Edinburgh under the auspices of the Chemists and Druggists' Trade Association, hardly gives a correct statement on a most important matter connected therewith. It is stated as one of the objects of the meeting that it was to consider whether a North British branch of the Association should be formed, etc.; such a proposal was neither intended nor considered, as this had been resolved a considerable time ago. It will be seen from the report, only one motion was submitted, which was simply expressive of hearty approval of the Association. Regarding the remarks "the proceedings which do not seem to have been very animated, were concluded within an hour." Truly a friend did not report it thus. Any one accustomed to ordinary meetings of chemists in Edinburgh would consider the attendance a fair average, while half of the animation exhibited that evening would materially improve them. The business of the meeting began shortly after half-past eight, and concluded a few minutes before ten, in order to allow the friends from the South to return by the 10.30 p.m. train.

JAMES MACKENZIE.

Feb. 22, 1877.

[*⁎* According to the circular of the Trade Association one of the objects of the Edinburgh meeting was to consider "whether an Association should be formed embracing" the counties of Edinburgh, Haddington and Linlithgow. In other respects also we believe our report was substantially correct.—ED. PHARM. JOURN.]

"*Gnol.*"—*Weissia controversa*; (3) *Tortula muralis*; (4) Probably *Bryum cernuum*; send some when the capsules are more mature; (5) *Ceratodon purpureus*.

"*Syrupus.*"—(1) *Hypnum confertum*; (2) *Tortula muralis*; (3) *Grimmia pulvinata*; (4) *Hypnum cupressiforme*; (6) *Bryum capillare*.

F. J. B.—(1) See Dragendorff on the rectification of essential oils, *Pharm. Journ.* [3], vol. vi., p. 649. (2) Cartier's hydrometer is constructed only for liquids lighter than water. In its scale 22° corresponds with 22° Baume, "but above and below this point the degrees of Baumé are diminished in the ratio of 16 to 15," (Watts).

"*Dispenser.*"—The Acid. Sulph. Dilut., B. P.

"*Chemist.*"—(1) Our reference was quite correct. (2) Browning for gun-barrels: blue vitriol, 4 ozs.; tinct. perchloride of iron, 2 oz.; water, 1 quart; dissolve, and add 1 oz. each of aquafortis and sweet spirit of nitre. The fluid to be rubbed on the barrel, previously well cleaned, and allowed to remain several hours.

G. W. G.—You will find the information asked for on p. 715.

C. G. B.—Bentley and Redwood's 'Elements of Materia' (Longman), Proctor's 'Practical Pharmacy' (Churchills), 12s.

"*Pharmaceutical Student.*"—See a note on "Pill Coating," in vol. iv., p. 953.

"*Chemicus.*"—Probably the solution of alkaline silicate commonly called "water glass."

"*Dispenser.*"—We do not know any solvent that would give a solution of neutral sulphate of quinine of the strength required. Perhaps a solution of the alkaloid in ether or alcohol might answer the purpose. Quinine dissolves in its own weight of ether and in less than ten times its weight of rectified spirit.

"*Circumambulans.*"—We do not think it is desirable to discuss the subject in these columns. Probably if you addressed your communication to the Secretary he would lay it before the Council.

M. H. Jones.—The suggestion has already appeared several times in this Journal.

A. E. Lomax.—You are recommended to address the questions to the editor of a medical journal.

R. Williams.—The proportion of one part of chloroform in nine of the solution is more than double the strength of the Pharmacopœia preparation, which will account for the separation on mixing with water.

ERRATA.—In the eighth line of the recipe for Tooth Stopping, No. 538, p. 706, *for* "pure gelatine," *read* "pure platinum." In the fifth line of the next recipe, for Essence of Musk, *for* "ad partes viginti quinque," *read* "āā partes viginti quinque."

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Chipperfield, Dr. Mehu, Dr. Dymock, Dr. Hesse, Mr. Ashwell, Mr. Bailey, Mr. Stevens, Mr. Lomax, Mr. Atkins, T. H.

NOTES ON THE ACTION OF CHLORINE UPON A BEAM OF LIGHT AND ON THE PREPARATION OF LIQUID CHLORINE.*

BY DR. A. SENIER AND MR. A. J. G. LOWE.

Action of Chlorine upon Light.—The following experiments were made with the view of obtaining, if possible, from chlorine an absorption spectrum analogous to the spectra given by iodine and bromine.

Combustion tubing, to the ends of which plates of glass were fitted, was filled with chlorine gas. Through various lengths of such tubes—the longest being about nine feet—light was transmitted and examined by means of a two-prism spectroscope. No absorption occurred except what was due to the colour of the gas, that is to say, the spectrum was brightest in the green and yellow, the violet and indigo being more or less absent.

In the next place, chlorine gas under pressure was examined. The pressures varied, the greatest being about four atmospheres. The deepest stratum examined was two inches. As regards absorption, the results were again negative.

Finally we experimented upon liquid chlorine in strata varying in thickness from one eighth of an inch to one inch and a half. The only absorption observed was that due to the deep yellow colour of the liquid chlorine.

We have therefore failed to obtain an absorption spectrum from chlorine, and our experiments—which in part at least are new—go to confirm the results already obtained.†

The Preparation of Liquid Chlorine.—The preparation of this element in the liquid form from crystals of hydrous chlorine ($Cl5H_2O$) by the methods generally described is a somewhat tedious operation, but by the use of a cotton-wool strainer to remove the hydrous chlorine from its mother liquor we have been enabled to render the operation comparatively easy. We prepare liquid chlorine as follows:—A stream of chlorine gas is passed through a bottle, about two thirds full of water and surrounded by a freezing mixture of sulphate of sodium and hydrochloric acid. Care is taken to prevent the water from freezing, and frequent agitation accelerates the formation of the hydrous chlorine. When by the deposition of crystals the contents of the bottle are fairly thick, they are poured through a funnel into a piece of combustion tubing sealed at one end. A plug of cotton-wool, attached to the end of a piece of twine, is inserted into the combustion tube, and is slowly pressed downwards by means of a glass rod or piece of glass tubing. In this way, the crystals are separated from the chlorine water, and are compressed tightly in the bottom of the combustion tube, while the water fills the tube above the plug and is poured off. By means of the string the plug is withdrawn, when more wet crystals may be added and the process of straining repeated. The combustion tube should be placed in a freezing mixture from time to time. When sufficient hydrous chlorine has been collected, the tube containing it is surrounded by a freezing mixture, and carefully sealed within about two inches of the surface of the crystalline mass. When cool it is surrounded by wire gauze and heated in a water or air bath to from 100° to 150° Fahr. In the course of ten minutes the crystals will be completely decomposed, the liquid chlorine appearing below the chlorine water as a dense deep yellow oily looking liquid.

In conclusion we have to express our thanks to Professor Attfield for his kindness in allowing us to make the above experiments in the laboratories of the Pharmaceutical Society.

[*The discussion on this paper is printed at p.* 744].

* Read at an Evening Meeting of the Pharmaceutical Society, March 7, 1876.

† See, however, experiments of Gernez (*Comp. Rend.*, lxxiv., 660—662).

NOTES ON INDIAN DRUGS.

BY W. DYMOCK.

(*Continued from page* 550.)

PEDALIUM MUREX.—*Local Names,* KARONTA, *and* BURRA-GOKHROO.

A spreading low succulent plant, with oval-dentate obtusely pointed leaves; pedicels axillary, 1-flowered, shorter than the petiole; 1, 2, or more dark brown glandular bodies situated near the axils; flowers yellow; tube of corolla about one-inch long; fruit pendulous, about half an inch long, and quarter of an inch in diameter at the base, four-angled, with a straight spine at the base of each angular ridge, above the spines is a narrow portion which is inserted into the five-clawed calyx; when dry the fruit is corky, it is divided into two cells, the seeds are elongated, narrow, and four in number. The young branches, petioles, under surface of leaves, and immature capsules have a frosted appearance, which is due to the presence of numerous small, sessile, brilliant crystalline 4- to 5- partite glands. The substance of the fruit consists in great part of dense fibro-vascular tissue, forming a kind of four-winged nut; the corky part consists of delicate cellular tissue; when fresh it is green and succulent. The fresh plant has a peculiar disagreeable musky odour. Simple agitation of the young branches in water, without any crushing produces a viscid mucilage, like white of egg. I find from experiment, that the glandular crystalline bodies described above, are the source of the mucilage; if they are gently scraped from the under surface of the leaf and mixed with water the viscidity is at once produced. The mucilage has a faint peculiar taste, but is not disagreeable; its properties have been sufficiently noticed in the Pharmacopœia of India.

VITEX NEGUNDO.—*Local Name,* LINGOOR.

The habit of this shrub is variable; when growing near the sea it has almost always 3-foliolate leaves, the leaflets being attenuated into the petioles. Inland, the shrub has a more delicate appearance: the petioles of the leaves are much longer; the leaflets are lanceolate, from 3 to 5 in number and often serrated; the flowers do not vary. The serrated variety is preferred for medicinal purposes, and is called Kâtree. The leaves of both varieties appear to me to be equally aromatic; the odour reminds one of the English Bog Myrtle; the taste is bitter and nauseous. The fruit is like a peppercorn, and very feebly aromatic. The *V. negundo* and *V. trifolia* of the Pharmacopœia of India will, I expect, prove to be but varieties of the same shrub. In Anthony Colin's

French translation of Clusius, Lyons, 1602, there are figures of both plants, which though old and quaint, represent the general appearance very fairly.

SMILAX OVALIFOLIA.—*Local name*, GOOTEE.

This climbing shrub is very common in the Concans. The roots are very numerous, and have a general resemblance to sarsaparilla. A section shows a dry, tuberous, brown bark; secondly, one row of 5-sided yellow cells which are more or less wedge-shaped, their nuclei being situated towards the apices; thirdly, a range of numerous rows of ovoid cells, variable in size, with central nuclei; these extend as far as, and partially surround, the vascular zone, which consists of large vessels with generally two smaller ones in contact with them. Within the vascular zone the central portion of the root is made up of large thin-walled cells filled with starch or red colouring matter; the latter is most abundant in young roots. Gootee is not used in Bombay, but in Goa it is kept in all the shops, and is the sarsaparilla of the Portuguese.

JATROPHA CURCAS.—*Local name*, MOGHLI ERENDI.

The young roots of this tree are soft, fleshy and tapering, with a whity-brown scaly epidermis, and a few thin rootlets; bark yellowish white internally, with a peculiar perfume, like tuberose, when freshly removed; wood white and very soft. On section the bark is seen to contain oil globules, and very numerous conglomerate raphides; the vascular system appears to be full of a yellowish viscid secretion; the woody portion is loaded with starch. Jatropha root bark has an acrid taste, like fresh mezereon; it is applied externally in rheumatism. The milky juice of this tree is worthy of remark; it dries into a brilliant transparent varnish of the colour and consistence of shellac, and is used by the country people like collodion, to close cuts or wounds.

MESUA FERREA.—*Local name*, NAGCHUMPA.

This handsome tree, with its large cistus-like flowers, is found in the Southern Concan and Goa territory, but is much more abundant further south. The dry blossoms are known as Nagkesur in the bazaars. The bark contains much resinous juice, which exudes freely when it is wounded. The root bark has a reddish brown epidermis, consisting of ten or more rows of brick-shaped cells, full of condensed resin. Within the epidermis is a variable number of rows of cells of the same shape, yellow, refractive, and containing resinous juice. The medullary rays are also yellow and refractive. There are numerous large laticiferous vessels. This bark is mildly astringent and feebly aromatic; it is not bitter as stated in the Pharmacopœia of India.

CALYSACCION LONGIFOLIUM.—*Local name*, SURINGEE.

The dried buds of this tree are known in commerce as Tamra Nagkesur (red nagkesur).

MICRORHYNCHUS SARMENTOSUS.—*Local name*, ALMIRAO.

Stem filiform, procumbent, bearing roots and leaves here and there; leaves crowded, sinuate-pinnatifid, lobes obtuse or subacute; peduncles rather shorter than the leaf, having at the top scaly bracts which are scarious on the margin. ('Bombay Flora,' Page 132.)—This plant has fleshy roots about the size of a crowquill and 6-8 inches long; when fresh they are yellowish white. A section shows a yellow central fibro-vascular column, containing very large fenestrated vessels arranged in a radiating manner. Beyond the radii the parenchyma is loaded with large colourless bodies of irregular size and shape, which gradually diminish in number towards the cortex where the parenchyma is not occupied by them. The cellular structure is delicate and the cells large. These bodies appear to be cells distended by some solid, nearly transparent matter, as they always correspond in form and position with neighbouring empty cells. This plant is much used in Goa as a substitute for taraxacum.

HYDNOCARPUS INEBRIANS.—*Local name*, KOWTEE.

Abundant in the Concans some distance to the South of Bombay, also in Goa. The oil is extracted for burning, and is also in repute as a remedy for skin diseases. It is at present on trial here as a substitute for chaulmogra; if found to be efficient it can be delivered in Bombay for less than half the price of the latter oil. It appears that the greenish tinge which the oil sometimes has is caused by the adherence of some of the pulp of the fruit to the testa of the seed; the pure oil from decorticated seed is of a pale yellow. The external appearance of the fruit varies considerably; upon the same tree perfectly smooth and very rough fruit may be seen.

SIDA ACUTA.—*Local name*, TUKATI.

The root of this plant is in general use as a diuretic and demulcent; it can hardly be classed as a bitter. I found it in all the Goa shops. It appears to be more used there than in Bombay. The root is small, woody, and fibrous, the stock not more than ¼ of an inch in diameter. The bark is of a light yellowish brown colour. *Sida cordifolia* is sometimes used for the same purpose. The lower part of the stem with a few leaves attached may always be found in parcels of these drugs and enables them to be distinguished one from the other. *S. acuta* has smooth lanceolate and serrated leaves. *S. cordifolia* cordate and tomentose leaves.

ÆGLE MARMELOS.—*Local name*, BEL.

The liquid extract is best prepared from the rind of the fruit only; made in this way it keeps well and does not become too thick. The pulp is too gummy to make a nice preparation.

ZANTHOXYLON RHETSA.—*Local name*, CHIRPHUL.

The capsules are similar in appearance to those of *Z. triphyllum* but a little larger. They have the same properties. The root is used in Goa as a purgative. It is of a yellow colour, and has a yellowish brown corky bark.

ANACARDIUM OCCIDENTALE.—*Local name*, KAJOO.

The acrid oily principle cardol is prepared in large quantities in the Goa territory during the process of roasting the nuts, and is used for tarring boats. I purchased twelve gallons at a country fair for Rs. 3

The Portuguese consider the spirit obtained from the torus to be a valuable diuretic, and apply it externally in rheumatism.

ERRATA.

Vol. vii., page 3, line 5 from bottom, for "Gowik," read "Gorukh."

Vol. vii., page 110, line 11 from top, for "Cuscuta reflexa" read "Cassytha filiformis."

Vol. vii., page 309, line 7 from bottom, for "Lamtanee" read "Parwel."

Vol. vii., page 309, line 4 from bottom, for "Ailanthus excelsa" read "Cinnamomum Tamala."

Vol. vii., page 491, line 31 from bottom, for "Lumetorum" read "dumetorum."

Vol. vii., page 491, line 3 from bottom, for "Airwan, Mairwan," read "Airwan-mairwan.

Vol vii., page 492, line 8 from bottom, for "Triphulli" read "Chirphul."

(*To be continued.*)

NOTE ON A PIPER, CALLED JABORANDI, IN THE PROVINCE OF RIO JANEIRO.*

BY A. GUBLER.

Besides the jaborandi of Dr. Coutinho (*Pilocarpus pennatifolius*), the sialogogue and sudorific properties of which are so remarkable, there exists in Brazil, as is known, a large number of plants bearing the same popular name, which are used against the bites of serpents, etc. All the botanical species, however, are included in two families, Rutaceæ and Piperaceæ. Among the latter, *Piper citrifolium* and *P. reticulatum* have been mentioned as particularly efficacious. A jaborandi from the province of Rio Janeiro, which has been the subject of a note in the *Journal de Thérapeutique* for November 25, by Professor Gubler, appears to be referable to either of these species, which perhaps should be combined in one.

The plant is a shrub, usually attaining, but sometimes considerably exceeding, a metre in height. The stems are fasciculated at the base, simple, and denuded for half their length, cylindrical, very straight, and articulated like the bamboo; towards the top they bear dark green leaves that are alternate, shortly petiolate, oval-lanceolate or slightly obtuse. In the axils of these are sometimes found catkins of male flowers. The figure of the plant, which by the courtesy of the publishers of the *Journal de Thérapeutique* is reproduced on the next page, is from a sketch drawn by Dr. Jules Crevaux. A supply of the plant, collected by Dr. Da Veiga, of the Brazilian navy, accompanied the sketch, and has been investigated chemically, physiologically, and therapeutically.

According to Professor Gubler the entire plant exhales a slightly aromatic odour, which becomes more pronounced upon bruising the leaves between the fingers. When chewed the taste is at first slightly acid, then warm and aromatic, and finally very piquant, and comparable to that of pyrethrum root. This taste is met with in the stems, and especially in the roots, where it attains a high degree of intensity, chiefly in the moderately large portions, about the size of a crow quill, which are externally of a rather decided grey colour. The more slender and whitish portions are rather insipid, and the finest have hardly any taste at all. These differences are dependent upon the constitution and thickness of the cortical layer, which appears to be the seat of the active principle.

When a picked fragment of the root is chewed, at first no sensation is produced on the palate; the prickling is first manifested at a short interval after the vegetable tissue becomes impregnated with saliva. It would appear that the active principle of the drug does not exist ready formed in the plant, but is due to a special fermentation in the presence of water, similar to that which sets free oil of bitter almonds or oil of mustard. When once manifested, the piquancy rapidly acquires great energy, being accompanied by painful shootings and vibratory tremblings of the tongue and lips, as though these organs were traversed by an electric discharge. At the same time a very active secretion of all the buccal glands becomes developed and especially an extraordinarily abundant salivation. These phenomena persist for a few moments after the sapid pulp has been rejected, but then decrease and disappear, leaving a sensation of freshness and a certain degree of anæsthesia of the palate. After a few minutes, however, all the parts return to their normal state.

Upon swallowing the saliva charged with the active principle, an impression of heat is produced at the back of the throat, which extends to the œsophagus and stomach, where it gives rise to a sensation resembling hunger.

The chemical composition has been studied by M. Hardy, who in some preliminary experiments with infusions was able to demonstrate the presence of an alkaloid.

Some leaves and stalks were therefore powdered, and left to macerate for four days with three times their weight of 90° alcohol, acidulated with eight grams of hydrochloric acid per litre. The alcohol was then decanted and fresh alcohol added, and this was repeated three times. The alcoholic solutions were concentrated by distillation, and the aqueous solution evaporated and decomposed by ammonia in the presence of excess of chloroform. Upon evaporation of the chloroform the base was left free, but still impure. It was therefore treated with water acidulated with hydrochloric acid, which dissolved the major part of it; the solution was filtered, evaporated, and again decomposed by ammonia in the presence of excess of chloroform. Upon evaporation of the chloroform solution the base was deposited, having a crystalline appearance and slightly yellowish tint.

The base presents the characteristic reactions of alkaloids; its solution give a white precipitate with iodide of mercury and potassium, and with iodine in iodide of potassium. Another portion of the leaves was distilled with water to obtain the volatile oil, but only a small quantity was collected, insufficient for investigation.

The alkaloid dissolved easily in water slightly acidulated with hydrochloric acid, and such a solution was used by Dr. Bochefontaine to study its physiological action upon animals. He found that it did not act upon the heart, or influence the muscular contractility; it was not a convulsivant. It appeared to have the power to prevent the mechanical or electric excitations of the mixed nerves, such as the sciatic, from being transmitted to the muscles. It appeared even to possess the paralysing power at the

* *Journal de Pharmacie et de Chimie* [4], vol. xxv., p. 128.

outset, and this property would seem to distinguish it with curare. Indeed, the paralysing action of curare is usually preceded by some slight spasmodic movements, which have not been observed in frogs poisoned with the alkaloid of false jaborandi.

Professor Gubler remarks that the effects observed after the administration of the plant to the human subject, although in small doses, had not led him to expect so violent an action from the alkaloid of the Rio piper. The first experiment, in 1875, with the comparatively fresh plant, did not reveal any great activity compared with the excessive power of *Pilocarpus pennatifolius*. Besides the peppery sensation in the mouth and throat, and the heat in the stomach, doses of four to six grams of the leaves in infusion only caused slight salivation and diaphoresis. More recent experiments have been still less fruitful. In a case of acute albuminous nephritis its effects were absolutely *nil;* whilst in the same patient on the following day, an infusion of four grams of *Pilocarpus* jaborandi in 200 grams of water caused abundant salivation and sweating, and an increased excretion of urine.

From these negative facts Professor Gubler draws the following conclusions:—

(1) That there exists a striking difference between the mode of action of *Pilocarpus pennatifolius* and of *Piper reticulatum.* With an insignificant topical action the *Pilocarpus* manifests a diffused action of great energy; the second, though very aggressive to the organs at the entrance to the *primæ viæ*, appears to be nearly inert when it once enters the circulation.

(2) That this inertia of the *Piper* is more apparent than real, and due to the insufficiency of the doses employed. In future it will be desirable to administer larger doses of the leaves, or, better still, of the root, to obtain physiological effects.

But if the alkaloid discovered by M. Hardy is a certain test of the efficacy of the *Piper reticulatum* the experiments of M. Bochefontaine show that it will be advisable not to seek to obtain the first manifestations through the secretions, as the new agent is a poison of the motor system closely allied to curare.

PHARMACY IN SOUTH AMERICA.*

BY PROF. C. GILBERT WHEELER.

There is much similarity between the various republics of the southern hemisphere as regards pharmacy; Italian and French systems seeming to be the models, accepted at least in very many of their leading features. The republics where general culture and intellectual activity stand the highest, make also the best show regards the condition of pharmacy. Foremost should be placed the Argentine Republic and Chili; the first place being accorded to the former country. I shall therefore go into detail only with relation to the Argentine Republic.

PHARMACY IN THE ARGENTINE REPUBLIC.—The pharmacists of the Argentine Republic are chiefly foreigners, mainly Italians, although the proportion of natives is steadily increasing. In 1875 there were 224 persons who had a licence to carry on the business, and of these but 68 were natives. About 70 pharmacists are in Buenos Ayres. There are a good number of French and German druggists, also a few English ones in the larger cities.

The business is indirectly under government control and supervision. The awarding of licences to pharmacists is, after an examination, the business of the faculty of the government school of medicine. The annual examination of the drug stores is attended to by the board of health. Provision is made by the government for a

* Read before the American Pharmaceutical Association.

regular preliminary and also a professional course of training for pharmacists. Thus, unlike most countries of continental Europe, there is no limit set to the number of pharmacists who may establish themselves in a given town or city. Each pharmacy, however, must be represented by a pharmaceutical chemist, although it is not required that he give personally his attention to the business. As his licence does not contemplate any particular location, he is at liberty to open branch establishments wherever he may choose. This concession has led to an abuse, towards correcting which earnest efforts are now being put forth. This grew out of the circumstance that parties holding a licence to practise pharmacy would open branch establishments at various points and, giving no personal supervision themselves, would leave them in charge of persons utterly incompetent to attend to the dispensing of medicines. It is true that on opening a pharmacy, they are required to give notice to the board of health, yet this is a mere form, and does not involve any inspection by a proper authority to ascertain whether the pharmacy is suitably equipped or provided with a trained pharmaceutical chemist. Thus it happens that sometimes a women or even a child may be seen in charge of the drug shop, while the principal is absent for an hour or two. Even when the incompetent manager of the branch business is himself present, it is not uncommon for him to dispatch a boy by the back door, to some neighbouring skilled druggist's, to execute a prescription, while he, with pleasant words, craves the indulgence of his customer on account of the care and time requisite in order that his (?) dispenser may compound the difficult prescription. The use of patent medicines is common in South America. Physicians prescribe them to a large extent, so that fortunately, in view of the abuse just referred to, the keeper of a pharmacy can thereby escape with fewer blunders.

In order, however, to correct this evil, the Society of Pharmacy at Buenos Ayres had, at this meeting on the 21st of last March, prepared a petition, and transmitted the same to the assembly, in which it is requested that provision be made for a class of pharmacial assistants to be denominated "Dependientes Aprobados."

The petitioners request that it may be by legal enactment forbidden to carry on a pharmacy without either the personal attendance of the licensed pharmacist himself, or a "Dependiente." The latter are to pass an examination in:—

I. Reading and preparing two prescriptions.

II. Recognizing by their physical characters and determining the dose of four chemical products and four organic preparations.

III. Performing three simple operations in practical pharmacy. Those passing a favourable examination are to receive a certificate sealed with the society's seal.

Licentiates in pharmacy are those who, having passed a satisfactory examination before the Faculty of Medicine, are awarded a diploma, and authorized to establish themselves as druggists wherever in the republic they may find a promising opening.

To prepare applicants for the examination, there is a course of study in the College of Medicine, especially intended for pharmacial students, and extending over a term of two years. To enter upon this course, certificates must be brought of having completed studies in grammar, geography, history, mathematics (higher and elementary), literature, and one modern language, Latin, or Greek, moral and mental philosophy, physics, organic, inorganic and analytical chemistry and natural history. The three last mentioned studies must have been pursued at a national college.

At the present time there are but two chairs of the "College of Medicine and Pharmacy" at Buenos Ayres, especially devoted to giving instructions to students in pharmacy. These are the professorships of botany and of pharmacology. Such other branches as they pursue, are studied in common with the medical students.

Besides these provisions for instructions to students of pharmacy at the "College of Medicine and Pharmacy," the faculty also examine and award licences to those who may have pursued similar studies elsewhere. Foreigners who may have graduated at colleges of pharmacy in other countries, are not exempt from this examination, if the said colleges are not connected with regularly established universities. The examination is both a theoretical and a practical one. Theoretical in physics, chemistry, natural history and pharmacology, and practical in the latter branch, including the making of eight pharmacal preparations. The fees are about fifty dollars.

Inspection of Pharmacies.—This occurs but once each year, and is attended to by the board of health, at least two members of which are always pharmacists. It is aimed at being such an official examination as is usual in most of the continental states of Europe; it can, however, hardly be considered as yielding altogether satisfactory results, from causes all of which I cannot here enumerate.

One of the chief difficulties is that the inspection does not occur sufficiently frequently. Often directly after the official examination has taken place, parties will open pharmacies and carry them on in a manner altogether to the reproach of the profession and prejudice of the community, resting perfectly secure from investigation for the period of a year. Then they will properly equip their establishments and reform their methods of doing business in time for the duly announced annual inspection, only to go on in a like illegal manner after the official visit has taken place.

Again, it is beyond all doubt an error, for reasons that are apparent, to have a board of inspection consisting almost entirely of medical men. Doubtless special experience in pharmaceutical matters should be as highly esteemed in the Argentine Republic as elsewhere.

It is also a faulty method to announce the time of inspection a long period in advance. Abundant opportunity is thus given to the unscrupulous druggist to duly "set his house in order," that the periodical visitation may not disastrously affect him.

In general I noticed that the honourable and thoroughly competent pharmacists in Buenos Ayres entertained grave suspicions of the value of the inspection, from the superficial and inadequate manner of its performance.

"*La Sociedad de Farmacia Argentina,*" or "Argentine Society of Pharmacy," located at Buenos Ayres, is the national pharmaceutical organization of the profession in the republic. It has done much during the twenty years of its existence to elevate the profession, and is still very useful. There are at present fifty-four active and about forty corresponding and honorary members. The president is the distinguished chemist and pharmacist, Professor Kyle, originally from Scotland. The society has a library and collection located in a central position, at the corner of two principal streets in Buenos Ayres. Three meetings of the society are held monthly, one for business, and two for the discussion of scientific and professional questions.

Each year prizes are offered for the best memoir or research in chemico-pharmacy. The society appoints a committee of three of its members to examine the manuscripts and report the successful competitor.

One feature of the society is peculiar. With the fees, dues and fines, there has now been accumulated a fund, from which, on the death of an active member, five per cent. is paid to family of deceased. The capital now amounts to nearly 10,000 dols. The initation fee is 12·00 dols.; the monthly fee is 1·20 dols. There is, thus, life insurance connected with the privileges of membership.

"Revista Farmaceutica," the title of the journal of the society, its official organ, and now in the eighteenth year of publication, is a monthly large octavo of forty-eight pages. It is edited by a committee of five, and furnished gratis to all members. Besides Argentine pharmaceutical news, it contains the proceedings of the society and various scientific articles and translations.

Miscellaneous Items.—There is no Argentine Pharmacopœia, but those of various European nations are used, usually according to the nationality of the respective physician prescribing. When no particular one is specified, that of the French (Codex Français) is used.

The drug stores of the republic resemble, as to their fitting, more those of the continent of Europe than any others I have seen. They are mostly small and, while as a rule neatly furnished, there is no attempt at display. The long list of extraneous wares kept at druggists in England and in the United States is not found, nor are mineral waters or soda ever kept on draught. There is a printed tariff of retail prices, which all respectable druggists adhere to. It is considerably higher than usual in the United States.

The Argentine Republic has provided at least one work on a pharmacal subject which, in Spanish, is perhaps one of the best. I refer to Carlos Murray's 'Pharmacy and Pharmacognosy,' now passed to a second edition.

Pharmacy in Chili is not altogether in as satisfactory condition as in the Argentine Republic, though the general features are much as in the latter country. I will only allude to some that differ considerably.

The profession is largely in the hands of foreigners, few of whom are Italians. English, French, and German, particularly the latter, have most of the better shops. The government now appears to have entered upon the policy of restricting the number of foreigners in the business, and of stimulating the natives to secure its control. Therefore of late years the examination in the case of foreigners has been exceedingly severe, more so, I should say, than in any other country of the world, if the representations made by some who have passed the ordeal can be relied upon. In one case the chemical examination alone involved six weeks of laboratory work as the practical portion of the examination. It was required to find out the composition, qualitative and quantitative, of specimens of paraffin, peat, and a mineral water. No amount of experience in other lands or diplomas of foreign countries can cause this examination to be lightened. For natives, or others, a course of two years is provided in the University of Santiago, but most of the studies are such as pertain to a general education, and those which are specifically pharmacal, I am informed, by competent judges, are not very thoroughly taught. Discipline is said to be lax, and superficiality in scholarship the rule. The examination at the close of each year does not compare in severity to that the graduate of a foreign school of pharmacy would be subjected to on seeking admission to the ranks of the profession in Chili.

There is a small society and journal of pharmacy at Santiago, neither of which exert very commanding influence.

What I have said regarding the character of the places of business in the Argentine Republic will apply equally well to Chili. In the large cities a certain number of druggists, as indicated by the Intendente, must remain entirely open each night for a week; all others may close completely by ten o'clock. Another set must remain open the following week, until the round is completed. In a population of forty thousand only two druggists, as a rule, would form the night contingent for one week. Retail prices are not uniform, and are very high. Chili is materially the most prosperous of the South American republics, though one of the youngest. It is not unlikely that the condition of pharmacy will steadily improve, as nearly all material, social and intellectual relations are constantly doing in this enterprising republic.

Pharmacy in Uruguay.—This smallest of South American republics—having a population only equal to the city of Chicago—hardly requires a special reference. The general character of pharmacy is as in the neighbouring Argentine Republic. There is a course for pharmacists in the University at Montevideo, though hardly an adequate one.

Uruguay has no society of pharmacists or journal devoted to pharmacy. The country is without any indigenous workers in any department of science, pharmacy included. The political disorder prevalent is not favourable thereto.

Pharmacy in Brazil is to a considerable extent in the hands of foreigners in the larger cities, but elsewhere there are few others than natives engaged in the business. Patent medicines form the principal bulk of the stock kept by a Brazilian druggist, chiefly French, English and American. Many nostrums that have had their day in the United States, also some that are little known with us, though made here, are enjoying a very great popularity in Brazil. These patent medicines are so largely prescribed by the physicians of the country that the compounding of medicines, or regular prescription work, forms comparatively but a small share of the pharmacist's ordinary duties. In short, he is in the main but the retailer of packages of medicines, put up ready for the patient's use by the foreign manufacturer, and supplied at wholesale by the importing house at Rio Janeiro.

There is no national Pharmacopœia, but those of various European nationalities are used, guided generally by the preference of the respective physicians. The weights and measures employed are those of the metric system.

It is not uncommon for a physician to have an interest in the profits of the pharmacist to whom he directs his patient, a practice which I believe is not altogether unknown in the United States.

The drug stores in Brazil resemble, as to their fitting up and general appearance, more nearly those of continental Europe than they do those of this country. Their fixtures are, to a large extent, supplied from France and Germany. The miscellaneous and *extraneous* articles usually found in a drug store in the United States are not found at the druggists' of Brazil, except to a comparatively very limited extent.

The display and elegance of the leading drug establishments in our large cities is nowhere equalled in Brazil, any more than is the case in the various countries of Europe.

Graduates in pharmacy in foreign countries are permitted to establish themselves as druggists in Brazil, upon satisfactory evidence of their having completed a pharmaceutical course of study. If they have not graduated at a school of pharmacy connected with some *university* they are, however, usually required to pass a rather detailed examination.

Many of the natives who are pharmacists have acquired their knowledge of the profession entirely of other druggists, and been admitted to practice on examination by the board of examiners provided for that purpose at Rio Janeiro.

The Faculty of Medicine, however, at Rio Janeiro and at Bahia, provides a special course in pharmacy, in which the following subjects are taught: Physics, chemistry, mineralogy, botany, materia medica, and pharmacy.

The students have the advantages offered by a chemical laboratory, physical cabinet, natural history collections, and a practical dispensatory.

At the Rio Janeiro there were, in 1874, 113 students of pharmacy, and 95 at Bahia. In the same year there graduated, at Rio, 32; at Bahia 64. There is a matriculation examination for the students in pharmacy, in the following branches: Arithmetic, geometry, and French.

There is in Brazil the following pharmaceutical societies: the Pharmaceutical Institute of Rio Janeiro, the Brazilian Pharmaceutical Society, and the Pharmaceutical Academico Athenum.

The first-mentioned carries on, with the assistance of the government, a so-called "School of Humanities," which appears a sort of preparatory institution for pharmacists. This society also publishes a review entitled the "Tribuna Pharmaceutica."

The Brazilian Pharmaceutica publishes a monthly periodical, denominated "Abelha" or "The Bee."

All the three societies above mentioned co-operate in the formation and revision of the official course of study insisted upon by the Imperial government for those contemplating the profession of pharmacy.

The Pharmaceutical Journal.

SATURDAY, MARCH 10, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PUBLIC FUNCTIONS OF THE PHARMACEUTICAL SOCIETY.

THE luxury of indulging in law proceedings is proverbially expensive, and often one of the results most obvious to a litigant is that he has contributed to the prosperity of the gentlemen of the long robe. We do not suppose it would add much to his satisfaction even if to this privilege were added that of raising simultaneously a contribution to Her Majesty's Treasury. Such, however, is the position from which we are able now to congratulate the Pharmaceutical Society upon its escape. This will appear from the following statement of facts.

In performing the duty imposed upon the Pharmaceutical Society by Parliament, of carrying out in the interests of the public the provisions of the Pharmacy Act, it has become necessary on various occasions to institute legal proceedings against offenders. Almost invariably when these cases have been carried to a hearing a penalty has been imposed, and this has exercised a certain amount of deterrent influence. So far, such a result has been satisfactory, but it has nearly always involved a cost to the Society far exceeding both the penalty imposed upon the offender and the costs allowed, so that the expense of such proceedings for the protection of the public have in fact been to a great extent borne by that portion of the trade which constitutes the Pharmaceutical Society. It might therefore have reasonably been assumed that the penalties recovered under the Act would be left in the hands of the Society as partial reimbursement of its expenses in carrying out a public duty.

Such an assumption, however, would have been unwarranted, as was evidenced by two penalties recovered in Glasgow being claimed by the Queen's Remembrancer in Scotland last October. It became necessary therefore to make a formal application to the Commissioners of Her Majesty's Treasury,—who, according to the 14th section of the Act of 1852 and the 15th section of the Act of 1868 are the authorities to decide to whom the penalties shall be paid,—that they would direct that the penalties should be retained by the Society. Somewhat unexpectedly this application met with a prompt refusal, accompanied by an order to pay over to Her Majesty's Receiver of Fines all penalties recovered under the Acts since they were passed. This communication was considered by the Council at its meeting in November last, when a deputation was appointed to wait upon the Commissioners of Her Majesty's Treasury with a view to obtain a more favourable decision.

After an interval of nearly three months, an appointment was made for an interview, and the deputation laid before the Secretary to the Treasury the reasons why the Council thought the Society should be allowed to retain the penalties. It is satisfactory to find that upon reconsideration these reasons were deemed sufficient by the Treasury, and that in a letter which was read at the meeting of the Council on Wednesday last, and which will be found in another page, the Commissioners of the Treasury cancel the previous order to pay into the Exchequer the fines in question.

We suppose the original refusal was based upon a very natural and proper hesitancy on the part of the Government to allow, even in appearance, the levying of penalties in the name of Her Majesty by a body over whose proceedings it has but little control. Still, so long as the Pharmaceutical Society is thought worthy of its expensive trust of watching over the public safety,—for it must not be forgotten that the Pharmacy Acts though incidentally beneficial to chemists and druggists have their primary *raison d'être* in the welfare of the public,—so long it cannot logically be asserted that it is unworthy of being entrusted with the disposal of the penalties.

But we are inclined to think that it would be a great gain to the Pharmaceutical Society should the day ever arrive when, by the appointment of a Public Prosecutor, it is relieved of this portion of its duties; for it is quite possible that even while performing them faithfully the Society's influence is injured in other directions. Thus, amongst chemists and druggists themselves, opinions will vary that the Society is doing too much or too little, just as individuals stand in relation to particular cases; whilst by those leaders of public opinion, the writers in the daily press, the strength of their condemnation is often in direct ratio with their ignorance of the subject under discussion. It is no uncommon occurrence for them to call for the enforcement of a law that never existed outside of their own imaginations, and to give the schedule of poisons an elasticity never dreamt of by Parliament.

We need go no further than the proceedings that culminated at the Old Bailey during the present week for an illustration of our remark. The appearance of a prisoner at Bow Street charged with personation at the Preliminary examination let loose a flood of sensational generalities upon the facilities that existed for the perpetration of such an offence, and the possible influence upon the civil service. Intermixed with these have been several statements calculated to produce a prejudicial influence upon the public mind. Thus the *Pall Mall Gazette*, with its lofty style of general censuring which it appears to think a necessity when a "gentleman is writing for gentlemen," remarks of the Pharmaceutical Society, that it appears to be unusually lax in its method of administering the functions entrusted to it by law, though this is *à propos* of nothing more pertinent than that probably similar frauds to that discovered by it are suffered undetected by other bodies. We take leave to say that, even in the present days of loose writing, such a charge, made without a tittle of evidence to support it, is itself "unusually lax," and probably would not have been made had the writer been possessed of adequate knowledge as to what are the functions entrusted to the Society by law or how they are administered. The *Standard*, too, in its wisdom, could not see the necessity of requiring from a man who was acquainted with drugs a proof of his knowledge of Latin and arithmetic, although the writer's life has possibly before now depended upon his chemist's ability to read correctly the directions and apportion the doses in his physician's prescription. We regret to note that something of the same sort of feeling tinged the remarks of the learned judge before whom the case came, and influenced his judgment. Even if the Preliminary examination were the mere literary exercise it was assumed to be, and not a portion of the test of the candidate's fitness for his business, we submit that the essence of the offence was in evading it, and that the fact of one of the offenders having passed the Minor examination afterwards was an accident of the case, which neither increased nor mitigated his culpability, and had absolutely nothing to do with his accomplice. The result was that the Society appeared to ask, through its representatives, for a punishment more than commensurate with the offence, and furnished a fresh reason for using great circumspection before exercising the functions that we hope one day to see committed to a public functionary.

In conclusion, we would remark, that in the prosecutions at Salford for the alleged sale of adulterated balsam of copaiba, there is another proof that the final result is not always the measure of desert in respect to legal proceedings, it having fallen to the lot of the Trade Association to appear in the only case of the three in which a fine was inflicted.

THE QUALIFICATIONS OF PUBLIC ANALYSTS.

THE proceedings which took place on Thursday last, at the Town Hall at Salford, a brief account of which will be found in another part of this Journal, are calculated to create feelings of mistrust and alarm among many of our readers. Three druggists, Messrs. WHITAKER, HALL, and HOLT, had been summoned before the magistrates on a charge of selling adulterated balsam of copaiba to the inspector under the Adulteration of Food and Drugs Act. The cases had been once adjourned by desire of the local authorities; chemists in Manchester, Liverpool, and London had been engaged on behalf of the defendants to analyse the suspected samples, and much interest was excited among the members of the trade—an interest comparable to that which was created by the sweet spirit of nitre and the scammony cases which occurred in London some time ago. In two of the cases the defence was undertaken and chemical evidence provided by the wholesale houses who had supplied the balsam, Mr. SIEBOLD of Manchester having been employed by Messrs. EVANS and SONS of Liverpool in WHITAKER'S case, and Professor REDWOOD by Messrs. HEARON, SQUIRE and FRANCIS of London, in HALL'S case, while Professor ATTFIELD, acting for the Chemists and Druggists' Trade Association, was prepared to give evidence if required. These chemists had arrived at the conclusion that WHITAKER'S and HALL'S samples were free from any adulteration, but that HOLT'S sample had been adulterated by the addition of a small quantity of some fixed oil.

In only one of the defended cases was evidence given, for after hearing the defence in the first of these cases the magistrate immediately dismissed it with costs, and a similar result was accepted without evidence in the other case. These results, however, were due to the nature of the evidence produced, at considerable cost, for the defence.

The remarkable feature of the proceedings consisted in the evidence given by the public analyst, Mr. J. CARTER BELL, who represented WHITAKER'S sample as adulterated with 35 per cent., and HALL'S with 28 per cent. of some foreign volatile oil, while he alleged that HOLT'S sample contained about 80 per cent. of a fixed oil. He had arrived at these results by the application of tests which have long been shown to be fallacious, and had used the tests for a purpose for which they were never intended and were wholly inapplicable. In fact it was evident that he was entirely ignorant of the means of testing balsam of copaiba, and hence the absurd conclusions at which he arrived.

Now, it is really a very serious consideration that tradesmen should be subject to loss of character, and consequent ruin, through the employment as public analysts of men who, without possessing any sufficient acquaintance with subjects they undertake to investigate, rashly jump at conclusions, and condemn as adulterated, articles which, when examined by competent chemists, are found to be perfectly genuine and good.

ACCLIMATIZATION IN QUEENSLAND.

AMONGST the successful experiments in acclimatization mentioned in the last report on the Brisbane Botanical Gardens, plants of the breakfast table are well represented. No less than forty varieties of sugar cane are cultivated in the gardens, and nearly a hundred thousand plants were distributed to colonists during the year. The ordinary coffee plant (*Coffea arabica*) is reported healthy, and thirty acres are to be put under crop during the forthcoming season. Seeds of the Liberian coffee plant (*Coffea liberica*) also have germinated, and healthy plants have been distributed. As for tea, all that appears to be required is skilled labour for the manufacture of the crop at a reasonable rate, many parts of the colony having proved to be adapted for the production of superior varieties. The Paraguay tea plant (*Ilex paraguayensis*) is also flourishing. Amongst other important economic plants introduced to the gardens during the year are the balsam of tolu plant (*Myroxylon toluifera*), the Sumatra and Penang rubber plant (*Urceola elastica*), and the Siam gamboge (*Garcinia morella*, var. *pedicellata*).

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, March 7, 1877.

MR. JOHN WILLIAMS, PRESIDENT.

MR WILLIAM DAWSON SAVAGE, VICE-PRESIDENT.

Present — Messrs. Atherton, Atkins, Betty, Bottle, Cracknell, Greenish, Hampson, Hanbury, Hills, Mackay, Owen, Rimmington, Robbins, Sandford, Schacht, and Shaw.

The minutes of the previous meeting were read and confirmed.

PERSONATION AT THE PRELIMINARY EXAMINATION.

The PRESIDENT drew attention to the case of personation at a Preliminary examination, in which the solicitor had been instructed to take proceedings, the result of which appeared in the *Times* that morning. This case is reported at p. 745 of this Journal.

APPLICATION OF PENALTIES RECOVERED UNDER THE PHARMACY ACT.

The SECRETARY read the following letter with regard to the application of penalties recovered under the Pharmacy Act:—

"Treasury Chambers,
"21 Feb. 1877.

"Gentlemen,—I am directed by the Lords Commissioners of Her Majesty's Treasury to acquaint you that upon consideration of the arguments brought forward by the deputation from your body which recently waited upon the Financial Secretary to this Board, with reference to the disposal of the penalties imposed under the Acts of 15 and 16 Vict. c. 56, and 31 and 32 Vict. c. 121, and upon further reference to the provisions of the 12th and 14th sections of the former, and the 15th sertion of the latter Act, my Lords are not prepared to give any directions for the payment to the Exchequer of the penalties referred to in the letter from the Registrar to the Society of 4th Oct. last.

"You are therefore at liberty to retain those penalties which my Lords understand to have been imposed under the sections above referred to, and you may regard the instructions to pay them over to the Receiver of Fines, contained in the letter from this Board of 13th October, as cancelled.

"I am, Gentlemen,
"Your obedient Servant,
"William Law."

"The Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, London, W.C."

Mr. SHAW remarked that the Society expended a great deal of money in carrying out the law, and it was only just that the penalties recovered should be retained by it. Last year the sum of £250 was spent in law expenses, and the previous year £385.

The SECRETARY said he feared that the recent prosecution for personation would be very costly.

The following, being duly registered as Pharmaceutical Chemists, were respectively granted a Diploma stamped with the Seal of Society:—

Babb, James.
Glover, William Kensit.
Jones, George Marsh.
Littlewood, John Oscroft.
Peat, Joseph.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

Campbell, Henry ....Redcar.
Farmer, Charles Adolphe ......London.
Jones, George Marsh ....London.
Peat, Joseph ... .London.

Chemists and Druggists.

David, Samuel Sinclair ....Laugharne.
Hunter, John Wilson ....Gateshead.

Mr. James King Haworth, an Associate of the Society before July, 1842, was elected a Member.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Batchelor, Alfred Ernest ......Fareham.
Cooper, Herbert Hudson.........London.
Fowke, Robert Main ....Lewisham.
Gooseman, John Brocklesby ...Great Grimsby.
Humphries, Edgar ....Garston.
Lawson, William ....Bellshill.
Mackenzie, Charles Anderson...Hastings.
Mackenzie, George Grant ......Alness.
Marsh, Edward Robert ....London.
Moore, George Brass ....Southport.
Righton, James ....Southport.
Saunders, Arthur ....Walthamstow.
Sykes, Henry ....Huddersfield.
Veitch, Andrew..... ....Castle Douglas.
Vince, James ....Lancaster.

Modified.

Edwards, Thomas Roberts......Devizes.
Hill, John ....Reading.
Oates, Edward Brooke ....Dewsbury.
Spurgeon, Frederick John ......Ipswich.

ASSOCIATES.

The following, having passed their respective examinations and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Allsworth, Norman ....Havant.
Ashburner, Isaac ....Broughton-in-Furness.
Avison, David ....Wakefield.
Bayston, George Coryndon ....Guildford.
Bond, Alfred.........................Fallowfield.
Bullen, George William ....Newark.
Campbell, Charles..................Hull.
Challice, Swann Ripsher ....London.
Crook, Charles William Wallace Plymouth.
Dixon, Herbert......................Retford.
Edwards, Frederick William ...Bradford.
Fletcher, Redfern ....Newcastle-on-Tyne.
Francis, Rawson Parke ....Diss.
Gibbs, John ....Worcester.
Green, George ....Horncastle.
Gutheridge, George Frederick...Falmouth.
Hall, Edward......... .. ..Norwich.
Hume, John William David ...Stokesley.
Keith, Alexander Reid ....Arbroath.
Lees, David ....St. Andrews.
Matthews, James Wavell ......London.
Peirson, Henry ....Banbury.
Rickarby, Arthur George.........Bromley.
Russon, Samuel Tonks............Birmingham.
Shenstone, James Chapman......Colchester.
Shilton, James ....Sutton Coldfield.
Southee, William Jennings.......London.
Squire, Frederick John Cripps...Plymouth.
Stewart, Duncan ....Crieff.
Wastie, Francis, jun. ....London.
Weatherley, Richard John ......Teignmouth.

Modified.

Gall, Frederic ....Devizes.
Lloyd, Thomas Edwin ....London.
North, Thomas Henry ....Hull.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society :—

Aston, Walter ....Tarporley.
Beck, Albert Neve ....St. Leonards.
Bell, Robert R. ....Liverpool.
Bosher, Alexander ....London.
Cooper, Thomas Edward ....Wellington.
Evans, Thomas Fryer .... Manchester.
Goss, Samuel Howard ....Barnstaple.
Greenhill, Samuel Osborne ......Colchester.
Griffiths, John Moore ....Birkenhead.
Heath, Robert Philip ....Norwich.
Herbert, George ....Shap.
Higgs, Alfred ....London.
Hoare, William Parker ....Cirencester.
Hoddinott, Francis Frederick...Chipping Campden.
Hoult, Joseph Emanuel ....West Bromwich.
Inglis, William Keiller ....Ashton-under-Lyne.
Jones, Hugh ....Abergele.
Keeling, John Henry ....Hackney.
Kent, Benjamin John ....Boston.
Notcutt, William Brighty ......London.
Patterson, James ....Landport.
Shields, William ....Belfast.
Shine, Alfred J. ....London.
Smith, William Thomas ....Bath.
Stacey, Frederick Charles ......London.
Swift, Philip Dickerson ....Spalding.
Todd, Matthew James..........Sunderland.
Watts, Arthur Rugg ....Shaftesbury.
Williams, Samuel Roskelly ......Devonport.
Williams, William Jesse ....Crickhowell.
Wilson, William, Joseph.. ......Oxford.

The following names were restored to the Register of Chemists and Druggists:—

Challice, Swann Ripsher, 79, Tachbrook St., Pimlico.
White, Fitzherbert, Birchfield Rd., Birmingham.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

Reports of Committees.

Finance.

The report of this Committee was read and adopted, and various accounts ordered to be paid.

Benevolent Fund.

The report of this Committee recommended that a grant of £20 be made to the widow of a late member.

The report was received and adopted.

Revised Regulations for the Benevolent Fund.

Mr. Shaw then moved.—

"That the Benevolent Fund Regulations now submitted be received and adopted with exception of the last one respecting the canvassing."

He said that the Committee had gone carefully over the regulations clause by clause, and made a few alteration, but as a whole the regulations now submitted were very similar to those he had before brought forward. The sub-committee had been divided in opinion with regard to the clause with reference to canvassing and he proposed, therefore, that that clause should be considered separately. He then stated briefly the nature of the alterations introduced, the principal one being that the names of persons recommended for election as Annuitants should be placed in a book, and a second selection made at the end of the year.

Mr. Sandford said the sub-committee had gone carefully through the regulations, and the alterations in regard to matters of principle were as follows:—At present the Council decided in June how many annuitants should be elected in October; now it was proposed to determine the number in October and elect in December. The next point was that if any one who had been a subscriber to the fund became a candidate for a pension, votes equivalent to the total amount of his contributions to the fund should be carried to his credit. That proposition was a novelty, and it was for the Council to say whether it agreed to it. A similar regulation was in operation in connection with the Royal Agricultural Benevolent Institute, and was reported to work well. Then, again, the votes of each unsuccessful candidate were at present carried forward for four years but no longer. There appeared to be no reason why there should be this limit, and it was now recommended that the votes should be carried forward to all future elections. Another important matter was an amplification of the clause providing for the forfeiture of an annuity in certain cases at the discretion of the Council.

Mr. Robbins suggested that the rules as now revised should be circulated amongst the members of the Council, and the decision deferred for another month.

Mr. Shaw said the regulations had been distributed a month previously.

Mr. Betty said the regulations had in fact been before the members of the Council for three months. The Committee was unanimous in favour of every alteration now recommended.

Mr. Schacht asked if the Committee had directed its attention to the verbal alterations, because it appeared to him that many were required. He should therefore support Mr. Robbins's suggestion.

Mr. Hampson objected to putting the decision off any longer.

Mr. Bottle objected to the alteration which proposed to carry forward the votes indefinitely instead of being limited to four years. The old rule had worked admirably, because every candidate who had been put on the list had ultimately been elected. To alter the rules so that the votes would accumulate *ad infinitum* would be setting up the minority against the majority, because any candidate, however objectionable he might be to a considerable number of voters, would be bound in the end to succeed.

Mr. Sandford said there never had been a candidate yet who had not got in in less than four elections.

The President remarked that the candidates were first selected by the Committee and approved by the Council, so that every one was supposed to be equally eligible.

Mr. Robbins said on the other hand the Council might see reason to change its opinion of a candidate, and if he did not succeed in four years it would indicate that there was something unworthy in him.

Mr. Sandford observed that the new regulations could not come into force until 1878.

Mr. Shaw thought there was nothing to prevent their being put in operation at once.

Mr. Schacht moved an amendment,—

"That the revised regulations be printed and circulated amongst the members of Council before they were finally adopted."

Mr. Robbins seconded the amendment.

Mr. Hanbury said it was necessary that the regulations should be as correct as possible in every way before they were made public, but he understood that the sub-committee had carefully revised them.

Mr. Betty said this had been done. He did not think the Council would have any cause to regret passing the regulations as now proposed, and it would seem unnecessary to delay the decision.

Mr. SCHACHT thereupon withdrew his amendment.

Mr. ROBBINS said he objected to alterations which were not improvements, and he saw no advantage in postponing the election to December, while it would have the effect of depriving the newly elected annuitants of their money until after Christmas. Some of the other alterations he approved of, having suggested them himself.

The PRESIDENT remarked that under the present system, those who subscribed between October and December got no votes until the following year, and the consequence was the fund got no subscriptions during that period.

The amended regulations were then put and carried unanimously.

Mr. SHAW then moved the insertion of the following paragraph at the end of the regulations:—

"The Council, having in view the interests of candidates for annuities on the Benevolent Fund, earnestly desire that no printed canvassing cards or circulars be sent to the Members, Associates, Donors, or Subscribers, by any of the candidates or their friends. The Council will give a full and impartial statement of the circumstances of each approved candidate, and will publish the same in the *Pharmaceutical Journal* during the four weeks previous to the election; and will also insert such statement in the voting papers sent to the voters."

He was sorry to find this was likely to meet with some opposition, for the more he considered it, the more he was convinced of the desirability of this clause being inserted, not merely as a recommendation, but, as one of the regulations.

Mr. ATKINS said in that case the form must be altered.

The PRESIDENT remarked that the only form in which the clause would have a chance of being adopted would be as a recommendation.

Mr. SHAW said he should not like to run the risk of failure, and would, therefore, simply move it as a recommendation, and he trusted the result would be an honourable observance of it by all parties. He proposed this in the interest of the poor candidates, whom it was very desirable to relieve from all needless expense. Looking back to the discussion on this subject a year ago he would endeavour to meet the objections then raised. The first was that it was impracticable; but he presumed that if the Council was entrusted with the management of this fund it was competent to it to make such regulations as would be deemed most in the interest of the candidates. It had been done in other institutions and he did not see why it should not be done here. In the Royal Albert Orphan Asylum no canvassing or trafficking in votes was allowed, and if it was proved to have taken place the candidate was disqualified.

Mr. OWEN said that was not a very successful charity.

Mr. SHAW said the same rule was carried out in the Merchant Seamen's Hospital and it had worked well. The next objection was that it would throw the election into the hands of the commercial travellers, but these gentlemen were very numerous, and he did not think they were likely to all choose the same candidates and procure votes for them. A much greater influence was exercised under the present system by the wholesale houses, and probably the commercial travellers would feel almost bound to support the candidates favoured by the houses they represented. He believed the Council would be glad to be relieved from the position in which it was now placed. During the past three years those who had been elected the first time their names were put on the list were those who had canvassed right and left; on the last occasion there were five candidates, of whom one only did not canvass, and all the others were elected, though the person shut out was in his opinion one of the most deserving. Then it was said that the adoption of this rule would take all the heart out of the fund, but he could not see the force of the objection. The recommendation applied to existing subscribers, and if any one was very anxious to get a candidate elected he would still subscribe, and ask his friends to help him. What he desired was that subscribers should not be interfered with; but if they voted at the solicitation of a friend, they voted not for the candidate but for their friend. Then it was said that the appeals made by the candidates induced people to subscribe, but it was not a right principle to go upon, to add to the subscription list at the expense of these poor people. The fear seemed also to be entertained that he was desirous of placing the elections in the hands of the Council, but nothing was further from his thoughts. It was also said he wanted to deprive the poor people of the privilege of canvassing. It was not much of a privilege to spend money which they could not afford; the Council ought rather to try to prevent them squandering their scanty means. One poor man had expended £5 or £6 in canvassing, and though he was elected he died a week previous to the election so that the money was entirely thrown away. If the name of his widow were placed on the list was she to go through the same course again? He would conclude his remarks by reading the following passages from the circular of the Charity Voting Reform Association which put the case very strongly and clearly:—

"1st. The circumstances of the candidates recommended by the subscribers should be investigated by the Committee, both as to their positive eligibility and relative urgency, special reference being had to the consideration whether the candidates have claims for support on friends or relatives prior to those upon public charity.

"2nd. Those candidates who are proved by investigation to be eligible should be arranged according to the strength and urgency of their claims, such moderate number only being included in the list as would be likely to be provided for within a reasonable time.

"4th. Trafficking in votes, and the use of canvassing cards and circulars, should be prohibited under pain of forfeiture of the candidate's claim.

"One important function of the Association, already employed with success, is to prevent, in the case of new charities, the introduction of the present system of election, or at least of its admitted abuses. And the Committee may here mention that 'the managing body of the Railway Servants' Orphanage having unreservedly adopted the suggestions of the Charity Voting Reform Association, have reported that their first election was carried on with perfect satisfaction to their subscribers, and without a penny of expense to any applicant.

"To release hundreds of poor toiling widows and other applicants from cruel and unnecessary labour in canvassing, as well as from heavy and useless expenditure of time and money; to spare poor maimed and crippled invalids a weary and painful hunt for hospital and other letters; to discourage that systematic and shameless habit of begging, which is the fruitful source of pauperism, begging-letter writing, and imposture; to cover rather than coarsely expose the domestic woes and wants of our less fortunate neighbours by not compelling them to parade their sorrows in thousands of printed cards and circulars; to try and ensure a measure of attention and justice to the candidates and their comparative claims, rather than to foster a desire to 'oblige friends' or gamble in votes; in fine, to help the most helpless and befriend the most friendless, are objects worth earnestly contending for, even against the most formidable opposition."

Mr. HANBURY seconded the motion as he believed the principle involved was a thoroughly sound one.

The VICE-PRESIDENT was very sorry that the benevolent object of Mr. Shaw was quite impracticable. If this recommendation were adopted it would not prevent canvassing, and the report of the very charity from which Mr. Shaw had quoted showed that it could not be done without.

Mr. HANBURY said that the proposition did not go so far as he could have wished, but he saw the Council was not prepared to go farther, and therefore he supported it, as being better than nothing. He had been a subscriber to the Infant Orphan Asylum from the commencement, and had never read an application from any candidate. A long paper with the names of parties was sent round, which was too long to read, and therefore he entrusted his votes to the Committee, who were by far the best judges, and with whom the election practically rested.

Mr. HAMPSON said this was a very serious matter and he hoped the motion would be carried. The object was to prevent an abuse of which all charities more or less complained, or rather to control it. The system of canvassing often led to the election of the least necessitous candidates, whilst the weakest always went to the wall. They frequently heard of cases in which the applicant was paralysed or confined to his bed, and, though the most in need, was thus prevented from using the means which others could employ and placed at a great disadvantage. He hoped that, in the spirit of the present times, of the Charity Organization Society, and of common sense, the Council would sanction this recommendation as the first step towards abolishing the system of canvassing.

Mr. ATKINS thought the matter had better remain as it was, because unless the practice were absolutely prohibited, the recommendation would make things worse. He should be glad if canvassing ceased, but there were two sides to the question, and both should be fairly looked at. Those who lived in the country did not know much about the London candidates and could only get their information from the cards, and as far as his information went the expense did not usually fall on the candidates themselves, but was undertaken by their friends.

Mr. ATHERTON said there ought either to be an entire prohibition or else no interference at all. Such a recommendation would simply act to the disadvantage of the conscientious candidate who attended to it.

Mr. OWEN said in his opinion if the Council wanted to get money into the Benevolent Fund it must not prevent the candidates asking for votes. Nothing had been so beneficial to the benevolent institutions of this country as this system, for every case excited a vast deal of interest and tended to bring in subscriptions.

Mr. BETTY thought the Council might consider what charity really was before voting upon this question, and he was sorry to say that the meaning of the word in modern English had become quite different to that of the old Latin. "Charity" came from *carus*, and meant giving something to one who was dear to you, and the charity which was kept alive by canvassing was not worthy of the name. Any charity which could only be kept up by this artificial excitement was not sound or permanent in its character. Imagine a gentleman who subscribed half-a-crown to this fund just before an election. He would receive from the different candidates say six cards which could not cost less than 9*d*., so that for a net expenditure of 1*s*. 9*d*. he would have the satisfaction of thinking what a charitable man he was, and if he were one who thought canvassing the very life of charity he would probably place the cards in his drawing room for all his friends to see what a reputation he had for benevolence. It was evident from the tone of public opinion that this system of electioneering and charity mongering was not destined to endure much longer. The great bane of the charity of this country was the manœuvring and tricks which were resorted to at the election of candidates at our public institutions, and he should like any one who supported this system to go to the London Tavern on an election day and see for himself what really was the life of charity in England. It was an organized system of buying and selling relief. The Council had now an opportunity of entering a very mild protest against it, which he hoped would be embraced. It could not hinder private individuals from seeing their friends on behalf of candidates, but it could make it known that public canvassing through the post office was discountenanced. It was the same thing in the end whether the candidate or his friends found the money, and he must say he never received one of these cards without a feeling of regret that the poor person who had sent it, and who perhaps had not had meat on his table for a week, should have been put to such a needless expense.

Mr. ROBBINS said there were at least three systems of conducting charities; one, that which the Charity Organization Society attacked, and he went very far with it, where a large number of candidates were put on the list, so that unless they bestirred themselves and spent money, they had hardly a chance. Another system was that of leaving the election in the hands of a committee, giving no voice to the subscribers, and that he also objected to, because it took the life blood out of a charity. In their own Society they adopted a medium course. The Council examined into every case, and was very careful that none should be put forward which was not a deserving case, and a larger number were not put on the list than could get in within a reasonable time. There had never yet been a candidate for this fund who did not get in within three years. The plan had worked well, and it would be a pity to change it.

Mr. SANDFORD said he held very strong views on this subject, and had therefore consulted several secretaries and active members of different institutions, and found every one of them was of opinion that if the proposition of the Charity Organization Society were carried out, the charities themselves would fail. Mr. Betty intimated that charity was nothing unless arising from a proper motive, but he (Mr. Sandford) did not see that they were to judge other men's motives, they had simply to apply the funds placed at their disposal in the best possible way. These poor people did not, as Mr. Shaw said, pay their money to bring in subscribers; they made their case known to their friends by the best means in their power, and their friends subscribed in order to assist them. If they were not allowed to send round the cards how were their cases to be made known? Mr. Hanbury had told them that the list of cases he received was too long to read, but no doubt when the cards came before him singly he read them, and attended to the contents. It was very painful, no doubt, to receive these cards time after time, but he certainly did not consider when he received them that he had a portion of his subscription returned to him, as Mr. Betty intimated.

Mr. MACKAY could not vote for this recommendation, because in such a case as this he considered half measures worse than none. If the Council liked to put on the rules a distinct prohibition, that was one thing; but with this recommendation only it could not be said that a candidate was doing wrong in canvassing, and therefore the proposition had much better be negatived.

The PRESIDENT having spoken to the same effect,

Mr. SCHACHT said he wished to raise his voice distinctly in favour of canvassing. An expression he had made use of on a former occasion had been referred to, and he was quite ready to repeat it, that to prohibit it would be to take the life out of the Benevolent Fund. If it ever came to handing over the whole power of election to a committee, as Mr. Hanbury's remarks seemed to suggest, it would be fatal to the whole scheme. Mr. Betty had rather lofty ideas as to the nature of charity, which if carried out would prevent him taking any part in the Benevolent Fund dinner. Their province was not to teach mankind christian charity, but to direct its exercise and administer the funds which it supplied them with.

Mr. SHAW, in reply, said he could not see any force in any of the objections which had been raised, and he felt more strongly than ever the desirability of the change. He hoped at some future time a positive rule would be made, but, in the meantime he believed this recommendation would be a step in the right direction.

On the motion being put it was negatived by 12 votes to 6.

Mr. SANDFORD then moved,—

"That the amended rules come into force on and after January 1, 1878."

This was seconded by the VICE-PRESIDENT.

Mr. SHAW moved as an amendment that they come into operation forthwith, but, on a division, the amendment was negatived, and the motion carried.

BENEVOLENT FUND DINNER.

The Committee appointed last month reported that it had held three meetings and that the following gentlemen had been added to it, viz.:—Messrs. Owen, Robbins, Greenish, Hanbury, Barron, Professor Attfield, Dr. Paul, Messrs. Hampson, Stacey and Carteighe. It had been decided by the Committee that the dinner should be held on Tuesday evening, May 15, at 6.30 p.m., at the Freemasons' Tavern. It had been moved by Mr. Owen that ladies be admitted to the dinner, but after full discussion the motion had been withdrawn. A sub-committee was also appointed to draw up and issue circulars and make further arrangements.

Mr. HAMPSON asked why it had been decided not to invite ladies.

Mr. OWEN said he was desirous of ladies being present, and had on some occasions attended dinners which were very successful where ladies were present. But he had found there was no chance of carrying the motion and therefore had withdrawn it.

Mr. ROBBINS said if necessary the reasons which had influenced the Committee could be given, but he thought there was no necessity to do so.

The report was then adopted unanimously.

The PRESIDENT said there was one question which had not been referred to in the report, and that was, Who should occupy the chair at the dinner? His view was, that some gentleman of eminence should be asked to preside, but some of the Committee thought he, as President, should occupy that position Under the circumstances he would ask the Vice-President to take the chair while the Council discussed the question, and he should be glad if he could be relieved from the responsibility.

The PRESIDENT having retired, several members of the Committee stated that it was the unanimous opinion of the Committee that Mr. Williams, as President, should preside at the dinner. A resolution to this effect was carried unanimously and communicated to the President on his returning to the room.

CONVERSAZIONE.

This Committee had held a meeting at which a letter from the Lords of the Committee of Council on Education had been read, stating that the South Kensington Museum would be placed at the disposal of the Society on the evening of the 16th of May, for the purpose of holding a Conversazione. The Committee had given the Secretary instructions as to the arrangements to be made and the invitations to be issued.

Mr. SCHACHT suggested that tickets should not be sent to members in London any more than to those in the country unless they were applied for.

Mr. HAMPSON said if every one were obliged to apply for a ticket the success of the meeting would be jeopardized.

Mr. BOTTLE, as a country member, asked Mr. Schacht to withdraw his proposal. It would throw a good deal of extra work on the office, and this year there would be a deal of work at the same time in connection with the Benevolent Fund dinner.

The PRESIDENT said that the reason invitations for the Conversazione had been sent to the London members and associates in business without application was that a very much larger proportion of them would be likely to attend the Conversazione than of those residing in the provinces.

Mr. MACKAY suggested that tickets should be sent to all members and associates in town and country.

This was agreed to, and the report as thus amended was adopted unanimously.

THE BRISTOL PHARMACEUTICAL ASSOCIATION.

Mr. SCHACHT stated that a formal application had been made by the Bristol Association for some assistance from the Society's funds, but it was not received in time to be considered this month. It would, therefore, come before the Council at its next meeting.

LAW AND PARLIAMENTARY.

This report included the report from the Solicitor as to the progress in various matters he had in hand. The Secretary had stated that he understood the summons against a Nottingham chemist and druggist for prescribing was returnable on the 13th inst. A pharmaceutical chemist had written to the Secretary, reporting that he had been summoned to serve on a coroner's jury, and in reply to his protest had been informed by the coroner that there were no exemptions whatever in the case of inquests. The Secretary had been instructed to send him a copy of the section of the Juries Act relating to exemption from jury service, The Secretary had also reported correspondence with several parties accused of breaches of the Pharmacy Act, and the result of the prosecution for personation as reported elsewhere.

Some discussion ensued as to the question raised in regard to service on coroners' juries.

Mr. ATKINS said in his neighbourhood pharmaceutical chemists were never summoned. The officer could only go by the jury list, and if a man was not on the list he could not be summoned.

Mr. SANDFORD said he had often heard that coroners' juries were subject to no exemption, and that the officer was not obliged to go by the jury list.

The report and recommendations of the Committee were received and adopted.

LIBRARY, MUSEUM, AND LABORATORY.

The Librarian had reported to this Committee that the average attendance in the library during the preceding month had been as follows:—Day, 23; evening, 10. Circulation of books, in town, 182; in the country, 32 to 20 places. The donation to the library of Smiles' 'Life of a Scotch Naturalist,' by Mr. T. H. Hills, had been reported. The purchase of books required to complete the set of Longman's Text-books of Science was recommended; also of the Catalogues of Food, etc., in the Bethnal Green Museum. The question of purchasing the first seven volumes of the *Berichte der Deutschen Chemischen Gesellschaft* was considered, but the President stated that he had some of the back numbers which he should be happy to present to the library, and he would try if he could not get the set completed.

Professor Attfield had reported 61 entries in his class since the commencement of the session, 46 being now at work.

Professor Redwood had reported defects in the ventilation in the room in the basement in which his specimens were kept. This matter was referred to the House Committee.

The Curator had reported the average attendance in the Museum to have been during the month, in the morning 16, evening 3. Also that the Hanbury Herbarium was now ready for inspection. A proof of part of the chemical portion of the catalogue was submitted, and the President and Mr. Greenish undertook to look through it.

The report was received and adopted.

Mr. GREENISH asked that a copy of the Journal should be sent regularly to the Royal Botanical Gardens, D'Urban, Natal. The Curator of that Museum had sent over several things which were very useful to the Society's Museum and would be glad to receive the Journal. He thought it very important that the Society should have, if possible, a correspondent in every colony.

The suggestion was unanimously agreed to.

House.

The report of this Committee stated that its attention had been called to offensive smells in various parts of the premises, and that a sub-committee had been appointed to make further investigations. The water supply was stated to be ample, and a ventilating shaft which had been placed in the library was found to be effective. Various other matters connected with the house arrangements had been attended to, and a sub-committee had subsequently met and made recommendations as to the means to be taken for remedying the defects complained of, for which an estimate was now presented.

The report was received and adopted.

The President reported that very good progress was being made with the refitting of the octagon laboratory, but he asked for a further vote of £5 to replace the old chemical stove by one suitable for warming the room.

This was agreed to.

The Chemists and Druggists' Trade Association.

The Secretary read the following letter which he had received from the Secretary to this Association in reply to the resolution of the Council passed at its last meeting:—

"Chemists and Druggists' Association,
"23, Burlington Chambers,
"New Street, Birmingham,
"February 19, 1877.

"The Secretary and Registrar,
"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, London, W.C.,

"Sir,—I have to inform you that your letter of the 8th inst. was submitted to the Law Committee at its meeting on Friday last, the 16th inst., when the annexed resolution was passed.

"I am, Sir, yours faithfully,
"W. F. Haydon, Secretary."

Resolved:—"That the Secretary be directed to acknowledge the resolution passed by the Council of the Pharmaceutical Society at its meeting on the 7th inst., which clearly answers the question put by the Secretary of the Association in his letter of November 27th, 1876; and at the same time to inform the Council that the previous letters of this Committee have been misunderstood, as this Committee had no intention of forcing upon the Council any cases, but simply of supplying, as they stated, such evidence as the Council might deem necessary if the Council on its part was willing to make use of the same."

A letter was read from the Secretary of the College of Pharmacy, New York, expressing the thanks of the College for the donation of some back numbers and volumes of the *Pharmaceutical Journal*, and the current numbers.

Report of Examinations,
February, 1877.

ENGLAND AND WALES.

	Candidates. Examined.		Passed.		Failed.	
Major, 21st	6		2		4	
„ 22nd	5		3		2	
	—	11	—	5	—	6
Minor, 21st	14		7		7	
„ 22nd	17		11		6	
„ 23rd	19		11		8	
	—	50	—	29	—	21
Modified		2		2		0
Total		63		36		27

SCOTLAND.

	Candidates. Examined.	Passed.	Failed.
Minor	11	8	3
Modified	1	0	1
Total	12	8	4

Preliminary Examination.

Six certificates were received in lieu of this examination:—

3 University of Oxford.
1 „ „ Durham.
1 Royal College of Surgeons of England.
1 College of Preceptors.

PHARMACEUTICAL MEETING.

Wednesday, March 7, 1877.

MR. JOHN WILLIAMS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting were read and confirmed.

The following donations to the library and museum were announced, and the thanks of the Society were voted to the donors:—

Library.—Smiles' 'Life of a Scotch Naturalist,' from Mr. T. Hyde Hills; 'Berichte der deutschen chemischen Gesellschaft zu Berlin,' 1874, and part of 1873, from Mr. J. Williams; 'Sur l'avantage qu'il y aurait à remplacer la quinine par la cinchonidine dans le traitement des fièvres intermittentes,' from M. Weddell (Author).

Museum.—Specimen of Spurious Pareira Brava, from Mr. Gutheridge; Specimens of liquid Sulphurous Anhydride, Trioxide of Nitrogen, and Tetroxide of Nitrogen, in hermetically sealed tubes; also Sulphuric Anhydride, pure Iodide of Potassium, and Ammonio-sulphate of Nickel, from Messrs Hopkin and Williams; Specimen of very fine Sagapenum, in the tear, from Messrs. Hearon, Squire, and Francis; Specimen of the Gum of Ægle Marmelos, from Mr. H. W. Pound; Fruits of *Pedalium murex*, from Mr. Martindale; Sumatra Benzoin, in the tear, from Mons. Chantre; Crystals of Native Borax from California, from Mr. Robottom.

Mr. Martindale said, with reference to a specimen of gokhru which was exhibited on the table, that a notice had appeared in 'The Practitioner' for last November, stating that the juice of this substance had been used as a diuretic. In India it had proved useful in the treatment of gonorrhœa and diseases of a like nature. It was also mentioned in the Pharmacopœia of India.

A New Source of Borax.

Dr. Paul said that he had to bring before the Society that evening a new source of borax. Most of those present in the room would be aware that during the last two or three years the price of borax had been very considerably reduced. Within that period it had fallen from about £70 or £80 a ton to about £35 or £40 a ton, and the circumstance to which this fact was due was the discovery of the new source of this material, to which he now desired to draw their attention. Hitherto the supply of borax had been derived almost entirely from Tuscany, being manufactured from the boracic acid obtained from the suffioni in that district. A small quantity had been imported from Thibet in the form of what was commonly know as tincal, which is a naturally crystallized biborate of soda, and this had been shipped to England through India. There had been also a small quantity produced from the soda lakes in Nevada, situated at the south western part of North America. Two of these salt lakes, called Teel's Marsh and Fish

Lake, had been for a considerable time sources of supply of borax, not so much for the European as the American market. These lakes had been worked for six or seven years; but the cost of land carriage had been too heavy to admit of the working being continued, and he believed that they were now abandoned. The particular source that he wished to call their attention to from which the borax now came was in California, close to the River Colorado. It was a large lake of the same character as the two that had been worked in Nevada, which appeared to be the remains of previous volcanic action. This particular lake was about fifteen miles in length and eight miles across. It was entirely dried up, but the whole area of the lake was occupied with beds of common salt, sodium sulphate, borate of soda and blue mud. The native borax was now being worked by two American companies, and immense quantities of it were being shipped over to this country. Borate of lime had also been found to be present with the borax, and had been brought over to this country. Mr. Robottom, who had discovered this lake, and who had been mainly intrumental in bringing it into the market, was present and would perhaps give an account of some of the various uses to which he proposed to apply it. He would, however, draw attention to one of the uses of borax, for the preservation of animal and vegetable substances, as illustrated by some specimens exhibited on the table. A flower had been preserved in a strong solution of borax, and retained its colour and characteristics. A fish had also been preserved for some months in the same manner and was now perfectly sweet.

Mr. Robottom said that his reason for bringing the subject forward was to endeavour to utilize the immense quantity of borax which existed in this deposit. He had no occasion to go into its uses for medicinal purposes, as to which those present were better able to speak than himself. Apart from this, however, it was desirable to bring borax into use in the laundry to supplant soda; for it was found to be one of the finest washing substances in the world. It could be used also with great advantage in starching and in the getting up of lace and fine linen. Woollen materials were washed by it better than by anything else. Soda turned wool quite yellow, while borax made it perfectly white. The same remark would apply to flannels, and the colours of prints and ribbons were not affected by it in any way. In the district where he resided there were thousands of rabbits, and the skins of these animals were there generally sold for a small sum—about one farthing; he had induced poor people to preserve these skins with a little borax, and then make them into small mats, the whole cost of which was only a few pence. These skins had been utilized to replace blankets, for which they were a very good and cheap substitute. Next, there was the preservation of meat, and in connection with this he would mention a circumstance which first led him to think of using borax for this purpose. The last time that he was at the lake, he was fixing some boundary stakes, when his attention was drawn to a brown object lying on the surface of the borax, which on inspection proved to be a dead horse. On that day the barometer stood at 110° in the shade, but upon examination the flesh of the horse was found to be quite fresh. Further, upon inquiry of the men how long the horse had been lying there, he was informed that it had dropped down dead on the borax six months previously, and had been lying there since. This suggested to him the idea of preserving the different things which were shown. Borax was also valuable for cleaning paint; and glass globes were so well cleaned by the borax, that he had saved a considerable quantity of gas by it. It would be found that by using it in tea, a considerable saving would be effected. His own tea bill, since using the borax, had been reduced by about half. Borax could also be made into soap. A young gentleman came to him a short time ago and said that he had been greatly troubled by having to take balsam of capivi, but that, upon putting a piece of borax into the mouth, it acted like magic and took all the flavour away. There was another thing. In Manchester and Liverpool, particularly in the back slums, he had seen people on Sunday mornings buying cow cabbages, which weighed fourteen or fifteen pounds each. The stems of these cabbages were not nice to eat, but a piece of borax about the size of a penny-piece, boiled with the cabbage, made the green stalks quite beautiful to eat. It was a remarkable circumstance that there were scattered over the lake pyramids of carbonate of soda, about four feet high and as thick as a man's body; and there must be some hundreds of thousands of tons of this carbonate. Below the blue mud of the lake there was three feet of borax combined with sulphate of soda. When this had been taken out and put into warm water, the sulphate was dissolved, and left the borax. He believed that there was no place in the world where solid borax was found like the specimens exhibited.

In reply to the President, Mr. Robottom stated that at the lake water had to be fetched every day from a distance of fourteen miles. The number of workmen employed there was fourteen, who were Chinamen. The labour was very little, and they were each paid 7*s.* a day. He (Mr. Robottom) thought that none but Chinamen would be able to do the work. It was a very disagreeable country to live in. There was not a woman within forty or fifty miles. The ground all around the lake was perfectly free from vegetation. It was a difficult matter to get things conveyed to this locality. Twopence halfpenny a pound had to be paid for carting the houses, boilers, vats, etc., from Los Angelos to the works. The borax was conveyed from the lake by the bullion waggons which came into that district.

Mr. Martindale thought that the discovery was a very valuable one, particularly as being a source of yielding boracic acid. This acid would in future come into much greater use in medicine than heretofore, especially as an antiseptic dressing, either in plain solution in water or made into the form of ointment. It was one of the best antiseptic dressings that had of late come into use for simple burns, and boracic acid kept the part from suppurating and getting into that disagreeable condition which would arise in the case of other dressings. This new means of cheapening borax would be of great service.

The President said that the uses of borax were almost unlimited, and the uses mentioned by Mr. Robottom were insignificant in comparison with the use of borax as a flux in the arts. If it could be procured in large quantities, as was likely to be the case, it would take the place of many other fluxes now in use; but the high price at which it had previously been sold had prevented its being used to any great extent. He did not think that the borax could ever be supplied in quantities too great to find a ready market. There was also another very abundant source of borax in the mineral, a specimen of which was exhibited on the table, and which he believed was borate of lime. As a mineral they must admire the specimen very much. He believed that it yielded about 75 per cent. of borax.

Mr. Umney said it could not be supposed that the borax which had been supplied in such large quantities to the English market for the last two or three years had all been supplied by the working of fourteen men. He expected that the mineral to which the Chairman had alluded had been the source of most of it.

Mr. Robottom said that the Nevada company had supplied large quantities, but the largest amount of it was now being forwarded from the lake of which they had been speaking.

Dr. Paul called attention to the fact that the borate of soda, as now produced was procured ready for use, while the borate of lime had to go through an expensive operation to convert it into borate of soda.

A vote of thanks was passed to Dr. Paul and Mr. Robottom for bringing the subject before the Society.

A paper was then read, entitled—

NOTES ON THE ACTION OF CHLORINE UPON A BEAM OF LIGHT AND ON THE PREPARATION OF LIQUID CHLORINE.

BY DR. A. SENIER AND MR. A. J. G. LOWE,

The paper is printed on p. 729.

The PRESIDENT remarked that the communication reflected great credit upon the authors of the paper, and proved how simple and easy some apparently difficult operations became when conducted with intelligence and in a business-like manner. He could have scarcely believed that the liquid chlorine could have been prepared so easily. The preparation of condensed gases was attracting a great deal of attention at the present time, and the paper was, therefore, of great interest on that account.

A vote of thanks was accorded to the authors of the paper, and the proceedings terminated.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, March 1, 1877. Professor Abel, F.R.S., President in the chair. After the visitors had been announced and the minutes of the previous meeting read and confirmed, the names of Messrs. J. R. Young, S. S. Bell, W. Watson, and F. W. Toms, were read for the first time. Messrs. Edward Hunter, Frederick Charles Cresswell Hewett, William Terrill, Alexander Kinninmont, John Borland, W. Handsel Griffiths, and George A. C. Pearce were ballotted for and duly elected fellows after their names had been read the third time.

The President then read the list of officers and other members of council proposed for election at the anniversary meeting, and announced that there would be a special general meeting held afterwards, to take into consideration the proposals of the council relative to alterations in the bye-laws regarding associates, and in the form of obligation to be signed by fellows on admission. The Secretary also gave notice that those fellows who wished to be present at the Chemical Society's dinner at Willis's Rooms on the 20th March should at once send in their names to Mr. Hall at Burlington House.

The President then called on Professor Thorpe to give his lecture "On the Theory of the Bunsen Lamp." The speaker, after some preliminary remarks as to the great value of this lamp, both to the scientific chemist and in the arts, pointed out the origin of it at the time when Bunsen introduced coal-gas into his laboratory. Bunsen considered the contrivances which had been used in this country as unworthy of the fuel they had to burn, and bringing his own great inventive powers to bear on the subject, the bunsen lamp was the result, the original apparatus differing but little from that now generally in use. After a short description of the lamp, the mode by which the air is drawn in at the holes at the bottom and caused to mix with the gas was considered. This is due to the well-known fact that when a gas under pressure, issues from an orifice, it carries with it more or less of the circumjacent air, partly as the result of the expansion and partly as the result of its viscosity. This was experimentally illustrated by an ingenious adaptation of List's multiplying manometer, which, when connected with one of the holes at the base of a bunsen lamp, distinctly showed the rarefaction produced by the gas as it issued from the jet, despite its low pressure. The intermixture of the gas and air in the tube is greatly facilitated by the spreading out of the gas stream after leaving the jet, and the amount of air carried in varies of course with the size of the air holes, being in an ordinary burner from two to two and a half times that of the gas. An average lamp giving a flame 120 mm. high, burns about 80 litres of gas per hour, so that as much as 250 litres of mixed gases pass through the tube of the lamp in that period of time. In some modifications of the lamp, such as Wallace's, the proportion of air is very largely increased, but then it is necessary to resort to some such contrivance as a perforated cap to prevent the flame retreating down the tube and burning below, for from Mallard's observations on the maximum rapidity of the propagation of combustion, it is evident that the velocity of the current of mixed gases in the tube of the bunsen lamp would have to exceed that of the velocity of the propagation of combustion, in order that the flame should not retreat down the tube.

Having traced the progress of the mixture of air and gas up the tube, attention was directed to the flame itself, which is hollow and contains a large internal area of the uninflamed mixture, as it has been found that a mixture of gas with less than three and one-third times its volume of air will not burn; it is only therefore when it meets with an additional supply of oxygen from the surrounding air that combustion occurs. The composition of the gas in the uninflamed interior cone is not the same in every part however, as has been shown by Blockmann. The amount of hydrogen, of the hydrocarbons, and of oxygen diminishing, and that of the carbonic oxide, carbonic acid, and especially the aqueous vapour and nitrogen being largely increased, the latter being derived from the surrounding air. This was still more clearly shown in a table giving the amount of air mixed with 100 volumes of gas, both in the tube and at various distances above it. The cause of the rapid diminution in the proportion of hydrogen and the corresponding increase in aqueous vapour is to be sought for in the greater diffusive power of the gas, and the lower ignition point of a mixture of hydrogen with air.

If the supply of air be cut off from the air-holes at the bottom of the bunsen lamp, the flame becomes luminous, so that the non-luminosity of the flame is due to the air, and at first sight it would be imagined that it was due chiefly, if not entirely, to the oxygen in the air, since it is known that an admixture of air with coal gas greatly decreases its luminosity; the nitrogen, however, is concerned in the matter, for if instead of supplying air at the holes at the bottom of the lamp we supply nitrogen or even steam, the flame at once ceases to be luminous, showing that the oxygen of the air is not necessarily the true cause. Knapp has shown that any indifferent gas, as carbon dioxide or hydrochloric acid, will produce the same result. Frankland proved many years ago that a mixture of marsh gas and air which was almost destitute of illuminating power might be made to give a luminous flame by heating the gas to redness, and Weber has recently shown that the ordinary bunsen flame becomes luminous when the gas is previously heated. This fact was experimentally illustrated by means of a bunsen lamp with a platinum tube; when the latter was heated to redness by means of a blowpipe, the flame became luminous, as when the air supply is cut off from the holes at the base. The feeble luminosity of the bunsen flame would appear to be due to a variety of causes, such as the oxidation of luminiferous material, the action of the nitrogen and other diluting gases, and the withdrawal of heat by the indifferent gases such as nitrogen, carbon dioxide, and water vapour, for although the temperature of a flame of coal-gas mixed with air is higher than that of one of unmixed coal-gas it requires a still higher temperature in order to become luminous.

When the gas is lowered in the bunsen lamp and the flame becomes very small, it will be seen that it does not rest immediately upon the end of the tube, a fact due to two causes, namely, the cooling action of the tube, and to the velocity of ignition of the mixed gases being less than the rate at which they issue. When the flame is very small, it is well known that the least current of air causes the flame to retreat down the tube and ignite the gas at the jet below; this is due to an admixture of air causing the velocity of ignition of the mixed gases to become greater than the rate at which it passes upwards in the tube. When the flame burns at the bottom a very much smaller quantity of air passes into the tube, and the gas which issues at the top is entirely deprived of oxygen, and has, moreover, a disagreeable odour arising in part from the presence of acetylene formed by the imperfect combustion of some of the hydrocarbons present, the amount of carbon monoxide also is very largely increased. The pernicious effect of this partially burned gas is due to the acetylene and carbon monoxide thus formed.

The President, in thanking the Lecturer, remarked that it would have been difficult to select a subject having a more special interest for working chemists; he had brought before them facts with which many were only generally or very partially acquainted, and made them familiar by his explanation and admirable experimental illustrations. Of the points of interest in the theory of the bunsen lamp which had been mentioned, perhaps those bearing on the luminosity of flames were of the greatest interest at the present time when so much attention was being directed to the subject.

Dr. Frankland said that although he had not paid any special attention to the luminosity of the bunsen flame, it had been a point of special interest to him to ascertain the cause of the greater or less luminosity of flames under certain conditions. With regard to the effect of dilution on the luminosity of the bunsen flame it had been advanced that when gases containing oxygen had been employed, such as carbonic anhydride, they had given up their oxygen, but there could be no doubt that this was not the case when nitrogen was used. From his own experiments, it was evident that a comparatively slight elevation of temperature has a great effect on the luminosity of a flame which was just on the point of becoming luminous. He had resumed his researches on the luminosity of flame and might say that he had repeated the very important experiments of Heumann, whose details of results he had found to be most accurate. He might mention that the exceedingly luminous flame of phosphuretted hydrogen did not give the faintest shadow in bright sunlight, showing that no solid matter was present in it, but as to whether the luminosity of carbonaceous flames was due merely to the great density of the hydrocarbon vapours, or to solid particles of carbon, was a matter which must still be considered as *sub judice*. The two important points to be determined were, the presence or absence of polarized light in carbonaceous flames, and as to whether a flame whose luminosity was undoubtedly due to the presence of solid particles would behave in the same way under diminished pressure as hydrocarbon flames, such as that of a candle, etc.

Mr. Vernon Harcourt wished to ask the Lecturer whether the luminosity of the bunsen flame, when the tube was heated to redness, might not be due in part to the formation of tarry matters or of hydrocarbons containing a large proportion of carbon, as it was not possible that the mixture of gas and air could be passed through the red hot tube without undergoing considerable change.

Dr. Wright suggested that the effect of heating the tube was comparable to that produced by lighting the jet below.

Professor Thorpe replied that Heumann had very carefully examined into the matter, and had found that when the experiment was properly performed there was no deposit of tarry or carbonaceous matter in the tube. If a much longer platinum tube to the bunsen were employed and only the lower part heated so that the gases became cooled again before being burnt, the lamp gave a non-luminous flame, showing that the luminosity was chiefly due to the heating. In reply to a question put by Professor Foster, he said that when a cold body was introduced into the luminous flame soot was deposited on it.

The President, after a formal vote of thanks to the Lecturer, adjourned the meeting until Thursday, March 15, when the following communications will be read:— 1. "Note on a Method for Estimating Bismuth Volumetrically," by Mr. M. M. P. Muir; 2. "Note on on Gardenin," by Dr. J. Stenhouse and Mr. C. E. Groves; 3. "Preparation of Copper-Zinc Couples," by Dr. J. H. Gladstone and Mr. A. Tribe; 4. "On Chromium Pig Iron," by Mr. E. Riley.

Parliamentary and Law Proceedings.

The Personation at the Preliminary Examination.

At the Central Criminal Court, on Tuesday last, before the Common Sergeant, sitting in the Third Court, John Thomas Faulkner Colegrove, Andrew Ritchie Hunter, and John Hinks, pleaded "guilty" to an indictment charging Colegrove with procuring himself to be registered in the Pharmaceutical Society's Register of Apprentices by false representations, and Hinks and Hunter with aiding and abetting him in so doing, contrary to the provisions of the Pharmacy Act, 1868.

Mr. Straight and Mr. Horace Avory appeared for the prosecution; Hinks was represented by Mr. Besley, Colegrove by Mr. Grain, and Hunter by Mr. C. Mathews.

The counsel for the prosecution briefly recapitulated the circumstances of the charge against the defendants, the substance being that, upon the introduction of Hun ter Colegrove by Hinks, Hunter undertook for a sum of £10 to personate Colegrove in the first or Preliminary examination of the Pharmaceutical Society, and to pass it for him. This deceit was successfully accomplished, and Colegrove became thus qualified to go in for the second or Minor examination, which he, in his turn, properly passed for himself, and so became registered as a chemist and druggist. In conclusion, Mr. Straight suggested that, with the consent of the Court, the defendant Hinks might be bound over to appear for judgment if called upon, but with respect to Hunter and Colegrove he applied that the provisions of the Act might be put in force.

It was pleaded on the part of the prisoners that they had hitherto borne excellent characters, and that so far as Colegrove and Hunter were concerned, they had already suffered nearly ten days' imprisonment. It was also urged that under the 14th section of the Pharmacy Act, 1868, the offence was one which, if committed in Scotland, was punishable by fine or imprisonment.

The Common Serjeant, however, thought that the phrase in the section might be held to be merely indicative of the class under which such an offence was to be included. In such a case as that before him he would have preferred to inflict a fine. After the counsel for the defendants had all been heard, the Common Serjeant said that having regard to the peculiar circumstances— above all things to the fact that the examination passed by Hunter for Colegrove was not a matter relating to the pratical business of a chemist and druggist, in which, from passing his Minor examination since, Colegrove would seem to be well versed, he would, especially as it was the first prosecution of the kind, allow the prisoners to go out upon their own recognizances to come up for judgment when called upon. The proceedings had been very properly instituted by the Pharmaceutical Society, and would no doubt act as a warning.

Alleged Adulteration of Balsam of Copaiba.— Another Public Analyst's Blunders.

On Thursday, March 8, at the Town Hall, Salford, Messrs. Whittaker, Hall, and Holt, chemists and druggists, of Salford, Manchester, were summoned for selling adulterated balsam of copaiba.

Mr. J. Carter Bell, public analyst for the district, said that the sample purchased of Whittaker contained

35 per cent. of foreign oils. Cross-examined, he said that he had never analysed balsam of copaiba before. He had tested the sample by half a dozen or more processes. Pure balsam should be soluble in rectified spirit, should dissolve a fourth of its weight of carbonate of magnesia, and should give a clear liquid with solution of ammonia of 0·965 specific gravity, but the sample did not respond to either test. Thirty-five per cent remained insoluble when the sample was shaken up with the spirit and therefore 35 per cent. of foreign oil was present. The foreign oil was a volatile oil, not a fixed oil, but he could not say what volatile oil it was. He relied on this spirit test and on the magnesia test which roughly confirmed the quantitative result of the spirit test. The sample contained a total of 48 per cent. of volatile oil, of which 13 was natural and 35 added. Questioned as to whether pure balsam ever did contain so little as 13 per cent. or so of volatile oil, he said he did not know, nor did he know what volatile oil could be used in adulterating copaiba. He did not recognize any particular smell suggestive of any particular volative adulterant.

The Magistrate: As I said in the milk cases, Mr. Bell, I think you ought to tell us not only the percentage of adulterant, but, also, the nature of the adulterant. How would the purchaser be prejudiced in this case?

Mr. Bell: I do not know.

Re-examined: The sample might have contained more than 48 per cent. of volatile oil, for the 52 per cent. of resin remaining might partially have been formed from the oil during evaporation.

This was the case for the prosecution.

For the defence Mr. Louis Siebold was first called. He had received from the defendant the portion of the purchased balsam which had been sealed and handed back to the seller by the purchaser. He had separated its volatile oil, and by the specific gravity, boiling-point and smell pronounced it to be pure oil of copaiba. He had otherwise examined the sample and had found it to be pure balsam of copaiba. Turpentine was not present; for the boiling-point of the volatile oil was not low enough to indicate turpentine, and the products did not smell of turpentine. The rectified spirit test of purity on which Mr. Bell had relied was absolutely useless. The sample certainly was not all soluble in rectified spirit, but many pure balsams, notably those of Para, were not completely soluble in rectified spirit. The other test relied on, namely, the magnesia test was useless. He, also, had found that the sample did not dissolve all the magnesia, but that was because the proportion of acid resin in the balsam was too small, and the proportion of such acid in balsam varied naturally. There was no Gurjun oil in the sample; for petroleum ether dissolved it, which would not have happened if Gurjun oil had been there.

Cross-examined: Copaiba, if adulterated, is adulterated in Brazil. Occasionally it was adulterated by fixed oil. The sample was faintly fluorescent, but, according to Flückiger and Hanbury, pure balsam was occasionally faintly fluorescent. Pure balsam was sometimes soluble in rectified spirit, but more often only partially soluble.

Professor Redwood who, although not engaged in this case, was present to give evidence in Hall's case was by consent called to corroborate Mr. Siebold's evidence, with which he entirely agreed.

The Counsel for the defence said that other chemists and witnesses were in court, but he would not trouble them.

The Magistrate: I have no hesitation in at once dismissing the summons, with costs.

The summons against Mr. Hall, on the agreement of the Counsel for the prosecution, was also dismissed with costs, the Counsel for the defence stating that Mr. Squire, of Coleman Street, London, partner in the firm of wholesale druggists who supplied the defendant, was present and prepared with witnesses to defend the case.

In Holt's case, Mr. Glaisyer, Solicitor to the Chemists and Druggists' Defence Association, said his executive had instructed him to defend all three of these cases, and he had to acknowledge the courtesy of the Town Clerk, who had supplied him with sealed portions of some of the Inspector's samples. The defence of Whittaker had, however, been undertaken by his wholesale druggists, Messrs. Evans and Co., of Liverpool. He (Mr. Glaisyer) had forwarded the sample in Hall's case to Professor Attfield, who was present, and all preparations had been completed for defence of that case, but on the previous evening Mr. Hall had finally elected to be defended by his wholesale druggists, Messrs. Hearon, Squire and Francis. In the third case he had been informed by Professor Attfield that fixed oil was present, whereupon he had at once decided to withdraw from the defence of that case. He desired to make this statement in explanation of his application to the Town Clerk for the sealed samples, which of course were given to him on the understanding that he would defend. He begged to retire.

Mr. Bell then gave evidence to the effect that this sample was adulterated to the extent of eighty per cent. with fixed oil which appeared to be linseed oil.

A fine of £5 was then imposed, and costs allowed.

A Mysterious Death.

On Thursday evening Mr. Carter held an inquest at the Globe Tavern, Regent Street, Lambeth Walk, on the body of Honor Kipping, the child of an artisan, who is alleged to have died from the administration of some drug obtained from a Mrs. Coomber, a registered chemist, of 10, Chester Street, Kennington Road. Mrs. Kipping deposed that on Wednesday night the deceased was very ill, and apparently suffering from measles. Witness went to a Mrs. Coomber, stated the symptoms, received two bottles, one containing castor oil and the other a medicine of a purple colour. Mrs. Coomber gave instructions that the deceased should have a tablespoonful of the castor oil and after the lapse of an hour a tablespoonful of the medicine. Witness did as she was told; but, although the castor oil sent the child to sleep, the mixture had such an effect upon her that the witness could hardly hold her. About 8 o'clock the next morning the child died. James Kipping said he went to Mrs. Coomber and told her of the death. She at once said, "Run back, then, and fetch the stuff," and he did so, and handed her the bottle. She put it to her mouth and said "Lord bless my soul; it is a bad job, I can't do anything for you." She walked up and down the shop and got out of sight, and he suddenly heard the tinkling of glass. She then came forward and handed witness the bottle, saying, "It is no fault of yours or mine. If I could have seen the baby my partner would have given a certificate." Witness ran home, and upon looking at the bottle saw that the purple liquid had been poured away, and a light-coloured liquid substituted. The Coroner said the case had assumed a very serious aspect, and he therefore adjourned the inquest for a fortnight for an analysis of the contents of the child's stomach to be made.—*Times.*

The following journals have been received:—The 'British Medical Journal,' March 3; the 'Medical Times and Gazette,' March 3; the 'Lancet,' March 3; the 'London Medical Record,' March 3; 'Medical Press and Circular,' March 3; 'Nature,' March 3; 'Chemical News,' March 3; 'Gardeners' Chronicle, March 3; the 'Grocer,' March 3; 'Journal of the Society of Arts,' March 3; 'Grocery News,' March 3; 'Produce Markets Review,' March 3; Practical Magazine,' for March; 'Educational Times,' for March; 'British Journal of Dental Science,' for March; 'Journal of Applied Science,' for March; 'American Journal of Pharmacy,' for March; 'Pharmacist,' for March; 'Canadian Pharmaceutical Journal,' for March; 'Moniteur Scientifique,' for March; 'Pharmaceutische Zeitung,' for March 3; Sanitary Record,' for March 3; 'Medical Examiner,' for March 3.

Notes and Queries.

[541]. CASE HARDENING COMPOSITION.—Can any of your readers give me a recipe for a good Case Hardening Composition?

IRON.

BOOKS, PAMPHLETS, ETC., RECEIVED.

A PRIMER OF CHEMISTRY, INCLUDING ANALYSIS. By ARTHUR VACHER. London: J. and A. Churchill. 1877. From the Publishers.

Obituary.

Notice has been received of the death of the following:—

On the 5th of February, 1877, Mr. Thomas Wilkinson, Chemist and Druggist, Bishop Auckland. Aged 29 years.

On the 10th of February, 1877, Mr. Charles Holloway, Chemist and Druggist, Birmingham. Aged 71 years.

On the 16th of February, 1877, Mr. Joseph Gibbons Lewis, Chemist and Druggist, Brunswick Road, Liverpool. Aged 43 years.

On the 20th of February, 1877, Mr. James Martin Wellington, Pharmaceutical Chemist, Oakham, Rutland. Aged 70 years. Mr. Wellington had been a Member of the Pharmaceutical Society since 1842.

On the 21st of February, 1877, Mr. Marcus Fitzwilliam Mitchell, Chemist and Druggist, London Street, W. Aged 32 years. Mr. Mitchell had been an Associate of the Pharmaceutical Society since 1869.

On the 26th of February, 1877, Mr. William Thomas Holden, Chemist and Druggist, Hull. Aged 63 years.

On the 26th of February, after a few days' severe illness, Mr. John William Steel, Chemist and Druggist, Beccles, Suffolk. Aged 34 years.

On the 4th of March, 1877, Mr. Josiah Matthew, Chemist and Druggist, Dalston. Aged 56 years. Mr. Matthew had been an Associate of the Society since 1870.

On the 4th March, 1877, Mr. Walter Breton, Pharmaceutical Chemist, Greenwich. Aged 45 years. Mr. Breton had been a Member of the Pharmaceutical Society since 1858.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

THE PHARMACEUTICAL SOCIETY OF IRELAND.

A Copy of the following letter addressed by Dr. J. Emerson Reynolds, Professor of Chemistry, University of Dublin, to the President of the Pharmaceutical Society of Ireland, has been sent to us, and as it may afford some idea of the progress being made in working the Pharmacy Act in Ireland, we place it before our readers.

"*Dublin, Feb.* 14, 1877.

"My dear Sir Dominic,

"I regret the Council of the Pharmaceutical Society of Ireland have, by their adverse vote of the 7th inst. upon my resolution, declined to adopt the plan of testing each candidate's knowledge of practical chemistry by a sufficiently long examination in a suitable chemical laboratory.

"I first brought this subject before the Council when the examination programme was under discussion last year, and before examiners were appointed; but, yielding to the wishes of some of the members, I did not press the matter beyond a general resolution.

"In the interval the examinations in chemistry, as far as they could go, have been ably conducted by your present examiner with the limited means at his disposal.

"At the termination of the "year of grace," however, I again urged the Council to require all candidates for the Society's certificate to work out suitable exercises in synthetical and analytical chemistry during at least two hours. As it is expedient that a number of candidates should be examined at the same time without risk of communicating, the practical testing I contemplated could only be conducted in a large and suitably fitted laboratory, hence I offered to give the Council material aid in obtaining the necessary accommodation. As no action was taken then I brought the subject forward for the third time and after full notice, on the 7th instant, when my resolution was rejected by a majority of two.

"I cannot agree with those who think that there would be any danger to the Society or hardship to candidates for the certificate of "Pharmaceutical Chemist" in asking them to undergo a two hours' laboratory examination, when more is demanded in England, and when we require candidates for medical degrees and for special arts' courses in the University of Dublin to be examined for at least *three hours* in the College laboratory.

"Under the circumstances, however, I cannot continue to be a consenting party to the issue of the certificates above referred to, and therefore beg to resign my seat at the Council.

"I am, my dear Sir Dominic,
"Very faithfully yours,
"J. EMERSON REYNOLDS.

"To Sir Dominic J. Cardigan, Bart.,
"President,
"Pharmaceutical Society of Ireland."

THE BOTANICAL PRIZE.

Sir,—I was very pleased on reading Mr. Hanbury's good suggestions concerning the regulations under which the Pharmaceutical Herbarium is formed.

I will not say anything respecting paragraphs Nos. 1, 2, 3, 4, 5 and 6 of the article of April 29, of which Mr. Hanbury speaks; I will leave those for far more able pens than my own to criticize, but, still I think I must say a few words respecting Nos. 7, that is,—"Candidates must not exceed the age of 21 years."

I have no doubt it places a great many assistants in the same predicament as it does myself, viz., being just over 20 years of age, I cannot compete for the Herbarium Medal on that account. I should have had a try for the forthcoming one in June, but owing to an illness which confined me to the house for two months, I was unable to do so.

I am quite of the opinion of Mr. Hanbury, that as students cannot go up for the Minor or Major until they have attained the age of 21 years, the age of young men ought not to be restricted to such a limit, for I have no doubt, were the standard of age raised to 24, or even 25, the Herbaria sent up would be more than twice as many and far better in respect to number, preserving and classification of specimens.

I trust those in power may fully consider the matter.

J. HEIGHINGTON.

Bridport, March 5, 1877.

MILK OF SULPHUR.

Sir,—After the appearance of Professor Redwood's letter I did not intend to intrude myself again on your columns respecting the much vexed Milk of Sulphur question. I was quite content, despite the Professor's being so elaborate an article, to let your readers "look on this picture and on that," without any addition being made to my humble effort, but were I to allow to pass unnoticed Mr. Slipper's remarks on my "*ipse dixit*," he and others might conclude that it was only an "*ipse dixit*," and worth no more than his own.

Dr. Bell, in his examination at Runcorn, stated that out of nine samples of "milk of sulphur" purchased for analysis in Salford (North of England) only one was contaminated. In Southampton (South of England) there are twenty-five druggists' shops: the borough analyst a short time since procured a sample of "milk of sulphur" from each, of which only three were found contaminated. These statistics do not prove "a great and continuous demand" for the contaminated article, they certainly prove the contrary, *ergo* Mr. Slipper's *ipse dixit* is only an *ipse dixit*, while the truth of mine is corroborated by facts. Twenty-five years ago these figures without doubt would have been reversed, and there can be little doubt in any unprejudiced mind that the demand for the contaminated article must be growing, and will grow, less and less.

The adulteration of Foods and Drugs Acts were specially passed to protect the poor. They were not passed because it was known or suspected that such adulterated articles were sold at high prices to the rich and educated in such places as Bond Street and Plough Court, but because it was known or suspected that they were sold at low prices to the poor and uneducated in such places as Seven Dials and Petticoat Lane, and kindred metropolitan and provincial localities.

What Mr. Mee said so tersely in a dozen lines in your issue of the 3rd of February is possibly the most to the point of all that has been written on the subject. There is little doubt that the lawyers will soon cut the Milk of Sulphur gordian knot in the way he intimates. It were hard indeed on the grocers to compel them to declare when they sell a sophisticated coffee, if the druggists may sell sophisticated milk of sulphur without a similar declaration. Mr. Slipper will not lose his patrons by being unable to sell them the whiter article of which they are so enamoured, but while supplying them, he will be compelled to assist in educating them, by teaching them that the article he sells them is contaminated with sulphate of lime.

In past Pharmacopœias "Lac Sulphuris" has been ordered to be prepared by alternative processes, one of which would yield an impure and the other a pure article. At different times in past Pharmacopœias, but more recent ones than those to which I have just alluded, "Sulphur Præcipitatum" has been ordered to be prepared by processes one of which would produce the impure and the other and later the pure article. Therefore how more than idle it is to contend that "Milk of Sulphur" is the equivalent of sulphur *cum* lime, and "Precipitated Sulphur" of pure sulphur.

Mr. Slipper is painfully illogical; he would always for "milk of sulphur" sell the contaminated article to his customers, he would never dispense for "lac sulphuris" other than the pure if written in a physician's prescription. Why he would make fish of one and fowl of the other it were hard to tell. He certainly should make at least one exception to the rule he lays down for his guidance—viz., when prescribed for himself.

Mr. Slipper praises "the common sense and skill" which Professor Redwood has by tongue and pen displayed in the matter, but the Professor is logical, and consequently would do the very reverse of what Mr. Slipper says he would do with such prescriptions.

ROBERT CHIPPERFIELD.

Southampton, Feb. 22, 1877.

THE ADMINISTRATION OF PHOSPHORUS.

Sir,—The last two numbers of the *Pharmaceutical Journal* (pp. 694 and 712) have contained an interesting account of the preparation and administration of phosphorated cod liver oil, by Dr. E. R. Squibb, of Brooklyn. He gives a process for making a one per cent. solution of phosphorus in cod liver oil by employing heat and shaking the two together in an atmosphere of carbonic acid. By this means he avoids the liability to oxidation of the phosphorus and the formation of the pellicle on the surface of the oil, and subsequent dark brown deposit on the sides and bottom of the bottle, which have always given so much trouble to those who have attempted to make it. So much does this latter difficulty stand in the way that, according to the formula* of one who makes it largely, he directs a solution of phosphorus in almond oil to be made first and this diluted with sufficient cod liver oil to make it the required strength. This process, I believe first suggested by M. Méhu,† is now generally adopted, taking so much phosphorated oil of the British Pharmacopœia and adding the requisite quantity of cod liver oil. The subject has been well and carefully investigated by M. Méhu,‡ who holds that the most stable solution of phosphorus in oil is in almond oil that has been carefully superheated (I am glad here to be able to corroborate M. Méhu, now that I find, as he says, it stands exposure to light better).

Dr. Squibb prefers the cod liver oil solution because on the authority of Mr. J. Ashburton Thompson, and others

* *Pharm. Journ.*, Nov. 11, 1876, p. 407.
† *Pharm. Journ.*, July 2, 1875, p. 3.
‡ *Pharm. Journ.*, July 2, 1875, p. 3.

cited by Mr. Thompson, he states that it "seems to have been pretty clearly shown" "that its solution in vegetable oils is liable to develop poisonous properties, which render these variable and unsafe; and it is supposed that this is due to the formation of hypophosphorous acid, by a reaction between the phosphorus and certain elements of the oils, under the influence of light, air and moisture." Too much credence, according to many authorities with whom I have communicated, seems to have been placed by Dr. Squibb on Mr. Thompson's statements. Most of the solutions of phosphorus in vegetable oils are poisonous, because they are active, definite, and stable in comparison with the ethereal, alcoholic, and cod-liver oil solutions which Mr. Thompson recommends. As was pointed out by your reviewer of his work,* the quantity of phosphorus given in ethereal solution could not have been one-fourth that mentioned by him, *i. e.*, one-fifth to three tenths of a grain three times a day, to a boy of ten years. Because four grammes of phosphorus are ordered to be macerated in 200 grammes of pure ether it is taken for granted that it will be all dissolved. Whereas if saturated it cannot hold in solution more than one-third of that quantity at the ordinary temperature. Reckoning on such assumption one cannot wonder that stable phosphorated vegetable oils given in doses containing an amount of phosphorus equivalent to that which Mr. Thompson supposed he was giving in phosphorated ether produced poisonous effects. It has also been shown that the supposition of their poisonous action being due to the formation of hypophosphorous acid in the phosphorated vegetable oils was erroneous. A sample of phosphorated almond oil containing one per cent. of phosphorus, which I kept for years, gave but a very faintly acid reaction to litmus paper; and hypophosphorous acid and the hypophosphites are both frequently used in medicine in doses above those which could be contained in medicinal doses of phosphorated oil.

In my hands (I have not tried Dr. Squibb's process) I have found phosphorated cod-liver oil very prone to change. On keeping there is always a dark-brown deposit quickly formed on the bottom and sides of the bottle. This must detract from its strength, and probably account for the palatability (?) of phosphorated cod liver oil in comparison with an equivalent dose administered in other forms. I do not think that it will be conceded here that "its solution in cod liver oil is the best" form of administering phosphorus. I should be glad if Dr. Squibb or Mr. Thompson would set the matter at rest in regard to the poisonous property of phosphorated vegetable oils in comparison with that of phosphorated animal oils, by physiological experiments on dogs or other animals with samples, of each oil carefully prepared and of equal strength.

Dr. Squibb's suggestive mode of administering phosphorated cod liver oil with glyconin and in powder is worthy of attention in regard to its appliance to phosphorated almond oil.

10, *New Cavendish Street.* WM. MARTINDALE.

* 'Free Phosphorus in Medicine,' *Pharm. Journ.*, Nov. 8, 1873, p. 399.

C. R. H.—The subject was recently under the consideration of the Council, and it was then decided that lists of the candidates who succeed in passing should be exhibited in the hall of the Society's house on the morning following the examination. We can see no just cause of complaint in the regulation.

I. O. U.—Any good modern school book on Arithemetic.

J. Lonsdale.—Your question is one that should be addressed to a medical contemporary.

A. B. C.—See an article on "Preservation of Plants for Herbaria," in the *Pharmaceutical Journal* for March 21, 1874.

"*Syrupus.*"—(1) *Tortula muralis*; (2) *Grimmia pulvinata*; (3) *Mnium hornum*; (4) *Bryum carneum*; (5) *Didymodon umbellus*.

C. W. Lawton.—(1) He would cease to be a member of the Society. (2) By an order from a Fellow. (3) He must attend the course during the following session. (4) Yes.

A. Frazer.—In most parts no examination at all is necessary.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Edden, Mr. Strebor, Mr. Gallaway, Mr. Mould, Mr. Heighington, Mr. Palmer, Dr. Hesse, Mr. Goodall, G. C., R. O., X. Y. Z., Y. E., Inquirer, Nemo.

AN ADULTERATION OF ACONITE ROOT.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

Aconite root possesses such powerful properties that it is very important the medicinal article should be, as far as possible, of uniform strength and quality. Yet this is by no means the case, for it is difficult to find in a commercial sample one root in a dozen which upon fracture appears sound and in good condition. This is due, according to Hanbury, to its being gathered indiscriminately by peasants, who regard neither the most advantageous time for collection, nor the proper species. This is not to be wondered at considering that the wholesale price in this country is as low as 6*d.* per lb. As the root is sold by the German peasants to buyers who obtain a profit by supplying wholesale dealers in Germany, and these again have to obtain a profit before it is exported to this country, it is obvious that the prices paid to the peasants must be too small to pay for careful collection.

In some districts aconite root is said to be gathered by intelligent herb and root collectors who are well acquainted with the plants they gather, but what is collected by them is probably retained for home consumption, and the inferior samples exported.

From the cheapness of the root, and from the fact that few roots have the distinctly conical appearance of aconite, it is evident that it would scarcely pay to adulterate it. Adulteration then must either result from careless collection, or from accidental admixture.

The root which has lately been found mixed with aconite is that of Masterwort, *Imperatoria Ostruthium*, L., an umbelliferous plant, official in the Edinburgh Pharmacopœia so late as 1792. It is a native of mountainous countries and grows in similar districts to those in which aconite is found. As it is still official in the German Pharmacopœia, its accidental occurrence in aconite root from Germany is not surprising.

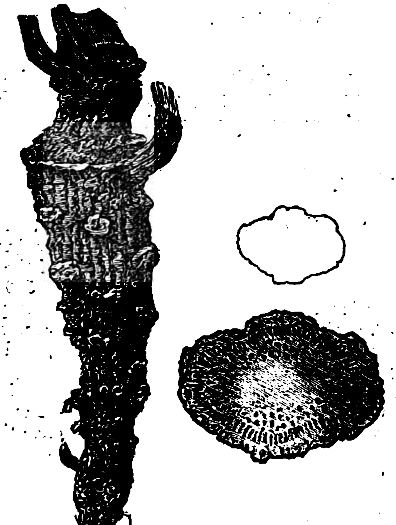


Fig. 1.—*Imperatoria Ostruthium.**

Its value in this country is double that of aconite root, and it is obvious therefore that it has not been purposely used as an adulteration.

In the sample examined, the masterwort root amounted to about 5 per cent.

The characters by which it may be distinguished from aconite root are as follows :—

The rootstock, fig. 1, for it is properly so called, is less tapering than aconite root, is slightly compressed, and exhibits several warty zones indicating periods of growth. In some specimens, these are much less prominent than in others, but can always be traced. The whole of the rootstock is finely wrinkled transversely, so as to give it a somewhat annulated appearance. The transverse section presents very marked characters. The central portion is of a yellowish white colour, and exhibits a more or less complete ring of brownish dots. The portion next the bark presents elongated dots of a paler colour, which give this portion of the section a radiate appearance. With the aid of a lens, these dots are seen to be filled with an oily or resinous substance. The cortical portion is very thin. The rootstock has an odour comparable to bruised ivy leaves, or to the plant commonly known as cow parsley (*Chærophyllum sylvestre*, L.), and a pungent slightly bitter taste.

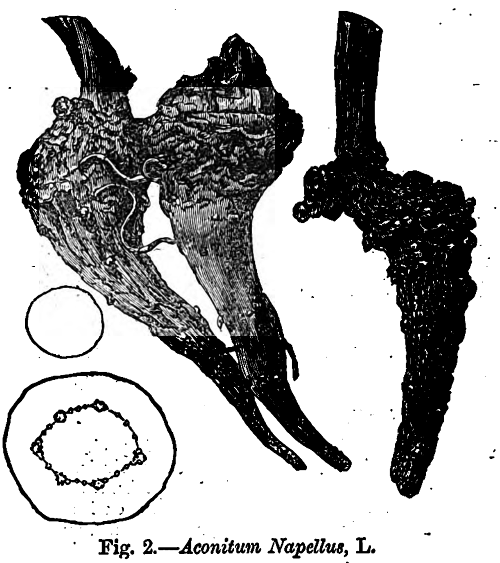


Fig. 2.—*Aconitum Napellus*, L.

Aconite root is very variable in appearance internally; frequently the centre is quite hollow. Some pieces have a brownish colour, others are white and starchy, and a few present a resinous fracture. In a sound root, however, which is usually starchy or slightly resinous, a faint line may generally be traced, which marks out the meditullium. This line has usually five to nine prominent angles, see fig. 2, the number of angles being larger as the section approaches the top of the root. If the root be wetted and examined with a lens, the line is seen to consist of an irregular line of vessels, which form small bundles in the apex of the projecting angles. The cortical portion occupies nearly half of the circumference of the root.

From the above characters it will be observed that the

* In the woodcuts the roots are represented of the natural size; the sections are shown both of the natural size and magnified.

presence of oil receptacles in the masterwort root at once distinguishes it from aconite. A spiritous tincture of masterwort when dropped into water gives a blue fluorescence resembling that of quinine, and a slight milkiness, and communicates to the water its peculiar odour. By these characters its presence might probably be detected in a mixture containing tincture of aconite.

Although the small percentage in the sample examined would lead to but very slight diminution of strength in the tincture of aconite made from it, yet the appearance and odour communicated to a mixture containing such a tincture might lead to much inconvenience in pharmacy, and throw discredit upon the dispensing department.

It is quite time that the attention of cultivators of medicinal plants in this country should be drawn to the bad quality of the imported root, and that attempts should be made to cultivate it extensively in this country. It is very probable that, as in the case of henbane, a good article would command a fairly remunerative price. It is obvious, also, that until it is possible to obtain a plentiful supply of the roots of *Aconitum Napellus*, free from any admixture of other species, it will not be possible to obtain an accurate knowledge of the alkaloids contained in that species.

SILPHION OF THE ANCIENTS AND ITS ALLEGED MODERN REPRESENTATIVE.

BY M. HERINCQ.

About three years since* allusion was made in this Journal to a report that a plant found in the Cyrenaica, and called by the natives "*drias*" (*Thapsium Silphium*) possessed surprising curative properties, and was claimed to be identical with the ancient silphion, the plant from which the precious "laserpitium" was extracted. Since that time this claim has been put forward more prominently, and under the name of *Silphium Cyrenaicum* the plant has been introduced as a specialty by a French homœopathic house. This claim has been disputed rather warmly, and the subject being brought before the Société Botanique de France in 1874, and the materials for an examination being deficient, a wish was expressed that some botanist should examine this plant in the alleged place of its growth. This was done in 1875 by M. Daveau, principal of the seed department of the Natural History Museum in Paris, who brought home from the Cyrenaica a complete set of specimens of the so-called *Silphium Cyrenaicum*. The conclusion he came to was that the plant was identical with *Thapsia garganica*. The subject, however, still appears to excite interest, and in a pamphlet issued by M. F. Herincq, an attaché at the Museum of Natural History, Paris, the whole subject is treated in a very thorough manner.† The conclusion arrived at will be best shown by the following extracts which, by the courtesy of M. Herincq in placing *clichés* at our disposal, we are enabled to illustrate. In order to avoid confusion, the author uses the word "Silphion" when speaking of the plant of the ancients, and "Silphium" when referring to that of the moderns.

The Greeks gave the name "Silphion" (Σιλφιον) and the Romans "Laserpitium" to a plant which grew more particularly in the Cyrenaica and which yielded a gum resin when incisions were made in the root or stem. This gum resin was called "Laseros" by the Greeks, and "Laser" by the Romans, and was emplowed as a condiment. Marvellous properties were also attributed to it, such as giving sight, healing poisoned wounds, and restoring youth. It was sold for its weight in gold. The plant was said to have had a supernatural origin. According to Greek authors, seven years before the foundation of Cyrene, silphion was suddenly produced by a kind of pulverulent rain that fell in Africa, in the neighbourhood of the garden of the Hesperides and the Syrtis Major; the productive energy of this rain extended over 4000 stadia.

All authors agree in saying that the silphion gradually became more rare in the Cyrenaica from the first century in the Christian era, and that at last it disappeared completely; but they explain this disappearance in various ways. Pliny says that in his time only a single specimen of this plant was to be found in the Cyrenaica, and that it was sent to the Emperor Nero. However this may be the silphion became unknown to succeeding generations, and its representation is now only found upon medals or coins bearing on one side figures of various parts of the plant (stem, root, and seeds) and on the other the head of Jupiter Ammon.

Numerous researches have been made with the object of ascertaining to what, if any, existing plant the ancient silphion should be referred. It has been generally accepted, thought without proof, that the *laser* was produced by an umbellifer; but with respect to the species or even the genus there has been no such unanimity. Several plants growing in Africa have been successively indicated: *Thapsia garganica, Ferula tingitana, Laserpitium gummiferum, Ferula asafœtida, Laserpitium Siler*, etc. In 1817, Della Cella brought from the Cyrenaica several plants, among which was an umbellifer that he supposed to be the silphion of the ancients. Viviani thought he recognized in it the characters of the silphion of the coins, and also a great resemblance to the *Thapsia garganica*, and named it *Thapsia Silphium*. But the theory was not accepted as proved, for in 1826, when the Société de Géographie instituted a prize for the description of the Cyrenaica, it expressed a wish that a search should be made for the silphion among the plants of the country. M. Pacho, who obtained the prize, collected the *Thapsia Silphium* of Della Cella and Viviani, and believed it was the silphion of the ancients; but hesitated to pronounce definitely, because he had found his plants upon the northern hills of the district, whilst the geographical indications for the plant marked its place further south.

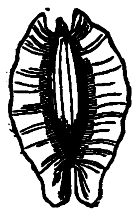
The question was in this state when, in 1873, Dr. Laval, médecin-major in the military hospital at Valenciennes, sent to the Jardin d'Acclimatation, Paris, some seeds, labelled "Seeds of Cyrenaican Silphion," and accompanied by the following note: "This plant grows abundantly around the ruins of Cyrene and other cities of the Libyan pentapolis, upon plateaux elevated 200 to 500 metres above the level of the sea, and exposed to a temperature of 15° C. during the months of December, January, and February. It seems to prefer sandy soils, and flowers during April and May."

The seeds were sent to the Muséum d'Histoire Naturelle to receive their botanical name, and the author was the first to examine them. He saw at once that they belonged to a *Thapsia*, and by comparing them with seeds of various species of the genus he was convinced that they belonged to the *Thapsia garganica*, Linn., a plant growing in Algeria, Spain, Italy and all the regions on both coasts of the Mediterranean. This opinion was confirmed by other competent authorities, but did not satisfy Dr. Laval, who visited the Museum to point out the differences he considered to exist between the *Thapsia garganica* and his *Thapsia Silphium*, which he asserted was identical with the famous silphion of the Greeks. It was then that the author first heard of the wonderful cures which it was alleged had been worked with an extract prepared from the plant. There appears to have been little difficulty, however, in demonstrating that these seeds presented no character distinguishing them

* *Pharm. Journ.* [3], vol. iv., p. 598.

† La Vérité sur le Prétendu Silphion de la Cyrenaique: ce qu'il est; ce qu'il n'est pas. Par M. Herincq. Second edition. 51 pp. and map. Paris: Lauwereyns.

from those of *Thapsia garganica*, as will be seen from the following sketches:—



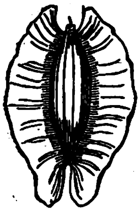


Fig. 1. *Silphium Cyrenaicum*. Fig. 2. *Thapsia garganica.*

The dispute then turned upon the leaves, Dr. Laval claiming that the segments were terminated by three lobes and that this was not the case with the leaves of the *Thapsia garganica*; but this was easily settled by the herbarium specimens. When Viviani published his 'Floræ Libycæ' he had to assist him in his diagnosis of *T. garganica* only the description by Linnæus, in which the trifid character of the terminal segments is not very clearly indicated. Viviani was thus misled when describing Della Cella's plant, which is also Laval's *Silphium Cyrenaicum*, into making it a new species as *Thapsia Silphium*, close to *T. garganica*, with the remark, "cui nostra species valde proxima." A comparison, however, of the later description of *T. garganica* by De Candolle with that by Viviani of *T. Silphium* will leave no doubt, the author thinks, in the mind of a botanist that they refer to the same plant. They are as follows:—

"*Thapsia garganica* (DC. Prod. iv. 202).—Foliis bi-tri-pinnatisectis, nitidis, laciniis linearibus acutis elongatis, secus margines integerrimis. Variat petiolis glabris aut pilis sparsis subhirsutis."

"*Thapsia Silphium* (Viviani, Flor. Libycæ, 117).—Foliis pinnatis, foliolis multipartitis, laciniis simplicibus trifidis, omnibus linearibus elongatis, utrinque hirsutis, margine revolutis."

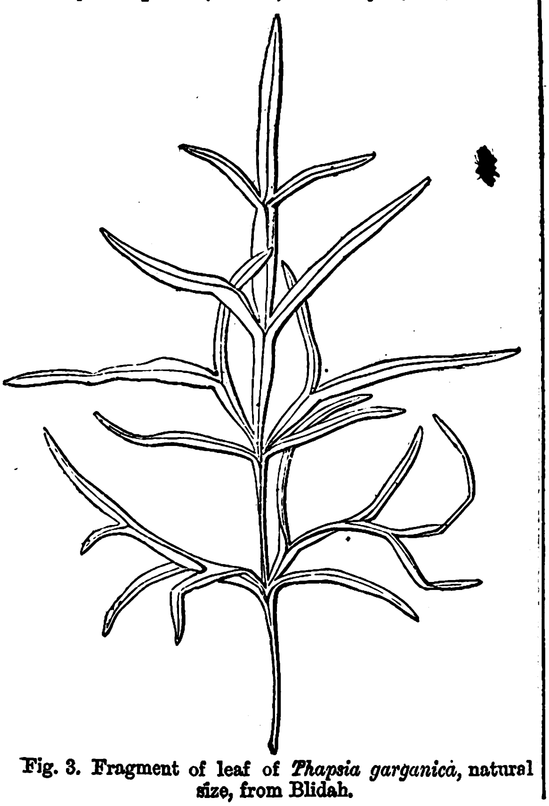


Fig. 3. Fragment of leaf of *Thapsia garganica*, natural size, from Blidah.

The "margine revolutis" of Viviani the author explains as the result of a badly prepared specimen, he having met with a similar appearance in other herbarium specimens of *T. garganica*. The illustrations (figs. 3 and 4) represent a fragment of a leaf of *Thapsia garganica*, collected in the Blidah, and one of *Silphium Cyrenaicum (T. Silphium)* collected under the superintendence of Dr. Laval himself.

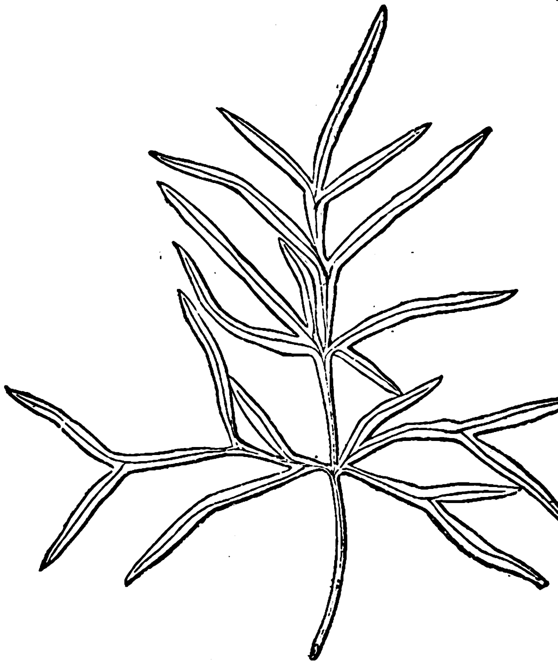


Fig. 4. Fragment of leaf of *Silphium Cyrenaicum*, natural size, from the Cyrenaica.

Further, M. Daveau, who met with Dr. Laval's plant between Benghazi and Dernah in 1875, says, "The leaves are divided exactly like those of *Thapsia garganica*, and I have also observed more or less villosity. The radical leaves are much more developed than those inserted on the stems, which are alternate with one another."

The dispute next raged about the roots, the advocates of silphium contending that the *Thapsia garganica* has a tap-root, *sometimes* bifurcated at its extremity, whilst the *T. Silphium* has numerous large *creeping* divergent horizontal roots, the principal stock giving rise to four to eight rhizomes which attain a length 0·70 to 0·80 metres, and where their extremity reaches the surface give rise to a new stock. To this the author replies that the root of *Thapsia garganica* is *always* bifurcated when of a certain age, and that he has received from Algeria specimens having three, four, and even nine bifurcations, all very horizontal. As to the four to eight rhizomes springing from the principal stock, which is put forward as characteristic of *Silphium Cyrenaicum*, the author remarks that this character belongs to all the perennial umbellifers, except the length, and that no botanist would admit these creeping roots, 80 centimetres long, giving rise to new stocks where their extremities touch the surface of the soil. Concerning this point, M. Daveau says, "The root of this plant, which at all ages is brown, is simple while young, becoming branched when older, like that of *Thapsia garganica* if it grows in arid and stony soil, conditions that are met with in the Cyrenaican soil. The divisions of the roots sometimes shoot perpendicularly into the soil, sometimes more horizontally, but in no case do they give rise to adventitious buds upon approaching the surface of the soil. This mode of multiplication,

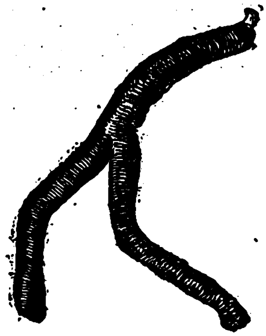


Fig. 5. Bifurcated root of *Silphium Cyrenaicum.*

Fig. 6. Bifurcated root of *Thapsia garganica.*

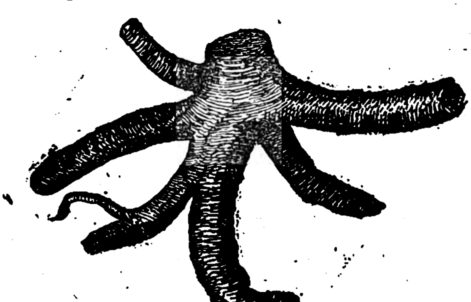


Fig. 7. Old stock, with multiplied roots, of *Silphium Cyrenaicum.*

Fig. 8. Old stock, with multiplied roots, of *Thapsia garganica.*

which is said to be the only one with this plant, is materially impossible, as the stalks of the *Thapsia Silphium* are separated in most cases by a distance of twenty metres. Moreover they frequently extend into the crevices of the rocks, where it would be impossible for them to form runners. Figs. 5, 6, 7, 8, represent the roots.

Having finished his argument that the *Thapsium Silphium* of Viviani (*Silphium Cyrenaicum* of Dr. Laval) is identical with *Thapsia garganica* of Algeria, Spain and Italy, the author proceeds to demonstrate that it cannot be the Silphion of the Greeks.

Professor Oersted, in his memoir on the subject,* arrived at the conclusion from a study of the designs on ancient coins that the silphion was probably a species of *Narthex,* which in anticipation of its discovery at some time he proposed to name *Narthex Silphion.* On the other hand Dr. Laval claims that the figures on the coins agree with the characters of his plant. M. Herincq, however, remembering the difficulties experienced every day in naming certain species when surrounded by all the

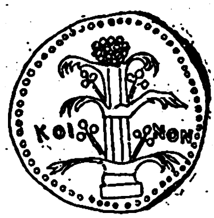


Fig. 9. Coin showing the Silphion Plant.

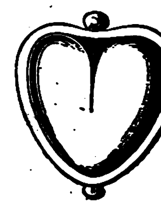


Fig. 10. Coin showing the Silphion Fruit.

facilities of a modern herbarium, does not admit the possibility of deciding satisfactorily from the designs on coins. But so far as he admits such evidence he claims that the opposite connate leaves and the heart-shaped seeds (see figs. 9 and 10) are not indicative of an umbelliferous plant at all. The arguments that M. Herincq prefers

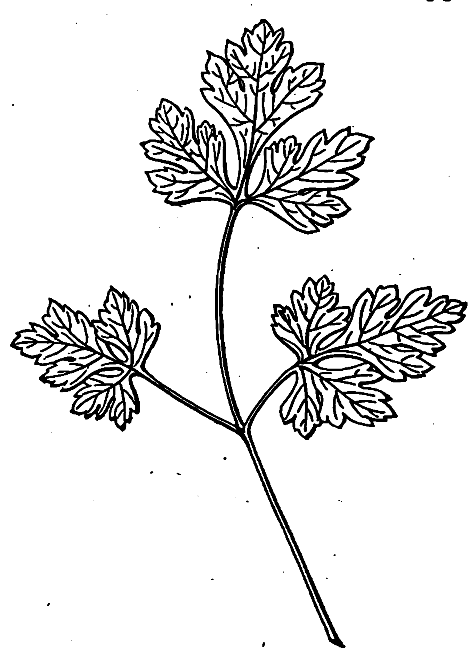


Fig. 11. Fragment parsley leaf.

* See *Pharm. Journ.* [3], vol. iii., p. 1012.

to rely on as proving that the *Silphium Cyrenaicum* of Dr. Laval is not the silphion of the ancients are briefly as follow:—

(1.) Theophrastus says (lib. vii., c. 8), "The stem of the silphion is as large as the ferula; its leaf resembles that of parsley."

According to Dioscorides (lib. iii., c. 78), "The seed was large and the leaves were similar to those of parsley." According to Pliny, "the seed was folded like a leaf; the bark of the root was black; the leaves resembled strongly those of parsley, and burst in the spring." The force of these quotations will be best seen by comparing the drawing of a fragment of parsley leaf (fig. 11) with that of a fragment of a leaf of *Silphium Cyrenaicum* (fig. 4).

(2.) The taste of the juice of the ancient silphion is represented by the Latin *acer*, and Greek ἀκη, pungent, sharp, tart; but nothing is said of its irritating properties, or of a vesicating principle, or of any process being necessary to render it inoffensive. On the contrary the juice of the *Silphium Cyrenaicum* is composed of two principles, one vesicant, the other resolvent, and it is indispensable that the vesicant portion be removed before the juice is administered internally.

(3.) All ancient authors agree in saying that animals were nourished by the use of silphion, and that their flesh was improved. But the *Silphium Cyrenaicum* is considered poisonous to animals. Dr. Reboux, writing to the Botanical Society of France in 1875, says, "The straw drawn from the region where it abounds is not given to asses or mules until it has been carefully examined and ascertained to be free from fragments of stalks and seeds of *Silphium Cyrenaicum*. Cauvet, in his 'Elements of Medical Natural History,' says, "It is known that the drivers carefully muzzle their camels and asses whilst passing through the district where this plant grows. It is alleged that a single seed is sufficient to provoke in an animal an intense diarrhœa and even to cause death."

(4.) The silphion of the Greeks, or laserpitium of the Romans, was considered a universal medicine, but it was also, and especially, a very choice condiment for gourmands. Pliny says, "After truffles and mushrooms laserpitium takes the first rank." Dioscorides says that the root was eaten mixed with salt, to give a more agreeable flavour to the meats. Lastly, Theophrastus says that the roots brought to Athens were preserved and put into pots with flour, but that they were equally good, eaten fresh, cut into slices and seasoned with vinegar. Now the plant collected by Laval could not be reckoned a condiment, and nobody would venture to eat the fresh root cut into slices. But even when deprived of its vesicating principle it appears not to be entirely without danger, it being stated that half the number of granules containing the aqueous extract that can be taken without inconvenience in one case will induce spitting of blood and symptoms of suffocation in others.

As to the therapeutic side of the question, M. Herincq contents himself with giving a long list of the ailments for which the ancient silphion was held in repute, and denying that there is evidence that in this respect either that the *Silphium Cyrenaicum* of Dr. Laval, or, as M. Herincq will have it, the *Thapsia garganica*, Linn., is the representative of the silphion of olden times.

NOTES ON PERFUMERY.*

BY W. SAUNDERS, LONDON, ONTARIO.

The art of compounding perfumes is an ancient one. It was practised by the early Egyptians and other Oriental nations, and with them perfumes were in frequent use. In Holy Writ, Moses speaks of being directed to take sweet spices, stacte, onycha, galbanum and frankincense, and confection them into a pure and holy perfume after the manner of the apothecary, to be offered up to the Lord; and in Proverbs we read of epicures indulging in the luxurious use of costly perfumes. The Greeks and Romans used perfumes freely, as well on their persons as at their feasts; they were also used with flowers at sacrifices to regale the gods. These fragrant compounds were in demand for theatres and other places where crowded audiences assembled, when their use subdued the offensiveness of a vitiated atmosphere.

From the frequent mention of perfumes in the form of ointment, it would appear that the solvent powers of fatty matters over the odorous principles of flowers were among the earlier discoveries in this department. Subsequently fragrant waters were in great demand, and, costly as these articles of luxury then were, they were nevertheless largely consumed. Grave men at times protested against the prevailing extravagance, and philosophers declared their aversion to perfumes. "There is the same smell," said Socrates, "in a gentleman and a slave when both are perfumed;" hence, in his opinion, the only odours desirable were those arising from honourable toils and "the smell of gentility;" but in spite protests the wealthy perversely and persistently followed their own tastes, anointed their bodies, pomaded their hair and bathed their limbs in fragrant waters, as though the thoughtful ones had never spoken.

In later times, with the advance of civilization, the use of perfumes gradually extended to other nations, culminating in their general use throughout the civilized world. In some countries there was for a time stout opposition to the introduction of all such preparations. In England it was seriously thought to be a fit subject for legislative control. In 1770 (?) an Act was introduced into the English Parliament as follows: "That all women, of whatever age, rank, profession or degree, whether virgins, maids, or widows, that shall from and after such Act, impose upon, seduce and betray into matrimony any of his majesty's subjects by the scents, paints, cosmetic washes, artificial teeth, false hair, iron stays, hoops, high-heeled shoes, bolstered hips, shall incur the penalty of the law now in force against witchcraft and like misdemeanours, and that the marriage, upon conviction, shall stand null and void."

In large cities the manufacture and sale of perfumery is sometimes carried on as a separate occupation, yet as a rule this department of business as in ancient days is still associated with the trade and mysteries of the apothecary. Some may perhaps have but little sympathy with the manufacturer of perfumery, and may think that it were better handed over to the hairdresser or dealer in notions, and that the apothecary should devote his time exclusively to the more important duties of dealing out medicines, pure and simple, to meet the requirements of physicians and the wants of suffering humanity. This latter is doubtless the most legitimate and beneficent exercise of the apothecaries' skill, and ought always to be regarded as of primary importance, yet he will often have spare hours when he can enjoy the pleasures connected with the compounding and blending of odours, and at the same time develop a profitable and time-honoured branch of his business

The cultivation of the olfactories is an advantage to the pharmacist. The nose is an organ whose importance he cannot ignore in his business, and it is doubtful if better training can be found for it than in the compounding of perfumes. We all think it a gain to have a fine ear for music; why should we think less of an exquisite nose for odours? Surely this prominent member is as capable of cultivation as is the ear, not that an unusual development is desirable in either case, but rather the making the very best use of the organs with which we have been supplied. There are harmonies and discords in perfumes as in music; Piesse has reduced these to a scale which he calls the gamut of odours. "If," says he, "a perfumer desires to make a bouquet from primitive odours, he must take such odours as chord together; the perfume will then be harmonious."

* Read before the American Pharmaceutical Association.

For some time past the tendency has been to turn over the manufacture of perfumes too much to the specialist. This has probably resulted mainly from two causes,—first, the difficulty of procuring the materials used in the making of perfumes in a state of purity, and in the second place for want of plain and practical information on the subject. The first obstacle is less felt now than formerly, and to aid in the removal of the second is the main object of the present paper. My purpose is to place within the reach of every one of our members such information as will enable him, with a little attention, to equal the finest productions of a Lubin, an Atkinson, or a Rimmell. I shall first briefly refer to the ingredients which enter into their composition, and afterwards give the formula for their production.

Alcohol.—One of the first requisites in the manufacture of good perfumes is pure alcohol, free from fusel oil or other foreign flavour. This purer grade of spirit is known in commerce as pure spirits, silent spirits, or deodorized alcohol, and may readily be distinguished from ordinary alcohol by the absence of that peculiar pungency of odour which is present to a greater or less extent in most commercial samples.

Ottos or Essential Oils.—It is of the greatest importance that these should be strictly pure and of the finest quality.

Pomades.—From these are prepared some of the simple extracts in the appended formulas, such as jasmine, tuberose and cassia. The quality must be that known as triple pomade. The simple extracts are prepared as follows: one pound of the pomade is cut in small pieces and placed in a bottle of sufficient capacity, in which is put a pint of pure spirit. Place the bottle suitably stoppered in a water-bath, and apply heat sufficient to barely melt the pomade, shake well together, and repeat the shaking frequently until the fatty matter solidifies. In this way the pomade will be reduced to a finely divided or granular state, permeated thoroughly by the spirit. Allow this to stand for several days, giving it an occasional shake, then drain off the liquid extract into another bottle; if this fall short of a pint repeat the operation with a sufficient quantity of alcohol to make up to this measure. By subsequent and similar treatment, a second and even a third quantity of extract may be made, which, although much weaker, will be found useful in the preparation of cheaper perfumes.

Extract of Orris.—Seven pounds of finely ground orris root of good quality is treated by percolation with pure alcohol until one gallon of extract is obtained.

Extract Vanilla.—Four ounces of vanilla beans of the finest quality powdered finely in a mortar with a sufficient quantity of dry white sugar (from four to six ounces), pack in a percolator, and percolate with proof spirit until one gallon is obtained.

Extract Tonka.—Take one pound of tonka beans, reduce to a coarse powder, and percolate with alcohol, to make one gallon.

Extract Musk.—Take of pure grain musk of the first quality two drachms. Mix half an ounce of liquor potassæ with four ounces of proof spirit, and triturate the musk with this mixture until it is thoroughly softened, and reduced to a creamy state; add enough proof spirit to make up about one pint; stir well, then allow the coarser particles to subside, and pour of the supernatant fluid. Rub the coarser portions again with a fresh portion of spirit, proceeding as before, and repeat the process until the musk is entirely reduced, and the quantity of extract measures three pints. Allow this to stand for a fortnight with occasional shaking, when it will be ready for use.

Extract Styrax.—Eight drachms of styrax balsam dissolved in one pint of alcohol.

Benzoic Acid.—Only that prepared from gum benzoin should be used.

FORMULAS.

Jockey Club.

Ext. Jasmin	5 ounces.
„ Orris	20 „
„ Musk	7 „
„ Vanilla	1½ „
Otto Rose, Virgin	1½ drachms
„ Santal. Flav	1½ „
„ Bergamot	2½ „
„ Neroli Super	40 minims.
Benzoic Acid	2 drachms.

Pure Spirit, sufficient to make four pints.

In this, as well as in all the following extracts, before adding the last portion of the spirit, replace as much of it with water as the perfume will bear without becoming milky, which will vary from two to eight ounces or more. This addition will make the perfume softer.

Moss Rose.

Otto Rose, Virgin	2 drachms.
„ Santal. Flav	2 „
Ext. Musk	12 ounces.
„ Vanilla	4 „
„ Orris	2 „
„ Jasmin	4 „
Benzoic Acid	1 drachm.

Pure Spirit, sufficient to make four pints.

White Rose.

Otto Rose, Virgin	2 drachms.
„ Red Cedar Wood, *true*	6 minims.
„ Patchouli	4 „
„ Orange, *fresh*	½ drachm.
Ext. Tuberose	2 ounces.
„ Orris	2 „
„ Jasmin	2 „
„ Musk	2 „
Benzoic Acid	1 drachm.

Pure Spirit (to which four ounces of rose-water has been added), sufficient to make four pints.

Victoria.

Otto Rose, Virgin	2 drachms.
„ Neroli, Super	2 „
„ Bergamot	4 „
„ Coriander	16 minims.
„ Pimento	24 „
„ Lavender (English)	16
Ext. Jasmin	2 ounces.
„ Orris	16 „
„ Musk	2 „
Benzoic Acid	2 drachms.

Pure Spirit, sufficient to make four pints.

Ess. Bouquet.

Ext. Musk	4 ounces.
„ Tuberose	2 „
Otto Rose, Virgin	1 drachm.
„ Bergamot	1½ „
„ Neroli Super	½ „
„ Verbena, *true*	8 minims.
„ Pimento	10 „
„ Patchouli	3 „
„ Red Cedar Wood, *true*	½ drachm.
„ Lavender, English	12 minims.

Pure Spirit, sufficient to make four pints.

Musk.

Ext. Musk	1 pint.
„ Orris	6 ounces.
„ Vanilla	2 „
„ Styrax	2 drachms.
Otto Santal. Flav	1 drachm.
„ Bergamot	2 drachms.
„ Neroli Super	10 minims.
„ Patchouli	12 „
„ Lavender, English	15 „
„ Cinnamon, *true*	6 „

Pure Spirit, sufficient to make four pints.

Patchouli.

Otto Patchouli	2 drachms.
„ Santal. Flav.	40 minims.
„ Rose, Virgin	40 „
Ext. Musk	8 ounces.
„ Orris	8 „
„ Vanilla	4 „
„ Styrax	2 drachms.

Pure Spirit, sufficient to make four pints.

Millefleurs.

Otto Rose, Virgin	1 drachm.
„ Red Cedar Wood, *true*	1 „
„ Orange, *new*	1 „
„ Pimento	20 minims.
Ext. Orris	6 ounces.
„ Jasmin	2 „
„ Styrax	1 ounce.
„ Tonka	4 ounces.

Pure Spirit, sufficient to make four pints.

Ylang Ylang.

Ext. Tonka	3 ounces.
„ Musk	4 „
„ Tuberose	4 „
„ Cassia	4 „
„ Orris	8 „
Otto Orange, *new*	2 drachms.
„ Neroli Super	½ drachm.

Pure Spirit, sufficient to make four pints.

Tuberose.

Ext. Tuberose	24 ounces.
„ Musk	4 „
„ Jasmin	1 ounce.
Otto Rose, Virgin	1 drachm.
„ Neroli Super	10 minims.
Benzoic Acid	2 drachms.

Pure Spirit, sufficient to make four pints.

Spring Flowers.

Ext. Orris	4 ounces.
„ Jasmin	4 „
„ Musk	4 „
Otto Bergamot	2 drachms.
„ Neroli Super	½ drachm.
„ Verbena, *true*	10 minims.
„ Red Cedar Wood, *true*	1 drachm.
Benzoic Acid	1 „

Pure Spirit, sufficient to make four pints.

Wood Violet.

Ext. Orris	12 ounces.
„ Tuberose	2 „
„ Jasmin	1 „
„ Musk	4 „
Otto Bergamot	2 drachms.
„ Lavender, English	1 drachm.
„ Verbena, *true*	10 minims.
„ Amygd. Amar.	12 „
„ Coriander	6 „
„ Sweet Flag	4 „
„ Bay Leaves	4 „
Benzoic Acid	1½ „

Pure Spirit, sufficient to make four pints.

West End.

Ext. Orris	12 ounces.
„ Jasmin	4 „
„ Musk	8 „
„ Cassia	4 „
„ Styrax	1 „
Otto Bergamot	3 drachms.
„ Verbena, *true*	15 minims.
„ Neroli Super	½ drachm.
„ Rose, Virgin	1 „
„ Red Cedar Wood, *true*	1 „
Benzoic Acid	1 „

Pure Spirit, sufficient to make four pints.

Stephanotis.

Ext. Cassia	4 ounces.
„ Tuberose	4 „
„ Jasmin	2 „
„ Musk	8 „
„ Orris	8 „
„ Tonka	3 „
Otto Rose, Virgin	1 drachm.
„ Neroli Super	½ „
Benzoic Acid	1 „

Pure Spirit, sufficient to make four pints.

Rondeletia.

Otto Lavender, English	1 ounce.
„ Cloves	½ „
„ Bergamot	½ „
„ Rose Geranium, *Turkey*	2 drachms.
„ Cinnamon, *true*	20 minims.
„ Rose, Virgin	10 „
„ Santal. Flav.	1 drachm.
Ext. Musk	2 ounces.
„ Orris	4 „
„ Vanilla	2 „
Benzoic Acid	1 drachm.

Pure Spirit, sufficient to make four pints.

New-Mown Hay.

Ext. Tonka	25 ounces.
„ Musk	6 „
„ Orris	8 „
„ Vanilla	1 ounce.
„ Styrax	1 „
Otto Bergamot	1 drachm.
„ Neroli Super	15 minims.
„ Rose, Virgin	10 „
„ Cloves	6 „
„ Lavender, English	10 „
„ Patchouli	10 „
„ Santal. Flav.	1 drachm.
Benzoic Acid	1½ „

Pure Spirit, sufficient to make four pints.

Frangipanni.

Ext. Orris	4 ounces.
„ Tuberose	2 „
„ Musk	4 „
„ Vanilla	2 „
„ Jasmin	1 „
„ Styrax	1 „
Otto Neroli Super	1 drachm.
„ Rose, Virgin	½ „
„ Santal. Flav.	1 „
„ Red Cedar Wood, *true*	1 „
„ Pimento	½ „
„ Cassia	20 minims.
„ Bergamot	½ drachm.
„ Ginger	4 drops.
„ Lavender, English	6 „
Benzoic Acid	2 drachms.

Pure Spirit, sufficient to make four pints.

Clove Pink.

Ext. Jasmin	12 ounces.
„ Orris	12 „
„ Musk	8 „
Otto Rose, Virgin	1 drachm.
„ Cloves	2 drachms.
„ Neroli Super	1 drachm.
„ Pimento	10 minims.
„ Patchouli	20 „
„ Santal. Flav.	2 drachms.
Benzoic Acid	1 drachm.

Pure Spirit, sufficient to make four pints.

Violet.

Ext. Orris	2 pints.
„ Tuberose	4 ounces.
„ Vanilla	3 „
„ Musk	3 „
„ Tonka	2 „

Otto Rose, Virgin	1 drachm.
„ Neroli Super	40 minims.
„ Pimento	12 „
„ Bergamot	1 drachm.
Benzoic Acid	1 „

Pure Spirit, sufficient to make four pints.

Mignonette.

Ext. Orris	12 ounces.
„ Tuberose	4 „
„ Vanilla	4 „
„ Musk	2 „
Otto Rose, Virgin	1 drachm.
„ Neroli, Super	1½ „
„ Pimento	12 minims.
Benzoic Acid	1 drachm.

Pure Spirit, sufficient to make four pints.

THE MODIFICATIONS PRODUCED BY LIGHT AND HEAT IN ELÆOMARGARIC ACID.*

BY M. CLOEZ.

Elæomargaric acid is the name given by the author to a solid fatty acid, fusing at 41°, separated from the crystalline salt obtained by saponifying with alcoholic solution of potash the oil expressed from the seeds of *Elæococca vernicia.* The oil yields about 72 per cent. of its weight of this acid. The acid exists in the oil in combination with glycerine, as trielæomargarin, a liquid neutral immediate principle having the curious property of solidifying under the influence of light, without any change in its elementary composition or neutral state.

Elæomargaric acid is a superior homologue of sorbic, linoelic, and palmitolic acids, its place being between the last and stearolic acid, obtained by the action of potash upon bromated oleic acid. Its composition, when prepared without exposure to air and dried in a current of hydrogen at 110°, is represented by the formula $C_{17}H_{30}O_2$. It is a non-saturated body, rapidly oxidizable by air at the ordinary temperature.

Solutions of elæomargaric acid in ether and carbon bisulphide can be preserved indefinitely in the dark and sheltered from air. When exposed to the light the acid is modified, but remains dissolved. Upon distilling off the solvent in a current of hydrogen, the residue consists of the modified acid fusing at 71°, mixed with a very small quantity of a liquid fatty acid that is produced under other conditions in a state of purity. In an alcoholic solution of elæomargaric acid, saturated in the cold, this transformation takes place very rapidly under the influence of light, the tube eventually becoming filled with magnificent lamellar crystals. To obtain the crystals pure they should be rapidly pressed between several folds of paper and removed from the action of air, traces of alcohol or water being driven off by heating them to 110° in a current of dry hydrogen.

The new acid, which the author calls elæostearic acid, has the same elementary composition as elæomargaric acid, but differs from it in the fusing point being 23° higher and in being much less soluble in cold alcohol. It is found in the state of glyceride in oil of elæococca concentrated in the sun or by the action of carbon bisulphide or sulphydric acid. It appears to be the result of the polymerization of the elæomargaric acid.

Upon heating these two solid acids to 175° or 180° in sealed tubes containing hydrogen, nitrogen or carbonic acid gas, they were converted into a liquid modification apparently without either absorption or separation taking place. Elementary analysis confirmed the fact of the transformation of these two isomerous solid acids into a third liquid acid having the same composition

This third acid is named by the author elæolic acid, and it is the acid referred to as present with the elæostearic acid formed by the exposure of elæomargaric acid to the light. It is also found among the products of saponification of oil of elæococca oil that has solidified in the sun. These experiments explain, the author considers, the curious properties that have been observed in elæococcae oil. See before, p. 2.

* *Journal de Pharmacie,* [4], vol. xv., p. 5.

THE ACTIVE PRINCIPLE OF STROPHANTUS HISPIDUS.*

BY E. HARDY AND N. GALLOIS.

In a paper read before the French Academy of Sciences the authors announce the isolation of two crystalline principles from the seeds of *Strophantus hispidus,* DC., or Inée, an apocynaceous plant, used in tropical Africa as an arrow poison.

The seeds deprived of their hairs were powdered and macerated in alcohol slightly acidulated by hydrochloric acid, the alcoholic tincture filtered and evaporated to the consistence of an extract in a water-bath and then treated with cold distilled water. The solution, left to evaporate spontaneously, yielded white shining crystals that were purified by a second crystallization.

The crystals were soluble in cold water, more soluble in hot water, and only slightly or not soluble in alcohol and chloroform. The crystalline body contained no nitrogen and presented none of the reactions of the vegetable alkaloids, the aqueous solution not being precipitated by iodide of mercury and potassium, iodized iodide of potassium, iodide of cadmium and potassium, phosphomolybdic acid, chloride of gold or chloride of platinum. Neither did the aqueous solution, after being heated with a small quantity of sulphuric acid, reduce the double tartrate of copper and potassium, indicating that the new body was not a glucoside. Pending further chemical studies of this body the authors adopt for it the name "strophantine," which had been suggested for it by Dr. Frazer, who anticipated that it would prove to be an alkaloid. This body possessed considerable toxic power, quickly causing cessation of the heart's action when injected into a frog.

The tufts of hairs removed from the seeds were submitted to similar treatment, and also yielded a crystalline substance; this presented the reactions of an alkaloid, but did not possess the same physiological properties as strophantine, as a considerable quantity injected into the foot of a frog did not stop the movements of the heart. The authors have named this substance "ineine."

PHENICATED CAMPHOR.†

The preparation which has been introduced by Dr. Soulez under this name is a simple solution of 2½ parts of camphor in 1 part of carbolic acid. The liquid thus obtained is pale yellow, of an oleaginous consistency, and smells slightly of camphor without any admixture of the carbolic odour. Phenicated camphor is insoluble in water, in glycerine and in alcohol; but it dissolves in all proportions in the fat oils (olive and almond), and readily emulsifies with water containing saponin.

This preparation is recommended by Dr. Soulez as a preventive of fermentation in dressings for wounds. The dressings are steeped in a mixture of 10 parts of phenicated camphor and 200 parts of olive oil, or one of 10 parts of phenicated camphor and 200 parts of infusion of saponaria. The infusion may be prepared by pouring 1000 parts of boiling water upon 100 parts of saponaria leaves. Dr. Soulez, however, prefers to make a tincture by macerating 250 grams of *Quillaia saponaria* bark for ten days in a litre of 90° alcohol. This tincture, mixed with its weight of phenicated camphor, forms a concentrated emulsion, which is diluted with ten parts of water when required for use.

* *Comptes Rendus,* vol. lxxxiv., p. 261.

† *Journ. de Pharmacie* [4], vol. xxv., p. 32, from the *Bulletin Therapeutique.*

The Pharmaceutical Journal.

SATURDAY, MARCH 17, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, to MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE GLORIOUS UNCERTAINTY OF LAW.

WHEN the Lord Chief Justice of England and Mr. Justice HAWKINS concur in laying down a point of law, the layman would need to be a very bold, and even presumptuous man, who would challenge their decision. In commenting briefly upon a case reported on another page, therefore, we distinctly disclaim any intention of challenging the correctness of the ruling; we only point to it as analogous to the class of problems which caused Lord DUNDREARY so much perplexity.

At the Bodmin assizes a man was charged with giving to a girl two figs into which he had introduced a "poison called cantharides, with the intent to injure, aggrieve, or annoy" her. The act was not disputed, but the commission of a statutable offence was disputed. The evidence only deposed to the detection of a grain and a half of cantharides, this being the quantity found in one fig after it had been lying about for some time, the second fig not being examined. It was contended, and successfully, too, that as twenty-four grains would be required for a fatal dose, so small a quantity as a grain and a half, whatever might be the motive of its administration, would not be sufficient to produce the effect desired, and that therefore it was not, legally speaking, a "noxious thing." The Lord Chief Justice held that "there must be a distinction between a thing only "noxious when given in excess, and thing which "is a recognized poison, and is known to be a thing "noxious and pernicious in its effect. A distinction "is to be made between poisons, such as prussic acid "and strychnine, poisons of a well-known and established character, and a thing which is only capable "of doing mischief when administered in excess."

Passing by the fact that prussic acid and strychnia are both administered beneficially as medicines as well as, but much more frequently than, cantharides, and that they too only become capable of doing mischief when administered in excess, we venture to ask a question that in our opinion quite justifies our allusion to the subject in these columns. What constitutes a "recognized poison?" So far as we know, the only poisons recognized formally by law are those included in schedule A. under the provisions of the Pharmacy Act, 1868, in Part 1 of which prussic acid, strychnia and cantharides stand side by side. We are therefore bound to confess that we fail to see the ground of the subtle distinction drawn by the Lord Chief Justice between them, and almost feel tempted to suggest that perhaps the items in the poison schedule were not just then present to his mind. However this may be, it was a fortunate thing for the poisoner that the point of law wae raised, for probably the jury, not being troubled with such niceties of definition, would have come to the conclusion that in administering the alleged non-noxious quantity he was guilty of the "*intent* to injure, aggrieve, and annoy," and after all that was what he appears to have been charged with.

GREEN PEAS AND COPPER.

IT is generally understood that the preserved peas which have more than once brought their vendors in this country within the clutches of the Sale of Food and Drugs Act, because of the copper they contain, have had their origin in France. It will therefore not be inappropriate, considering the different opinions that have been expressed as to them in our own police courts, to hear what is said about them in their native land.

The occasion was a discussion started in the French Academy by General MORIN, upon certain falsifications or alterations of alimentary substances, during which that officer denounced the prevalent colouring of wines with fuchsine and certain articles of food with salts of copper as an injurious fraud. In this condemnation he received the support of the celebrated chemist, M. DUMAS.

It then transpired that the Council of Hygiene for the department of the Seine had requested M. PASTEUR to investigate the subject and ascertain to what extent salts of copper are used to colour preserved peas. From the report which that gentleman is about to make, it appears that of fourteen samples bought in various parts of Paris, ten of them contained copper, some of them to the extent of one-thousandth part of the entire weight of the preserves after the liquor had been drained off. The liquor also contained some copper when any was found in the peas, but in smaller proportion. This copper appeared to be fixed in an insoluble form in the solid matter of the peas, especially under the exterior cortical envelope. The presence of the copper was easily detected even by the eye in every case, by the colour resembling the green of fresh peas, the preserved peas from which copper was absent having always a yellowish tint. In fact, no method is at present known by which peas can be preserved of a green colour without the addition of a salt of copper.

M. PASTEUR is of opinion that even if experimental physiology should prove copper to be less poisonous than has hitherto been supposed, its use in the treatment of preserved foods ought no less to be absolutely prohibited. He would have the name preserved peas represent only the natural product from which copper is absent, and he would not tolerate the sale of coloured peas unless they were labelled, "preserved peas coloured green by salts of copper." Under these conditions tolerance and prohibition might be ranked as synonymous terms, for it is probable that even the greediest gourmand would dispense with his favourite dish rather than have it under such a questionable name.

ANOTHER NEW LOCAL ASSOCIATION.

As every movement that brings chemists and druggists more into friendly intercourse with each other must tend towards the elevation of the trade, we are glad to learn that a new local association has been formed at Blackburn, called the Blackburn Chemists and Druggists' Association, having for its object the better scientific instruction of the assistants and apprentices of chemists and druggists, the protection, general advancement and mutual improvement of its members, and the formation of a library and a museum. We hope that the new association will meet with a full measure of success in attaining these objects, and that especially the courses of lectures and classes which it is proposed to organize will be well supported by the younger members who have yet to pass their examinations.

THE SPONTANEOUS GENERATION DISPUTE.

THE question whether under any known conditions the spontaneous generation of living beings can take place has been the subject of so many diametrically opposed assertions during the past few years, that the discussion seemed fast drifting into the ridiculous. As, however, an attempt at least is now to be made to decide one phase of the dispute between two of the foremost combatants, M. PASTEUR and Dr. BASTIAN, it may be interesting to indicate the points to be dealt with.

According to Dr. BASTIAN if urine carefully deprived of every organic germ be exactly neutralized with liquor potassæ and exposed to a temperature of 50° C. certain forms of bacteria promptly appear in the liquor. M. PASTEUR repeated this experiment, with the exception that he used fused potash instead of solution of potash, and the mixture remained sterile, the inference being that the germs were introduced with the liquor potassæ. He therefore expressed his opinion that it was not accurate for Dr. BASTIAN to say that he had discovered the physicochemical conditions necessary for the spontaneous generation of bacteria. Dr. BASTIAN replied that in using solid potash M. PASTEUR had departed needlessly from the conditions of the experiment, and that as a strong solution of potash in suitable quantity could be easily heated to 110° C. in a closed glass tube there was no necessity for the substitution. Dr. BASTIAN looked upon it as incredible that a fluid so caustic as the strong liquor potassæ he had employed could contain living germs after being heated at 110° C. Further he asserted that M. PASTEUR had added too much potash and rendered the liquid alkaline.

The next step was on the part of M. PASTEUR and was a "defiance" to Dr. BASTIAN to produce fermentation in sterile urine, under the stated condition, in the presence of competent judges, provided only that pure potash and pure water, free from organic matter, should be used in the preparation of the solution, or, if otherwise, that the solution should be previously heated to 110° C. for twenty minutes, or to 130° C. for five minutes. This challenge Dr. BASTIAN at once accepted, with the remark that he had already repeated his experiments under conditions even more severe than those proposed by M. PASTEUR, having used liquor potassæ that had been previously heated to 110° C. for sixty hours, instead of twenty minutes, and that in twenty-four to forty eight hours the urine was in full fermentation and swarmed with bacteria.

At the request of M. PASTEUR, the French Academy of Sciences, before whom the latter part of the discussion had taken place, has appointed a commission, consisting of Messrs. DUMAS, MILNE-EDWARDS, and BOUSSINGAULT, to express an opinion upon the point under dispute between Dr. BASTIAN and M. PASTEUR. Notwithstanding the scientific eminence of the members of the commission, however, it is open to doubt how far they will succeed in convincing either of these able antagonists against his will.

THE CONVERSAZIONE.

WE are requested to say in reference to the Society's Conversazione, that the decision arrived at by the Council, was that cards of invitation should be sent to all Members of the Society and Associates in business.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of the above Association will be held at 17, Bloomsbury Square, on Thursday evening next, March 22nd, at eight o'clock, when a paper will be read by Mr. A. P. LUFF, F.C.S., on "The Common Metals and their Chief Uses."

MR. LOUIS SIEBOLD has requested us to express to the members of the British Pharmaceutical Conference his great regret at the long delay in the publication of the 'Year-Book of Pharmacy,' which, he says, has been caused by frequent illness and the consequent accumulation of his engagements. He wishes it to be distinctly understood that he alone is responsible for the delay.

MR. OSWALD A. READE, Pharmaceutical Chemist, has been appointed Dispenser in Charge of Stores in the Royal Naval Hospital, Bermuda.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

The fifth meeting of the present session was held in the Society's Rooms, 119A, George Street, Edinburgh, on the evening of Thursday, 1st March. Mr. Wm. Gilmour, President of the Branch presided and briefly introduced to the meeting Dr. Andrew Wilson, who delivered a very interesting lecture on "A Study of some Lower Animals."

Dr. Wilson prefaced his lecture by expressing the pleasure it afforded him to address the Society. He proceeded to say that the tendencies of the present age have in many cases an injurious and limiting influence on mental work, and he would endeavour to carry out his promise to lecture that evening by directing the attention of the audience to some points in the organization of lower animals which had a bearing on the mental and physical affairs of man himself. It was, in fact, a valuable feature in natural history studies that, in seemingly unimportant studies, the mind was led towards subjects of high import and interest. The following is an abstract of the lecture.

A Study of Some Lower Animals.

BY DR. ANDREW WILSON, F.R.P.S.E.

Lecturer on Natural History, Edinburgh Medical School, and Examiner in Medicine, University of Glasgow.

In stagnant pools a little animal, the *Hydra*, was found in plenty in the summer months. The length of this little body was about one quarter of an inch. It was coloured green, and consisted of a tubular body, rooted by one extremity and possessing at the other or free end a mouth surrounded by tentacles. An examination of this body showed a very simple structure. The tissues of the body consisted of two layers, the outer named the *ectoderm* and the inner the *endoderm*. These tissues formed the walls of the hydra's body, which could be compared to nothing liker than a simple tube, the interior of the tube or body being destitute of any organs such as are found in higher animals. Microscopic examination of the hydra's body showed that the tissues possessed peculiar stinging-cells or thread-cells, each consisting of a tough outer capsule containing a fluid and a coiled up filament. When such a cell was irritated, it ruptured, and the fluid and filament were everted and discharged upon minute animals so as to cause paralysis or death. Stinging-cells of larger size and greater power were noted to form the stinging organs of jelly fishes and similar forms.

That the hydra was a sensitive being was proved by its shifting its position on a glass tumbler so as to come round to the side next the light, and when touched or irritated in any way, the animal contracted both body and tentacles. Food captured by the tentacles was conveyed to the mouth and digested within the simple interior of the body, in the absence of a stomach-sac. The investigation of the manner in which an animal or plant provided for the wants of its individual life, Dr. Wilson remarked, did not by any means complete a naturalist's duties. Death is continually busy in the ranks of animal and plant life, and the biologist has also to note how the losses of individuals are repaired—just as he noted how each individual repairs its own personal losses by nutrition. The hydra was seen to reproduce its kind in three ways. It could be artificially divided, longitudinally or transversely, and from each portion into which it was cut a new hydra would in due time be produced. Trembley, of Geneva, in 1744, first made known to the world the wonderful reparative powers of these animals. The lecturer described in detail his own experiments on these animals, and also on the nearly allied sea anemones, the latter beings also exhibiting a great fertility of reproductive powers, after being cut and divided. The second mode of reproduction noted in hydra was that of "budding" or "gemmation." Veritable buds grew in the warmer months of the year from the sides of the parent hydra, these buds gradually developing into forms resembling the parent. Sooner or later, however, these buds dropped off from the parent organism, each floating away through the water to begin life on its own account. The study of the great group of zoophytes was shown to be greatly facilitated by the investigation of hydra, inasmuch as these beings consist simply of colonies of animals aggregated together in the most intimate manner. They have further been produced originally from a single being, which differed from hydra in that its buds remained connected together in a permanent manner to form the plant-like zoophyte. In describing the history of the zoophyte, Dr. Wilson remarked the interesting nature of the co-operative principle exhibited by these forms. Co-operation in man's affairs, owing to the frailties and weaknesses of human nature, could hardly be carried out to perfection; but in the zoophytes we had an excellent example of the harmonious co-operation of many similar beings to one end—the nutrition and support of the colony. The hydra was also shown to exhibit the common phase of reproduction among animals, in that it produced eggs, from which, through a stated process of development, new beings like the parent were in due time evolved.

Proceeding, by way of application of these remarks, to note a few points of general interest in the life history of animals, Dr. Wilson first directed attention to the "automatic doctrine" of animal organisms. No one could doubt that the acts of a hydra were purely automatic. It acted simply as it was acted upon. It could by no stretch of the imagination be conceived to possess any intelligent appreciation of the why and wherefore of its acts. Many higher animals were in a like position. In the acts of a bee, wasp or ant, wonderfully intelligent as their acts might appear, we had simply an exhibition of *excito-motor* or automatic movements. This was proved to us by the fact that the young insect, just liberated from its chrysalis, entered at once upon and performed all its duties with a perfection and regularity unsurpassed by the adult and fully grown insect. There was thus exemplified a thorough reaction between the animal and its surroundings; but the thoroughness of that relationship did not imply an intelligent appreciation on the part of the insect of the meaning or bearing of its life-acts. In man we had many examples of automatic actions, but in the human subject and in his nearest allies we had to take into consideration the fact that out of the human experience and habit had arisen a new element—consciousness or the knowledge of self, and in the possession of this power of understanding the why and wherefore of their actions, the higher animals differed essentially from their lower neighbours. The development of an infant's mind and intellect might possibly indicate to us, as by a panoramic picture, the stages through which man's intellectual powers had become evolved from lower phases of nervous action.

Remarking that in sea-anemones and hydra no nervous system could be detected, the lecturer said that we could understand the exhibition of nervous powers in such organisms, and also explain the irritability of such plants as the venus' flytrap and sensitive plant, on the supposition that these animals and plants possessed a diffused power of appreciating sensations. This power might in fact be regarded as existing in an unspecialized state in the tissues, and it was probable that all animals and plants possessed this power, although in very varying degrees of development.

The powers possessed by many lower animals of reproducing lost parts were explained under the simile of comparing the hydra and its neighbours to animal "republics," whilst the higher animals in which such powers were undeveloped might be regarded as "limited monarchies." In the theoretical republic every man was as good as his neighbour, although, the lecturer remarked, he did not think this principle of equality could be so perfectly carried out in the human as in the lower phases of life. Thus, one part being as good as any other part in hydra, each part was endowed with great reproductive powers. In the limited monarchy, equality was not a distinctive feature. Some parts assumed precedence of others, and hence in higher animals a breach of continuity so broke up and destroyed the relations of closely connected parts that perfect repair was impossible.

At the conclusion of a very interesting lecture, Dr. Wilson said that his remarks that evening might by many be deemed as leading them very far from the sphere of pharmaceutical studies and from the professional avocations in which his hearers were engaged. It appeared, however, to him that the crowning glory of any learned and intelligent body of men, united for the advancement of their common science, was to be found in their frank and hearty recognition of other branches of scientific inquiry. Recognizing the grand principle that the prosperity of any single science meant the advance of all, he rejoiced to find that the liberal spirit influencing the North British Branch of the Society had ever been illustrated by their encouragement and appreciation of the views and opinions of other scientists. He esteemed it therefore no small compliment to be asked to address the Society, and he would fain hope that in virtue of the interest which the Society evinced in science at large, the subject he had selected as his topic for that evening, although far removed from pharmaceutical matters, had found a certain measure of acceptance with his hearers. The cultivation of natural science studies presented a powerful means for extending and bracing those powers of observation and research which lie at the foundation of scientific advance of every kind; and if he had succeeded in arousing an interest in fields of observation which possess large claims upon human sympathy and regard, he should assuredly feel that his labours of that evening had not been in vain.

Dr. Wilson illustrated his lecture very fully by diagrams.

On the motion of Mr. J. R. Young, a hearty vote of thanks was accorded to the doctor for his very interesting lecture.

The Honorary Secretary intimated the following contributions to the library:—'Proceedings of the American Pharmaceutical Association for 1876,' per John M. Maisch, Philadelphia; 'Pharmacy in its Sanitary Relations,' by John M. Maisch, from the author; the *Canadian Pharmaceutical Journal* for February, from the Ontario College of Pharmacy; The *Pharmacist* for February, from the Chicago College of Pharmacy.

To the museum:—Specimens of the metal Sodium, Cinnabar, Mispickel and Stibnite, from Mr. David Brown, to complete the collection left by his father.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The ninth general meeting was held at the Royal Institution, February 15, 1877; the President, Mr. A. H. Mason, F.C.S., in the chair. The minutes of the previous meeting were read and confirmed.

The following donations were announced to the library:—Current numbers of the *Pharmaceutical Journal*, from the Society; and a copy of the 'Quinology of the East Indian Plantation,' by J. E. Howard, F.R.S., from Mr. Abraham.

The President moved, "That a special vote of thanks be given to Mr. John Abraham, for his liberal donation." This was seconded by Mr. Haddock, and carried unanimously.

Mr. T. L. J. Hughes was elected a member.

The President asked if the tests reported upon by Mr. T. Garside, F.C.S., at the previous meeting, could be applied to the detection of fusel oil in naphtha, the latter substance being often adulterated with fusel oil. He also called attention to Dr. Paul's method of testing quinine, published in the *Pharmaceutical Journal*.

Messrs. A. C. Abraham, Michael Conroy, A. Haddock, and others, entered into a discussion on these points. Other miscellaneous communications having been received, the Hon. Secretary read the following paper:—

A Preliminary Account of some Comparative Analyses, showing Results obtained by Different Processes and their Ultimate Bearings. Part I.

BY THOMAS WILLIAMS, F.C.S.

The study and practice of the science of chemical analysis is more or less an intimate subject to the members of this Association.

The measure of cultivation the field of chemical analysis receives determines the number and value of new substances produced in the arts and manufactures.

The utility of chemical quantitative analysis is of first importance for the aid which it gives to the progress of original research. Another function which it performs is the determination of the chemical value of natural produce, and of products of manufactories.

I propose to limit my subject on this occasion to copper analysis.

It is satisfactory to note that the cultivation of processes for the estimation of copper has not been neglected. I shall give a brief description of methods that are at present in general use. Probably the oldest method (under some improvements in the *modus operandi*) is the Cornish assay: this continues to be extensively practised at the present day. The results which it gives, however, are, from an analytical point of view, universally condemned as being widely erroneous; it never reports the true amount of metal contained in the substance under operation. One of the chief causes operating the loss sustained is due to volatilization of copper in the presence of sodium chloride, which is an ingredient largely employed in the assay. The process consists of three distinct stages, viz.:

1st. Fusion for regulus.
2nd. Calcination of regulus.
3rd. Refining of regulus.

In the first operation the ore is mixed with a flux composed of lime, fluorspar, borax, and salt, with a careful addition of nitre, and fused in a clay crucible. This produces the regulus which in the second stage is finally pulverized and thoroughly calcined to expel the sulphur. The oxides obtained are in the third process reduced at a high temperature with admixture of argol, nitre, borax, and salt. This fusion yields a crude button of metal which has to undergo three or four repeated fusions with a refining flux composed of argol 1 part, nitre 1 part, and salt 2 parts; and the resulting button of metal after this treatment consists of fine copper. By this rough description of the Cornish assay you will see that it is not an uninteresting process, and it illustrates, moreover, the metallurgy on a miniature scale of the principal operations in the Welsh process of copper smelting. But whatever useful purpose it can serve to one class of miners or smelters, who deal with cupreous substances of high produce, it must fail entirely to give any assistance to another class who have extensive transactions daily in the copper industry in low-produce material. The *Chemical News* of January 19, 1877, notes the interesting fact that the Alderley Edge Copper Mines, though producing an ore which by the Cornish assay yields nothing at all, have paid dividends to the extent of nearly £40,000.

I shall leave it with you to say whether, if Mr. Kingzett had performed his investigations on the brain in a Cornish crucible, we should have heard anything about copper in the interesting lecture which he delivered to us.

We had last session a detailed account from Mr. E. W. Parnell, F.C.S., in his paper on "Electricity applied to Analytical Chemistry," of a method of a highly scientific value for the estimation of copper, which he had seen performed on an extensive scale at the Government Mining Establishment, at Mansfeld, Eisleben. That method consisting of, 1st. Roasting the ore. 2nd. Its solution and separation of insoluble matter. 3rd. The precipitation of the copper in the presence of either free sulphuric or nitric acid by means of a galvanic current; and finally weighing the result as metallic copper. This elegant process has received only a limited application in this country; so far, though, its results are indisputed. One explanation for it not being more adopted, probably, is due to the impression that battery power is not so easily kept ready for action as a supply of cyanide of potassium solution, to the use of which we are so long accustomed.

The volumetric estimation of copper by means of a standardized solution of potassium cyanide was invented over a quarter of a century ago, and has been since that period in general use in different parts of the world.

This method depends upon the action of potassium cyanide on an ammoniacal solution of copper, the azure blue colour of which is discharged by the formation of a double cyanide of copper and ammonium and separation of free potash, while one equivalent of cyanogen is separated, which, acting on the free ammonia, gives urea, oxalate of urea, cyanide of ammonium, and formiate of ammonium.

It is a well-known fact, however, in practice, that the decomposition is uncertain, the quantity and degree of concentration of the ammonia salts producing a very appreciable variation in the results. Towards remedying this uncertainty, Fleck's modification of the process has proved itself to yield more reliable results, but still they are only approximate in character. By Fleck's process, a solution of sesquicarbonate of ammonia, one in ten, is employed instead of the caustic ammonia; the assay is heated to a temperature of 60° C., and in order to render the end reaction plainer he proposed the addition of two drops of solution of ferrocyanide of potassium, one in twenty; the addition of which should not affect the assay, but at the point when the blue colour is discharged by the potassium cyanide the characteristic red-coloured ferrocyanide of copper becomes visible; and on the addition of a final drop of the standard (KCy) solution, the red colour in its turn vanishes, leaving the assay entirely colourless. Fresenius states that he finds that the presence of ammonia salts are here also not without influence, and remarks that on this account the method seems to be applicable only if the standardizing of the cyanide of potassium solution and the actual analysis are performed under a very similar circumstance.

In May, 1867, the directors of the Mansfeld Copper Mines, Germany, offered an award of £45 for a process of assay to estimate copper in ores produced at their mines. Out of sixteen answers which they received, Dr. Steinbeck's method was adjudged the most suitable. A premium was given also to Luckow for his plan, which consisted finally in precipitating the copper by means of a galvanic current and weighing in the metallic state.

Dr. Steinbeck's process consists of, 1st. That the copper contained in the sample (of which 5 grammes is taken) be brought to a state of solution in hydrochloric acid. 2nd. The insoluble matter having been separated by filtration, the copper is precipitated in the metallic state in a covered beaker-glass of about 400 cubic centimetres capacity by means of a rod of metallic zinc weighing about 50 grammes, to which is fastened a stout piece of platinum foil (the zinc and platinum having at the onset been placed in the beaker); the precipitation is effected in from half to three quarters of an hour, when the zinc rod is removed, leaving the platinum foil in the beaker; the spongy copper is thoroughly washed by decantation with water. 3rd. The estimation of the precipitated copper. This is effected by dissolving the copper in a *definite quantity* of nitric acid, diluting a *definite quantity* of ammonia added, and finally titration with standard potassium cyanide solution.

Fresenius observes that the results given by this method are not only concordant, but also very nearly correct, if the cyanide *is standardized under the same condition as it is used.*

In standardizing, as nearly as possible the same quantity of copper should be employed as will have to be estimated. The strength of the cyanide solution employed being 1 c.c. = ·005 gramme metallic copper. To what extent Dr. Steinbeck's masterly application of the cyanide process is followed in this country I am not able to say, but I have a strong impression that it is not so widely adopted as its advantages over the results obtained in the ordinary unreliable way warrant. I will here show one or two results obtained by different processes. A carefully prepared sample (No. 1) was apportioned and sent to four different professional analysts to be tested for copper:—

Chemist A returned the produce by the cyanide of potassium process . . .	6·30	per cent.
Chemist B returned the produce by the cyanide of potassium process . . .	6·28	„ „
Chemist C by Dr. Steinbeck's process .	5·60	„ „
„ D by Luckow's galvanic precipitation of metallic copper . . .	5·38	„ „
Sample No. 2.		
Chemist A, cyanide potassium process	0·32	„ „
„ B, „ „ „ .	0·28	„ „
„ C, Dr. Steinbeck's process .	0·16	„ „

I could produce further comparisons on samples of about ten times the richness of sample No. 1, where differences amounting to 2 per cent. have occurred. Can there be any reasonable objection to adopting Dr. Steinbeck's process for general use in all laboratories where the cyanide process is practised? I may answer for myself that though I do not find it convenient in every case to determine copper by Steinbeck's method, I certainly never trust cyanide under the old system.

To any one who would prefer some other process not referred to this evening, I beg to contribute my testimony to the accuracy of results obtained by the gravimetric subsulphide process. This method, first recorded by Berzelius, and afterwards by Brunner, has of late received a very practical application from the apparatus introduced by Rose.

The value of this process is based on the strong affinity which copper and sulphur have to combine either in the dry state or in solutions. The subsulphide process may be conveniently divided into three stages, viz.:

1st. The solution of the cupreous substance in nitric acid, addition of sulphuric acid, evaporation to dryness, and separation of insoluble matter by filtration and washing (preferably with dilute H_2SO_4).

2nd. The precipitation of the copper in the filtrate by sulphuretted hydrogen gas, and collection of the copper sulphide on filter paper, thorough washing with water containing a little H_2S, and drying.

3rd. The ignition of the dried sulphide with a slight addition of sulphur in a current of dry hydrogen gas, and weighing.

The precision with which copper can be estimated by this process is as accurate, if not more so, than any other process on record. If time permitted, I might produce abundant proofs of this from results of a great number of experiments that I have performed in this direction during the last twelve months. To attain success the conditions must be rigorously attended to, and the certainty of the results are nothing short of the perfection of the combining weights assigned to the copper and sulphur.

It is well known that whatever process is adopted to determine the chemical value of a substance for copper, that difficulties often arise with the presence of certain other metals that have to be overcome, but I presume we all agree that the best process is that which yields the greatest returns, so long as they are strictly to be relied on and express the *chemically pure* substance.

An interesting discussion followed, and, on the motion of Mr. Haddock, seconded by Mr. A. C. Abraham, a cordial vote of thanks was given to Mr. Williams for his paper.

The tenth general meeting was held at the Royal Institution, March 1; the President, Mr. A. H. Mason, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed. The President read a letter which he had received from Mr. E. W. Parnell, F.C.S., stating his inability to be present to read his paper "On the Separation of Iron and Alumina," and would be glad to read the same the earliest opportunity that could be afforded him.

It was decided to announce Mr. Parnell's paper for Tuesday evening, the 27th inst.

The President called attention to the number of deaths which took place from the accidental drinking of carbolic acid. He said that hardly a week passed over without some person being poisoned by drinking it in mistake for something else, and this generally arose in consequence of its being kept, when obtained for disinfecting purposes, in beer bottles. He suggested that in order to guard against those accidents, the acid should be sold in a particular description of bottle, or that carbolic powder, which was most convenient for use, and would not be attended with the dangers of the acid, should be used for disinfecting.

Mr. E. Davies, F.C.S., said that much of the powder sold was very poor in quality, some containing not more than one fourth or one fifth of the strength of the acid, and therefore its efficacy for the purpose required would be very slight. He thought that the sale of carbolic acid should be surrounded with as many precautions as any other poison.

Mr. James T. Armstrong, F.C.S., exhibited an ingenious apparatus invented by Dr. Mills, of Glasgow, the chief purpose of which is for ascertaining the colours of different liquors required to be compared for commercial purposes.

The thanks of the meeting having been given to the authors of the various miscellaneous communications, the members adjourned.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

A meeting of the Executive Committee was held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, on the 28th February, 1877, at 1 p.m. The President in the chair; Mr. Thomas Barclay, Vice-President.

Present:—Messrs. Andrews (London), Arblaster (Birmingham), Churchill (Birmingham), Cross (Shrewsbury), Fairlie (Glasgow), Greaves (Chesterfield), Holdsworth (Birmingham), Jervis (Sheffield), Johnson (Manchester), Laird (Dundee), Shaw (Liverpool), Southall (Birmingham), G. Walker (Coventry), R. Walker (Birmingham), and the Solicitor of the Association.

The minutes of the previous meeting of the Executive Committee and of the meetings of the Finance and Law Committees were read and approved.

Reports from the Finance and Law Committees were then read, and resolutions passed ordering them to be received, adopted and entered on the minutes.

In answer to the President, the Solicitor said with regard to the Runcorn milk of sulphur case, the court would open for the spring quarter sessions at Knutsford, on Easter Monday, when the appeal would be heard, and it had been arranged that the Salford milk of sulphur cases should stand adjourned until after this appeal; it would then be for the committee to decide what course should be taken in the Salford cases. He further stated that he had personally investigated the case of a member residing at Nottingham, who had been summoned by the Master and Warden of the Apothecaries' Company of London, for the penalty of £20 for prescribing, and that as far as he could ascertain the case was clearly that of simple "counter prescribing;" it would be heard at the Nottingham county court on the 13th of March.

The arrangement of a time and place for the annual meeting of the Association was fully discussed, when it was moved by Mr. Andrews, seconded by Mr. Jervis, and unanimously resolved: "That the Annual Meeting of the Association be held in London on Tuesday, the 15th of May, and that the following gentlemen be appointed a sub-committee to make further arrangements:—The London members of the Executive Committee, Messrs. Howden, Humpage, John Owen, Postans, Urwick, and J. H. Wright, with power to add to their number."

Mr. Greaves said the election for the Council of the Pharmaceutical Society was approaching, and he thought it would be a great advantage to the members of the Society if all candidates would make known their views. He thought as a rule a majority of the members voted in the dark, he would therefore move: "That in the opinion of this Committee it is desirable that all candidates offering themselves for seats on the Pharmaceutical Council should publish their views, so that members of the Society may have an opportunity of voting for such candidates as would advance their interests."

Mr. Jervis quite agreed with Mr. Greaves that members of the Society should know something of the politics of the candidates for whom they voted.

Mr. Churchill seconded the resolution, which was passed *nem. con.*

Mr. Fairlie said, that in accordance with the desire of the Executive, a scheme for Scotland had been drawn up by the sub-committee appointed for that purpose, and that bye-laws had also been framed, a copy of which was on the table.

After some discussion, it was moved by Mr. Fairlie, seconded by Mr. Greaves, and unanimously resolved: "That the clauses of the scheme and bye-laws now proposed to the Executive Committee be considered *seriatim.*"

The scheme and bye-laws having been gone through minutely, and the various details carefully considered, and in some instances amended, it was moved by Mr. Southall, seconded by Mr. G. Walker, and unanimously resolved: "That the amended scheme and bye-laws of the Scotch Committee of the Chemists and Druggists' Trade Association—here following—be and are hereby approved of."

Bye-Laws of the Scotch Committee of the Chemists and Druggists' Trade Association.

1st.—That this Committee shall be called "The Scotch Committee of the Chemists and Druggists' Trade Association."

2nd.—It shall consist of eighteen members of the Association, five to form a quorum, selected from the various districts as set forth in the scheme for Scotland, three of whom shall be recommended for election as members of the Executive, and all of whom shall be recommended for election as members of the General Committee of the Association. Any district failing to elect a member, the vacancy shall be filled up by the Executive.

3rd.—It shall meet as occasion may require, and shall, at its first meeting, appoint a president, vice-president, and honorary secretary; it shall also nominate three of its number to be members of the Executive.

4th.—Its duties shall be to aid the Executive in conducting the affairs of the Association in Scotland, with the assistance of a Scotch solicitor, appointed by the Committee, and subject to the approval of the Executive; and it shall prepare and submit annually to the Executive a report of its proceedings during the year.

5th.—The rules of the Association shall be binding on the Committee.

6th.—It shall not incur expenses exceeding the amount of £10 sterling per annum, without the sanction of the Executive or that of the Finance Committee of the Association.

7th.—The Committee shall have power to convene a meeting of the Scotch members of the Association for purposes connected with the Association, and shall do so at the request in writing of any seven members of the Committee; ten clear days' notice of which shall be given by circular to each member in Scotland, by the Hon. Secretary of the Committee.

8th.—These bye-laws shall not be altered or rescinded unless with the consent of the Executive of the Association, and no motion of change shall be entertained, unless such proposal has appeared on the agenda of business.

SCHEME FOR SCOTLAND.

	Counties in District.	Estimated Number of Chemists in Districts.	Principal Town in District.	Number of Representatives on General Committee.
1	Kinross, Clackmann, Fife	29	Dunfermline	1
2	Haddington, Linlithgow, Edinburgh	140	Edinburgh	3
3	Berwick, Peebles, Selkirk, Roxburgh	33	Galashiels	1
4	Dumfries, Kirkcudbright, Wigton	40	Dumfries	1
5	Stirling, Dumbarton, Lanark, Renfrew, Ayr, Bute, Argyle	350	Glasgow	5
6	Perth	27	Perth	1
7	Forfar	60	Dundee	2
8	Kincardine, Aberdeen	75	Aberdeen	2
9	Banff, Elgin, Nairn	30	Elgin	1
10	Ross, Cromarty, Inverness and Western Islands, Caithness, Sutherland and Northern Islands	40	Inverness	1

The Secretary reported that he had canvassed the town of Leeds, Bradford, Sheffield, Wolverhampton, Stourbridge, Manchester, Stockport, Runcorn, Rochdale, Carlisle, Newcastle-on-Tyne, and Gateshead, in which towns he obtained about 330 new members, and donations slightly in excess of his travelling and hotel expenses. He obtained about fifty other members in Edinburgh and Liverpool, when addressing meetings there during the last few weeks; time did not permit his canvassing these towns. He would submit to the notice of the Committee that although he had been absent from the office about six weeks altogether, a considerable portion of his time had been employed in arranging public meetings of the trade, replying to correspondence forwarded to him from the office, and some little time in collecting evidence of illegal trading under the Pharmacy Act 1868.

The best means of electing the General Committee was debated, when it was moved by Mr. Barclay, seconded by Mr. Andrews, and unanimously resolved: "That no steps be taken to elect a General Committee until after the annual meeting of the Association in May."

Several letters were read from persons complaining of illegal trading, and the Secretary was instructed to continue to gather evidence on the subject.

A vote of thanks to the President for presiding terminated the proceedings.

THE ASSOCIATION OF CHEMISTS AND DRUGGISTS FOR WOLVERHAMPTON AND DISTRICT.

A meeting of this Association was held in the committee-room in the Agricultural Hall, on Thursday evening, March 8th. The chair was taken by Mr. Fleeming, the President of the society.

The Chairman stated that the meeting had been called to consider the desirability of having classes formed entirely among themselves, and the selection of a new room, as the one they now occupied would have to be given up at Midsummer next. He expressed his disappointment that so few apprentices were present, as it was entirely for their benefit that the institution was kept up, and the necessity for close application to their books was becoming more evident every day. He earnestly invited them to make good use of the means offered them, so that the council might feel recompensed for the trouble they had taken in the matter.

Mr. Brevitt (Honorary Secretary) strongly recommended the apprentices to attend the classes that were being conducted at the Free Library, and at one or two other places in the town. There were many reasons why he advised this, the chief being that there would be greater decorum at those classes than there had been in one of the classes conducted by themselves. Studious apprentices had complained to him about the disorder, and it was impossible that any good could be done or any knowledge obtained unless order prevailed. He felt sure that would be the case at the Free Library classes, as he expected that some of those who attended would be of riper years. With respect to the rooms, he offered a room he had in Darlington Street, and explained how the students would be much benefited thereby. He proposed their assembling once a week, and the students having free access to the Materia Medica specimens, as well as the plates and books. One of the council would attend and offer them any advice when they needed it, and also register the books lent.

Messrs. Coleman, Cannell, Lowe, and others expressed their approval of this suggestion, and eventually a resolution was passed authorizing its adoption, at the same time expressing thanks to Mr. Brevitt for his offer.

Mr. Cooley was elected co-secretary in the room of Mr. F. J. Barrett, F.C.S., who now holds an appointment at Coventry.

Mr. Brevitt also read a letter from Mr. Southall, Birmingham, who had kindly undertaken the adjudication of the Essay prizes. After complimenting the authors of the four essays generally, he decided as under:—

First Prize . . . . Mr. W. B. Cooley.
Second „ . . . . Mr. Fletcher.
Third „ . . . . Mr. Watts.

The programme for the prizes at Christmas next will be issued shortly. The thanks of the meeting to Mr. Fleeming for presiding concluded the proceedings.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A lecture was delivered at the rooms of the above Association on Tuesday evening, March 6, by Mr. Walter Clark; the subject being "Chlorine, Bromine, and Iodine." There was a good attendance of the members, and special interest and attention exhibited.

After a brief introduction by the President, Mr. W. Hammond, the lecturer proceeded to state that he did not purpose treating the different elements separately, but would take their respective peculiarities, properties, and differences together, thereby rendering the lecture more interesting, and as he (the lecturer) thought enabling the hearers better to retain the various facts advanced. The years in which these elements were discovered and by whom, together with their sources, were first referred to; after which at considerable length the lecturer pointed out their physical characteristics, solubility, density, etc. The processes of their preparation and the decompositions which occur during the necessary operations were also made clear. The various chemical tests necessary for the detection of impurities in these elements were also pointed out.

At the close of the lecture a vote of thanks, proposed by Mr. Raynor, to Mr. Clark for his able and instructive lecture was carried unanimously.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of the above Association was held at 17, Bloomsbury Square, on Thursday evening, March 8th, Mr. Harold Senier in the chair, when a paper on "Fermentation" was read by Mr. G. F. Gutheridge.

The author commenced by explaining what was ordinarily understood by the term "Fermentation," and then proceeded to point out its relations to putrefaction, decay, and various catalytic actions, remarking that the confusion that existed with regard to the application of the term was probably due to the number of different theories held upon the subject. He then showed that fermentation differed essentially from putrefaction and decay, in the fact that in the former process no offensive odour was present, and the product formed was of a useful nature, whereas in the latter noxious gases, such as sulphuretted and phosphoretted hydrogen, were evolved. Reference was then made to the various kinds of fermentation, which received distinctive names from the products formed in each case, and certain essential conditions of temperature, etc., were noticed, which were the same in all cases. He then passed on to consider in detail the more important of the many varieties of fermentation, beginning with the alcoholic or vinous, as being the chief. After describing this, and explaining that it was due to the development and growth of a peculiar fungus, known as the "Torula cerevisiæ," a specimen of which was exhibited under the microscope, he pointed out the various theories held, notably those of Pasteur and Liebig, regarding the action of this fungus in inducing the process of fermentation. He then went on to treat of the acetous, lactous, and saccharine fermentations, noticing the various conditions under which each took place, and concluded by briefly referring to some of the less important kinds, as the gallous, the amygdalous, and the mucous varieties.

The paper gave rise to an interesting discussion, at the close of which, on the motion of Mr. J. Edward Owen, a vote of thanks to the author was unanimously passed.

The President, having announced miscellaneous business, an election of officers to fill some vacancies that had lately occurred then took place. Mr. Charles H. Hutchinson was elected Vice-President in the room of Mr. H. Campbell, resigned; and Messrs. W. R. Atkins and H. G. Greenish were elected members of the Committee in place of Messrs. J. C. Shenstone and C. H. Hutchinson resigned. The meeting then adjourned.

Parliamentary and Law Proceedings.

PROSECUTION OF A CHEMIST AND DRUGGIST UNDER THE APOTHECARIES ACT.

At the Nottingham County Court, on Tuesday, the 13th inst., before Mr. Wildman, Judge, Mr. George Shepperley, chemist and druggist, Long Row, Nottingham, was sued by the Apothecaries' Company, for having acted as an apothecary, he being unqualified so to do. Mr. Arthur Browne represented the plaintiffs, and the defendant was represented by Mr. Buszard, Q.C., instructed by Mr. Glaisyer for the Chemists and Druggists' Trade Association.

Mr. Browne stated that the action had been brought under the Act of George III., chap. 194, as follows:—"And be it enacted that any person (excepting such as are then actually practising as such) who shall after the first day of August, 1815, act or practise as an apothecary in any part of England or Wales, without having obtained such certificate aforesaid, every person so offending shall upon every such offence forfeit and pay the sum of £20."

His Honour did not consider it necessary to hear a statement of the facts from advocates, consequently Mr. Browne called

Mr. George Shepperley, who said: I am a chemist and druggist, carrying on business on the Long Row, having conducted the business on my own account for nine years. I was in business before that. I was assistant in the same shop along with my predecessor and father, Mr. James Shepperley. Previously to that I was dispenser at the General Hospital. I am not a qualified apothecary. I know a person of the name of Hubbard, at all events I know him by sight. I recollect him coming on the 4th December last to my shop. He asked me for something to cure pimples in the face which I noticed he was afflicted with. I did not examine him with a view to ascertain what he had the matter. I will not swear that he did not go behind the screen, but I believe he did not. The screen and counter are attached. I cannot well remember now, but I know I stood behind. I cannot recollect what the medicine was that I gave unless I see the bottle. It might be medicine to be taken internally, or it might be a lotion. The bottle produced is no doubt the one that I gave, but I am not sure, though the label is very much like those which I use at times. I cannot say from memory what was the kind of medicine I gave, but for pimples I often give sarsaparilla. I usually charge tenpence or a shilling a bottle, but I could not say what I charged in this instance. I only remember Hubbard coming once. He was a perfect stranger to me. The medicine was not given for a particular disease—it was a simple medicine. I know a Mrs. Cooper, wife of William Cooper, of Radford, and I believe she has been to my shop, but I have no very distinct recollection. I believe she had some gallic acid from me, but I do not known whether that would lead me to know from what disease she suffered. I asked her what she wanted it for, and she said it was because she had too much monthly weakness. She asked me if I thought that was the right stuff to take, and I said it was. I mixed it up with plenty of water, and, in fact, in the usual way of mixing the acid. Before she asked for the acid I do not think she told me what she was suffering from. She asked me to mix it properly, so I put another kind of acid, which is usual. This was in August, 1876. She came again several times, in fact she was a regular customer. I cannot say whether, when she came again, she said whether the medicine had done her good or not. Subsequently to the visit I allude to she has not told me what she has been suffering from. Though I keep no entries in my books, I know this was gallic acid, as Mrs. Cooper has told me so.

I saw her a week ago; in fact I called upon her to ask what she came to me for. I did that in consequence of my having received a notice about an action being brought against me. I did not call to ask her not to give evidence against me; I will positively swear I did not. I know a woman named Elizabeth Moore, whom I saw some years ago. I recollect seeing her about the beginning of January. She had some one with her. I believe it was her sister in-law, Mrs. Burton. When Miss Moore came she wished to rest in my shop, as she complained of a pain in the head. I did not examine her in any way. I did not take her into a private room, neither did she go there. She merely sat down in the shop. I am quite sure on that occasion I did not give her any medicine. She has not been since; she was a regular customer, but I cannot say what she asked me for when she came. I swear that I never used an instrument to her, though I keep such things for sale. I never use such a thing as a stethescope. I supplied her with drugs generally, but I cannot say what she had in particular. She generally complained of pain in the head. I think she never brought me a prescription.

His Honour: She may have had drugs, but not medicine.

Witness continued: I believe she has had medicine at my shop, but not of my giving. I have had Mrs. Burton at my shop, and dispensed a prescription of Dr. Burnie, a local physician. A Mrs. Osborne has been to my shop.

Mr. Buszard, Q.C., here contended that in the case of Osborne the twenty-one days' notice had not been given as required by the 30th section of the Apothecaries Act.

Mr. Browne expressed an opinion that the Act did not apply to such cases as this, but really to the entire case, and not of different cases which cropped up in the whole action.

His Honour agreed with Mr. Browne, and overruled Mr. Buszard's objection.

Mr. Buszard, however, still held that Mr. Browne had no right to call such evidence without proper notice having been given, as the Act defines the matter very definitely, when it says that for ever such offence he shall be liable to a penalty.

His Honour allowed plaintiffs to continue their case.

Mr. Browne: Do you know a Mr. Death? Yes. (Laughter.)

Mr. Browne: I do not know what the laughter should be for.

His Honour: I really do not know what there is about Death to provoke laughter, except for the fact that in this instance it is Jolly Death.

Examination continued: I have a very indistinct recollection of Mr. Death's presence in August last. I do however remember seeing him in the Talbot Vaults, as a neighbour of mine had told me Death was watching my shop. I went to the Talbot to ask him if it were true. He said he was not. He told me what the law was in reference to prosecution. He said then that before that night he had been to my shop and I prescribed for him. I have an indistinct recollection of Death having called at my shop, when I looked at his throat. I cannot say what I did but certainly if he asked me I should have looked and supplied him with medicine. I think he did not bring a prescription. I cannot say what I gave him, whether he asked for any medicine, or what I charged him. When at the the Talbot I did not say I refused to prescribe, but I know I have at times refused to prescribe. Though I have refused at times to prescribe I have consented to prescribe on other occasions. My age is 45 years.

By Mr. Buszard: I have been in the habit of giving simple remedies for simple complaints. When people have come to me suffering from disease or serious complaints I have invariably sent them to a physician. I recollect very little about Mr. Death or Mrs. Cooper. I make up thousands of prescriptions every year. I have known Miss Moore and her father for years.

Re-examined by Mr. Browne: I cannot say how I judge of sample medicines. The prescriptions I make up are medical men's prescriptions.

Thomas Jolly Death said: I recollect going to Mr. Shepperley's shop on the 22nd of August last. Mr. Shepperley was there behind the counter. I said, I want some medicine for relief of sore throat, cold, tightness of the chest.

His Lordship: A complication I suppose.

Witness: Mr. Shepperley then told me to face the light that he might look down my throat.

His Honour: Had you asked him to look at your throat?—No.

Witness: He tapped me in the chest and said, "The tightness is there, I suppose."—I said, Yes. He then said "I think I can give you something for there does not seem to be much amiss with you."

His Honour: I suppose in point of fact there was not much amiss?

Witness: He gave me some medicine to take internally and I paid a shilling. I asked him how much and his reply was, "One shilling, please. I think you'll find relief from that; if not come again." That was all that passed. I did not take the medicine. I saw Mr. Shepperley again. It was in the Talbot. Mr. Shepperley said, "I believe you are Mr. Death." I said, "That is my name." He said, "Being a nervous man I was at first alarmed, but I took counsel amongst my friends and I have decided to go on prescribing." After attending a woman who had a bad leg he said, "I have been prescribing, still prescribe, and mean to continue. If you go on we shall fight the question and if you win we shall make an appeal."

His Honour: Then we may take it that he said he had prescribed, was prescribing, and should go on so doing?

Witness: I have seen many people go into Mr. Shepperley's shop, but I cannot say whether they had not prescriptions.

By Mr. Buszard: I was not engaged in what I call continued watching, but I have been employed to take this matter in hand.

Mr. Buszard:—You do a large business in this way, I suppose.

Witness: I have been at it about fifteen years.

By Mr. Buszard: It was in November when I saw him at the Talbot Vaults. I do not know whether I really asked him first to look at my throat.

Mary Cooper, wife of William Cooper, living at Radford, said in answer to Mr. Browne: I recollect going to Mr. Shepperley's shop at the latter end of August last. I saw him in the shop, and, in accordance with my complaint, I asked for some gallic acid and seidlitz powders. He supplied me. I asked him if he thought it would do me good, but he did not advise me to take it. However I said I should like to try it. He did not say what would do me good. I went to him again several times, and had the same kind of stuff.

Mr. Browne: You went at other times?

His Honour: Unless you can carry it further than this it does not matter if she went 500,000,000 times.

This being the whole of the evidence,

Mr. Buszard contended that his Honour ought not to give judgment for plaintiffs, as the defendant had done no more than was the practice before and since 1815, when the Apothecaries Act passed, which was to prevent the chemists from visiting patients as doctors.

His Honour said if defendant had done no more than a druggist usually does over the counter as a dispenser, he could not find for plaintiff. Though several witnesses had been called, the real point at issue was that spoken to by Death, as the other witnesses had broken down; and if Death's evidence had stood alone, he should have hesitated about convicting upon it, but then it was to some extent borne out by the evidence of Shepperley himself.

Mr. Buszard said then he must rely on the 28th section, which gave chemists power to prepare, compound, dispense and vend, and he contended Mr. Shepperley had done no more.

His Honour, however, told the learned counsel that the defendant had done considerably more than that.

Mr. Buszard continued that it was the practice before 1815 and since for chemists and druggists to prescribe for simple ailments, and the Act of that year was never intended to diminish that custom. The Act did not define what an apothecary was.

His Honour observed that the case went further than that, for, according to the evidence, a man went, complained of cold, tightness at the throat, and defendant prescribes for him as a medical man.

Mr. Buszard: How is that acting as an apothecary?

His Honour: Then are we to suppose acting as an apothecary is cutting off a man's arm?

Mr. Buszard: It is a question as to the definition of the term dispensing.

His Honour said he should be quite contented if his definition of the term were overruled by the Supreme Court.

Mr. Buszard then called Thomas William Parsons, who said he lived at Swithland, and was 84 years of age. He was apprenticed to Messrs. Blews, chemists and druggists, of Worcester, in 1809, and from there he went to a London firm of chemists, finally setting up in business in Leicester on his own account. He said that when he first went into the trade it was the custom of chemists and druggists to prescribe over the counter for persons who suffered from sore throats, or ailments of that kind.

His Honour: That was before the passing of this Act. (To Witness): What do you understand dispensing means? —Mixing up medicines.

His Honour: Upon prescription?—Yes: and sometimes without a prescription. His Honour put several questions to the witness as to what he considered to be the meaning of the word prescription.

Mr. Buszard: He is eighty-four years of age, your Honour.

His Honour: Well, I am not much younger.

Mr. Buszard said it seemed to him that the intention of the Act under which these proceedings were taken was in no way to diminish the business of the chemists and druggists as it existed before the Act. He admitted that the visiting and attending of patients was prohibited by the Act, and cited a similar case heard before Judge Heath, in 1849, and reported in the *Pharmaceutical Journal*, where the charge was one of attendance upon patients at their own households. In that case the judge said a single act did not of necessity imply the adoption of a business or calling, and held that a chemist might administer a dose of medicine for a sore throat or a complaint of that kind without being liable to a charge of practising as an apothecary. He (the learned counsel), submitted that attending patients meant something more than giving a man a prescription for a sore throat or headache. The only right he contended for, was that of counter practice, which would not be included in the word dispense.

His Honour: As to the word dispense, that is really a question for a superior court.

Mr. Buszard then called

Mr. John Horne Glaisyer, who said he was assistant in the shop of Messrs. Glaisyer and Kemp, at Brighton, 1876. If persons came into the shop for something for a sore throat or headache, it was the custom to give them something to relieve the complaint.

After hearing the evidence his Honour gave judgment for the amount claimed, (£20) and also gave leave for an appeal, Mr. Buszard having intimated that the case would be taken to a superior court.—*Nottingham Journal*.

ALLEGED ATTEMPT TO POISON.—IMPORTANT RULING.

At Cornwall Lent Assizes on Wednesday, March 7, before the Lord Chief Justice, Sir A. Cockburn, William Hannah was charged with administering to Mary Ann Rowe a poison called cantharides, with intent to injure, aggrieve, or annoy, at Mevagissey, on the 21st October, 1876. Mr. St. Aubyn prosecuted and Mr. Carter defended. On the day in question the prosecutrix and defendant had some conversation together in the street, after which the defendant gave the prosecutrix two broad-figs. On getting home she was proceeding to eat them when her father detected something glistening in them, and he at once ordered her to throw the figs away. It was then found that what was glistening was cantharides. A few days afterwards the defendant came to her house and told her father that he intended the figs containing cantharides for a girl named Robins, and asked for forgiveness, but Mr. St. Aubyn contended that whether it was intended for this person or anybody else the prisoner would still be guilty of attempting to annoy by means of a noxious drug. In reply to Mr. Carter, the prosecutrix's father said he did not know at the time what the nature of Spanish fly was, but he was suspicious of what appeared to be glittering, and he made subsequent inquiries.

P. C. Brown produced the fig in question, which was handed over to him by the last witness.

Mr. G. Mitchell, chemist, St. Austell, examined the fig, and found it to contain Spanish fly, weighing from a grain to a grain and a half, a quantity insufficent to produce any effect upon the human system. According to Dr. Taylor cantharides would not produce the effect popularly supposed unless it was given in sufficient quantity to produce death.—In cross-examination, witness said there were other flies besides the Spanish fly that had the appearance of the one now produced. A fatal dose would amount to about 24 grains.

Mr. Carter contended that to sustain the indictment it must be shown that there had been a sufficient quantity of the drug administered to cause the effect alleged to be desired, so that, whatever the intent was, it would not in law amount to administering a noxious thing if what was administered could produce no effect.

His Lordship observed that one of the most deadly poisons that a murderer could resort to was strychnine, yet it was used as a medicine by the most eminent practitioners. A man might administer strychnine, thinking he would produce a destructive effect, but he might only use that quantity which a medical man would say would do no harm, still he used a noxious thing for producing a certain effect.

Mr. Carter, continuing his argument, said in many little *bon bons* made by confectioners for children, prussic acid was used, and although prussic acid was a most deadly poison, yet it was used in such small quantity as to be perfectly innocuous.

His Lordship could not help thinking, that, supposing the thing was not capable of doing mischief, if it were used for the purpose of doing mischief, then the person administering it must take the consequences. There were three points for consideration. Did the prisoner administer the thing? Was it a noxious thing? Or was it administered, being a noxious thing, with the intent to injure or annoy?

Mr. Carter submitted that there must be both the power and the intent to injure, basing his remark upon a former ruling of his lordship's, when he held that, in order to find a man guilty of pocket-picking, it must be proved that there was something in the pocket, and that the prisoner put his hand there.

His Lordship consulted his learned brother, Mr. Justice Hawkins on the points raised, and on returning into Court said:—

My learned brother and I have given this case great attention. We feel it is a question of considerable importance, and we are of opinion that Mr. Carter's point is a good one; and that the prisoner must be acquitted. The statute requires, in order to constitute an offence, that there shall have been the administration of a noxious thing, and we think in order to make out an offence, the thing administered must be of such a character as to satisfy rigorously the requirements of the law, namely, that it must be a noxious thing. I think there must be a distinction between a thing only noxious when given in excess, and a thing which is a recognized poison, and is known to be a thing noxious and pernicious in its effect. A distinction is to be made between poisons, such as prussic acid and strychnine—poisons of a well-known and established character, and a thing which is only capable of doing mischief when it is administered in excess. Upon the medical evidence before us cantharides, or, as it is commonly called, Spanish fly, is administered medicinally, and in small quantities, and up to a certain extent it is incapable of producing any effect at all. What is important to the present case is that the quantity administered was incapable of producing any effect. The statute makes it an offence to administer, although not with the intention of taking life, but of doing any serious bodily harm, any noxious thing with intent to cause injury or annoyance, but unless the thing is a noxious thing in the quantity administered, it seems exceedingly difficult to logically say there has been a noxious thing administered. The thing is not noxious in the form in which it has been taken; it is not noxious in the degree or quantity in which it has been given and taken. We think, therefore, that the indictment will not hold. It would be a very different thing if the thing administered, as regards either its character or degree, were capable of doing mischief, but because it happens to fail in a particular instance from some collateral or unforeseen cause, owing, may be, to the vigour of the constitution of the person to whom it was administered, or some cause of that description, if it was capable of doing mischief it would not be within the statute. But here the quantity was incapable of doing any mischief, and, therefore, we shall not be justified, although it was administered with the intent of producing inconvenience or annoyance, in saying that it is within the statute, seeing the thing is not, in the form administered, noxious. Therefore, under those circumstances, the case is not made out against the prisoner, and you are bound to find him not guilty.

The prisoner was accordingly acquitted, and discharged with a caution to be careful for the future.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

The Herbarium Prize.

Sir,—Mr. F. J. Hanbury's able criticism of the regulations under which the above prize is offered, recalls to my mind an interesting conversation I had with the late Mr. D. Hanbury at the very evening meeting when Mr. F. J. Hanbury's own splendid Herbarium was exhibited and the medal it so justly deserved presented. Mr. D. Hanbury when asked if he did not consider the limit of age too narrow, acknowledged that the subject was one worthy of further consideration, and the prize regulations capable of improvement. Seeing that Mr. F. J. Hanbury's collection was so far above the standard usually reached, it is highly gratifying to find him opening up a scheme for increasing the popularity and usefulness of this competition.

Would it not, however, be far better to divide this competition into two classes, the one open to students of the Society only, age limit from 15 to 21, the other for members and associates, age limit from 21 to 25?

In this manner the younger men would not be open to the competition of the more advanced students of botany, whilst a few clauses in the regulations requiring at least a certain number of specimens (say 600) and such like restrictions, would give a tone of superiority to this higher grade of the competition.

I think there could be little difficulty in carrying out this scheme, a scheme at any rate less expensive than Professor Bentley's liberal suggestion offered at the meeting before alluded to, recommending "that in different centres, covering say an area of twenty miles, prizes might be offered for the best collection of British plants."

Nor need expense stand in the way, for I am sure, in the event of the Council shrinking from the annual outlay such a modification would entail, there must be many gentlemen who would be willing to subscribe a sufficient sum to cover any cost of medals, etc., aiding, as it assuredly would, the advancement of the study of botany amongst their younger *confrères*.

In conclusion I hope Mr. Hanbury's suggestions will receive from the Council the attention they deserve, and so be the means of increasing the usefulness of one of the best competitions connected with our Society.

John Herbert Wilson.

Harrogate.

Pharmaceutical Chemists and Coroners' Inquests.

Sir,—Referring to the discussion at the last Council meeting, I wish to say that I know from experience that it is not at all uncommon for a pharmaceutical chemist to be summoned to serve on a jury, and that being so, he must attend at the time and place appointed. But by presenting a certified copy of the register to the presiding judge or coroner he can get released, because there are always more persons summoned than are really wanted, to provide for emergencies; not only so, but I find that coroners are yearly supplied with the calendar by the Secretary. Some time ago we were all advised to get a certified copy of the register of our own name from Bloomsbury Square, which could be done on payment of one shilling. It was on a small piece of paper and I pasted mine in the volume of the Journal that contains a copy of the Juries Act, so that by taking this book I was armed with all that was necessary to free me.

But what I wish more particularly to say is, that there is some little difficulty in keeping one's name off the list of persons liable to serve. When pharmaceutical chemists were first exempted, I, as local secretary for this town, was requested to see the vestry clerk and supply a list of pharmaceutical chemists, which I did, and saw the names erased from the official list. My surprise can therefore be imagined on being summoned not long after, but it was to serve on a grand jury for the Borough Sessions; this I found was a separate list altogether, in fact a sort of burgess list which had nothing to do with the county. I caused all our names to be crossed off this list and then I thought I was really free. But no, some two years later I received another precious document, and this was because I found it necessary to live away from business, and the house happened to be in an adjoining parish, and so my name had got on the county list in another parish. Since then, however, all has gone on well; but even now, if the various officers who compile these lists were to leave and fresh people be appointed, I should not at all be surprised if our names were put on again. It is about Easter when these lists are being made up, and it behoves all local secretaries to be on the alert both in town and country at that period, for it is a great nuisance to have to waste one's time and for which there is no recompense.

William Yates Brevitt.

Wolverhampton.

Borax as an Antiseptic.

Sir,—At the evening meeting of the Pharmaceutical Society held on March 7th, Mr. Robottom, in his very interesting remarks on the discovery of borax in Southern California, related a very remarkable and somewhat romantic incident. Travelling on one occasion, weary and unwell, across the bed of what had been at some former period, a vast salt lake, and from which "some hundreds of tons" of native borax are now dug out and obtained, he saw in his pathway the dead body of a horse, and upon it, with but little hesitation, sat himself down to rest. The sun was shining fiercely, and the water he was carrying was hot and unfit to drink. He, however, bathed his temples from the vessel containing it and felt refreshed. Then, with his mind bent on discovery, he commenced a *post-mortem* on the body of the horse. To his astonishment, though the temperature around him was almost too high for endurance, he found that no decomposition had taken place, but that on the contrary, the flesh, as such, was in a perfectly sound and good condition. On inquiry he was *told* that the carcase had been lying on the bed of borax, which was immediately underneath it, during the whole of the previous six months. Thereupon Mr. Robottom arrived at the conclusion, and it may be said very naturally so, that the borax had been instrumental in preserving the flesh, and in entirely preventing those putrefactive changes which under ordinary circumstances would inevitably have set in. Now if this were really the case the discovery would be of much value. For an account of some excellent experiments showing the effect of borax on substances readily capable of fermentation and putrefaction I would refer to a paper by J. B. Schnetzler (*Comptes Rendus*, lxxx., 473, *Pharmaceutical Journal*, 3rd series, v., 846), inserted in the 'Year-Book of Pharmacy' for 1875, page 332. Though, in these experiments, "Beaf, veal, and portions of sheeps' brain," were *wholly immersed* in a concentrated solution of borax, the result was not completely successful. There was no putrefaction, but the meat "had an odour *sui generis*." In the case, however, of the dead horse, not only had the borax kept intact the part with which it was immediately in contact, but, inferentially, the whole carcase had been brought successfully under its preservative influence. It is difficult to acquiesce in a conclusion such as this. Borax, in fact, possesses no such power. As an antiseptic it is inferior to boracic acid, whilst boracic acid must yield in turn to carbolic and benzoic acids. And yet meat will putrefy in an atmosphere of the latter though entirely cut off from contact with the outer air. How then, in the present instance, is the preservation of the body of the horse under a burning sun to be accounted for? Presuming the statement of Mr. Robottom's informant to be correct, it would seem to point to the probable truth of the germ theory. It is not impossible that in the wild and untrodden regions of Southern California, beyond and around the Sierra Nevada, the atmosphere, from its extreme and almost optical purity, together with its excessive dryness, causing particles of saline matter from the surface deposits to diffuse themselves through it, might be found incapable of propagating germ life. In an atmosphere such as this, decomposition would be slow, and even the experiments of Dr. Bastian might be reduced to *nil*. But, be this as it may, borax can scarcely exercise its antiseptic power except under the condition of actual contact. If it were otherwise, the grand problem of bringing animal food from the distant shores of Australia would be immediately solved. We might well wish for such a result, and it may be ours in time. In the meanwhile, it is instructive to learn the many and various uses to which borax may be advantageously applied, and at the same time deeply interesting to know that, henceforward, it will come to us in comparative purity, and without stint or limit, direct from the newly-discovered saline deposits of the "Far West."

King's College Hospital. W. WILLMOTT.

CASTOR OIL LOZENGES.

Sir,—In the *Pharmaceutical Journal* of Febuary 3, you drew attention to an anonymous letter which appeared in the *Lancet*, in which the writer implied that the so-called "Castor Oil Lozenges" contain a large quantity of calomel. As it is very important that every chemist should know something of the nature of what he is retailing, I write to state that within the last few days two specimens of lozenges have been brought under my notice for analysis. One lozenge was stamped "Castor Oil Lozenge" and purported to be made by a surgeon carrying on a retail business in the East End, and the other was marked "Aperient Lozenge" and was sold by a chemist at Deal. Both lozenges were pink in colour and flavoured with otto of rose, and on analysis proved to contain exactly three grains of calomel each. I am informed that the surgeon is doing a large business, both wholesale and retail in these lozenges.

The above result entirely corroborates the statement of the writer in the *Lancet*, and it is to be hoped that the persons dealing in these lozenges will caution their customers against a too free indulgence in them.

368, *Clapham Road, S.W.* A. RIVERS WILLSON.

HYDROBROMIC ACID BY FOTHERGILL'S PROCESS.

Sir,—When hydrobromic acid is made according to the formula of Dr. Fothergill, published in the last number of this Journal, viz., by adding tartaric acid to a solution of bromide of potassium, not nearly all the resulting bitartrate of potassium is deposited, and the stronger the solution of hydrobromic acid, the more bitartrate is apparently held dissolved thereby. A sample recently examined, containing 6·4 per cent. of acid, left on evaporation 3·7 per cent. of bitartrate. A fluid ounce of a second sample, containing 11·9 per cent. of acid, similarly treated, left 67·9 grains of residue, or about 14 per cent. Other samples examined gave no residue when evaporated, and had either been otherwise made, or if made by Fothergill's process had afterwards been distilled.

Manchester. ALFRED N. PALMER.

THE BRITISH PHARMACOPŒIA.

Sir,—A reprint of the British Pharmacopœia is soon to be published without alteration; but there is at least one which ought to be made, and that is in the strength or name of an Aqua which is peculiarly and dangerously different from all the others. I allude to the Aqua Laurocerasi (which a late mysterious death must recall to the recollection of most of us). The dose of this Aqua is 5 to 30 m., similar to that of Tinct. Opii, and yet it is classified with the Aquæ, the dose of which is in all other cases about ½oz. or more. This extreme difference seems to me not only dangerous but absurd, and I suggest either that the name be changed, or that its strength be reduced to that of the other Aquæ. W. S. CARMICHAEL, M.D.

5, *Haddington Place, Edinburgh.*

MILK OF SULPHUR.

Sir,—Is it not time that the uninteresting subject of milk of sulphur was dropped, to give place to some more inviting correspondence? Your correspondent, Mr. Robert Chipperfield, seems big with the importance of the subject, and looks like riding his hobby until he goes up in a "blue flame." It would indeed be a pity if the child of his imagination should hoist him in such a fashion, so please warn him in time so that his services may not be entirely lost to his loving brethren. If the authorities under the Food and Drugs Adulteration Act declared it to be illegal to sell the old well-known popular and valuable preparation of sulphur with lime, as "Milk of Sulphur," there is only one thing to be done and that is to "submit to the law," to the detriment of the public who will no longer get what they have been accustomed to and believe in. If public analysts and common informers—mind I do not class them together—wish for a wider field to display their zeal, there are scores of things which they can pounce upon, of more importance to the public at large, and also injurious, which the old-fashioned milk of sulphur is not.

March 12, 1877. LOYNE CESTRA.

P. D. Streber.—In dispensing copaiba, it matters little whether it be weighed or measured as its specific gravity averages ·950 to 1·000, which would be nearly that of water. As to the best modes of making the emulsion, this depends on the excipient, if liq. potassæ be the excipient it may be emulsified in a bottle; if mucilage, it must be triturated in a mortar; and the result in the latter case is more satisfactory if a little powdered gum arabic be added at the time to thicken the mucilage.

"*Invalid.*"—The eggs may be preserved by packing them with the small end downwards in clean dry salt, in barrels or tubs, and placing them in a cool and dry situation (Cooley).

X. Y. Z.—(who should have sent his name and address). —A successful candidate for a Bell Scholarship must attend the course in the next succeeding session.

"*Lumen.*"—We see nothing in the Regulations to prevent a man presenting himself a second time, provided that he is under the stated age.

"*Syrupus.*"—*Tortula intermedia.*

H. G.—We think troy ounces must be intended.

Y. E.—The so-called egg powders are generally only the ordinary "baking powders" with the addition of a little turmeric or other colouring matter.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Wilkinson, Mr. Clarke, Professor Dymock, Professor Landerer, Mr. Houghton, Mr. Wilson, Mr. Jackson, Mr. Thirlby, Invalid, Dispenser, J. A., W. B. C., G.

GLYCERINUM TRAGACANTHÆ.

BY J. C. THRESH.

Numerous suggestions have at various times been made for improving the pill masses of the Pharmacopœia, or rather such of them as acquire by keeping a consistence unsuitable for rolling into pills. This object it is generally sought to obtain by use of some more suitable excipient, which, without being hygroscopic shall still retain the mass in a plastic and readily diffusible condition. A mucilage of Tragacanth and Glycerine would appear most likely to fulfil these conditions, and has been recommended for the purpose by several pharmacists, but I am not aware that any one has undertaken a series of experiments for practically determining this point. As the subject appeared worthy of consideration I caused to be made, in September last, a series of the official pill masses made according to the official formulæ, and two other series of the same masses made up with Glycerine of Tragacanth.

The Glycerine of Tragacanth used for the two latter series varied in composition, the forms for which I will designate as No. 1 and No. 2.

No. 1—(Proctor's).

Pulv. Tragacanthæ	℥iij
Glycerini	℥ix
Aquæ	℥iv

Mix the gum and glycerine till smooth before adding the water.

No. 2.

Tragacanth. Pulv.	℥iii
Glycerini	℥vj
Aquæ	℥vj

Mix, as above.

The excipients thus prepared form an opaque and not very tenacious mass, but by keeping a few days they become almost transparent and very tenacious. If when the mucilage is being prepared, the whole be placed on the water-bath the same change takes place in a few minutes.

From each of the pill masses a small portion was taken and rolled into pills, and the whole placed in the shop store. Six months having elapsed since the pills were made, the whole have been submitted to examination, with the subjoined results. The references in this table are to the conditions of the masses, as being of suitable or unsuitable consistency for rolling into pills.

Name	B. P.	No. 1.	No. 2.
Pil. Aloes Bbd.	Good	Good	Good
„ „ et Ferri	Hard & brittle	Hard & brittle	Hard & brittle
„ „ et Myrrh	Ditto.	Ditto. (1)	Ditto.
„ Coloc. Co.	Like Stone	Good	Good
„ Cambog. Co.	Not rollable	Too tough	Good
„ Ipecac. Co.	Very good	Good (2)	Good (2)
„ Hyd. Subchl.	Good	Hard (3)	Hard (3)
„ Rhei. Co.	To hard	Good	Good
„ Scillæ Co.	Brittle	Very good	Very good
„ Saponis Co.	Hard (4)	Good	Good

(1).—This mass could be rolled out, though with great difficulty.

(2).—These masses were not, even when first made, as plastic as the B. P.

(3).—These were very hard, but when worked in the mortar formed a very good mass.

(4).—A very good mass when mixed with a little water.

With regard to the two forms of Tragacanth Mucilage, I see no reason for giving the preference to either, since the results obtained are the same, both with regard to consistency of mass when first formed, and after being kept for a length of time.

The following notes taken at the time when the masses were first prepared, may be of service in this inquiry, and as the masses formed by aid of Tragacanth and Glycerine No. 2, differed only from those made with No. 1, in being a little softer, I shall cease to mention them separately.

Pil. Aloes Bbd. (B. P.) A very good mass which rolled well.

Pil. Aloes Bbd. (G. T.) Required only half quantity of G. T., instead of Conserve; rolled well.

Pil. Aloes et Ferri (B. P.) Crumbly mass; rolled out with difficulty.

Pil. Aloes et Ferri (G. T.) 6½ drs. of pill powder made a good mass with 1½ drs. of Tragacanth paste; rolled readily.

Pil. Aloes et Myrrhæ (B. P.) A fairly good mass.

Pil. Aloes et Myrrhæ (G. T.) 3½ drs. of powder took 45 grs. of Tragacanth; the mass rolled well.

Pil. Cambogiæ Co. (B. P.) A good workable mass.

Pil. Cambogiæ Co. (G. T.) 5 drams powder required 1 dram glycerine, making a very good mass.

Pil. Coloc. Co. (B. P.) Tough mass, requiring to be rolled rapidly.

Pil. Coloc. Co. (G. T.) 22 parts of powder took 3⅜ Tragacanth and Glycerine; formed a good plastic mass.

Pil. Hyd. Subchlor. (B. P.) Greasy paint-like mass, rolling fairly well.

Pil. Hyd. Subchlor. (G. T.) 4 drams powder required 1¼ of the mucilage, making a good mass.

Pil. Ipecac. Co. (B. P.) (5 parts powder, 1 treacle.) A very good mass.

Pil. Ipecac. Co. (G. T.) Not so good a mass as the B. P., not being sufficiently adhesive.

Pil. Rhei Co. (B. P.) Very good mass; rolling well.

Pil. Rhei Co. (G. T.) 8½ drams powder took 2½ of excipient, forming a very nice mass.

Pil. Saponis Co. (B. P.) Rolling tolerably well.

Pil. Saponis Co. (G. T.) Opium 1, Sapo 3½, Glycerine of Tragacanth ½, (1 in 5); a very good mass.

Pil. Scillæ Co. (B. P.) Tough, easily worked mass.

Pil. Scillæ Co. (G. T.) Not so good as the official form.

It will be observed that the relative proportion of Tragacanth mucilage required to make up the various powders into a mass depends upon the nature of the powders, but the average proportion of this excipient appears to be 1 to 4. One part equals about 2 of conserve, or 1½ of treacle.

A further and most important consideration is the diffusibility of the pills made by aid of this medium, since an excipient may answer perfectly so far as regards the forming of substances into plastic masses, capable of forming pills which will retain their form, etc., yet if these pills, either have or acquire a condition rendering them difficult of disintegration, this would be an insuperable objection to the use of that excipient. Therefore to ascertain the action of fluids upon the pills made with Glycerine of Tragacanth, and to compare it with the action of the same fluid upon the official pills, a number of the various pills were placed in test tubes, ½ oz. water being added to each. The whole were then placed in a warm place, and occasionally shaken. In most cases the pills made with Tragacanth swelled to about double their original size, and but slightly coloured the water. They also retained their form after a number of hours, even when well shaken, but at once fell to pieces if squeezed with a rod. Some of the official pills, as the Pil. Rhei. Co., readily yielded to the action of water, others as Pil. Coloc. Co. have resisted this action for over thirty-six hours.

These tests are not satisfactory, since the action of the water does not represent the solvent action of the stomach's contents; but when a pill yields to water, there can be no doubt as to its exercising its proper action when taken into the system, whereas in the opposite case, there is necessarily a doubt which can only be cleared away by physiological experiments. I hope, however, by further investigations, to arrive at some more satisfactory results as to the diffusibility and action of pills made with the Tragacanth and Glycerine medium.

Granting, then, for the present, that pills made with this excipient are as active as those made with syrup, treacle or conserve, these experiments appear to justify the following conclusions:—

1st. That Glycerine and Tragacanth is totally useless for keeping the Pil. Aloes et Myrrhæ and Pil. Aloes et Ferri in a plastic condition, but that it makes with the latter a better pill mass (than conserve of roses) for immediate use.

2nd. That for Pil. Ipecac. Co. it is not so good an excipient as treacle. That its advantage in Pil. Hyd. Subchlor. is doubtful. When this pill is first made it is more cleanly, and rolls better, if made with tragacanth than when made with castor oil; and pills of the former kind, when placed in boxes with magnesia, do not acquire the unsightly appearance which the ordinary pills do. In Pil. Sapo. Co. the advantages are also doubtful.

3rd. In Pil. Aloes Bbd. and others of a similar character, the conserve is to be preferred.

4th. In Pil. Coloc. Co., Pil. Cambog. Co., the Glycerine medium answers admirably, and might with advantage be ordered by the Pharmacopœia for that purpose. In Pil. Rhei Co. and Pil. Scillæ Co., it also appears to possess advantages over the official excipients, but I would not take upon myself, without further trials, to recommend its being substituted for them.

On the whole, however, Glycerine and Tragacanth does not answer the expectations, and scarcely bears out the assertions of some who have recommended it. It is undoubtedly a very convenient substance to have upon the dispensing counter, as there are very few combinations which resist its persuasive powers, but it is equally undoubted that there are very few combinations for which an experienced dispenser cannot find a more suitable excipient.

Buxton, March 16, 1876.

COMPARATIVE EXAMINATION OF THE MORE IMPORTANT COMMERCIAL VARIETIES OF GALBANUM AND AMMONIACUM GUMS.*

III. COMPARISON OF GALBANUM WITH AMMONIACUM.

BY EDWARD HIRSCHSOHN.

(*Concluded from page* 712.)

A comparison of the results obtained with these two gum resins shows that quantitative analysis, as illustrated in the tables, gives a means of recognizing the commercial varieties of each gum and their falsifications, whilst the qualitative reactions sharply distinguish the two gum resins from each other. Especially the behaviour of the gum resins towards rectified petroleum furnishes an important test, since petroleum spirit that has been some time in contact with the gum resin should not when heated to 120° C. leave a residue exceeding 1 per cent. of the weight of the resin, otherwise an adulteration is indicated. In the case of galbanum an adulteration with sagapenum might be suspected. Also, the petroleum residue should not contain any sulphur, the presence of which might arise from sagapenum or asafœtida.

As will appear from the tables already given* the portion taken up by petroleum spirit (volatile oil) plus the ether residue (resin) should not in a good sample of Persian galbanum fall under 65 per cent; from the Levant galbanum in granis these residues should be not less than 63 per cent.; from galbanum in massis not under 60 per cent.; from ammoniacum in granis not under 66 per cent., and from ammoniacum in massis not under 55 per cent.

The amount of ash† may also be used in the estimation. From Persian or Levant galbanum in tears it should not exceed 4 per cent., from the Levant in lump not more than 6 per cent., from ammoniacum both in tear and in lump it should not exceed 3 per cent. in a good sample.

As a qualitative reaction to distinguish the varieties of galbanum, hydrochloric acid can be used, as it colours the Persian resin yellow red, passing into red, and the Levant different shades of violet. The petroleum spirit extracts from the Persian sorts gave with nitric acid a rose-red colour; those from the Levant sorts differing shades of violet. Bromine vapour coloured the Persian weakly or intensely violet, but coloured the Levant yellow.

The Persian and African ammoniacum may be distinguished from each other by chloride of lime solution, which colours the Persian orange, but produces no colour with the African.

Persian ammoniacum and galbanum may also be distinguished from each other by chloride of lime solution, which produces no change with any of the galbanums, whilst, as before mentioned, it colours Persian ammoniacum orange. To distinguish African ammoniacum from galbanum the behaviour of the gum resins with sulphuric acid and hydrochloric acid, and of the petroleum extracts with nitric acid and bromine vapour, may be used, as these reagents produce no noteworthy change on African ammoniacum.

Persian and African ammoniacum differ in the melting point of the resin, that of the former being from 40° to 50° C., that if the latter 36° C. An adulteration with olibanum or similar resins may be detected by the melting point, as olibanum does not melt until 75° C. is reached. Also, the ether-resin from all the samples of galbanum, upon boiling with water, gave indications of umbelliferon; this is not the case with Persian ammoniacum, which by similar treatment gave a body resembling phloridzin.

The two gum resins were both found to consist of a volatile oil, various resins, gum, sugar, dextrin, and bassorin like substances; besides which galbanum and African ammoniacum contain umbelliferon, and Persian ammoniacum the phloridzin-like body.

---

* From a memoir for which the gold "Suworow" medal has been awarded by the Medical Faculty of the University of Dorpat. (*Pharmaceutische Zeitschrift für Russland*, April 15, 1875, p. 225.)

* See before, pp. 531 and 711.
† See tables on pp. 430 and 711.

As to the origin of galbanum the author believes, from its varied behaviour with reagents, the different action of the volatile oils upon polarized light, and the different proportions of volatile oil to the gum resin, that it is derived from different plants. He also points out that the Levant galbanum occurring in commerce contains no fruit, and seldom stalks, but always slices of root, whilst the Persian galbanum always contains fruit and stalks.

IV. SAGAPENUM AND OPOPANAX.

Sagapenum.—As sagapenum is used for the adulteration of galbanum, the author included it in his researches. The following were the varieties examined:—

1. Sagapenum, from Bombay, presented to the Dorpat Institute by Professor Henkel. Irregular, moderately soft masses, formed of agglutinated bluish or greenish yellow translucent tears, mixed with rather a large quantity of thin stalk fragments. Smell resembling galbanum. Professor Henkel considered this specimen to be a galbanum, an opinion that was confirmed by the chemical reactions.

2. Sagapenum in massis, from the Dorpat collection. Agglutinated masses of a dirty dark olive-brown to almost black colour, rather soft in the interior; slightly translucent. Contains a little stalk débris, and possesses a strong garlic-like odour.

3. Sagapenum in massis, from the Dorpat collection (occurred in commerce in 1820 to 1830). Greenish white, soft, agglutinated masses, permeated with stalk débris, and smelling like No. 2.

4. Sagapenum electum, from the Lucae collection. Brownish yellow, slightly translucent, tolerably hard lumps, softening between the fingers, having a garlic-like odour, and containing stalk débris.

5. Sagapenum, London, 1873, sent by D. Hanbury to the Dorpat collection. Like No. 3, but formed from tears.

6. Sagapenum in granis, from the Dorpat collection. Various sized, angular or rounded reddish yellow-brown grains, moderately translucent to transparent. Fracture even and dull; easily powdered; smell not so strong as in preceding.

7. Sagapenum in granis, from the Lucae collection. Like No. 6.

8. Sagapenum ordinarium, from the Lucae collection. Similar to No. 5, but the small pieces more translucent.

Upon moistening a small piece with alcohol and treating with concentrated sulphuric acid, all these sorts of sagapenum dissolved with a dark brown colour, the solutions of Nos. 1, 6, 7, and 8 being carmine-red at the edges. Upon adding to these solutions two to three volumes of 95° alcohol, Nos. 2 to 5 formed light brown-red solutions, No. 1 a violet solution, and Nos. 6, 7, and 8 blue-violet solutions passing into blue. Water added to the sulphuric acid solution causes a deposition of a violet body.

Hydrochloric acid added to sagapenum moistened with alcohol gave with Nos. 2 to 5 yellow-red solutions, with Nos. 1, 6, 7, and 8 rose red, passing into violet, which in 6, 7, and 8 changed to blue violet, and finally to blue. By distillation in the vapour of water, No. 3 yielded 7·5 per cent. of a light sulphuretted oil, smelling intensely of garlic, which dissolved with a blood red colour in strong sulphuric acid, and with a blue-green, passing to a blue colour, in a mixture of chloral and chloral hydrate.

The quantitative estimations gave the following results:—

No.	Petroleum Spirit.		Ether.	Alcohol.	Water.	Residue.	Moisture.
	Vol. Oil.	Resin.					
1	5·98	0·3	38·85	3·50	29·23	18·68	3·72
2	13·59	2·30	58·99	2·40	10·74	8·46	3·52
3	12·83	3·57	54·70	2·88	16·85	5·18	2·99
4	16·94	5·10	41·26	3·09	20·37	10·54	2·70
5	10·55	3·68	37·00	2·06	25·61	19·12	2·03
6	9·63	6·26	27.21	3·04	21·42	30·09	2·35
7	7·37	9·20	38·78	3·13	29·00	11·39	1·18
8	7·34	12·86	37·14	2·46	25·95	12·44	1·81

The figures in this table show that the petroleum spirit residues were considerably greater than in any of the ammoniacums and in almost all the galbanums. Only a very few of the latter yielded a greater residue, and that residue was nearly all volatile, whilst the petroleum spirit residues from sagapenum, with the exception of No. 1, consisted of volatile oil and *non-volatile* resinous bodies.

Upon treating the petroleum spirit extracts with a few drops of solution of bromine in ether, a red, passing into violet, turbidity was produced in Nos. 2 to 5, and after a time a violet body changing to blue was deposited (resembling Persian galbanum). Nos. 1, 6, 7, and 8 gave no colour, but possibly there was a separation of a very small quantity of violet body (similar to Levant galbanum). Bromine vapour produced in Nos. 2 to 5 a very intense red-violet colour, passing to blue-violet; whilst in Nos. 1, 6, 7, and 8, only a yellow colour resulted. Frohde's reagent produced in Nos. 6, 7, and 8, first a carmine red colour, which became violet and finally blue; in No. 1 a very faint rose colour; and in Nos. 2 to 5 a yellow colour passing to blue. Hydrochloric acid produced with the petroleum spirit residues from Nos. 2 to 5, yellow-red solutions (similar to Persian galbanum); with Nos. 1, 6, 7, and 8 rose red solutions, which in 6, 7, and 8 passed through violet and blue-violet to blue; but No. 1 showed a redder violet. Chloral and chloral hydrate mixture coloured the residues from Nos. 2 to 5 green (like Persian galbanum), and those from Nos. 1, 6, 7, and 8 rose red to raspberry red, passing to violet (like the older specimens of Levant galbanum).

Upon deflagrating the petroleum spirit and the ether residues with saltpetre and testing for sulphuric acid, the presence of sulphur was recognized in all except No. 1. The residues from the ether extracts behaved exactly like those from galbanum, and also gave upon boiling with water a clear indication of umbelliferon. The alcohol residues behaved exactly like those from galbanum; sugar also was detected in them.

Water took up considerably more from sagapenum than from ammoniacum or galbanum, and the extracts behaved like those before described; they also contained an inactive mucus and a dextrin-like body. The insoluble residue consisted principally of a body resembling bassorin, besides stalk fragments and fruit.

The different behaviour of the sagapenums examined towards reagents indicated that they included two commercial varieties. No. 4 and 5 behaved exactly similar to the undoubted Persian sorts, Nos. 2 and 3, so that, notwithstanding their physical differences, the author is inclined to reckon them as Persian. Nos. 6, 7, and 8 he considers to be Levant sorts. No. 1, from its behaviour with petroleum spirit and reagents, he considers to be galbanum.

It is worthy of remark that in their behaviour towards reagents, Persian sagapenum and Persian galbanum so closely resemble each other, and the same may be said of the behaviour of Levant sagapenum and the older sorts of Levant galbanum.

As characters distinguishing sagapenum from galbanum and ammoniacum, therefore, may be used (1), the presence of sulphur in sagapenum, and (2), their behaviour towards petroleum spirit. Persian sagapenum yielding to it 2 to 5 per cent., and Levant 6 to 12 per cent. of resin, whilst the resinous residue from Persian galbanum amounted at the most to 0·2 to 0·3 per cent., and that from Levant galbanum to 1 per cent.

OPOPANAX.—The samples examined were as follows :—

1. Opopanax, in granis, from the Lucae collection.
2. Opopanax, from a Dorpat pharmacy.
3. Opopanax, in massis amygd. from the Lucae collection.
4. Opopanax, in massis, from the Lucae collection.
5. Opopanax (worm-eaten).
6. Opopanax, from Paris.
7. Opopanax, from the Lens collection.
8. Opopanax, from an old pharmacy.
9. Opopanax, frust. marm., from the Lucae collection.
10, 11, and 12. Opopanax, from the Dorpat collection.

Small pieces treated with alcohol and sulphuric acid gave yellow solutions, which with three times their volumes of alcohol added formed clear light yellow solutions. With hydrochloric acid a light yellow solution resulted. Solution of chloride of lime gave no reaction worth noting.

The quantitative examination gave the following results :—

No.	Petroleum Spirit.		Ether.	Alcohol.	Water.	Residue.	Moisture.
	Vol. Oil.	Resin.					
1	3·27	2·97	38·85	10·39	25·41	16·85	2·76
2	3·11	2·52	26·25	13·63	28·98	27·95	2·56
3	5·97	1·61	29·71	14·95	20·83	25·59	1·84
4	2·86	2·58	24·86	16·06	33·45	17·82	2·26
5	3·07	1·10	14·81	10·08	11·00	57·91	1·43
6	2·06	1·45	22·68	16·66	26·29	29·18	1·68
7	2·06	1·53	30·37	12·10	28·04	29·01	1·89
8	2·06	1·78	31·81	18·91	30·85	18·11	1·53
9	1·04	1·00	23·05	13·50	28·74	32·00	0·67
10	1·25	1·01	25·21	15·46	17·89	37·88	1·30
11	1·65	1·20	20·68	12·13	25·56	36·61	2·17
12	1·36	1·49	28·26	10·86	28·95	30·09	3·99

The petroleum spirit extracts upon heating to 120° C. left an odourless, oily, almost tasteless mass, amounting to 1 to 3 per cent. of the weight of the drug. Treated with strong sulphuric acid this resin dissolved with a yellow colour, which changed after a time to a faint red. Hydrochloric acid, nitric acid, solution of chloride of lime, and chloral and chloral hydrate gave no noteworthy reaction. Tested for sulphur the petroleum spirit residues gave negative results.

The residues from the ether extracts were brittle and dissolved readily in alcohol, the solution giving a plentiful precipitate with alcoholic solution of acetate of lead. Boiled with water the resin gave a faintly yellow intensely bitter liquid, with a strong acid reaction and becoming turbid on cooling; this liquid contained no umbelliferon. Acetate and subacetate of lead and subnitrate of mercury produced in it a plentiful precipitate; perchloride of iron a plentiful greenish grey precipitate. Solution of chloride of lime did not change the colour of this liquid, indicating the absence of a body resembling phloridzin. No umbelliferon was obtained by dry distillation of the resin.

Alcohol (95°) extracted considerably more from opopanax than from galbanum, ammoniacum, or sagapenum, and the residue when treated with water gave a strongly yellow coloured bitter liquid, having an acid reaction. Perchloride and protosulphate of iron gave with this solution a greenish brown precipitate, and more or less coloured precipitates were produced by acetate of lead and subnitrate of mercury. Fehling's solution and ammoniacal silver solution were reduced after gently warming. Solution of gelatine gave no precipitate; therefore neither sugar nor a body resembling gallic acid was present.

The residue from the watery extract behaved like those from the other gum resins, and contained an inactive mucus and a dextrin-like body.

The insoluble residue gave with solution of iodine an intensely blue colour, and consisted principally of stalk fragments.

The almost negative behaviour of sagapenum in the presence of reagents presents, therefore, a means of distinguishing it from the other gum resins referred to. But a more certain character is the proportionally large alcoholic residue that opopanax yields; the maximum from galbanum, ammoniacum, or sagapenum being 4 per cent., whilst the minimum quantity from opopanax is 10 per cent.

THE DETECTION OF ADULTERATIONS OF OLEUM THEOBROMÆ.*

BY GUSTAVUS RAMSPERGER.

In the list of queries of the American Pharmaceutical Association, the following occurs :—There is reason for believing that our oleum theobromæ is largely adulterated. How can the adulterations be detected, and to what extent do they exist?

The answer to this query is somewhat difficult, as there seems to be no perfectly reliable criterion by which to distinguish the adulterated cacao butter from the pure. The statements in the books of reference are conflicting, and differ in essential points. The U. S. Pharmacopœia gives no test for purity, neither does Wood and Bache.

The Pharmacopœa Germanica says: "Sit e subflavo album, odoris exigui proprii, saporis mitis, sebo ovillo rigidius, calore 30° liquescens."

The Pharmacopœia of Würtemburg puts the melting-point at 40°, the specific gravity at 0·89–0·91. The Belgian Pharmacopœia gives as the density 0·810.

Dorvault's 'Pharmacie Legale' gives the melting-point as at 242–5° C., and directs that ether be used for detecting adulterations, pure cacao butter being easily dissolved in 2 parts of ether at common temperature, the solution remaining clear, while when it is adulterated with tallow or wax, the solution becomes turbid.

Fehling's 'Handwörterbuch der Chemie' gives similar directions, and adds that if the solution gets turbid at 0° in less than ten minutes, the cocoa butter is adulterated; "the solution of pure cacao butter shows turbidity only after ten to fifteen minutes, such turbidity disappearing again at 19–20° C."

According to Hager, the pure cacao butter is soluble in 6 parts of anilin, and from the clear solution the pure cacao butter separates as a clear liquid layer; if the cacao butter contains tallow, then crystals and grains will separate.

Gmelin gives the specific gravity as 0·89–0·91, and the melting-point at 20–30° C.

Klenke in his 'Verfälschung der Nahrungsmittel,' puts the melting-point at 24–25° C., that of beef tallow at 30°, of mutton tallow at 35°, and of ox marrow at 37°, but considers the melting point as no sure criterion. He

* Read before the American Pharmaceutical Association.

says that drops of pure liquefied cacao butter dropped into warm water remain more or less globular, but if the cacao butter is adulterated with animal fat, the drops flatten, assuming a lenticular or discoid shape.

Muspratt gives the specific gravity as 0·90, but thinks it is not a test of purity.

The *American Journal of Pharmacy* (vol xxiii., p. 16) gives the melting point at 76° F., the congealing point at 60°F.

Mr. Henry W. Lincoln, of Boston, in a very interesting essay on this subject in the Proceedings of 1867, mentions also the test of dropping the cacao butter into warm water, and further says: "The best test, however, for any adulteration of cacao butter, is a cultivated taste, such as is only acquired by practice, similar to that employed by dealers in teas and wines, and can hardly be described. The point of fusibility is its first distinction. Bitten and placed on the tongue, its melts quickly and leaves no harsh taste, which it always does when adulterated with wax, spermaceti, tallow or stearin. Dropped on a warm iron it gives out its odour, and if adulterated largely, the peculiar odour of the article with which it is adulterated will be prominent. There is no doubt that it is sometimes largely adulterated, but although the writer has procured samples from various sources, he has not been able to find any that seems to be adulterated to any great extent, and he is confirmed in this by Dr. Hayes of Boston."

Dr. Squibb, in a discussion about suppositories during the convention of 1870, makes a rather sweeping statement in saying "all the cacao butter which is made is adulterated."

Hager and Jacobsen's 'Industrieblätter,' recommend the following method for the discovery of adulteration of butter: The butter is formed into candles, these are lighted, and then the light blown out, when an adulteration by tallow will be discovered by the smell. This a more troublesome, and as I found out by experiments, not more reliable test than the dropping on hot iron recommended by Mr. Lincoln.

This is now about all the information of any importance which I could gather as a guide to find out the best test for the purity of oleum theobromæ.

My experiments I began by preparing a quantity of pure cacao butter from Caracas beans by three different methods: expression, extraction by ether, and by bisulphide of carbon. The extraction by ether is less practical than by bisulphide of carbon, the former extracting with the fat a purple-coloured matter, while the later extracts the oil only.

To these three different portions of pure cacao butter I applied some of the above mentioned tests. In point of solubility in ether, and also in anilin, I found all three alike; not so, however, in their specific gravity and fusibility. The specific gravity of the first was found to be 0·850; of the second, 0·970; and of the third, 0·958. This great incongruity shows the unreliability of the specific gravity test. The melting point of two specimens I found 31–32° C., of the other 33–34° C.

Pure cacao butter dissolves easily within a few minutes at common temperature in 2 parts of ether, forming a clear solution, which sometimes separates after standing for awhile into two clear layers, the heavier layer (having the greatest bulk) being the larger one.

My experiments with butter of cacao and anilin (anilin from two different factories) gave a different result from that indicated by Hager. I found 1 part of butter of cacao soluble in 2 parts of anilin (not in 6 parts only), but the solution neither in the first-mentioned nor any other proportion ever separated into two layers. It is clear, but when concentrated somewhat thick, like very thin jelly. For the reason of this jelly-like appearance of the concentrated solution anilin is not quite so good a test for adulteration of butter of cacao with paraffin; the latter is a little soluble in anilin, the solution or mixture having a semitransparent gelatinous appearance. In ether paraffin is not soluble at a temperature below 0° C. At this temperature ether makes a perfectly clear solution, which at 35° C. congeals, and even diluted with 10 parts of ether forms a homogeneous, somewhat crystalline, and solid magma.

Having tested the pure ol. theobromæ, I made mixture in different proportions of it with several animal and vegetable fats, as beef and mutton tallow (freshly rendered and old), ox marrow with beeswax, Japan wax, Myrica wax, and spermaceti, and also with paraffin; then made solutions of them with different solvents, as ether, anilin, chloroform, bisulphide of carbon, oil of turpentine, and absolute alcohol, and subjected the mixtures and some of the solutions to the above-mentioned tests. As a result of this great number of experiments I found that none of these tests are infallible, but that several taken together would be a tolerably sure indication of the purity or adulteration of oleum theobromæ.

The best test I found to be ether. It indicated all admixtures which I had made to the cacao butter, with the exception of ox marrow, either directly by the turbidity of the solution of 1 part of the adulterated cacao butter in 2 parts of the ether (as is the case with the adulterations of tallow, bees-wax and bayberry-wax, and paraffin), or if not immediately after solution, then by becoming turbid after standing for some time, and by formation of little crystals and grains at the spontaneous evaporation of the solution, which crystals are not soluble again in 2 parts of ether at common temperature (this is the case with Japan wax and spermaceti with or without the addition of ox marrow). Anilin shows adulterations with tallow and wax almost as well as ether. The other above-mentioned solvents cannot be used as tests, all the different fats and wax being easily soluble in them, with the exception of bayberry-wax, which with chloroform only makes a clear solution.

Next to ether and anilin the taste seems to be the most reliable test. The dropping on hot iron or burning the mixtures with wicks, does not show plainly enough an adulteration with 25 per cent. of tallow, and of freshly rendered beef tallow even 50 per cent. could hardly be recognized. With Klenke's test I did not succeed; I was very seldom able to see any difference in the shape of the drops of cacao butter from that of tallow or ox marrow drops on water, the former expanding dish-like over the surface of the warm water about as much as the latter.

The specific gravity test is unreliable, as I have shown already. The same seems to be the case with the point of fusibility as a test; at least I found out that recently melted and recongealed cacao butter melts at a temperature several degrees lower than such as had been melted several weeks before. This may account for the conflicting statements about this point.

Guided by the result of the experiments made, I examined a dozen specimens of oleum theobromæ, which I had collected in different wholesale and retail stores. The result was as follows:

	Specific Gravity.	Melting-Point.	Taste.	Solution in Ether or Anilin.
No. 1,	0·850	31°C.	Pure.	Clear.
" 2,	0·897	33° C.	Pure.	Clear.
" 3,	0·900	31° C.	A little rancid.	Clear.
" 4,	0·874	30° C.	Pure.	Clear.
" 5,	0·976	34° C.	Not quite pure.	Turbid.
" 6,	0·938	32° C.	Pure.	Clear.
" 7,	0·979	34° C.	Very little rancid.	Clear.
" 8,	0·875	34° C.	Strongly rancid.	Very turbid.
" 9,	0·978	30° C.	Pure.	Clear.
" 10,	0·872	35° C.	Pure.	Very little turbid.
" 11,	0·919	33° C.	Pure.	Clear.
" 12,	0·959	30° C.	Rancid.	Clear.

This shows two or three adulterations among the dozen, one of them with tallow plainly recognizable.

In concluding, I must confess that the result of my labours is not quite satisfactory, because I did not succeed to find a sure test to distinguish ox marrow from cacao butter in the mixtures, but I shall continue my researches, and communicate the result, if any, at some later time.

MUSCARINE.*

BY O. SCHMIEDEBERG AND E. HARNACK.

Previous experiments upon the composition of muscarine gold chloride had indicated for it the empirical formula, $C_5H_{14}NO_2Cl + AuCl_3$, so that independently of the number of hydrogen atoms, muscarine appeared to be an isomer with betaine. Further investigation showed that free muscarine when heated yields a volatile base easily recognizable as trimethylamine. Muscarine was therefore assumed by the authors to be a trimethylammonium base, from which choline, or hydroxethylentrimethylammonium, differs, as it does from betaine, by containing an atom of oxygen less in the ethyl group. It had been supposed that upon the oxidation of choline by means of nitric acid betaine would be formed. Nevertheless as the identity of all the trimethylammonium bases isomeric with choline, but prepared in different ways, was not perfectly established, it was attempted by the authors first to obtain muscarine by oxidation of choline prepared from egg albumen. The experiments with potassium permanganate and chromic acid were negative, but by using concentrated nitric acid the conversion of this choline into muscarine was easily attained. It was believed, therefore, that the formation of betaine and muscarine takes place from isomeric choline bases. Experiment, however, gave no support to this assumption, for examination of the bases obtained from animal and vegetable sources, and described as choline, neurine, or sinkaline, showed that they were identical with one another, and with the synthetically prepared hydroxethylentrimethylammonium, and all yielded muscarine upon oxidation. The synthetic choline was obtained by the action of ethylenechlorhydrin upon aqueous trimethylamine at a temperature of 50° to 60°C. (Wurtz). The base was converted into the platinic salt and purified by recrystallization. The ethylenchlorhydrin was obtained by saturating ethylenglycol with hydrochloric acid gas, and heating in a closed tube to 100° (Wurtz). The glycol was obtained by boiling commercial ethylene bromide with an aqueous solution of potassium carbonate (Hüfner).

That the base contained in the fly fungus, and named aminitine, is also identical with choline, was apparent upon a comparison of the platinic compound. This occurs in large well formed klinorhombic tables, the sharp angles of which are mostly broken off, so that the crystals appear six-sided. The muscarine prepared from this choline was perfectly identical with that from the synthetic choline.

The identity of sinkaline with choline has been established by Claus and Keesé. The authors obtained the base from black mustard seed, and convinced themselves that its platinic salt had the same form as that of the synthetic choline, and that it could be converted into muscarine by oxidation.

The platinic salt of choline obtained from animal constituents presented several peculiarities, on account of the presence of impurities difficult to separate, so that it appeared to consist partially at least of a base differing from ethylene choline, but upon the removal of these impurities crystals were obtained identical with those of the synthetic choline.

In preparing choline from brain substance, a paste consisting of the brains of twenty-six oxen was boiled for two hours with a solution of barium hydrate, and from the evaporated filtrate an extract was prepared which was soluble in alcohol and in water; from an alcoholic solution the base was precipitated by platinic chloride. The precipitate, well washed with alcohol, did not dissolve completely in hot water, but left behind a brownish amorphous substance, of which a portion went into solution with a yellow colour when heated with much boiling water, but was deposited on cooling as a fine granular amorphous mass. Upon cooling the first aqueous solution, after concentration upon a water-bath, the platinic-compound of the brain base separated as a conglomerate of small slender irregular brownish-red crystals together with a quantity of a citron-yellow amorphous body, which could not altogether be removed by treatment with cold water or repeated recrystallizations. The choline platinochloride was therefore evaporated to dryness with excess of ammonium chloride and the residue extracted with absolute alcohol. The alcoholic solution, which contained choline chloride and was still slightly coloured, was evaporated, a portion of it was crystallized over sulphuric acid, the crystals spread on blotting paper, and placed without sulphuric acid under an air-tight glass bell until the blotting paper had absorbed all the mother liquor. The platinic compound prepared from choline chloride, thus purified, crystallized like the synthetic compound. The crude platinic compound prepared from the alcoholic extract of hens' eggs behaved similarly.

In the oxidation of choline to muscarine either the chloride or the platinic compound may be used, but the latter is the most suitable. The choline platinochloride is dried and powdered and concentrated nitric acid added; the mixture is then heated, at first gently until the solution of the platinic salt, and then the solution is evaporated, with careful stirring, rapidly to dryness. Excess of acid and non-nitrogenous decomposition products are removed from the mass after cooling by washing with alcohol, and the residue is treated with cold water which dissolves any unaltered choline platinochloride, and leaves the difficultly soluble muscarine compound. As the greater part of the choline escapes oxidation the filtrate may be evaporated and a fresh quantity of muscarine platinochloride obtained by submitting the residue to oxidation. It is preferable to repeat this operation several times rather than carry a single operation too far, but there is always a great loss of choline through the formation of by-products, especially if the action of nitrous acid be not avoided. The oxidation should always be carried on in the presence of the least possible quantity of water. With dilute nitric acid numerous by-products are formed, but sometimes no muscarine.

Betaine as a product of the oxidation of choline was not observed by the authors during their experiments, but no special search was made for it. The muscarine platinochloride obtained in this way was purified by recrystallization from hot water. It separated from the concentrated solution upon cooling in more or less well-formed octahedra, which seldom exceeded a pin's head in size, and were sometimes aggregated together. The compound had the composition $(C_5H_{14}NO_2Cl)_2 + Pl\,Cl_4 + 2H_2O$. Upon drying it did not give up its water of crystallization readily, the second molecule being lost only just previous to decomposition, which took place at 150° to 155° C.

Muscarine chloride can be obtained by evaporating an aqueous solution of the platinic compound with an excess of potassium chloride to dryness, and extracting with absolute alcohol which dissolves the muscarine. An excess of potassium chloride is necessary for the complete decomposition of the muscarine platinochloride. The potassium chloride may be still more perfectly removed by again evaporating this solution to dryness, treating the residue with absolute alcohol, adding to the alcoholic solution one-fourth its volume of chloroform and after a time filtering. From this solution, when concentrated, the muscarine chloride is deposited upon standing under an air-tight bell glass, frequently in large, colourless, shining, not quite regularly defined crystals, but principally in variously grouped needles or well-formed pointed prisms, which do not effloresce over sulphuric acid, and deliquesce rather readily in the air.

The muscarine hydroxide is obtained by treatment of the choride with moist silver oxide. It forms upon evaporation of the aqueous solution *in vacuo* a strongly alkaline readily deliquescent mass, which solidifies in a crystalline form in the exsiccator.

* Abstract from a paper in the *Archiv für Experimentelle Pathologie u. Pharmakologie*, vol. vi., p. 101.

The Pharmaceutical Journal.

SATURDAY, MARCH 24, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BOTANICAL PRIZE.

It has frequently been the subject of regret that the silver medal given annually by the Pharmaceutical Society for the best Herbarium collected under certain conditions does not evoke a greater amount of competition. We have therefore received with great interest the correspondence respecting it which was initiated by Mr. F. J. HANBURY, and consider it worthy of most careful perusal to see whether any of the suggestions put forward are calculated to remove any existing obstacles to a more general competition.

There are two points to be kept clearly in view in the consideration of the question: (1), the object specially sought to be attained by the foundation of the prize; and (2), the conditions which, while keeping this object strictly in view, will influence the greatest number of persons to compete and enable them do so upon the most equal terms.

The object, as fairly quoted by a correspondent this week from a quasi-official statement published about the time of the institution of the prize in 1856, was undoubtedly to infuse into the minds of the coming generation of pharmacists "a due appreciation and a "practical knowledge of the structure, characters, "classification and properties of plants, *especially* "*those which are comprised in the Materia Medica.*" The herbarium was adopted as a means to this end, because it was thought that in its collection the pharmaceutical student would be compelled to acquire an acquaintance with the rudiments of botany that would greatly facilitate his study of the plants more especially belonging to his department. This, therefore, does not seem to demand so much that the specimens should be rare, or even numerous, as that evidence should be given that they have been carefully studied and not merely collected.

A primary essential is that, so far as possible, the results should be measured by one standard. Consequently, Mr. HANBURY's recommendation that the nomenclature, sequence and numbering of one authority, such as the London Catalogue, should be followed, instead of leaving a choice, is an important one. Of course, it does not necessarily follow, because the collector following BENTHAM could only collect one *Rubus*, whilst another following HOOKER might collect forty, that the adjudicator would place the latter at an advantage of forty to one in his award, although the official statement that in estimating the merits of the collection not only the number of species but their rarity will be taken into account might be considered to imply as much. But there would be an advantage even in the avoidance of any ambiguity or cause of perplexity. Mr. HANBURY's suggestion that the student should be allowed to use herbaria as well as books to aid him in the naming of his specimens is also a good one, although we are inclined to think that this clause has not been so strictly interpreted according to the letter in the past as Mr. HANBURY would appear to think.

The limit of the age of competitors is another point worthy careful consideration. It is perhaps true that between the age of twenty-one and twenty-four a man might study botany with facilities he had never before possessed, but this only heightens the contrast when these conditions are compared with those of an apprentice still serving his time. We are decidedly of opinion that if the limit of age be extended, it will become necessary to divide the competitors into two classes, or else, so far as the prize is concerned, the younger students will give up the contest in sheer despair.

Another most important question arises as to how far mere number or rarity of the specimens should affect the competitor's position with respect to the prize. We confess that the words in the regulations, already quoted, give some colouring to our correspondent's assertion that the man who lives in the richest botanical district, and has the most time to spare and the deepest pocket, will infallibly carry off the prize from a less fortunate and poorer competitor. We are almost sorry to note that it is now tacitly assumed that a herbarium to have a chance of success must contain five or six hundred plants. Seeing that the bulk of the working time for collection must be concentrated within six or eight months, a simple calculation will show how utterly futile it would be for many of our younger friends, for whose special benefit the prize is supposed to exist, to expect to find the spare time, or even the spare money, necessary for gathering so great a number. It is worthy of consideration how far Professor BENTLEY's suggestion might be utilized to meet this difficulty, in the marking out of botanical districts to one of which each collector should be limited. But at least equal in value is the suggestion made this week by "A Former Competitor," that the illustration of species by dissections and descriptions of the distinctive characters and properties should have their value in the estimation for the final award. There would also be this further advantage that some of the work could then be done during the winter months.

As the time has so nearly arrived when the usual annual announcement concerning the botanical prize will have to be made for next year, it may not be practicable to make any alterations in the regulations at present. But nevertheless in calling attention to the subject, and expressing his views upon it, we consider Mr. Hanbury has done useful service.

JAPANESE HYDROPATHY.

One of the most remarkable national transformations of modern times has doubtless been that which has resulted from the introduction of the civilization of the West into Japan, and prompted her sons to compete for wranglerships at Cambridge. Already there has been created in Yeddo a Faculty of Medicine, where the science is taught to native pupils according to European notions by professors drawn from Germany, and more recently help has been requested from France to assist in the establishment of a Faculty of Law, and the organization of a system of superior education in the capital of Japan. In aid of this movement MM. Mangeot and Berson have been charged with a scientific mission by the French Government, at whose request the Academy of Medicine has presented a scheme drawn up by M. Jules Lefort, to assist them in the systematic investigation of the geology, mineralogy, volcanoes and mineral waters of the country. From this report we borrow a few details.

The mineral and thermal springs of Japan are known to be very numerous and many of them of a high temperature; in fact, it is asserted that only Japanese who are accustomed to very hot water from their infancy are able to bathe in some of them, and it is probable that their virtues are occasionally entirely due to their elevated temperature. But most of the springs may be included in one of two classes, the sulphurous and the chlorinated, the ferruginous waters being very few. One of the most frequented, that of Kourats, about fifty leagues from Yeddo, was found upon analysis to contain per litre 1·34 gram of free sulphuric acid, 2·20 grams of sulphates (mostly aluminum), 0·85 gram of free hydrochloric acid, and an abundance of sulphydric acid.

The methods of using the waters appear to be very primitive. For applying the *douche* the water is conducted in troughs to a point from which it has a fall of several metres upon the bather, who receives it upon the part of his body affected, the duration of the operation being limited only by the patience of the patient. When the water is too hot for this method, and in one case it reaches 91° C., instead of lowering the temperature, as in Europe, by the addition of fresh water or exposure to the air, a number of attendants beat the water with flat boards, scattering about a plentiful spray and disengaging volumes of sulphurous vapour which envelop the bathers in a semi-transparent cloud.

The bath, therefore, in this case partakes pretty closely of the nature of a vapour bath, and it is evident that the portion of water which reaches the bathers may differ very considerably in its constituents from the bulk as it issues from the spring.

YORKSHIRE COLLEGE OF SCIENCE, LEEDS.

The Council have just arranged for the purchase of the Beech Grove Hall Estate, comprising about 3½ acres, and situated a mile from the more central of the railway stations, and within sight of the Grammar School. The sum to be paid to the vendor is £13,000. It has also been decided to add to the curriculum Chairs of English Literature and Classics, experience showing that many candidates for science degrees require instruction in these subjects.

The amount promised to the college is now about £43,000, besides the endowments received from the Company of Clothworkers and the trustees of the Akroyd Charity.

THE CHEMICAL SOCIETY'S DINNER.

On Tuesday last the President, Fellows and Friends of the Chemical Society dined together at Willis's Rooms. About 200 sat down to dinner. The toast of "Armed Science and its Representatives" was responded to by the Inspector-General of Fortifications, the Director of Artillery, and the Assistant-Director of Naval Ordnance; that of "The Learned Societies," by Professor Huxley and Mr. Bramwell, C.E. "Success to the Chemical Society" was proposed by Professor Odling. We are informed that the Worshipful Company of Clothworkers and the Worshipful Company of Merchant Taylors have each contributed one hundred guineas towards the Society's Research Fund.

We regret to learn of the destruction by fire, on the 16th inst., of Cumbernauld House, which had been recently leased to Mr. Daniel Frazer, of Glasgow, and was at the time in the hands of the workmen preparatory to his taking possession. The house was an old baronial mansion, built in 1731 by John, sixth Earl of Wigtown. It is curious to note that on another page Mr. Frazer is recorded as having recently lectured on Fire as one of Man's Servants.

Mr. A. P. Luff, Pharmaceutical Chemist, and formerly a "Bell Scholar" in the School of Pharmacy Bloomsbury Square, has been appointed Demonstrator of Chemistry in St. Mary's Hospital, Paddington.

An application made by a lady, who had kept a homœopathic pharmacy fifteen years, for registration as a chemist and druggist under the section of the Ontario Pharmacy Act, which saves the rights of persons engaged in business prior to the date of its passing, has been refused on the ground that the law does not apply to dealers in homœopathic medicines.

As will be seen by the advertisement on another page, the Calendar of the Pharmaceutical Society is now ready, and may be had upon application to the Secretary

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

The sixth meeting of the present session was held in the Society's Rooms, 119A, George Street, Edinburgh, on the evening of Wednesday, March 14, Mr. Wm. Gilmour, President of the Branch, in the chair, when the following paper was read—

BOTANY, IN REFERENCE TO SOME MODERN SPECULATIONS.

BY HENRY B. BAILDON, B.A.

Mr. President and Gentlemen,—My paper, to-night, is in some sort a continuation of the previous one on chemistry, although neither mutually nor individually are they so logically arranged as I could wish. Before commencing, I would like to guard against misapprehension on the part of those who are now present, or who may read any report that may appear of what is said. In the first place, if I have occasion to refer to great and well-known scientific names, and, it may be, to endeavour to show their conclusions to be erroneous, let it not be thought that I would for one moment compare myself with them in point of knowledge of facts, but rather that I think myself, or any sane person, quite competent to combat their conclusions from mutually admitted facts. In the second, I do not wish it to be thought, that my arguments are intended to support any special religious view or scheme. That our view of nature must affect our religious belief there is no doubt, but to press conclusions home into the region of religious conviction would be here extremely out of place.

In resuming our subject I would ask you first to look broadly and generally on the contents of the universe, and mark the two great divisions into which the whole may be divided. They may be denominated Force and Matter. But let us at once guard against the crude error of supposing that because these two between them embrace all phenomena, that either of them is necessarily homogeneous, so to speak, that is, that either all force or all matter is the same in kind. They are mere generalizations, and are incapable of definition or conception apart from each other. Force is that which moves, changes, constructs, organizes, animates matter, while matter is that which is moved, changed, constructed, organized by force. Force acts, matter is acted on. Force is the active, matter the passive. Let us bear in mind that at this point we have attained to no knowledge regarding either force or matter, but have simply agreed to use these two words as equivalent to the active and the passive states of being in the universe. It is just like the beginning of a sum in algebra, when we write down—Let $x =$ so and so and $y =$ some other thing, both unknown for the time, and only ascertained at the conclusion of the problem. We cannot go further back and define either force or matter more simply. It cannot be said that matter is that which is perceptible by our senses, for apart from force it is not perceptible. So at the outset we must content ourselves with agreeing to make force stand for all the active, and matter for all the passive. There are a series of relations between force and matter, which by the nature of things and the constitution of our minds we are compelled to regard as distinct.

The lowest and most universal we must style mechanical or dynamic though the phrase is not specially happy. All matter is subject to, and is even to be regarded as constantly under the influence of this mode of force. Newton's announcement of universal gravitation referred to this moving or mechanical force, as existing between every particle of matter and every other, and drawing them together by a force inversely proportional to the square of their distance. Molecular force may also be classed as mechanical, and indeed, as I suggested before, may be absolutely identical with gravitation. The definition of this force authoritatively given is "That which produces or tends to produce motion. Under the spell of this force every particle of matter animate or inanimate lies. But it will be clear to you that such a definition does not apply except in an indirect or metaphorical manner to all force, so although this force is a universal it is not the only force. Indeed the next mode of force we come to consider is also universal, though not constant in the sense that gravitation is; it is known as chemical. Now, if we may regard gravitation as the *constant* force possessed by each particle in common with every other by virtue of its being in some respects *identical* in quality with all these, chemical affinity must be regarded as a *varying* force possessed by each kind of matter by virtue of its *differing* from other kinds. No chemical affinity exists between substances chemically identical. Instead of like drawing to like it is unlike to unlike. This, I think, is as near as we can get to a definition of chemistry or chemic force. The one may be called the study of the differences of matter, the other that force which binds the different kinds of matter together. Hence chemical affinity is a very distinct phase of force to the mechanical or motor, represented by gravitation. Before proceeding to the higher modes of force, it will be well to note a mode which seems to take rank between the chemical and the organizing, and still to bear a relationship to the mechanical; it is the constructive or crystallic, which arranges matter into definite forms, and is for inanimate matter what the organic is for vitalized. It represents nature's primal effort at definite and beautiful form. But on this point we must not linger, seeing we are not yet over the threshold of our proper subject.

Those forces or modes of force which we have already noted are those which influence all matter, whether animate or inanimate, dead or living, but that which now comes to be treated of is peculiar to living or vitalized matter. And here it must be admitted lies no small difficulty, for in living organisms both mechanical and chemical forces are constantly at work, so that it becomes frequently a very perplexing point to decide as to whether certain phenomena are due solely to chemical or mechanical agency, or are to be attributed to a special vital force. While the attempt is constantly being made to explain all vital phenomena on purely mechanical and chemical grounds, it may safely be said that such attempts, however far they may have seemed to succeed, have never attained anything like complete and permanent success. I will, therefore, make bold to assert that neither chemical nor mechanical force, nor the two combined, ever yet produced an organism. It will, therefore, be the most distinctive title to confer on this phase of force peculiar to living matter if we call it organic, meaning by that term the force which forms and maintains organisms. It is usual to divide these organisms into two classes, vegetable and animal, although there is no doubt that primitive organisms are so slightly differentiated that it is a delicate task to assign some of them their respective class. This evening we shall confine ourselves to the consideration of vegetable organisms.

In vegetable life the simplest organism is the *cell*, which is to botany what the atom and the particle are in chemical and mechanical science. A plant may be said to consist of one or more cells; when matter is organized into a living cell that cell is a plant (or animal). There is sometimes a distinction made between cells and vessels; but it seems to me an arbitrary and dangerous one, for it is quite impossible to mark the point where the one passes into the other, and the best authorities seem to agree in regarding the so-called vessels as modified cells. It is, therefore, perfectly correct to say that a plant consists of one or more cells. The characteristic of cell is that it has an inside and an outside, an envelope, and something enveloped, unlike the particle and the atom, which are conceived of as solid and homogeneous. Let us consider, then, this cell as it exists in its simplest and most primitive form, a new-born being amid dead deserts of matter, a plant complete in all its functions, and yet but a tiny bag of matter without a single defined organ. We would fain surprise this marvellous entity at the moment of its making; catch, as it were, the maker or makers tool in hand. We are anxious to know the receipt for this genuine elixir of life, and we shall be, I suspect, like the alchemists of old, for ever on the verge of its discovery. Scientific men are not even agreed as to whether this organism can arise spontaneously, as it is called, or whether germs must be present before the plant can be produced. Whichever way it be, the wonder, the miracle is the same. Nature seems smilingly to confront us like a confident and accomplished *prestidigitateur*, when he says to the audience, in regard to a trick he has just performed, "Oh, it's quite simple! That's how it's done!" and no one is a bit the wiser. So nature's miracles are worked before our eyes, and she seems to say "Oh, I've no secrets, no concealments, I assure you! That's how it's done!" and we gaze at the proceeding up a telescope or down a microscope, and rub our eyes exactly as wise as ever. Yes, this simple cell marks an era in creation; it is the tiny ancestor of all plant-life. That from so simple and apparently insignificant a beginning, the whole of the plant system, from the lowliest lichen that grains the bared boulder with silver, emerald, crimson and ebon to the stateliest mountain pine and the delicate sweet-breathed primrose of the wood, should have been slowly evolved throughout the patient centuries ere eye of man beheld them, seems an idea so stupendous as to be almost incredible. Yet it is an idea not degrading nor humiliating, not irreverent nor revolting, but sublime, and solemn, and beautiful. Its contemplation bows the spirit down with a sense of infinitude, akin to that we experience as we gaze upward on the countless companies of stars, and strive to realize somewhat their magnitude and distance, till the mind falls back abashed from the enterprise. Equally impossible is it for us to trace in imagination those gradual and imperceptible mutations, those insidious invisible changes by which this astounding evolution has been accomplished. In all this there is for the mind, though at first inclined to start aside from the apparent incredibility of the notion, a fascination almost irresistible. For this conception of the history and origin of vegetation appeals to two of the strongest and seemingly antagonistic mental instincts of man, the delight in the marvellous and the passion for simplicity.

From what I have just said it might be expected that I should declare myself an euthusiastic Darwinite. But I am not. I have read a great part of Mr. Darwin's 'Origin of Species,' and although he certainly does remove many apparent objections, brings forward much that tends to show that great modifications have taken place in structure and that the difference between species and variety is chiefly in degree, and has gallantly assailed several very formidable difficulties in the way of accepting his theories, still on the whole there is very little that is conclusive or quite satisfactory in the work. But this should not occasion surprise nor should it be considered derogatory to Mr. Darwin's merits as an investigator, seeing how vast is the field he has undertaken to explore and how extremely fragmentary and imperfect is the record we at present possess of the past history of our globe. He is continually compelled to pull up short with the admission that too little is known to warrant conclusions. But there is about his writing a conspicuous candour in admitting the magnitude of the difficulties his theory encounters, while, at the same time, he vigorously defends his position. The main points in his favour are these:—the extensive modifications producible on plants and animals under domestication with artificial selection; some remarkable cases of reversion in various breeds to certain characteristics of a common ancestor; the close anatomical similarity in particular points observable in creatures of extreme diversity; the existence of rudimentary organs; and last, but not least, the absence of any definite opposition theory on an adequate scientific basis. The weakness in Darwin's Darwinism seems to me to lie in the insufficiency of his great factors, the struggle for existence or survival of the fittest and sexual selections to account for all forms of life. I will not attempt at present to go into details, but must be content to observe generally that the survival of the fittest is a most objectionably elastic phrase, which sometimes comes to mean merely the survival of the survivors, and, as regards sexual selection, to which Mr. Darwin attributes so much, while he has shown the operation of the principle he has forgotten to account for the origin of the instinct for the beautiful thus assumed as existing in animals. If the above statements as to the present condition of the controversy are correct, it follows that while a strong case may be made out for evolution as a fact, the Darwinian modes of accounting for this fact have not as yet proved themselves efficient.

Assuming the foregoing to be valid, I would proceed to strengthen the case for evolution (considered as a fact) by pointing out the notable analogy between life generally considered as an evolute, and the origin and history of the individual life. If it is thought incredible that in the course of long ages the various forms of life should have been developed from a small and simple origin, is it not equally incredible that a highly organized plant or animal can be evolved from a minute spermatazoon or seed in the space of a few weeks or months? Yet we contemplate the wonderful birth evolution daily without surprise, because it has become so familiar and is, indeed, so universal. Nor does the use of the term evolution in regard to the genesis of the individual lack some confirmation from clear fact, for the embryo does in a manner seem to pass through evolutionary stages, and the embryos of widely different species, even belonging to different classes, are at some stages indistinguishable. Evolution is, indeed, but the generalization or fulfilment of the dictum, *Natura non habet saltum*, wherein lies the alpha and omega of physical science. Whoever admits this maxim to be universally true is not only entitled but committed to a belief in evolution, whatever cause or causes he may have to assign for the phenomenon. If there have been no leaps or breaks in nature, either in the present or the past, creation has been an evolutionary, gradual process, as all growth is, and not a series of creative efforts after which the creatures produced were, so to speak, left to take their chance. It is extremely unfortunate that the term creation should have become so narrowed in meaning as to be applied only to a sudden instantaneous calling into being of what before had no sort of existence. From this it arose, that Mr. Darwin, while able as a man of science, was too little of a philosopher to avoid the use of this word in this very sense. Thus, in his anxiety to avow his deism, he banishes the action of his Deity to a remote period of the past, leaving him as it were at the very verge of his own universe, in such a position, too, that he must recede continually before the advance of science. That Mr. Darwin by no means intended to leave the deistic idea in this perilous position may well be believed; it was his ill-timed zeal in giving his bow of belief at the end of a volume which he could not but be aware was of an atheistic flavour, that did most of the mischief. His followers have seen the weakness of his position, and have many of them gone on to atheism. Now I trust I shall not be misunderstood, but that you will bear with me till I have fully explained myself, when I say that science must always be in a sense atheistic. By atheistic here is meant not what denies deity but what leaves it out of account. Science, so far as it seeks to pierce to causes and not merely record and classify facts, seeks only the particular, finite, intelligible or secondary cause, and has no concern with the universal, infinite, or first cause. When, for example, we say to a child that God made such and such a thing, we give the child no scientific information whatsoever, though we impart a religious truth. If, however, we proceed to give a scientific account of its origin, we find ourselves unable to exhibit the deity as acting in the matter, except at the point where our knowledge of particular causes ceases, when we are reduced to a simple acknowledgment of ignorance or reference again to the deity as an immediate agent. Here there is apparent the necessary and inevitable antithesis between the religious or theologic and the scientific aspect of nature. Now this fact that of necessity science must look at things from the atheistic standpoint deprives its apparently atheistic drift of all final significance as militating against a belief in the deity. For it only arrives at the point from which it started. Having assumed the causes of phenomena to be finite, intelligible, natural, it comes back with the same belief; for time and space, the great magicians, work the miracle of breaking up the infinite into an infinity of finites, each intelligible in detail. Still the true province of science is not the discovery of the ultimate reason or cause of phenomena; its true function is to observe, discover, register, classify, and accurately denominate and particularize phenomena; the other is the function of philosophy. And the simplest way of discriminating the aims of these two is to say, philosophy seeks an answer to the question, Why, by what cause and for what reason is a thing so? Science asks merely, How, in what manner, by what stages does a thing become so? Philosophy seeks to comprehend, science merely to know. Science must thus invariably form the material to which philosophy seeks to give shape, or the substratum or foundation over which philosophy builds. We are rather apt to imagine science to be a modern growth, whereas in fact it begins with the beginning of man, being at first small in the number of facts known and almost devoid of classification. But the veriest savage knows a certain number of facts and has probably discriminated them into classes in his mind, and this is as much science in *kind* as the works of a Faraday. This, no doubt, is putting an extreme case; but when we are told that Solomon knew every plant, from the cedar to the hyssop, it is clear that he is entitled to be called a scientific man (however little we may know of his system of classification) just as much as a Darwin or a Huxley. Upon his science, then, whether it be the few and ill-assorted facts of the savage, the extensive acquirements of a Solomon, or the great and carefully classified information of a modern scientist, does a man found his rationale of things, in short his philosophy. The distinction thus indicated is highly important in this regard that, as the functions of science and philosophy differ, so also do the mental faculties which they call into play and require for their prosecution. Hence a man may distinguish himself in science and yet prove a mere tyro and blunderer in philosophy, while another ill-adapted for laborious observation, calculation and experiment may wield the results of science in a masterly manner to philosophic ends. The requisite faculties and tastes for both might be combined, it is true, but we must bear in mind that the probabilities are greatly against such a combination and therefore should be chary of accepting the attempted philosophy of a scientific man, as though it were necessarily of authoritative weight. In the converse case the warning is not so necessary, perhaps, as a philosophic writer usually prefers reference to acknowledged scientific authority to original investigation. By all means let science become as powerful and perfect as she can, but let her not be suffered to lay on our souls the yoke of a coarse and mechanical philosophy.

Before we leave the consideration of the evolutionary hypothesis as a general scheme, I would like to state as clearly as I can what my own conception with regard to the creation or origin of the physical universe is, in order that you may perceive the drift of my remarks. Of course it is merely an individual opinion or belief, the result of the interaction of my individual mind and the facts which have been laid before it. It is best expressed by saying that I conceive the becoming of physical phenomena to have been evolutionary as to mode, but miraculous or divine as to cause. To illustrate more definitely I would say, that if a human being had awoke to intelligence and consciousness at any period of the creative process, howsoever remote, and had been a perpetual witness of it up to the present time, it would have presented to that mind a series of gradual changes and imperceptible mutations as apparently natural as the aspect of nature we now ourselves perceive; but, at the same time, that the process thus perceived was not automatic, still less accidental or tentative, not the result of a fortuitous concourse of atoms but the work of the supreme and external power of whom it has been sublimely said, that with Him, "One day is as a thousand years, and a thousand years as one day" Such a creed appears to me to include and sublate in itself the theologic and the scientific creeds, and in this position the mind may abide without any fear that new facts or novel theories can imperil its security or invade its peace.

Let us now revert from these generalities to consider more in detail the phenonomena of vegetable vitality, the manifestations of vital force. In doing so, we naturally commence with the lower phases of plant-life. Now there is a certain modern school of philosophy, if it be worthy of that august title, which is so eager to exercise a destructive dialectic and disintegrate thought into an irrational chaos, that its exponents might cavil at the use of such terms as lower and higher, and demand at the outset a justification of their employment. Let it be remembered, then, that we are men, and as such, either really the highest visible phase of being on the earth or, at the lowest, are compelled by some inherent conceit to think ourselves such. The main characteristics of man are that he lives, moves, thinks, feels, wills. Inanimate matter is incapable of any of these actions and thus stands as the antithesis to man at the bottom of the scale of being. Between the two extremes there are a series of delicate gradations. That, then, which is further from man by defect of these powers and nearer to mere matter, we are justified in calling lower than that which approaches man in these faculties. If we add that in man the functions are more specialized, we shall be in a position to arrange creation in its true order. There are no doubt many cases in which it might seem difficult to balance claims. It might be pleaded that an oak is higher than an earthworm or some low parasitic form of animal life. But we are, nevertheless, justified in saying that an animal is higher than a plant, because an animal can be produced possessing faculties more nearly approaching the human, than any plant does. It is perfectly legitimate, then, to class all flowerless plants, *i.e.*, those which do not specialize their reproductive organs, as lower than flowering plants, and also to assign to what are called cellular plants a lowlier position than those exhibiting a varied tissue.

There is no objection, then, to our calling, as all scientific men do, the Algæ, Lichenes, and Fungi the lowest orders of plants. It is remarkable, with regard to the two former, on what a slender and hard fare they seem able to exist. Well fitted do they seem to be the first hardy colonists of a naked planet, while as yet there was no true soil formed, and the one had to bivouac on the rude boulder and cliff, and the other fastened upon the submerged rock, the first missionaries of life to a sterile land and a barren ocean. The one to weave with lithe green arms the wondrous labyrinth of submarine vegetation, the haunt of forms of strange beauty and horror, as though they were not meant for the gaze of man; the other working humbly and, it would seem unselfishly, by insensible accumulations preparing the place for another till it dies the victim of its own industry, and yields to a workman the modest moss, more active but hardly any prouder, building itself up by its own decay, and yielding with no less pathetic self-surrender. Beautiful is it to observe these two still at their silent labours, covering with secret assiduity the nudities of nature, or borne on the great trunk or limbs of a forest tree whose life their bygone generations had laboured to make possible. To the fungi seems to belong, in the main, the less noble function of promoting and flourishing by the decay of organisms higher than themselves. Some indeed appear of purer instinct and sweeter feeding, as the creamy skinned mushroom with its dainty flesh-pink gills; but for the most part the fungus is a minister of decay and corruption. On the dank and moribund tree-stump its blackened, rot-bringing ridges extend; it squats in dark hollow of the fated trunk, curling its cancerous lip, as though it were some imp of corruption leering in malign pleasure over its anticipated triumph,—at once the slow assassin and the sexton of its nobler fellows. Still it is as much the servant of nature as others of gentler office. So long as an organism can retain its vital activity, and thus keep on duty, as it were, the matter it has absorbed into itself, nature seems to lend willingly enough. But as soon as the vitality flags, nature with stern economy demands back the loan, and despatches her certain ministers of decay to restore it again to her bosom. From this view of the diverse functions of these classes of plants, it will be amply evident that either the Algæ or the Lichenes must be the primal order of vegetable organisms, because there must first be life, before there can arise that mode of life which subsists by decay. One might expatiate long on the variety and beauty of these humble ranks of plant-life. It would be difficult to over-estimate the precious effect of the Lichenes alone in adding to the delight we reap from the appearance of natural objects. Even in looking at a wide landscape we must always owe somewhat to these lowly artists. On the boles and even the branches of the trees, and on ruin, cottage, fence, wall, and boulder, they have been at work, and with their silvery whites and greys, cool greens and bold blackness, must have greatly assisted in producing those subtle harmonies of tone and colour which delight our æsthetic sense. By this agency it is that the artificial structures of man are reconquered into the realm of nature. And if we look more closely every stone appears a study of colour and of blending arabesque outlines. To the Algæ also, apart from the strange splendours of submarine vegetation, we owe much of beauty that is visible from the land. To their presence, I apprehend, is partly due that play of shoaling colours, mainly green and purple, near the shore, which is one of the most brilliant and gorgeous aspects of the sea. Such are a few mere random hints on an extensive subject.

It is both according to the natural and the acknowledged order, if we now proceed to consider the Filices, Equisetaceæ, Musci, and Lycopodia, the Ferns, Horsetails, Mosses, and Lycopods. Here first of all we find the plant aspiring to rear itself above the earth, and it is significant that, in order to do this, it also descends into the earth. The stem and the root appear simultaneously, and seem to involve and imply each other. Hitherto the functions of nutrition and assimilation have been carried on by the general surface of the plant, now a certain portion is directed downwards in search of nutriment of one kind, and one directed upward to reach influences and support of another kind. The former we call the root, the latter the stem. The plant in this stage is more individual, more distinctly a vegetable ego or self than in the lower forms, and asserts more clearly its vital properties. The root exhibits faculties separated from anything merely mechanical or chemical by an impassible gulf, faculties such as its selective power, which is thus described by De Saussure:—"Each plant can take up from the soil a different amount of each substance contained in it, even though these substances should be all in the same proportion in the soil originally; in other words roots have a selective power, and only take up what is necessary to life, and that too, in the proper proportions." And the proposition that this power is super-mechanical, may be maintained even in the face of such ingenious suggestions as that of the same author who contends that the preference of a plant for one substance before another in the same liquid, is due to the different degrees of fluidity or viscosity of the different substances; so that the roots of plants are filters of the most perfect and delicate description possible. This will not do; for it is surely incorrect to conceive a liquid containing different salts in solution as consisting of solutions of differing degrees of fluidity and viscosity. This viscosity depends on the aggregate of the dissolved substances, and is constant throughout the liquid when solution is perfect. Besides, if this theory were the true one, the proportion of the substances taken up would vary inversely with the amount in solution, which it does not do. Filters in a sense the rootlets are no doubt, because, like filters, they allow no solid matter to pass through them. But solid matter is not concerned in the question, since it is never taken in by any plant at all. Unpalatable, then, as it may be to the scientific mind, it seems to be an inevitable conclusion, that this discriminative faculty is more nearly allied to a sense or instinct than to a purely mechanical arrangement. Nor need the fact that a plant will absorb energetic poisons invalidate this conclusion, seeing that, apart from the probability that the poison first destroys the sensibility of the surface before it is absorbed, it is a strong characteristic of what we term instinct that it is not equal to unusual emergencies, but invariably fails before them. Vegetable instinct, also, is doubtless very dim and dull in comparison with that of the higher animals, who, it must be remembered, possess also thought, but it is also wonderfully adequate to its own ends. It is surely much more scientific to describe such properties as this, and that of storing up in summer supplies for autumn use, as vegetable instincts, than to attempt to reduce them to mechanical contrivances. With regard to this economic and provident instinct, which roots display, the exponent of the survival of the fittest would doubtless argue that those which stored up had an advantage over their competing fellows and so the practice was increased and perpetuated. This will not, however, account for the fact, for, if we suppose, as the Darwinian would, that some of this supply was stored up by a chance in one root first of all, it would be of no use to it, unless there arose simultaneously the faculty for using this supply, the power of performing the necessary transmutations, and this power cannot be supposed to have been pre-existent to the necessity for it, and could hardly have sprung into existence by a mere varietal freak, just when wanted. In such attempts as the above example to reduce the progress from lower to higher forms to an automatic and necessary process, and which is the stock form of argument with the Darwinian school, the aim seems to be to get rid of the notion of contrivance and design and replace them by the notion of adaptation. That this vital elasticity or power of self-adaptation exists there can be no reasonable doubt; we see it in the hardening of the mechanic's hand and in a hundred every-day circumstances. What the Darwinist with his lack of metaphysical acumen fails to see is, that this very adaptability is itself the most perfect of contrivances and the deepest of designs. And this elasticity, this principle of yielding within certain limits, is a universal one. Nothing is absolutely rigid. The stone or piece of hard metal yields to the pressure of a finger enough to be ocularly demonstrable under the microscope. The mechanical elasticity of dead matter consists in the power of both yielding and resuming its form when pressure is removed. Vital elasticity or the adaptive power of organisms consists in the faculty of recovering from a temporary disadvantage by a change which meets the fresh exigency and even turns it to advantage. This is obviously distinct from and an advance upon the other. But here we are getting too far afield into the general question and must return to the special point under consideration, which was the selective sense exhibited by the roots of plants. In addition to this sense, as it may best be called, the roots of plants show also an instinct for method and symmetry. In proof of this I will quote the summary of Clos's discoveries on this subject, given in Brown's 'Manual of Botany:—

"The regular arrangement of the radicles is chiefly observed in the young plant, and gets less and less apparent as the plant increases in age. All the radicles in every root are produced one above the other, so that they appear in the form of longitudinal lines. However, in certain cases the lines follow an oblique and not a rigorously vertical course. This Clos calls 'The Law of Superposition.' The number of these longitudinal rows is fixed and determined either for the plants of the same order or for those of the same genus, or at least for the individuals of the same species. The rows are separated from each other by equal spaces: in number, according to the vigour of the plant, from two to five, the latter number being rare."

By such facts as these the supposition of some dull-witted scientist that the radicles come through just where the epidermis happens to be thinnest, at the points of least resistance as he phrased it, is shown in its naked and native absurdity. No doubt the radicles come through at points they have power to come through, but that is surely no discovery. It is also certain that the root, in contest with an obstructive soil, gets warped from its symmetric ideal, so to speak. Nevertheless, I believe, though of course it would be a point very difficult to establish, that even in adult roots there exists a subtle and complex symmetry on which the eye reposes with pleasure, though the mind cannot completely analyse the concurrent sources of the effect. Whether it arise from this original arrangement of the rootlets from their truly graduated tapering, their wayward, yet balanced, division, their suave or sharp flexures; from a conspiracy of all these or from the suggestion of a delicate and discerning energy, this to me is a matter of experience that an accurately drawn engraving of a root yields generally a pleasant sensation to the eye. Here, then, we discover in a plant-root, delving arduously for nourishment in a resisting soil, a dim aim at and instinct for beauty, which, how unconscious soever it be, links it with the loftiest achievements of the sculptor and the architect, exhibiting, as it were, the signature of the same spirit who appoints to the planets their pathway and controls the course of the suns and systems.

At this point it was, when we first encountered the root as a distinct organ in plant life, that it appeared opportune to enlarge somewhat concerning its structure and function. It would not be so convenient here to make any general comment upon the stem and its function, both because the subject is a larger one, and because it is in this part of the vegetable kingdom in what we may call an early and imperfect stage of its development. It will, therefore, be a preferable course to take a general view of those classes which were mentioned as succeeding to primitive ones in superiority of rank. The moss, as was said before, succeeds to the lichen. This process we can see going on before us. The one is the forerunner of the other and prepares for its support, as certainly as though consciously aiming at that end. For the under surface or root-face of the lichen has the power of slowly disintegrating the stone it grows on, and in course of time by absorption from the atmosphere and from elements acquired from rains, and other sources of moisture, and finally by the decay of the lichen itself, a soil is prepared capable of supporting a moss. Nor does this moss exist for itself alone. By its method of growth, which Mr. Ruskin has lovingly discovered and described, it accumulates by the decay of its lower leaflets a deep rich mould, wherein it flourishes, but wherein in due time alights also the spore of the fern, which declares itself heir to the legacy of the moss. Such may the historical succession of plants even on one spot be ascertained and observed to be. These lowly mosses and lichens are the true elves and fays of the woods, decking it with delicate tissues from their secret looms, dyeing it with sweet and brilliant colours in their viewless vats. Benign sprites they are and innocent, though they possess the power of ploughing the rock and reaping the stone. How the moss seems bent on padding and cushioning the hard stone, lest even a falling bird should be bruised thereon! If it had but its way, earth would be carpeted till silent to the tread as a mosque. Nowhere throughout creation do we find a finer, more exquisite workmanship than among the mosses. We call them velvet only because we can find no better and fuller expression. Who has not seen slanting sunlight enfilading a moss-grown wall, striking the myriad tiny stems of the moss into lustre as of silk and splendour, as of burnished bronze, till the old wall seems transfigured in a glory of chrysophras? Such sights seem to unveil for a moment the divinity of the universe: yet some would have us believe that these things were in no wise made for beauty nor for the delight of man.

Perhaps it may be thought that this last sentence implies a libel on those at whom it is aimed, but the following quotation from the 'Origin of Species,' gives it ample justification. Mr. Darwin says of "some naturalists" who object to his utilitarian doctrine, "They believe that many structures have been created for beauty in the eyes of man, or for mere variety. *This doctrine, if true, would be absolutely fatal to my theory.* Yet I fully admit that many structures are of no direct use to their possessors." Here, with a resolution almost dogged, Mr. Darwin places his back against his utilitarian theory, and stands grimly at bay against every admirer of nature and votary of the beautiful who may gather together against him. The very audacity of the position must embarass his opponents. It is like a man stepping out into the blaze of noon-day, and declaring there is no sun. What by-stander would attempt argument? That natural objects are for the most part beautiful, is a proposition that can hardly be denied, and will be most enthusiastically affirmed by those who have most closely studied nature from the æsthetic or artistic stand-point. If, then, we are to agree with Mr. Darwin, we must suppose that all this beauty has arisen incidentally and accidentally, without design or purpose, and this supposition is surely all but absolutely incredible. The truth is, and this is what misleads a one-ideaed observer, that in the architecture of nature, as in that of man, the useful and the beautiful are indissolubly connected. Discover, if you can, the most thoroughly convenient and serviceable form for any article, and depend upon it it will also be the most truly beautiful. We must not of course confound the ornate with the beautiful, or the ugly with the simple. Ornament is but an apology for the lack of that beauty which a completer fitness and finish would have bestowed. True is it that beauty unadorned is adorned the most. The human figure as we have it idealized in the marble of the sculptor is more beautiful than any costume can make it. Take also, as another example, that vessel best-fitted, by avowed means for traversing the ocean with safety and with swiftness. Look at a clipper-yacht running before the wind or cunningly slipping up sideways against it. As a study of clear and sweet curvage, sharp and clean meeting and crossing of straight lines, and grace of motion, nothing out of nature itself can excel it. So in nature fitness, which is here but a synonym for usefulness, goes hand in hand with beauty. But still nature evidently regards beauty also. If not, why so careful the external aspect of an animal should be so much more seemly than its internal? Why should plants hold aloft their flowers, as though in triumph at their own beauty? Why should——but one might ask many such questions. Suffice it to say that if Darwin stakes his theory on such an issue, and he avowedly does, the first snowdrop of spring shall confute him and the lowliest daisy look denial in his face.

And now, although so little of my subject is exhausted, it is time for us to draw it to a conclusion. I have endeavoured to point out and illustrate the different phases of force manifested in the external universe. After a brief notice of the mechanical and the chemical we proceeded to the vital which has since engaged our attention, and it will be always out of our province here to refer to those higher phases which are called mental and spiritual. Already we have, I think, seen sufficient evidence to warrant us in maintaining the position that vital phenomena are distinct in kind from mechanic and chemic, and cannot be regarded as the product of one or both of these. I have given you my opinion on the state of the great evolution question, to the effect that while the earth does seem to have arrived at its present condition by a gradual process, this process has not been satisfactorily accounted for by the automatic theories of Darwin and his followers. We then began to pass in review some of the lower orders of vegetable life, and marked their offices in preparing for higher forms or assisting their decomposition, and the utilization of the materials of which they were built up. Thus we saw that although in one view each organism struggles to maintain itself, yet whether wittingly or unwittingly, it subserves nobler ends and paves the way for the approach of higher forms. We saw also that dim instincts for order and beauty exist even in these lower organisms, and that the aims are attained to a remarkable degree. But, while yet occupied in tracing the beginnings of these vegetable aspirations, we find our allotted space of time is nearly exhausted. So for the present I would leave the subject, trusting that through your indulgence I may have another opportunity of pursuing it. But ere I release you, in case no other occasion should come, I would like to say that I fear there is little really fresh in thought in this paper. I am very largely indebted to the influence of other minds. To the American philosopher, Emerson, and to our Scotch philosopher, Dr. Hutchinson Stirling, I feel I owe largely, less perhaps on this occasion to the former than to the latter, who has made more energetic and effective attacks on the mechanical and materalistic schemes of modern scientists than any writer I am acquainted with. For matters of fact I had recourse to what I considered standard authorities. With this confession I will conclude.

On the motion of Mr. A. Noble, seconded by Mr. F. Schenck, a hearty vote of thanks was accorded to Mr. Baildon for his interesting paper.

The Honorary Secretary intimated the following donations to the Museum, viz., Seventeen specimens of Drugs, etc., chiefly from India, from the Society in London; Specimens illustrating the manufacture of Copper; Specimens of preparations of Lead used in the arts, from Mr. F. W. Pittuck, Hebburn.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The fifth meeting of the session of this Association was held on Wednesday evening, 14th February, in Anderson's College, George Street. Mr. D. Frazer, President, in the chair. The minutes of previous meeting having been read and approved of, donations were announced from Mr. John Henry, wholesale confectioner, Dr. A. M. Robertson, and the Secretary (Mr. J. M. Fairlie). Several new members were also proposed, after which, in the unavoidable absence of Dr. Machattie, F.C.S., the President delivered a popular lecture, entitled "Man and his Servants," in the course of which he gave a racy and entertaining sketch of the ancient "elements" fire, air, earth, and water, and their relation to man physically, socially and morally. At the close of the lecture, on the motion of Mr. Kinninmont, Vice-President, Mr. Frazer was awarded a hearty vote of thanks. At the opening and close of the evening's proceedings, Mr. John E. Fairlie exhibited a number of interesting objects by the aid of the microscope.

On the 14th inst. the sixth meeting of the session was held in the same place, Mr. Kinninmont, Vice-President, in the chair. The secretary (Mr. Fairlie), on behalf of Mr. Samual McCall Frazer, presented the Association with one of Messrs. Southall, Brothers and Barclay's "Students' Materia Medica' Cabinets." Mr. Kinninmont on behalf of the Association accepted the donation and moved that the best thanks of the Association be given to Mr. Frazer for his donation, which was agreed to by acclamation. Dr. A. T. Machattie, F.C.S., was then called upon, who delivered the last of his short series of lectures on "Modern Chemistry."

The following is an abstract of the lecture:—

The foundation of chemical science is obviously what is called chemical affinity, chemical attraction, or sometimes, *chemism*. This particular force, whatever it may be, seems to differ in some respects from all the other forces: gravitation, cohesion, adhesion, electricity, magnetism, etc. Notwithstanding the distinctions observable in these different forces, the opinion is growing among scientific men that all kinds of force are in some way connected, although we are at present ignorant of a principle common to all. In short, that the force which we call gravitation, acting throughout space and at immense distances, is not in essence different from the chemical force which unites atom to atom, and seemingly acts at distances almost infinitely small.

That substances combine with one another chemically is an elementary fact. That they always combine in definite proportions, when forming the same kind of compound, is a great advance in our knowledge, mainly due to Dalton, but foreshadowed to some extent by Wenzel and Richter, by experimenting on the double decomposition of salts.

Dalton's *atomic theory* assumes that the atoms of elementary, or so called elementary bodies, have a definite weight. The elements may not be simple substances; all we know is that they have not yet been decomposed. Indeed there is a possibility, even a probability, that there is only one kind of matter; and that the substances which we now regard as elements, may be special groups of atoms, which we have no means of decomposing. Speculations on the existence of an *ethereal medium* throughout space, conveying heat and light by undulation, but inappreciable by any other means yet discovered, favour the idea of the unity of matter, just as the correlation of the physical forces point to a unity in motion.

The question of deciding the atomic weights of the elements is one of vital importance in chemistry, and is by no means easy. Indeed lately several of the atomic weights have been altered, and the alteration has given rise to much confusion in text-books. Some chemists retain the old numbers as a matter of convenience merely; others use the new because they believe them to be correct; and others again, using both systems, introduce formulæ to illustrate the constitution of compounds, which still further increase the complication.

The atomic weights given for the elements are, of course, only relative. We do not know the weight of any atom. Hydrogen has at any rate the *lowest* atomic weight, or as we may more safely say, *combining proportion*. Hydrogen is accordingly taken as the standard, and its atomic weight regarded as one. In France, oxygen is the standard, and its atomic weight considered one hundred.

How are atomic weights determined? There are several means used to control the results.

Chemical considerations must necessarily be of most importance. Physical considerations are nevertheless of great value.

The expression *atom* is to be held to mean the smallest amount of any element which can exist in combination. This definition distinguishes the term atom from molecule; the latter term has two meanings: thus, a molecule of an element is the smallest amount which can exist in a state of freedom. The molecule of a compound should contain the smallest number of atoms of all its constituents which can enter into, or result from, a reaction.

Keeping close to hydrogen as one and our standard, for reasons which will become plain, we take for explanation of this atomic-weight question certain typical compounds, all of which contain hydrogen. These are hydrochloric acid, water, ammonia and marsh gas. Their symbols are, respectively, HCl, H_2O, H_3N and H_4C.

Is there any substantial chemical reason why they should be so represented? How do we arrive at the conclusion that these four compounds contain one, two, three and four atoms of hydrogen, and only one atom of each of the respective elements in combination? We cannot divide the hydrogen in hydrochloric acid. We can divide the hydrogen in water into two parts; in ammonia into three; in marsh gas into four. This is one of many chemical reasons, but applies only to the hydrogen of the above compounds. But if hydrogen be considered one, we find that no compound containing hydrogen can be produced or result from any chemical reaction which contains less than 35·5 parts of Cl; 16 parts of O; 14 parts of N; or 12 parts of C. We have thus one reason why these numbers may be considered the atomic weights of chlorine, oxygen, nitrogen and carbon.

Physical reasons may now be brought in to assist us.

Hydrogen, chlorine, oxygen and nitrogen are gases. The volume occupied by a gas (an elastic fluid) depends on temperature and pressure. Suppose we take one grain of hydrogen at any given temperature and pressure, and find the volume it occupies. We then try, at the same temperature and pressure, how much of the above remaining gases we can put into the same space. The result will show, 35·5 grains of chlorine; 16 grains of oxygen, and 14 grains of nitrogen. This cannot be considered a mere coincidence. Again, if we decompose hydrochloric acid, water, ammonia, and marsh gas—all in a gaseous state, and at equal temperatures and pressures—we get one, two, three, and four volumes of hydrogen in the respective compounds, and only a single volume of chlorine, oxygen, and nitrogen.

Carbon is never gaseous as an element, so we can only use the above experiment inferentially with regard to it.

Another means of controlling the accuracy of atomic weights, is the determination of the *specific heats* of the elements. The specific heat of any substance is the amount of heat required to raise a given quantity of it, equally in temperature, with the same weight of water. The unit usually taken in this country is the amount of heat required to raise one pound of water, one degree Fahrenheit. The French unit is different, but the principle is the same. If we take *equal* weights of the elements and determine their specific heats, they differ greatly; but if we take weights proportioned to what we call *atomic* weights, and determine the amount of heat required to raise them 1° F., we find a remarkable agreement. Practically, if the atomic weights of the elements be multiplied by their specific heats, the resultant number is *the same*, affording another means of corroboration.

Lastly, *isomorphism* assists in the determination of atomic weights. This means of control applies principally to compounds, and through them to their constituent elements. Thus the various *alums*, from their isomorphic character, assist in determining the atomic weights of aluminum, chromium, iron, etc., etc.

It may be here observed that when the atomic weights of a few elements are determined with all the certainty which the means at our disposal admit of, the atomic weights of the rest are more readily obtained; just as in a dissected map, whenever the position of a few pieces is ascertained, the completion of the problem becomes easier and easier as the progress proceeds.

The position that compounds occupy in relation to the present question has now to be considered. To find out this we must reverse our mode of examination. We wish to produce HCl, H_2O, and H_3N from their constituent gases. We take volumes in accordance with the numbers represented, and combine these to observe the result. Strange to say, though we *begin* with very *different* volumes, in every case we *end* with the *same*.

The resulting volume is always *double* the volume occupied by our standard volume of hydrogen. From this we derive the conclusion that the volume of a molecule of a compound volatile substance is *twice* the volume occupied by an atom of an elementary gas at the same pressure and temperature. Also that whereas the density or specific gravity of the gaseous *elements* is in direct proportion to their atomic weight, the density of a gaseous compound body is one-half of the sum of the atomic weights of its various constituents.

In order to bring elementary and compound substances into comparable relations, it is customary to consider elements, when free, to be in the molecular condition, a molecule of an element consisting of two atoms. A remarkable fact in connection with this view is what is termed the *nascent state* of elements. Illustrations of the nascent state may be taken from the extraordinary reducing power of hydrogen, and the oxidizing power of oxygen, provided that they are brought in contact with the substance to be acted on at the time of their production. They then exhibit a chemical action which they lose at once when free. It would appear from this that atoms of the same substance do combine, and in combining lose some of their previous activity. Hence the probability of the distinction between the atom and molecule of elements.

Seeing that compound volatile substances occupy the double volumes, it will be evident that their specific gravity is a most important control in determining their composition.

Atomicity or *quantivalence* next requires a short reference. These terms mean atom-fixing power. Hydrogen being our standard; chlorine, oxygen, nitrogen, and carbon obviously differ with respect to this power, and in the proportions of 1, 2, 3, and 4 respectively. According to the phraseology adopted, they are called monatomic, diatomic, triatomic, and tetratomic—or univalent, bivalent, trivalent, and quadrivalent. Attention to this curious feature in elementary substances has led to many important results.

It must be stated that there are exceptions to all the rules which have been referred to. Many substances may stand most, but not all, the tests applied. In such cases the balance of evidence must be struck, and characters of inferior value must subordinate themselves to those of more importance.

The exceptions, however, deserve great attention, whether the cause of their divergence should ever be cleared up or not. Indeed, having the general rules in our mind, it is easier to remember the rules by the exceptions than the exceptions by the rules. We may here apply the illustration of the parable of the lost sheep, and give ourselves far more trouble to find out the solitary instance that has strayed from the usual path, than bother ourselves about the ninety and nine that are securely locked up in their proper pen at home—our brains.

At the close of the lecture Dr. Machattie was awarded a hearty vote of thanks. The secretary then intimated that the examination of the tutorial and chemistry classes for the prizes offered by the council would take place on the 27th inst., and that arrangements were in progress for the botany class being commenced under the superintendence of Professor Keddie, who had so successfully conducted it during the two previous sessions. Several new members having been enrolled the proceedings terminated.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

At a joint meeting of the Law and Finance Committee held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, on the 16th inst., the following resolutions were unanimously passed:—

Moved by the President, seconded by Mr. Hampson, and resolved:—"That the Solicitor be instructed to take all necessary steps to appeal against the decision in the case of the Apothecaries' Company *versus* Shepperley."

Moved by Mr. Southall, seconded by Mr. Churchill, and resolved:—"That the Solicitor be directed to instruct two leading counsel and a junior to undertake the argument on the appeal."

Moved by Mr. Barclay, seconded by Mr. Churchill, and resolved:—"That a full report of Mr. Shepperley's case be printed and circulated to each chemist and druggist on 'Kelly's Chemists' Directory.'"

Moved by Mr. Barclay, seconded by Mr. Churchill, and resolved:—"That the Solicitor be instructed to write to the Apothecaries' Company, calling their attention to the fact that other proceedings in their name are threatened, and requesting them to withhold their authority from all such proceedings until the legal status of chemists and druggists under the Apothecaries Act, 1815, is determined by an appeal to the Queen's Bench Division of the High Court of Justice against the decision in Mr. Shepperley's case."

Moved by Mr. Hampson, seconded by Mr. Barclay, and resolved:—"That the Secretary be instructed to collect further evidence of infringements of the Pharmacy Act, 1868, and to forward the same to the Registrar of the Pharmaceutical Society."

LEEDS CHEMISTS' ASSOCIATION.

The sixth general meeting of this Association for the present session was held on Wednesday evening, March 11th; the President in the chair; when, after the minutes of the previous meeting had been read by the Secretary, a paper was read by Mr. George Ward, F.C.S., entitled "Notes on some of the Ethers." He first drew attention to the simple ethers, showing very clearly by the aid of styptic formulæ the close analogy between the ethers and the metallic oxides of mineral chemistry; and that just as these oxides are related to the hydrates, so the ethers are related to the alcohols. The modes of preparation were then noticed; especial attention being given to the continuous process of the Pharmacopœia, the chemical changes taking place being lucidly explained by formulæ. The haloid ethers were shown to be exactly similar in constitution to iodide of potassium and other haloid salts, and the action of these haloid ethers upon the sodium compounds of the different alcohols was explained as the process for preparing mixed ethers. The frequent occurrence of the compound ethers in natural products, as the odour of wines and as the principal constituents of oils and fats, was also noticed, and specimens of these compound ethers employed as flavourings were exhibited.

A cordial vote of thanks was passed to Mr. Ward at the conclusion of his paper on the motion of Mr. Brown, seconded by Mr. Pick.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, March 15. Professor Abel, F.R.S., in the chair. The visitors having been announced and the minutes of the preceding meeting read and confirmed, the names of Messrs. Carl T. V. Buch, H. Senier, S. G. Thomas, J. H. Poland and J. Y. Buchanan were read for the first time. Mr. Frank W. Young was elected after his name had been read the third time.

The first paper "On Isomeric Nitroso-Terpenes," by Dr. W. A. Tilden and Mr. W. A. Shenstone, was read by the Secretary. After alluding to the former paper by Dr. Tilden on the same subject the authors describe the methods they now employ for the preparation of the nitroso-chlorides of the terpenes, and which consists in passing gaseous nitrosyl-chloride into a well cooled mixture of the terpene with chloroform or with ordinary spirit, when the new compounds usually separate in the crystalline state. In this manner nitroso-chlorides have been obtained with the terpenes from both dextro- and lævo-gyrate turpentine oils, from oil of sage, and from oil of juniper; it is an important fact that although all these terpenes differ widely in their action on polarized light and in their other physical properties, yet the nitroso-derivatives, obtained by the action of alcoholic potash on the nitroso-chlorides, are all without action on polarized light, melt at the same temperature, and agree, apparently, very closely in their crystalline forms.

The nitroso-chlorides of that class of terpenes boiling at about 175°, of which hesperidene from orange peel oil is a type, were also examined; crystalline compounds being obtained from hesperidene, oil of caraway, bergamot, and, with some difficulty, from essence of lemon. The nitroso-chlorides from the two first when carefully heated in small quantities at a time yielded crystalline nitroso-derivatives, although none could be obtained by the process found to answer so well with the terpenes of the first class, namely, treatment with alcoholic potash. The authors believe that this method will not only serve to discriminate the different isomeric terpenes, but also to show that a large number of the natural terpenes are merely physical isomerides and not distinct chemical compounds.

Professor Maskelyne said he was engaged in examining the crystalline forms of the substances described in this paper, but the investigation was not yet completed. He might say, however, that the crystals from the first group of terpenes, although at first sight they appeared very different, seemed really to belong to one and the same system. The crystals from hesperidene and caraway were very simple, and had very few faces to them, but he believed they belonged to a different system from the other group.

The President having thanked the authors, Dr. J. H. Gladstone read a paper, by himself and Mr. A. Tribe, on the "Preparation of Copper-Zinc Couples." The object of the numerous experiments detailed in this paper was to ascertain the best formula for the preparation of the couple; and for this purpose it was necessary to ascertain the influence exerted both by the proportion of copper deposited on the zinc foil, and also by its state of aggregation, the latter varying with the strength of the solution of copper sulphate employed to attack the zinc. The results showed that the couple of maximum activity was obtained by depositing the copper from a two per cent. solution of the sulphate in six successive depositions, if it was to be employed in the decomposition of water, or for preparing ethyl hydride from a mixture of alcohol and ethyl iodide. For dry couples, however, such as those used in the preparation of the organo-zinc compounds and similar reactions, one deposition from a two per cent. solution was found to be most effective. The activity of these couples, from the results of experiments instituted with that object, was ascertained to be more than one thousand times greater than that of pure zinc. This paper was illustrated by numerous experiments.

The President said the authors had brought before them so many interesting results during the last few years, in connection with the copper-zinc couple, that their best thanks were due to Dr. Gladstone and Mr. Tribe for the lucid and precise details they had given them that evening as to the best way of making the most effective couple.

In reply to a question by Dr. Wright, as to whether other copper salts had been tried for the preparation of the couple, and if so, whether the conditions of maximum activity were the same, Dr. Gladstone said experiments had been made with other salts of copper, but not quantitatively, the object being to ascertain the best way of making the most active couple, so that copper sulphate was used as being most convenient.

Mr. Kingzett said that Dr. Paul, who had used the copper-zinc couple for estimating nitrates and nitrites in waters, had found a great difference in the results obtained with couples prepared with solutions of copper sulphate of different strengths.

Mr. E. Riley then gave a short account of "Chromium Pig-Iron." A quantity of pig-iron, which has recently been made in Australia, instead of having the ordinary qualities of pig-iron, was found to be exceedingly hard, and to present the appearance of the specimen exhibited. The ore employed in the manufacture had been analysed in this country by six or seven different chemists, all of whom, with one exception, had overlooked the presence of chromium, which might perhaps be accounted for by the fact that the specimen of ore sent over contained but a mere trace of chromium. The pig-iron from this ore, however, contained 6 to 7 per cent. of chromium, as might be seen from the analysis given of two samples

	I.	II.
Chromium	6·986	6·287
Carbon	4·418	4·200
Silicon	1·460	·976
Sulphur	·102	·207
Phosphorus	nil	·055
Iron	—	88·343
Manganese	·125	nil.

From this it could readily be seen that the relation between the amount of carbon and sulphur was quite abnormal.

As some 1200 tons of this iron had been manufactured it was important to know what to do with it. It had been stated that chromium plays the same part as manganese in iron, but in experiments made to ascertain if this chromium pig-iron could be substituted for speigeleisen in the manufacture of Bessemer steel, very unsatisfactory results were obtained, the steel breaking up under the hammer. When mixed with one-half hæmatite and puddled it melts with difficulty; but although the chromium soon goes out in the cinder, the iron produced would not weld.

The President said Mr. Riley's communication possessed considerable interest, but he himself should have considered it very unlikely that this chromium iron would play the part of spiegel-eisen. He had examined a specimen of the so-called chromium steel, but had found a mere trace of chromium in it. It was possible, however, that the chromium exerted a function in the production of the steel, but was eliminated at some stage in the process, so that it did not appear in the finished steel.

Mr. Riley, in answer to some remarks on the subject, expressed his opinion that the colour test, although it could be depended on for the determination of the amount of carbon in steel, was very untrustworthy when applied to iron, the determination of the carbon by combustion after removal of the iron being the most reliable. He had found that the chromium had dissolved with the iron during the ordinary treatment for analysis.

Mr. C. E. Groves then read a "Note on Gardenin" by Dr. J. Stenhouse and himself. Gardenin was discovered by one of the authors some twenty years ago in "Dikamali gum," an Indian drug, but the quantity obtained at that time was too small for analysis. Recently, however, they have obtained a larger specimen of the resin and extracted the gardenin from it. It crystallises in deep yellow needles, which melt at about 164° C., and are somewhat difficult to purify. The results of the analysis agree very well with the formula $C_5H_5O_2$, which requires 61·86 per cent. carbon, and 5·15 hydrogen, whilst the numbers obtained by Flückiger were 59·47 C. and 6·71 H. It is probable, however, that the specimen he analysed, and which melted at 155°, was contaminated with a colourless fatty substance of low melting point, present in the gum, and which is not entirely removed even by repeated crystallization from spirit. The authors find when gardenin is dissolved in glacial acetic acid, and carefully treated with nitric acid in the cold, that a red crystalline substance is formed which melts at about 236°. It crystallises in long needles, which are insoluble in water and almost insoluble in alcohol. As it is insoluble in dilute acids, but soluble in dilute alkaline solutions, from which it is reprecipitated on the addition of an acid, it has been provisionally named gardenic acid. The authors hope soon to be in possession of a large quantity of Dikamali gum, which will enable them to continue this investigation. A note on ginger was appended to this paper, in which it is shown that the resin in ginger, when fused with an alkaline hydrate, yields protocatechuic acid.

After the president had thanked the authors in the name of the fellows, the secretary read two papers by Mr. M. M. P. Muir, the first of which was an "Additional Note on a Process for Estimating Bismuth Volumetrically," in which the author gives a modification of his former process. He now precipitates the acid solution of bismuth nitrate with excess of sodium acetate, dissolves the precipitate by means of a slight excess of acetic acid, and titrates with a standard solution of potassium dichromate. The second paper was "On certain Bismuth Compounds, Part IV.," in which a chromate of bismuth $3Br_2O_3$, $2CrO_3$, is described as obtained by the action of a hot potash solution on the chromate, $3Bi_2O_3$ $7CrO_3$. The formation of the compounds $Bi_2O_5+H_2O$, and $Bi_2O_4+H_2O$, by the action of bismithous oxide suspended in a hot solution of potassium hydrate, is then considered, and it is also shown that the oxide $Bi_2O_5H_2O$, when dissolved in an acid, and precipitated with an alkali, always yields bismuthous hydrates, $Bi_2O_3+H_2O$, whether the solution has been previously subjected to the action of reducing agents or not. The author concludes this part of his paper by discussing the formula of the six known hydrates of bismuth. There is an addendum on the action of potassium ferrocyanide on bismuth solutions, from which it appears that in presence of nitric acid, bismuth ferrocyanide, Bi_45FeCy_6, is first produced, quickly passing, however, into the ferrocyanide Bi_35FeCy_6, which in turn undergoes decomposition with evolution of hydrocyanic acid.

The concluding paper "On the Determination of Urea, by means of Hypobromite," by Dr. M. Simpson and Mr. C. O'Keeffe, gives a description of a form of apparatus devised by them, of which it would be very difficult to give an intelligible account without reproducing the drawing which accompanies it. It does not seem to be so convenient for hospital practice, however, as that recently described by Dr. Dupré.

The meeting was then adjourned until Thursday, the 29th March, the anniversary. The next ordinary meeting will be on Thursday, 5th April, when Professor Nevil Story Maskelyne will deliver a lecture "On the Discrimination of Crystals by their Optical Characters."

PHILADELPHIA COLLEGE OF PHARMACY.

A meeting of this Association was held on February 20th, Mr. Robert England in the chair.

Mr. A. W. Miller presented a specimen of oil of cubebs, prepared by percolating the ground drug with light petroleum benzin, permitting this to evaporate spontaneously, and then subjecting the residue to distillation. The product was entirely free from all odour of petroleum. About 3 lbs. of essential oil were obtained from 25 lbs. of the drug, and about 20 ounces of resin, fatty oil, etc., were left in the still.

Mr. E. Gaillard read a paper on "Dr. Davy's Method of Detecting Arsenic by the use of Amalgam of Sodium."

Mr. A. W. Miller presented a specimen of so-called berry wax, the product of *Myrica cordifolia*, from Cape Town, Africa. The wax is of a dull greenish colour, closely resembling in its general appearance the myrtle wax of the United States.

Professor Maisch read the following note—

ON THE DETECTION OF CASTOR OIL IN COPAIBA.

At the last meeting I incidentally remarked (*Amer Journ. Pharm.*, 1877, p. 84), that the test for the detection of castor oil in copaiba by petroleum benzin, as proposed by Professor Wayne, was fallacious. The test is recommended to be applied (*Ibid.*, 1873, p. 326) by shaking the suspected balsam with three times its volume of petroleum benzin, when, if castor oil be present, a milky mixture is stated to be formed, separating quickly into two layers, the lower containing all the castor oil. Having often repeated this experiment with different copaibas mixed with their own bulk of castor oil, an absolutely transparent solution was always obtained with three or four volumes of petroleum benzin, and the solutions remained clear and free from sediment after standing for several days and even weeks. Mr. Charles A. Bowman, however, informed me that with larger quantities of the benzin, a separation of the castor oil from the copaiba could be effected, and that copaiba alone would yield with sufficient petroleum benzin a turbid mixture from which a flocculent precipitate would subside.

On dissolving a pure copaiba in petroleum benzin it was found that with eight measures of the latter the solution was perfectly transparent. On the addition of another measure of benzin, a slight turbidity occurred, which increased with more benzin, but it took nearly a week before the liquid became clear again, depositing at the same time some transparent resinous matter. When the same copaiba had been previously mixed with castor oil, it required the same amount of petroleum benzin to produce a turbid solution, from which, in the course of twelve hours, an oily liquid had settled to the bottom, equal in bulk to the castor oil employed. But in the course of several days the lower layer, containing the castor oil, had increased to more than double the volume.

It appears from this that petroleum benzin may be used for the purpose indicated, if not less than *ten* volumes are employed, instead of *three*, as originally proposed by Professor Wayne. But it must not be overlooked that pure copaiba will also produce a turbid, though less opaque solution, and its separation and the examination of the lower layer may become necessary, unless a sufficient quantity of the castor oil to be remunerative to the sophisticator had been added, in which case the dense milkiness will at once indicate it.

Different kinds of copaiba will be found to show somewhat different behaviour. A sample has been handled by Mr. Bowman, which, with *six* volumes of the benzin, became turbid and *readily* separated floccules, while another, as stated before, acquired its maximum turbidness with *ten* measures of benzin, and *slowly* deposited a transparent resin; another kind, a Para copaiba, over sixteen years old, required fifteen measures of benzin before a slight turbidity was produced, and even after it had been mixed with its own bulk of castor oil the amount of benzin mentioned did not disturb it to a very appreciable extent. Professor Wayne, having operated with a sample from which the castor oil was separated by *three* measures of petroleum benzin, it is evident that the variations are very considerable, and it is not impossible that still greater ones may be observed with other kinds of copaiba.

Mr. R. V. Mattison stated that he had also tried the petroleum tests for copaiba, but had become quite confused by them.

Professor Maisch said that so far aqua ammoniæ was still the best test; he attributed the perplexing variation in the behaviour of the copaiba to its production from different botanical sources.

Notes and Queries.

[542]. MARBLE POLISHING POWDER.—Will any reader kindly give me information about a powder, used very largely for polishing marble and ornamental stones at Wareham in Dorsetshire, or how it can be obtained? W. B. C.

VELPEAU'S DIARRHŒA MIXTURE (*The Pharm.*):—

Tinct. Opii,
„ „ Camph.
„ Rhei . . . . āā fl. ℥ j.
„ Capsici . . . . fl. ℥ vj.
Spts. Menthæ Pip. . . . . . . fl. ℥ x.
M.

BOOKS, PAMPHLETS, ETC., RECEIVED.

TABLES OF MATERIA MEDICA. A Companion to the Materia Medica Museum. By T. LAUDER BRUNTON, M.D., Sc.D., F.R.C.P., F.R.S., etc. London: Smith, Elder and Co. 1877. From the Publishers.

FOWNES' MANUAL OF CHEMISTRY, THEORETICAL AND PRACTICAL. Vol. I. Physical and Inorganic Chemistry. Twelfth Edition, revised and corrected by HENRY WATTS, B.A., F.R.S., etc. London: J. and A. Churchill. 1877. From the Publishers.

Obituary.

Notice has been received of the death of the following:—

On the 4th of March, 1877, Mr. Evan T. Prosser, Pharmaceutical Chemist, Witham. Aged 45 years. Mr. Prosser studied in the Society's laboratories during the Session 1853-54, and afterwards became Assistant to Dr. Stenhouse. He had been a Member of the Pharmaceutical Society since 1859.

On the 9th of March, 1872, Mr. Edward Merrikin, Chemist and Druggist, Lynn, Norfolk. Aged 51 years.

On the 9th of March, 1877, Mr. Robert Christopher Pitts, Pharmaceutical Chemist, St. Giles Street, Norwich. Aged 62 years. Mr. Pitts had been a Member of the Pharmaceutical Society since 1853.

On the 11th of March, 1877, Mr. Francis Hull, Chemist and Druggist, Leicester. Aged 86 years.

On the 12th of March, 1877, Mr. William Haythornthwaite, Chemist and Druggist, Kirkby Lonsdale. Aged 59 years.

On the 16th of March, 1877, Mr. Jabez Marlow, Pharmaceutical Chemist, Lees, near Oldham. Aged 46 years. Mr. Marlow had been a Member of the Pharmaceutical Society since 1853.

The following journals have been received:—The 'British Medical Journal,' March 17; the 'Medical Times and Gazette,' March 17; the 'Lancet,' March 17; 'Medical Press and Circular,' March 22; 'Nature,' March 17; 'Chemical News,' March 17; 'Gardeners' Chronicle,' March 17; the 'Grocer,' March 17; 'Journal of the Society of Arts,' March 17; 'Grocery News,' March 17; 'Produce Markets Review,' March 17; 'Educational Times,' for March; 'British Journal of Dental Science,' for March; 'Journal of Applied Science,' for March; 'American Journal of Pharmacy,' for March; 'Pharmacist,' for March; 'Canadian Pharmaceutical Journal,' for March; 'Moniteur Scientifique,' for March; 'Pharmaceutische Zeitung,' for March 17; Sanitary Record,' for March 17; 'Medical Examiner,' for March 17.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

The Herbarium Prize.

Sir,—While the subject of the herbarium prize is under discussion, I should like to throw out a few suggestions concerning it.

The prize was originally intended to encourage the study of botany and "to infuse into the minds of our successors a due appreciation and a practical knowledge of the structure, characters, classification and properties of plants, especially those which are comprised in the materia medica."

It was believed that the collection of an herbarium would "oblige the student to acquire an acquaintance with the rudiments of botany," and that such knowledge would "greatly facilitate the study of plants more especially belonging to his department."

Now the conditions under which the prize is competed for contain one sentence the first portion of which appears to me to require considerable modification. That sentence is as follows:—

"In estimating the merits of the collections, not only will the number of species be taken into account, but also their rarity or otherwise and the manner in which they are preserved; and should a specimen be wrongly named it will be erased from the list."

This sentence means to the competitor, that he must collect as many plants as possible in the given time, and that if he lives in the richest botanical district, has the most time to spare and the deepest purse, he will infallibly carry off the prize from a less fortunate and poorer competitor. Is this right or fair? The result naturally is that only a few students feel they have any chance of obtaining the prize, and, consequently, but few compete.

The effect upon an intending competitor is as follows: He endeavours to collect as large a number of plants as possible. If he has but little time at his disposal he will dry them badly, mount them hastily, consequently carelessly, and name them from drawings of plants, without examining their structure or characters. Not only so, but all plants with small flowers, and which take much time to examine, are discarded, and thus the knowledge of the structure of such natural orders as Polygonaceæ and Euphorbeæ is ultimately *nil*.

If the prize is really to do the good originally intended by its institution, it must be brought within the reach of a larger number of competitors, and the conditions attached to it, must require evidence of a practical knowledge of the structure, characters, and properties of the plants collected. I would suggest that if the necessary number of plants were very limited, say 150, and made to include all the indigenous medicinal plants in the district in which the competitor resided, a larger number would probably compete for the prize, and consequently more good would be done.

If the competitor were required to illustrate each species as thoroughly as possible, by as many varieties as he could meet with, and by dissections of a flower (and where possible a fruit and a root also), pasted neatly on the same sheet with the dried specimen; and to write the character by which each species is distinguished from another, at the bottom of the sheet, and to mention the properties of the plant; proof would be afforded that the specimens had been examined and understood, and that habits of careful and accurate observation had been commenced, and the competitor would have a small and most valuable collection of his own, even if he failed to win the prize.

The facts which it appears to me would be most worthy of being taken into account in adjudicating the prize are, the time at disposal for study (guaranteed by the employer), the nature of the district in which the collector resides, and the thoroughness with which his botanical work has been done.

One more point suggests itself, and it is this:—The prize offered for an herbarium is not a commensurate reward for the trouble taken. The collection of an herbarium in one year implies a very considerable expenditure of money in paper and travelling; and the chance of obtaining a bronze medal, or perhaps nothing at all, is by no means an inviting prospect. For my own part, I know that I should have considered such works as Bentham's 'Flora' and Sowerby's 'Grasses' a more valuable reward than a medal.

A Former Competitor.

Chemists and Druggists' Association.

Sir,—In the report of the Meeting of the Executive Committee of the Chemists and Druggists' Association, held in Birmingham, 28 Feb., 1877, which appeared in this month's *Chemist* and *Pharmaceutical Journal* of the 17th inst., I am reported as "A member of the Sub-Committee for making arrangements for the Annual Meeting in London."

Allow me to say my name is inserted without my consent.

I have from the first declined taking any official position in the movement, for reasons which I have assigned when applied to on previous occasions.

Benjamin Humpage.

Turnham Green, March 20, 1877.

Earthenware Measure Cups.

Sir,—Throughout the country chemists and druggists will welcome the appearance of Messrs Proctor and Sons' new earthenware measure cups, which combine, as mentioned in the published prospectus, accuracy, simplicity, and cheapness.

These unique little vessels, however, are being sold without precise instructions as to how they are to be employed, and chemists will need to exercise care in wording the label required to be attached to each measure, otherwise confusion and mistakes may result from their employment.

From the advertisement and the words at present stamped on these cups, it is evidently the author's wish to discourage the term spoonful.

Inasmuch, however, as this term will long continue to be employed, it is, I think, very necessary that additional matter be stamped on these cups, in terms corresponding to those employed by the dispenser on the label of the mixture.

At present the patient may be instructed to take one tablespoonsful of a mixture, and the only means of recognizing the proper measure is the patient's ability to translate the term "half-ounce," which is stamped in black letters on the vessel.

The term "half-ounce," is to many quite unintelligible, and even were patients able readily to translate it, how few there are who would also know it corresponded to one accurate tablespoonful.

Certainly the dispenser in presenting the measure would remark that when filled to the inner rim it corresponds to the dose prescribed, but this would fail to prevent mistakes in cases where several measures of variable size had previously been supplied.

In conclusion, I would suggest that these measures, previous to being sent out, either be attached in some secure way to the bottle for which they are to be employed, or otherwise distinctly labelled (preferably stamped by manufacturer), somewhat as follows:—

"This medicine cup when filled to the inner rim holds one accurate tablespoonful."

The word "accurate" also to precede the word "spoon" on each label, that something different to the ordinary spoon be understood.

J. R.

Milk of Sulphur.

Sir,—Notwithstanding Mr. Chipperfield's tall writing on the subject of the milk of sulphur case, the purchaser got what he asked for,—the article that has been sold as milk of sulphur for thirty years. If there is any fault it is an error of manufacture, and not an adulteration, the latter being the addition of an inferior to a superior article for the purpose of obtaining an increased profit; therefore, under the Adulteration Act, the conviction was decidedly wrong. This argument might be used with advantage by counsel engaged in the appeal.

C. K. G.

Grayshott Road, S.W., March 20, 1877.

[*** Though we fully agree with our correspondent's opinion as to the legitimacy of selling as "milk of sulphur" the preparation made with lime, according to the directions of the London Pharmacopœia of 1721, we do not think the argument he suggests is of much value, and we should deprecate its application to the milk of sulphur case.—ED. PHARM. JOURN.]

TO THE BENEVOLENT.

Sir,—With your kind permission, I beg to submit the result of further efforts on behalf of Mrs. Fowler, the particulars of whose melancholy case appeared in the *Pharmaceutical Journal* of January 13th.

		£	s.	d.
Subscriptions as reported on the 27th February	...	20	7	6
Bridgnorth	Mr. T. M. Deighton ...	1	0	0
Canterbury	Mr. E. Bing ...	1	0	0
"	Collected by Mr. E. Bing...	0	7	6
"	Mr. F. R. Harris ...	0	9	0
Chester	Collected by Mr. W. Grindley	3	17	6
Crewe	Mr. J. N. Mc'Neil ...	0	5	0
Christchurch	Mr. Green ...	0	2	6
Diss	Collected by Gostling and Son ...	1	4	0
Dover	" " Mr. A. Bottle	1	12	6
Edinburgh	Mr. J. Mackay ...	1	0	0
"	Mr. J. Young ...	1	0	0
Gosport	Collected by Mr. Hunter...	0	7	6
Harwich	" " C. F. Bevan...	0	5	0
Horsham	" " Mr. Williams	0	10	0
Hirwain	Mr. J. Sims...	0	5	0
Huntingdon	Per Mr. Provost	0	7	6
Newbury	Per Mr. F. P. Davis...	0	15	0
Newport, Mon.	Per Mr. Pearman ...	1	1	6
Stockton-on-Tees	Mr. W. B. Brayshaw...	1	1	0
Tiverton	Per Mr. W. Havill ...	0	12	6
Warwick	Mr. H. Pratt ...	0	5	0
		37	15	6

Some kind friends have offered to repeat these subscriptions, if need be, but I have great hopes that the £70 required will be obtained without the necessity of a second appeal. Mr. E. Bremridge or myself will gladly receive further subscriptions.

W. D. SAVAGE.

W. J. Cooper.—The formula for Ung. Althææ, P. L., 1746, is as follows:—

"℞ Olei e mucilaginibus M libras tres,
Ceræ flavæ P libram unam,
Resinæ flavæ P libram dimidiam,
Terebinthinæ communis P uncias duas.

Liquentur resina et cera cum oleo; deinde ab igne remotis adde terebinthinam, et, dum mixtura calida est, coletur."

"*Indiana.*"—You are recommended to apply to an export druggist.

W. Thirlby.—St. Mark's Hospital, City Road, London.

G. C. R. O.—The emulsion will not be satisfactory. As soon as the Mag. Sulph. is added to the emulsified Copaiba, the soluble potash soap which has been formed with the Liq. Potassæ will be decomposed, and an insoluble magnesia soap will result. A permanent and satisfactory emulsion may be obtained by placing in a mortar ℥ss of Mucil. Acaciæ with ʒij of Pulv. Acaciæ to thicken it, then adding gradually, with trituration, the Copaiba, and, if necessary, a drop or two of water during the trituration, to keep the mixture smooth and white. Next add water gradually to about ℥v., then the Liq. Potassæ and Tinct. Hyosc., afterwards the Potass. Bicarb., and lastly the Mag. Sulph., the last two being previously dissolved in a little water. This emulsion should be quite creamy, and should not separate.

"*Alpha.*"—The Ung. Hydrarg. Oxidi Rubri, diluted to about seven times its weight.

"*Dispenser.*"—(1) The swelling is due to decomposition of the iron salt and formation of ferric oxide. (2) The precipitation is due to the formation of an insoluble quinine salt with the tannin of the tincture; the bad smell is the result of fermentation.

"*Inquirer.*"—We are unable to suggest a substance that would increase the plasticity without interfering with the hardness. The specimen sent appears to be rather friable.

E. Atkins.—Hydrogen peroxide can be prepared from barium peroxide by the methods indicated in all works on chemistry.

X. Y. Z.—We are not aware that any patent right exists that would interfere with the sale of the article referred to.

Y.—The English Act is not in force there, and we believe the only Pharmacy Act regulating pharmacy in our Australasian colonies is that recently passed in New South Wales (see before, p. 318).

"*Reader.*"—The plan recommended by you is already carried out to a considerable extent. The newspaper particularly referred to shall be included in our list.

"*Ego Nescio.*"—Syrup of White Poppies is sometimes sold under the name.

J. A.—Linctus Glycerini Compositus, P. H. L.:—

Take of—

Muriate of Morphia	22½	grains.	
Cherry Laurel Water	5	fluid ounces.	
Syrup of Lemons	20	"	"
Spirit of Chloroform	2½	"	"
Glycerine to	40	"	"

M.

J. N.—See the paper by Dr. Dupré in vol. vi. of the present series, p. 868.

The Prosecution of a Chemist and Druggist at Nottingham.—Correction.—Mr. John Horne Glaisyer writes to say that there is a mistake in the report of his evidence given in the *Nottingham Journal*, and copied into this Journal (before, p. 766). The date should have been 1816, and the evidence was to prove the custom of chemists and druggists previous and immediately subsequent to the Act of 1815.

A. J. S.—The colour would be due to the action of the mineral acids upon the nux vomica, and the reaction would probably be a complex one.

E. H.—We think the dose should be two tablespoonfuls. The question of the antagonistic action of the ingredients is one that must be left with the prescriber.

"*Lex Talionis,*" *F.C.S., and* "*One Who has Served behind the Counter Twenty-one Years.*"—We do not think the publication of these letters would serve any useful purpose. A reference to the judgment of Mr. Baron Bramwell will show that it has a wider application than our correspondents appear to be aware. We should recommend direct communication with the Council in reference to any course of action which it is suggested that body should take.

"*West End Chemist.*"—We share your objection to underselling, but it is evident there is a difference of opinion as to the price at which patent medicines should be sold.

"*Statim,*"—The article referred is a proprietary preparation of which the formula has not been published.

H. W. Thorburn.—The chlorate of potassium is decomposed by the sulphuric acid and the sugar is oxidized by the products of the chloric acid liberated.

NOTICE.—Considerable inconvenience and disappointment are frequently caused by neglect of the regulations as to correspondence, letters intended for the Editor being sent to the Publishers or the Secretary, and *vice versâ*. A compliance with the explicit instructions published weekly over the Editorial columns will prevent delay, and the consequent annoyance.

COMMUNICATIONS, LETTERS, etc., have been received from Dr. Hesse, Mr. Wills, Mr. Bell, Prof. Dymock, Mr. Codd, Mr. Home, T. A. H.

"THE MONTH."

The cold frosty weather which has characterized the present month has somewhat hindered the progress of vegetation, and it is only during the last few days that the buds of the lilac and hawthorn have burst open, and that the signs of spring have commenced in earnest. Still, there are a few medicinal plants in bloom to be found in the woods and hedges in the country by those who have the courage to look for them. In almost any chalky wood south of Durham, and often in copses and thickets on other soil, may be found the dark shining evergreen leaves of the spurge laurel (*Daphne laureola*, L.), with its short racemes of sweet-scented green flowers nestling among the upper leaves. The plant is well named, for it has much the appearance of a small laurel, while the leaves have the peculiar oblanceolate shape of the wood spurge (*Euphorbia amygdaloides*, L.). The flowers are often polygamous; some staminate flowers, which may be distinguished by having the tube of the flower longer than the others, being found intermixed with the perfect ones. It may be here noticed that each flower consists of a single whorl of leaves, which by some botanists is called a calyx and by others a perianth—perianth is, however, the term more generally used. The perfect flowers will be found to exactly resemble in internal structure those of the mezereon (*Daphne Mezereum*, L.), having eight stamens arranged in two rows, and a superior ovary. The bases of the flowers are furnished with concave scaly bracts.

The dandelion (*Taraxacum Dens Leonis*) is now in full blossom, and although so common a plant is not undeserving of notice. The leaves are remarkable as affording one of the best instances of the runcinate form. Careful observers will notice several varieties of this plant; one of these has leaves so much narrower and more deeply cut than the common form, that if not in flower it might be supposed to be a different species; another growing in boggy places has the leaves almost entire and the outer scales (phyllaries) of the involucre ovate and pressed upwards. The plant is thoroughly cosmopolitan, being found in all four quarters of the globe. It is interesting as being one of the plants used by Linnæus to form a floral clock, its flowers opening between five and six in the morning and closing at nine o'clock at night; they also close during rain. Each of the heads consists of from 100 to 200 florets; these florets are abundantly furnished with honey, which rises high in the tube, so that it is a great favourite with insects, no less than ninety-three species of which were observed by Müller to visit the plant. The flower if not fertilized by the visits of insects has the power of fertilizing itself, the stigmas after a time curling over so as to touch the pollen. The root of dandelion should be compared with that of the *Hypochœris radicata*, a composite plant which has leaves and flowers resembling those of dandelion in size and shape, but the leaves differ in being rather rough and hairy and the flower stalk in being taller and having a few branches. The pappus affords an instance of what is known as pilose pappus, the threads being simple and unbranched. This is perhaps the best time of year to gather the root, as the juice is more bitter and the root contains less inulin than in the autumn, the period at which it is usually collected.

Another plant, of which little more than the name is at present retained in English pharmacies, may now be found decking railway banks and moist clayey places with its bright blossoms. The coltsfoot (*Tussilago Farfara*, L.) has a flower resembling the dandelion in shape and size, and might at a distance be easily mistaken for it, but upon a close inspection it will be seen that the flower-stalk (scape) is covered with scaly bracts, that the flowers appear before the leaves, and that the central florets in the capitulum are tubular, while in the dandelion they are all ligulate.

The green hellebore (*Helleborus viridis*) which must not be confounded with the green hellebore of America (*Veratrum viride*, Ait.) may now be found in blossom here and there in orchards and thickets. It is, however, by no means a common plant here. In Germany the root is used in medicine, and fetches three to five times the price of that of the black hellebore, from which it differs in being more bitter and acrid, and in containing more numerous drops of fatty oil. From the other British species, *H. fœtidus*, L., green hellebore is easily distinguished by its paler leaves, and large, open, entirely green flowers, of which there are usually two or three on the flowering stem. In *Helleborus fœtidus*, L., the leaves are dark green and the calyx is tipped with purple and is never widely open. In all the hellebores the petals are small and tubular like those of the Christmas rose.

Besides these two, another species, *H. orientalis*, may now be seen in blossom in the Botanical Gardens at Edinburgh by those who have the good fortune to reside in that city. This species is supposed to have been the hellebore of the ancients; it is said to be the most active, medicinally, of all the species. Its rhizome possesses the peculiarity of being easily peeled, a process which is impossible with *H. niger* and *H. viridis*. This species has usually two coloured flowers and *leafy* bracts.

On damp mornings during March and April the air in some places may be noticed to have a peculiar fragrance, due to the opening buds of the balsam poplar (*Populus Tacamahaca*), which are covered with a fragrant resinous exudation. This resin has the peculiar property, like benzoin, when boiled in lard of preventing it from becoming rancid. Its odour exactly resembles that of a Californian plant (*Eriodictyon californica*, Benth.) lately used in America as a remedy for bronchitis, and suggests that these poplar buds might be worthy of trial for the same purpose. The bark of another species is used as a tonic in America. Although a native of North America and Siberia, it is frequently to be seen in this country planted in avenues, or by roadsides and in gardens, and may be distinguished from all the British poplars by its larger ovate leaves and the different appearance of the branches. A resin called Tacamahaca, obtained from this tree in America, was formerly official in the Edinburgh Pharmacopœia.

The box tree (*Buxus sempervirens*, L.) may now be seen in flower, and is so common everywhere in gardens and shrubberies that it is easily examined, and although it has not very strong claims to rank as a medicinal plant, yet it presents many points of interest. It is the only native shrub which we possess belonging to the Euphorbiaceæ. The leaves have the epidermis quite loose and easily separable from the under surface, so that on breaking a leaf transversely and pressing it, the leaf forms a little bag. The flowers are peculiar among plants in this natural order in having petals. The little clusters of sessile flowers (glomeruli) open centrifugally; the central flower is a pistillate one, and is surrounded by a number of staminate flowers, the plant being monœcious. The pistillate flowers have a four-parted calyx and three petals, both of which are pale green and membranous, and the capsule has three short styles, each terminating in a bifid stigma; between the styles are three small yellowish fleshy glands. The staminate flowers have a three-parted calyx, two petals, four stamens, and an abortive pistil. Although the plant has apparently no odour, yet when growing in extensive patches, as on Box Hill, in Surrey, an exhalation of a peculiar urinous character is disagreeably evident. The plant contains an alkaloid (buxine) which is chemically identical with that of pareira brava and also with bebeerine. The medicinal action of the plant has been lately carefully investigated by Drs. Ringer and Murrell, a full account of which was published in vol. lix. of the 'Medico-Chirurgical Transactions.'

In the various botanical gardens the herbaceous grounds are still looking very desolate, with the solitary exception of the beds containing the Liliaceæ, Melanthaceæ and Amaryllidaceæ. The pretty little *Bulbocodium vernum*, with its naked lilac flowers, looking like those of colchicum in miniature, is almost the only garden representative of that order now in blossom; while the lovely blue flowers of *Scilla Sibirica*, the grape-like raceme of the starch hyacinth, and the solitary white flowers of the *Tritelia uniflora* are just beginning to enliven the Liliaceæ border. The latter flower is very singular on account of the flowers having a delicious odour of violets, while the stem when bruised exhales a most powerful smell of onions. The Amaryllidaceæ, on the other hand, are well represented; indeed, the coming month is the best in the year for the study of this group of plants, conspicuous among allied orders by the frequent occurrence of a corona in its flowers.

Through the kindness of Professor Balfour we are able to say that in the Edinburgh Botanical Gardens, the mandrake (*Mandragora officinalis*, L.) is now in bloom in the open ground, but under a glass frame. Although not used in the country, it yet undoubtedly possesses powerful properties; indeed, in olden times it was employed as an anæsthetic as chloroform is now. The plant has a strong family resemblance to belladonna in the shape of its flowers, but the leaves are arranged in a compact tuft at the root, and the solitary flowers arise from the tuft. From the occasional resemblance of its thick fleshy branching root to the trunk and limbs of a man, it was formerly an object of superstitious belief and was used as a charm to dispel demons and as a love philtre; indeed, it is supposed by some to have been the mandrake spoken of in Genesis, ch. xxx. In medicine it has been used as a hypnotic and as a resolvent for tumours, etc. Many curious legends are connected with this plant, some of which are scornfully alluded to in Gerarde's Herball. The root which is sometimes offered for sale by country people as mandrake root is that of *Bryonia dioica*, L. The rhizome of *Podophyllum peltatum* is sold in this country under the name of mandrake, or American mandrake root, by herbalists, and is what is generally wanted when mandrake root is asked for. Other plants now in blossom in the open air at Edinburgh are the three species of hellebore above alluded to, merzereon, elm, violet, dandelion and tacamahac poplar.

The hothouses at the Regent's Park Gardens now present a very brilliant aspect. The tree rhododendrons with their handsome tufts of scarlet or magenta coloured flowers, and the white and crimson camellias in full blossom, set off the dark green of the other shrubs, while the yellow blossoms of the narcissus, acacias, and genistas are tastefully arranged among the pink, red, white, blue, and deep purple of the hyacinths, the white and pink primulas, the azaleas of many hues, and the lovely cinerarias. One shrub, *Sparmannia Africana*, L., is particularly worthy of notice, from the beauty of its flowers and foliage, and the peculiar structure of the outer rows of stamens, which are sterile and covered with little swellings. The *Illicium Floridanum*, alluded to in January, may now be seen in full blossom in the larger conservatory. The only medicinal plant, however, of special interest, now in blossom at these gardens is the *Podophyllum peltatum*, L. The plant which is about a foot high, has two forms of leaves; those which do not bear flowers are distinctly peltate, and are deeply cleft almost to the middle into wedge-shaped lobes, which are again slightly lobed at the apex; the leaves which bear flowers are of the same height, but the stalk divides near the middle into two parts, each terminating in a leaf, and from the fork between these two leaves arises the solitary white waxy looking flower. The flower-stalk being shorter than the leaves, the flowers are somewhat hidden among the green leaves, with which they contrast very prettily. The leaves have a peculiar aspect, which once seen is not easily forgotten; the veins are much depressed and of a pale colour, which gives an appearance of convexity to the portions of the leaf between each vein.* The two leaves belonging to the flower-stalk are deeply divided on one side, often quite to the petiole, so that they are then not peltate, but rather pedatifid. It is noticeable that Hanbury and other botanists have placed this plant in Berberidaceæ, instead of Ranunculaceæ, on account of the petals being in a double row of three, the stamens definite in number (usually about 12), and the baccate fruit consisting of a single carpel. The plant may be looked upon as one of the links connecting the two families, since it has radiate-veined leaves, and anthers which dehisce longitudinally. While speaking of podophyllum it may be remarked that the resin met with in commerce under the name of podophyllum is very variable in appearance and even in specific gravity, and that the cause of this fact deserves investigation.

In the garden of the Apothecaries' Company at Chelsea the *Drimys Winteri* is now coming into blossom freely and is the only medicinal plant worth seeing there at present.

In the economical house at Kew, the coca plant is now full of buds and will during the next month be in full flower. Several varieties of orange, including the Seville and blood oranges, are now in full blossom, and the atmosphere there is redolent with the odour of neroli. The appearance of the orange flower is too well known to require much comment, but probably only a botanist would note that the stamens are arranged in a number of distinct bundles (polyadelphous) and arise from the base of a small white disc at the base of the ovary, the disc itself being moist with nectar; sometimes an inner row of stamens

* This appearance is well shown in Bentley and Trimen's 'Medicinal Plants,' pt. 9.

is present, and these appear to spring out of the disc, suggesting that the disc is, in this instance, a ring of suppressed stamens; neither the small five-toothed calyx nor the disc appear to enlarge during the growth of the fruit. The leaves are worthy of notice from the fact that the lamina or blade is attached by a joint to the top of the small leaf-like petiole, and that the leaf is an instance of the simplest form of a compound leaf, it being regarded as the terminal leaflet of a ternate or pinnate leaf, the other leaflets not being developed.

Several varieties of the tobacco plant may also be noticed in the same hothouse; these differ much in the shape and size of the leaves.

At Edinburgh the ipecacuanha plant may now be seen in perfection, having both flower and fruit; also the *Citrus medica*, and in the coolstoves *Kalmia latifolia*, a poisonous American plant, of which more may be said on a future occasion.

In the drug market large quantities of aloes have been offered during the past month, chiefly the Barbadoes and Curaçao kinds, the latter a variety we have not often noticed in retail commerce. It has much the appearance of Barbadoes aloes, but is rather more glossy and has a different and somewhat sulphureous odour. Sarsaparilla also has appeared in very large quantities. Among recent importations we have noticed Carnauba wax, obtained from the leaves of *Corypha cerifera*, Arr.; Cocum butter, a concrete oil from the seeds of *Garcinia purpurea*, Roxb., official in the Indian Pharmacopœia and used as a basis for ointments; Ceylon cardamoms, a long grey-tinted variety; China cantharides (*Mylabris Cichorii* and *M. phalerata*), which are said to contain more cantharidin than the Spanish fly; guarana; Chinese galls; eucalyptus oil; and gum acaroides, a resin which does not seem to have been turned to as much account as it is capable of. It is the product of one of the grass-trees of Australia and contains a quantity of cinnamic acid and an oil which has the odour of hyacinths, probably styrol. Japanese aconite has also been offered in larger quantities. A curious specimen of balsam of tolu, which is evidently a fictitious article, has lately come under our notice. It contains no crystals of cinnamic acid, dissolves in benzol and bisulphide of carbon, also in alcohol by the aid of heat, a portion separating on cooling. It has an odour like that of boiling syrup or molasses and an extremely tenacious consistence. It is at present undergoing further investigation.

In a previous article we referred to some observations made by Mr. Wanklyn in regard to Taunus water, and showed that his statements were based upon erroneous conclusions, arising from an imperfect comprehension of chemical physiology. That is to say, he argued upon the gratuitous assumption that carbonate of lime taken into the system is assimilated as such, and gives rise to various complaints, whereas the mass of existing evidence goes to show that this is by no means the case, and that hard waters are, speaking generally, productive of good to the human economy by strengthening bones and giving rigidity to their structure.

In his letter in the *Medical Times and Gazette* of January 20th, Mr. Wanklyn wrote "according to my knowledge, such an enormous quantity of carbonate of lime in a drinking water is not only an inorganic impurity, but a very dangerous and deleterious impurity," and again, "Certainly no chemist would dare to recommend the use of such a water for a population." Further, Mr. Wanklyn related that he was asked to express an opinion upon a similar water quite recently, and he unhesitatingly condemned it; he says "I should like very much to submit that opinion to you and your readers." Now in reply to Mr. Wanklyn, a letter was published by Mr. G. A. Ledeboer in the same journal for February 10th, in which certain facts are stated, to the effect that a number of gentlemen, well known in medical science, have prescribed Taunus water, and have also pronounced it not only "wholesome, but peculiarly beneficial in cases of indigestion, acidity, etc." But these facts fade away under the superior light of an editorial note, which, to quote, is as follows:—"Mr. Wanklyn stated certain facts; in opposition, Mr. Ledeboer states certain opinions; but that is all." With the last sentence we have nothing to do, it is beyond us; but we would submit that the editorial note in question would have been more correct had the statement of facts been credited to Mr. Ledeboer and that of opinion to Mr. Wanklyn.

Adopting the tone of Mr. Wanklyn's letter, it might be urged that distilled water constitutes that which it is best to drink; but, however true this may be theoretically, the chemist who would recommend it in preference to Taunus water would certainly be as bold as he who may dare to recommend Taunus water, and we believe some chemists there are who dare do even that.

The subject demands attention, from the fact that Mr. Wanklyn does not start on a philosophical basis with a standard water, and then proceed to go through the various declensions of danger, but he fixes on a water which has gained considerable favour as a beverage, and which represents moneyed interests. Such a proceeding is objectionable on more than one ground and is not above suspicion while Apollinaris water escapes free.

We leave this matter, to note several other subjects of more or less passing interest. In an interesting paper communicated on February 14th to the Society of Arts, Professor Barff has proposed to substitute pigments made with white lead by others having sulphide of zinc as their basis. Beyond the fact that white lead paints turn black when exposed to air containing even traces of sulphuretted hydrogen, they also give rise to a number of cases of lead poisoning, though it must be admitted that these generally ensue from neglect on the part of workmen, who too often are content to take their meals with hands sullied by such paints. White lead pigments moreover do not last well, although they are esteemed when recently prepared on account of their opacity, yet, on keeping, this opacity is lost, owing to the saponification of the oil used in the mixing by the oxide of lead, which produces "lead plaster," or oleate of lead, a body of more than ordinary transparent nature. The pigment recommended by Professor Barff is the invention of Mr. Griffiths, of the Silicate Paint Company, Liverpool, and is prepared as follows:—A solution of sulphate of zinc contained in a vat is precipitated by one of sulphide of sodium, and into the mixture thus resulting there is charged a quantity of sulphate of barium and a little magnesia. The mixed precipitate is isolated, washed, dried, and then roasted, giving a product of an excellent white colour, which mixes well with oils and has good body. The whiteness is due to the admixture of the baric sulphate, while the softness is derived from the magnesia.

The most important part of Professor Barff's paper has yet to be noticed. After describing the chemistry of the processes by which iron articles rust in a damp atmosphere, viz., by the formation first of ferrous oxide, and the peroxidation of this to ferric oxide, which readily crumbles off, he referred to the other oxide of iron known as "magnetic oxide," and formularized Fe_3O_4. This oxide results when steam is conveyed over iron heated to a considerable temperature; the steam is decomposed, the oxygen being fixed by combination with the iron, and the hydrogen escapes. Professor Barff was the first to observe that the magnetic oxide thus produced upon iron goods has a coherent state, and does not chip off, while it has been long known that it is capable of withstanding the action of air and water, and is not even altered by a damp atmosphere impregnated with acid fumes. He proposes to apply this steam process to all articles made of iron which are not too large to manipulate. Under this heading would be included cooking utensils, lamp posts, gratings, gas and water pipes, and so forth, and a most important direction in which this invention could probably bef applied would be in regard to the iron tackle o yachts and other vessels.

The only thing required is to place the articles in ovens or furnaces heated to 500° F. or 1000° F., according to the density and extent of magnetic oxide coating required, and then to blow through the chamber a current of steam for some five, six, or seven hours. It may be fairly expected that important results will follow from Professor Barff's process, for not only will goods made of iron be thus enabled to withstand the wear and tear of atmospheric influences, but it will probably prove possible to use iron where before it has not been possible, viz., for statuary and architectural work.

Leaving the subject of applied science, there are several matters worthy of note in more abstract scientific directions.

M. Albertoni, of Sienna, has published the results he has obtained in a study of the effects produced by the transfusion of blood, and he finds that transfused blood derived from the same species serves to form living tissue, and constitutes, in fact, a true blood-graft. But when the transfused blood comes from a different species this is not the case; the corpuscles dissolve and their colouring matter is eliminated in the urine, while the stroma partially coagulates and stops up the capillaries, obliterating them and causing not only grave accidents, but sometimes death.

While speaking of blood, we would note a preparation recently inroduced under the name of "Serum Sanguinis Exsiccatum." It is obtained from blood by allowing it to stand, removing the clot which forms in the meantime, and evaporating the resulting serum in chambers warmed by a gentle heat; in fact the preparation is ordinary blood albumen in a powdered state. Ten ounces are stated to yield about one ounce of the preparation, which is the ordinary yield of albumen obtained by the makers from blood; one gallon of serum yielding about 1lb. 1oz. of albumen dry at 100° C. The preparation to which we refer is soluble in water and is recommended not only as a blood medicine, but as an article of diet, to be used in the preparation of soups, gravies, and so forth. Whatever value it may possess for these purposes has not been so thoroughly established as is desirable, and in any case the greatest care should be observed in the making of the preparation, to ensure that the blood used in the process not only comes from healthy animals but is moreover perfectly fresh.

The importance of this matter comes out strongly if we place any faith in a theory of typhoid fever lately propounded by Mr. W. Stewart, L.R.C.P., etc.* This gentleman has endeavoured to fix upon the actual disease-bearing substance essential to typhoid fever, and he quotes a number of cases in his paper that lend weight to his hypothesis, which also derives support from some experiments of M. V. Feltz. Mr. Stewart believes that albumen in a state of putrefaction contains and carries the matter which by its reception into the system produces the disease of which we are treating. The albumen may originally have been derived from the blood of slaughter houses, or from the liquid evacuations in cases of diarrhœa. In these evacuations it must be remembered that much albumen is held in solution and is referable undoubtedly to the serum of blood. The experiments of M. V. Feltz consisted in injecting dried putrid blood mixed as a powder with water into the crural veins of dogs, when in all instances many symptoms were developed that are characteristic of typhoid fever. Beyond this, the effects strongly remind of the ordinary forms of this disease. Whether typhoid fever is to be referred to putrid albumen or not, it is at any rate more reasonable to follow up such a possibility and to investigate in similar directions, than it is to idly imagine the existence of a "contagium vivum" which defies isolation and which is not amenable to the laws of chemical science. It is important above all things, to bear in mind that by the expression "health" we mean the result of those processes of a chemical and physical nature which in their equilibrium allow animal life not only to exist but to exist free from disturbing influences. In their turn these influences are likewise of a chemical or physical nature, apart from the first cause, and in this sense they constitute the declensions of health.

It is absolutely impossible to describe those conditions which by their existence are capable of causing an outbreak, say of scarlet fever, and all we know of the disease is this, that the contagious matter is contained in the dry skin of those who suffer from it. But here is a tangibility, and with it we can at least appreciate its power to spread the disease. The matter is an infectant; it is matter in a state of change; and here it is that the physician must apply his knowledge with the view of extinguishing the disease, and he can only do this by bringing about a change in the actual state of the infectious matter. Those agents which can thus be used are truly disinfectants, and among these Dr. Day, of Geelong, would give to peroxide of hydrogen a foremost place. Between April, 1873, and the same month of 1875 he treated 51 cases of scarlet fever by anointing the bodies of his patients with lard containing peroxide of hydrogen, and in some cases he caused his patients to gargle a very dilute solution of the same reagent. Under this treatment there was extension of the disease only in four houses and there were no deaths. Subsequently Dr. Day treated 64 other cases, and out of these

* *British Medical Journal*, March 10, 1877.

only six proved fatal, while there was an extension of the disease only in three cases. Although we cannot accurately define the action of the peroxide of hydrogen in destroying the contagious nature of the matter thrown off from the skin in cases of scarlet fever, we can at least comprehend its possible mode of action. Just as the decomposition of potassic chlorate takes place on heating, the heat set free in the breaking up of one molecule into potassic chloride and free oxygen being sufficient to cause the decomposition of another, so we can also imagine organic matter in a state of change to exert a corresponding influence upon previously wholesome matter. If, however, the first molecule, while in the act of changing, could be so influenced by applied outside agencies, as for instance artificial cooling, as to reduce the temperature, the residual molecules of potassic chlorate would be rendered incapable of change under the circumstances. So also we can affect diseased matter that it is rendered powerless to infect, and among such agents peroxide of hydrogen takes its place by reason of its strong oxidizing character.

This direction of medical science is sacrificed in great measure at the present time on the altar of biology, which, however, has its proper function. While, as Dr. Moxon pointed out in his Hunterian oration, biology directs its aim to the ascertaining the circumstances and conditions upon which life begins, continues and flourishes, it should be the object of the physician to begin at the other end, and learn how to obviate those evils which result from the wear and tear to which life is subject, and from those disturbances of equilibrium between matter and force which bring about disease.

PARIS STATISTICS OF THERAPEUTIC AGENTS.*

In the *Archives Générales* for January and February are two very interesting papers, the joint production of Professors Lasègue and Regnauld (the Director of the Pharmacie Centrale), bearing the title "La Thérapeutique jugée par les Chiffres." The figures here referred to are not derived from the consideration of the effects produced by the various therapeutical agents, but from the amount of these supplied by the Pharmacie Centrale to the various hospitals and charitable institutions under the governance of the Assistance Publique. These exhibit some curious variations and oscillations in the employment of various medicinal substances, which may serve as an indication of the amount of favour these have enjoyed or continue to enjoy.

The "Pharmacie Centrale des Hôpitaux et Hospices Civils de Paris," the authors of the paper observe, is an establishment positively *unique* in the world, wherein is centralized the preparation, the purchase, and the distribution, *without exception*, of all the medicinal substances employed in the hospital establishments of the metropolis. First founded in 1794, its definite organization was due to Soubeiran; and subsequent improvements have constituted it an establishment of exceptional importance, where all the pharmaceutical preparations are made, and simple drugs and chemical products are submitted to the most rigorous examination by a large committee chosen from among highly competent persons. A strict account is kept of all medicinal substances which enter or are sent out of the establishment, and the tables exhibiting these are the sources whence the material for this paper has been derived. Unfortunately, it is not possible to exhibit the revolutions that medical practice has undergone in this respect during the early years of the existence of the Pharmacie Centrale, as the books of the establishment after they had served their immediate purposes of control were successively destroyed. So that the tabular statements for the last twenty years only are available, with the single exception of those relating to leeches, which go back uninterruptedly to the year 1820.

To instance the increase in consumption of some medicinal substances which have only come into use in recent times, it is stated that while 195 kilogrammes of *sulphuric ether* were consumed in 1855, these increased to 614 kilo. in 1875; and *chloroform* rose from 141 kilo. to 308 kilo. in the same period. *Chloral* first appears as 5 kilo. in 1869, and in 1875 had increased to 360 kilo. *Iodoform*, first entered at ½ kilo. in 1859, reached 28 kilo. in 1875. The *bromide of potassium*, which figures only at 3¼ kilo. in 1855, and in 1863 had only reached 7¾ kilo., then succeeded in establishing itself in professional favour, and rose progressively from 22 kilo. in 1864 to 731 kilo. in 1875. The consumption of *opium* has undergone little change, this having been 148 kilo. in 1855, and 151 kilo. in 1875; but *morphia*, as would be expected from the generalization of hypodermic injections, has made an immense stride from ¼ kilo. to 10⅓ kilo. The *sulphate of atropia*, from 9 grammes in 1855, rose to 1 kilo. in 1873, falling to 780 grammes in 1875. The quantity of leaves of *hyoscyamus* amounted to 15 kilo. in 1855, and after undergoing great variations in the interval, was 90 kilo. in 1875. Passing over some observations on emetic and antispasmodic substances, we come to *alcohol*, which has assumed a "colossal" rate of increase: in 1855 there were 1270 litres consumed, and 37,578 litres in 1875. Brandy, rum, and red wine have manifested the same progression, while white wine has greatly decreased in consumption, especially during the last two years. In curious contrast with this increase in the consumption of alcoholic liquids is the utter decline in the employment of *leeches*. Of this an account has been preserved since 1820. Between that year and 1824 the mean annual number was 183,000, and this rose during 1824-30 to 508,000. The hirudomania attained its apogee during 1830-37, when the mean annual number of 828,000 was reached; it amounted on three occasions to more than 1,000,000 per annum. From 1837 the numbers began to decline, moderately at first, but since 1863 precipitately—so that in 1874 only 49,000 were employed. The expenses have followed the same course, these amounting on three occasions to between 1830-42 to 100,000 fr., being nearly equal to 200,000 fr. at the present time. In 1875 they fell to 1600 fr., which would not be more than 1000 fr. in 1840, *i.e.*, a sum two hundred times less. The amount of *sulphate of quinine* consumed has about doubled, 24,525 grammes having been employed in 1855, and 53,734 in 1875.

Professors Lasègue and Regnauld terminate their first paper with the following observations:—

"The medicinal substances which we have now passed under review act, for the most part, as modifiers of the nervous system, with various titles, and under sufficiently different rubrics. Without attaching to the gross figures more importance than should belong to them, we may be allowed perhaps to hazard some deductions. Medical curiosity has, especially within the last ten years, undergone a change in its direction, abandoning local inflammatory affections, and even general diseases of the zymotic type, to occupy itself with nervous affections. In this respect science has made enormous progress. New species have been discovered, and confused agglomerations have been subjected to skilful analysis. In this work, so fertile in a pathological point of view, therapeutics as yet has not found its place. Medicinal indications are neither augmented nor perfected, and we witness the spectacle so often renewed of a pathology without a parallel therapeutics. Nevertheless, progress has been made by the introduction into the materia medica of new remedies directed almost exclusively to sensibility, in order to

* From the *Medical Times and Gazette*, February 3, and March 10, 1877.

diminish or annul it. It is thus that chloral has followed, as we have seen, an enormously increasing march, while neither opium nor other anæsthetics have diminished in amount. When we consider, summing up the figures, that there are consumed annually in the Paris hospital establishments 350 kilo. of chloral, 250 of iodoform, 300 of chloroform, 250 of opium, 10 of morphia, and 750 of bromide of potassium, we are struck by the immense favour which these agents, all more or less anæsthetic, enjoy. On the other hand, the stimulants of sensibility, and especially those of motion, have either kept at uniform figures or have undergone a notable decrease. The more that disturbances in locomotion have found their explanation in definite lesions of the the nervous centres, the less has the efficacy of *tetanisantes* substances been relied upon. [A table is given showing the stationary condition or decreased employment of nux vomica, St. Ignatius' bean, strychnia, brucine, ergot, etc.] Antispasmodics lend themselves little to statistics. Administered without conviction, and destined to produce only doubtful effects and at long intervals, they are usually but an expression which fills up the vacuities of treatment. Perhaps the time is approaching when, in place of addressing ourselves to consequences, we shall endeavour to ascend to causes. The therapeutics of the nervous system will then essentially consist of medicinal substances intended to modify the general or local circulation, and to struggle with reflex affections at their point of origin. Then, with the exception of anæsthetics, which respond to an immediate necessity, the nervine remedies of heretofore will become mere accessories of a second order."

In the second paper, commencing with the subject of *purgatives*, the authors observe that just as in a former period blood-letting preceded or accompanied all other important means of treatment, this position has been assigned more or less completely in more recent times to purgatives. In the hospitals, artificial compounds of soda, potass, or magnesia replace the natural purgative waters, the use of which is so much on the increase in private life. This is to be regretted, as it leads to the presenting the solutions of these salts in much too concentrated doses at intervals, while in smaller quantities they might be advantageously given more continuously. Of these *saline* purgatives, carbonate of magnesia and the sulphates of magnesia and soda have held the first places since 1855, a mean annual quantity of 3500 kilo. being consumed. The mild *vegetable* purgatives, with the exception of castor oil and senna in the children's hospitals, are not consumed in any important quantities. In fact, vegetable medicinal substances are fast losing their credit in France; and the tisanes, once thought of such importance, are left to the fancies of the patients themselves. Castor oil is, however, continually increasing in consumption. In 1875 the quantity used (3389 kilo.) nearly equalled the entire quantity (3675 kilo.) of all the saline purgatives put together. Taking the doses of both these classes at a mean of twenty grammes, there were administered during 1875 as many as 400,000 purgatives in the different hospital establishments, without counting other laxatives of lesser power. *Drastic purgatives* exhibit differences in the amounts consumed which are not easily accounted for. Aloes, however, has constantly increased in favour, rising from 10 kilo. in 1855 to 23 kilo. in 1875. Croton oil and gamboge have also quadrupled in quantity during the same period; while colocynth, never having attained more than 1 kilo. per annum, retired altogether in 1875. Jalap, from $30\frac{1}{2}$ kilo. in 1860, fell to 7 kilo. in 1875; and scammony, from $6\frac{1}{2}$ kilo. in 1855, rose to $11\frac{1}{2}$ kilo. in 1870, to fall to $8\frac{3}{4}$ kilo. in 1875.

Iodine.—As a cutaneous derivative, this is tending to replace all other revulsives, issues and permanent blisters being now well-nigh abandoned in its favour. The great abuse of the employment of issues has, however, led to a too favourable appreciation of iodine as an external application in phthisis and in affections of the joints. The tincture of iodine has increased during the twenty years from 48 kilo. to 150 kilo. The iodide of potassium, from 248 kilo. in 1855, has amounted to up 558 kilo. in 1875; but as the doses have been largely increased within the last ten years, the increase of a medicine of such approved value has not been so great as might have been expected.

Mercury.—The annual mean of this has varied from 200 kilo. to 250 kilo., a maximum of 331 kilo. having been attained in 1870, and a minimum of 178 kilo. in 1874. The quantity of mercurial ointments applied is slowly decreasing, while that of corrosive sublimate has enormously augmented of late, chiefly owing to its greatly increased employment in baths. From 1855 to 1871 the quantity varied from 30 kilo. to 60 kilo., but in 1872 suddenly rose to $106\frac{1}{2}$ kilo., and amounted to $135\frac{1}{2}$ kilo. in 1873, $141\frac{1}{2}$ kilo. in 1874, and $102\frac{1}{2}$ kilo. in 1875. The consumption of calomel has varied but little, having been from 40 to 50 kilo. per annum. The iodides have been nearly stationary.

Chlorate of Potash.—This salt, long neglected, was first used as a remedy in mercurial stomatitis. Its sphere since then has been continually augmented until (by an exaggeration that is to be regretted) it has been placed at the head of the means of combating stomatites and anginas of every description. From 39 kilo. in 1855, it rose in quantity to 419 kilo., and in 1876 even attained a maximum of 502 kilo.

Cod-liver oil is another remedy that has increased uninterruptedly from the important amount of 9576 kilo. in 1855, to 18,571 kilo. in 1875. The *phosphate of lime*, which is used for analogous purposes, has oscillated between 100 and 300 kilo.

Iron.—Of the preparations of this metal used in the Paris hospitals, reduced iron and the subcarbonate, while standing at the same figure (76 kilo.) during 1870–75, have reached it by inverse ratios, the former increasing from 54 kilo. in 1855–60, and the latter decreasing from 108 kilo. The carbonate has risen from 15 to 30 kilo. and the lactate has descended from 3 kilo. to 1 kilo. The protoiodide is the only preparation that has made a marked increase (from 22 to 93 kilo.), and that is rather due to the iodine than the iron which it contains. In old pharmacopœias the perchloride of iron holds an important place; but it gradually lost its reputation as a tonic. But its styptic and coagulating power has conferred upon it in recent times an importance which is on the increase. The amount used increased from $62\frac{1}{2}$ grammes in 1855-1860, to 155 grammes in 1865-70, and to 129 grammes in 1870–75.

Arsenic.—The quantity of this used in Fowler's solution has progressively increased from 1 kilo. in 1855 to 13 kilo. in 1875; while that of granules of arsenious acid has increased from $\frac{1}{3}$ kilo. in 1867 (when it first appeared) to $10\frac{1}{2}$ kilo. in 1875. Arseniate of soda has been little employed, except in the form of baths. *Alkaline* remedies have continued well-nigh stationary during the last twenty years.

The confidence in the efficacy of *vegetable bitters* during this period has continued to increase. They were held in high esteem by physicians at the end of the eighteenth century, and, although their employment declined during the prevalence of Broussaism, it never ceased, and has naturally increased since tonic and corroborant medicines have again come to the foreground, and have attained the somewhat exaggerated proportions of a victorious reaction. Between 1855 and 1875 the quantity of hops has risen from 1290 to 3794 kilo., that of gentian from 524 to 1518 kilo., of quassia from 31 to to 271 kilo., and of calumba from 12 to 44 kilo. The mean annual consumption of chicory has been 500 kilo., of camomile 200 kilo., and of absinthium 400 kilo. The progress of *pepsine* has been remarkable. First introduced into the hospitals in 1860, when $\frac{1}{2}$ kilo. was consumed, it has oscillated during the years 1873-75 between 28 and 44 kilo.

"Have we then found that *rara avis*, a remedy introduced into therapeutics without empiricism, taking its place by virtue of rational principles, and passing without transition from the laboratory of the physiologist to the bedside of the patient, there to gain its domicile? For our part, our personal trials of it, and the almost insurmountable difficulties of clinical observation, leave in our mind so much indecision that we cannot help regarding pepsine as a matter still in process of experiment, the harmlessness of which is not its least merit."

The *vegetable astringents* present great stability, 40 kilo. of tannin per annum being almost regularly consumed, as also 88 kilo. of oak bark, 300 kilo. of rhatany, and 20 kilo. of catechu. Of bismuth, which may be associated with these, the annual mean has been 350 kilo., the minimum not sinking below 250 kilo., and the maximum not rising above 450 kilo., even during epidemics of cholera, when it is resorted to even for slight diarrhœa. The years of the siege of Paris, 1870 and 1871, however, present a curious anomaly, the consumption of bismuth amounting to 520 kilo. during the first of these, and to 660 kilo. during the second. Of the *sulphurets*, the use of the monosulphuret of sodium, principally employed as a substitute for sulphuretted mineral waters, has increased from 1300 grammes in 1855, to 4800 grammes in 1875; and that of the polysulphuret, used for sulphur baths, has increased from an annual mean of 9352 kilo. to 19,300 kilo. Sublimated sulphur, chiefly used for the itch, has not varied in quantiiy during twenty years, the consumption being 1000 kilo. per annum. Glancing cursorily at other articles of the materia medica, it is found that the quantity of *glycerine* employed increased from 200 kilo. in 1855, to 6000 kilo. in 1875; and the progress of *collodoin* has been still more rapid, viz., from 13 kilo. in 1855, to 150 kilo. in 1875. *Silicate of potash*, which first appears in 1865 as 10 kilo., reached in 1875 nearly 3000 kilo. *Carbolic acid* rose from 162 grammes in 1862, to 306 kilo. in 1873, 278½ kilo. in 1874, and 221 kilo. in 1875. The great increase of *tœniafuges* corroborates the fact clinically observed for some time past, that the prevalence of tænia has greatly increased in Paris. Comparing the five years which preceded and the five years which followed 1870, the consumption of *kousso* increased from 4 to 5 kilo.; of *pumpkin seeds* from 3 to 5½ kilo.; of *pomegranate bark* from 13 to 14 kilo.; and of *male fern* from 5 to 12 kilo. From the doses having continued much the same, it may be concluded that the number of patients treated for tænia in the Paris hospitals has doubled within the last five or six years. Other anthelmintics employed for the treatment of ascarides, lumbrici, etc., have continued stationary in the amounts consumed.

THE QUALITATIVE EXAMINATION OF CINCHONA AND OPIUM.

In the "Guide pratique pour servir à l'examen des caractères physiques, organoleptiques, et chimiques des preparations pharmaceutiques," published by Messrs. Lepage and Patrouillard, the authors give the following processes:—

Cinchona.—Take a fragment from several barks in the same bundle and reduce to a fine powder; suspend 1 gram of the powder in 10 grams of distilled water containing 1 gram of dilute sulphuric acid, and leave them in contact two or three hours, agitating frequently. At the end of this time add 70 grams of distilled water and leave in contact several hours more, still taking care to agitate the mixture frequently. Then allow it to deposit, and afterwards filter. If the cinchona be of good quality, solution of the double iodide of cadmium and potassium, prepared by dissolving 2·80 grams of iodide of cadmium and 7·50 grams of iodide of potassium in 50 grams of distilled water, when poured in slight excess into this liquid, should produce at once an abundant turbidity, resulting after some hours in a voluminous precipitate. If the bark contain no more than 10 or 12 parts of alkaloid per 1000 the reagent does not give rise to any turbidity, or at most to a slight opacity. The yellow, red and grey barks may be examined in this manner.

Opium.—Reduce 0·10 gram to powder in a glass mortar and suspend the powder in 25 grams of distilled water; leave the mixture in contact during half an hour, agitating occasionally, and then filter. Take two-thirds of this liquor, which should possess a markedly bitter taste, and pour into it some drops of solution of iodide of cadmium and potassium. If the opium be of good quality an abundant turbidity is produced to which rapidly succeeds a flocculent precipitate; whilst if it contain not more than 4 or 5 per cent. of alkaloid or less, at the most a slight turbidity will be produced. The one-third part of the solution that is reserved, when tested with very dilute perchloride of iron ought to acquire a decided red colour, which is the reaction characteristic of meconic acid.

THE DISTRIBUTION OF CARDIAC POISONS IN THE VEGETABLE KINGDOM.*

BY PROFESSOR T. HUSEMANN.

The number of plants which have up to the present time been recognized as cardiac poisons is comparatively small and confined to but few natural families; and the number of pure proximate principles obtainable from these plants is nearly equal to the number of plants themselves, as the presence of several pinciples in one plant appears to be counterbalanced by their absence in others. It is a remarkable fact that all firmly established active principles which affect the heart's action, like digitalis, have been found to be glucosides, with the sole apparent exception of that from oleander, which is said to contain an alkaloid as its active portion. But the chemical history of this plant is by no means fully studied, and it is quite likely that on further investigation the supposed alkaloid will resolve itself into a glucoside.† It is probable that most of these plants contain other proximate principles, acting upon the nervous system in one way or another, as for instance the glucoside digitonin, resembling in its action saponin, in *Digitalis*; or helleborin, resembling the hypnotic opium-alkaloids, in *Helleborus niger*, and *H. viridis*, etc. The only exception appears to be *Thevetia neriifolia*, which was recognized as a cardiac poison by Professor Husemann, and which appears to contain only a single glucoside.

We now turn to the consideration of the various natural families furnishing these poisons, begining with the dicotyledonous group. The majority of the latter are represented by a solitary genus, or even species, while only one family, the Apocynaceæ, furnishes several representatives. The importance of the latter family will justify us in placing it at the head, especially as it is highly probable that other members of it, as yet unstudied, will be found to possess similar properties. In the following notes only such points are mentioned or touched upon as are not generally found in the usual works on phytochemistry and pharmacodynamics, it being supposed that the latter works will be consulted for further information.

1. Apocynaceæ.

The oldest known cardiac poison belonging to this family is *Tanghinia venenifera*, Poiret (*T. Madagascariensis*, Pet. Th.; *Cerbera Tanghin*, Hooker), native of Madagascar and other islands of the east coast of Africa,

* Abstract of a paper in *Archiv der Pharmacie*, Nov., 1876.

† Schmiedeberg, in *Beitr. f. Anat. und Physiol.*, has indeed lately shown that oleander does not contain an alkaloid, but a glucoside, with cardiac effect.

the bitter seeds of which are employed—like Calabar beans—by many African tribes as *criteria culpæ* in ordeals. Their chemical investigation cannot be considered as terminated, since the crystalline substance obtained from them, and termed tanghicin, does not produce the characteristic effects of the seeds. The activity of the latter is, on the contrary, ascribed to a brown, sticky mass extracted from the seeds, and not entitled to be counted among proximate principles. Husemann. however, suspects that this crystalline tanghicin (of Henry and Ollivier) still partakes of the general properties of the seeds, since it causes intense vomiting in dogs, which is well known to be a main symptom of cardiac poisons. Whether tanghicin is a glucoside or not, is unknown; but the investigations of Kölliker and Pelikan (1850) prove, beyond doubt, that an alcoholic extract of tanghinia seeds is an active cardiac poison; and this alcoholic extract must necessarily contain tanghicin, which therefore was made to take part in the experiments of the last-mentioned physiologists. Should there be discovered in tanghinia a second substance affecting the cerebral functions, as it is made probably by the researches of Ollivier and Henry (who administered some of the above-mentioned brown mass to a guinea-pig, which fell asleep standing), the constituents of the plant would be analogous to various species of *Helleborus*.

Nearest related, botanically, to *Tanghinia venenifera*, is *Thevetia neriifolia*, Jussieu (*Cerbera Thevetia*, L.), native of the West Indies and South America; the *ahovai-tree* of the Antilles, which contains, especially in the fruit, the glucoside thevetin, first studied by Blass and demonstrated by Husemann to act upon the heart, as likewise does its derivative theveresin. Since the substance thevetin is also found in the bitter seeds of *Cerbera Odallam*, Ham., the Javanese Mangas (Manghas), or resin-tree, there can be no doubt that the latter apocynaceous plant is also a cardiac poison.

A fourth member of this group is the arrow-poison, *Iné*, *Onage*, or *Kombe*, which is used in a large portion of Africa in the killing of large game (elephants, etc.). Pelikan, in 1865, first proved this substance to belong to the cardiac poisons, and his statements were corroborated by the investigations of Fraser (1871), Polaillon and Carville (1872), and Valentin (1873). The source of the poison is a species of *Strophanthus*, either *S. hispidus*, according to Baillon, or a new species, *S. Kombi*, according to Oliver. Fraser claims to have isolated, from an alcoholic extract of the seeds, the active principle, which he called strophanthin, but he has not furnished data.

The fifth member of this group is the well-known oleander, *Nerium Oleander*, L., the chemical constituents of which have so far not yet been established with satisfactory exactness. Lukowsky reported the discovery in oleander of two alkaloids, oleandrin and pseudocurarin, but these were not obtained in a pure state, and require re-examination. It remains to be seen whether Lukowsky's oleandrin, described as a faintly yellow, resinous and very bitter body, is identical with the yellow acrid resin obtained by Pelikan (1866), and pronounced by him as the active cardiac principle of oleander, mixed, however, in the plant with substances which were said by him to interfere with its action. The possibility of the existence of alkaloids in oleander cannot be denied *à priori*, particularly as another nearly related plant, belonging to the same natural family, undoubtedly contains an alkaloid, namely, conessine or wrightine, in the bark and seeds of the East Indian *Wrightia antidysenterica*, R. Br., which Linné classified under the genus *Nerium* (as *N. antidysentericum*). The last-named plant, however, as has been shown by Husemann in 1865, does not contain a cardiac, but a cerebro-spinal poison.

The poisonous properties of *Wrightia dysenterica* show that in the search for other cardiac poisons among the Apocynaceæ we must not always expect to find them in the nearest congeners to plants already known to contain them. Botanical relationship alone does not decide, and in this family particularly especial care must be exercised, as it contains plants of widely varying poisonous characters. Besides the above-named *Wrightia*, this family includes a great number of topical plants, which contain an acrid, milky juice, and may be classed among topical poisons or drastic purgatives. Many species of *Rauwolfia*, *Echites*, and *Tabernæmontana* belong to this kind.

A few North American members of this family appear yet to deserve particular attention. *Apocynum cannabinum*, L., is considered as antihydropic, and is also used as an emetic. It is a favourite remedy of the eclectics, together with another species, *Apocynum androsæmifolium*, L., both of which are generally used in the form of resinoids. This so-called apocynin is said to be an excellent alterative aperient, possessing tonic and diuretic properties. It is quite possible that *Apocynum* may contain a cardiac poison, but on the other hand its effect may be attributed to a topically irritant constituent, as we find the statement that the milky juice is capable of blistering the skin, and that even the effluvia and evaporation of the plant causes swelling of the skin, which properties would make it appear to resemble the poison-sumac and manchineel tree.

Finally, there is to be mentioned one other plant, belonging to this family, namely, *Vinca minor*, L., or lesser periwinkle, which is regarded as an excellent diuretic in many parts of Germany, while in others it is esteemed as an effective remedy in dysentery. The possibility of the existence in this plant of a cardiac poison may also extend to other species of the same genus, for instance, *Vinca major*, L., which has been used in other countries for similar purposes.

2. Scrophulariaceæ.

This natural family is distinguished by the peculiarity that one and the same species contains quite a number of cardiac poisons as glucosides. This is foxglove, or *Digitalis purpurea*, L., with three glucosides producing cessation of heart's action in systole—which we denominate digitalin, digitalein, and digitoxin — together with a fourth, resembling saponin in its action, and a fifth (digitin) which is inert.

After the researches of Schmiedeberg had shown that the substance called digitalin did not altogether consist of cardiac poisons, we are enabled to understand the varying statements about the greater or lesser activity of the different species of digitalis. Since we have acquired a clearer knowledge, in general, of the chemical constituents of digitalis, and since we know that the substance digitoxin (the principal constituent of Nativelle's crystallized digitalin) acts with much greater energy than the two other glucosides, the question arises, whether the differences of effect, which season, place of growth, and quality of soil produce in digitalis,, is not owing to the excessive or defective production of one or another of these glucosides. Various analogies appear to corroborate this view; among others, the influence of sunlight and shadow, noticed by Stenhouse, upon the active constituents of Sarothamnus Scoparius, and the increased percentage of quinia in East Indian bark treated by manuring.

Among the plants which are nearest related to digitalis, we could scarcely name a single genus which might be suspected to contain a cardiac poison. The nearest approach to it is perhaps *Chelone glabra*, L., which we learn is used by the North American Indians as a tonic and anthelmintic; but it cannot be reckoned among the poisons. A very poisonous plant belonging to this family, and generally omitted in toxicological works, is *Franciscea uniflora*, Pohl.; but our accounts of this Brazilian plant are insufficient to decide whether it belongs to the agents of local or remote effect; it is considered as a hydragogue cathartic, abortive, and antisyphilitic, on account of which latter property it is named *Mercurio vegetal*.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, MARCH 31, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE EXAMINED MEN ON THE REGISTER.

THE publication to day of the Registers of Pharmaceutical Chemists and Chemists and Druggists enables us to complete our annual review of the statistics of British pharmacy, begun on p. 655, by showing the progressive increase in the number of examined men on the Register, as compared with that of the previous year. It will be remembered that last month the Registrar reported that at the end of the year there were 2321 registered Pharmaceutical Chemists. Of these 1381, or 55·2 per cent., are now shown to be so registered by virtue of having passed the Major examination, against 1248, or 53·4 per cent., in the previous year. The proportion which this number bears to the whole number of Chemists and Druggists is 9·72 per cent., against 9·40 per cent., in the previous year. Besides these 1281 Major men, 1918 persons who are registered as Chemists and Druggists have passed the Minor examination, making a gross total of 3199 examined men. These 1918 persons represent 14·55 per cent. of the whole number of registered Chemists and Druggists, and, added to the 9·72 per cent. who have passed the Major also, give a total of 24·27 per cent. of examined men now on the Register of Chemists and Druggists. Thrown into a tabular form the result is as follows:—

	Jan. 1, 1876.				Jan. 1, 1877.			
	Number.		Per cent.		Number.		Per cent.	
Pharmaceutical Chemists:—								
Examined . . .	1248	2335	9·40	17·59	1281	2821	9·72	17·59
Non-examined	1087		8·19		1040		7·87	
Chemists and Druggists (only) who have passed the Minor . . .		1775		16·22		1918		14·55
Remainder, including those who have passed the Modified . . .		9166		66·19		8939		67·86
Total		13,276		100·00		13,178		100·00

We avail ourselves of the opportunity of stating that in some of the issued copies of the Calendar, the publication of which we announced last week, there is an omission, through a printer's error, of the name of Mr. S. R. ATKINS, Market Place, Salisbury, from the list of Members of Council.

AMERICAN PHARMACY LAWS.

SCARECROWS, if not very elegant objects, are, at least in proper time and place, very useful ones. But we presume that when there is nothing further left for the birds to fly off with even the American farmer does not specially trouble himself to prolong their exhibition. Now it may be that once upon a time the British chemist and druggist could have been held up before his younger and more inexperienced United States brother as a warning against coquetting with legislators; but we were under the impression that that time had now passed by, and that the pharmacists in several States of the Union were now under the regulation, and congratulated themselves upon being so, of laws that more or less show signs of the influence of the English Pharmacy Acts. We are therefore surprised to read in *New Remedies* an editorial statement of opinion that the troubles of the British pharmacist,—from Medical Defence Associations, Public Analysts and Co-operative Stores,—are all due to the "class legislation" by which a monopoly was given to the pharmacist in return for restrictions placed round the sale of poisons and the dispensing of medicines, together with the expression of a hope that United States pharmacists, having escaped these dilemmas, will have the wisdom to avoid the cause. Since we are not unfrequently asked for information as to the conditions under which pharmacy is practised in the United States, we propose to illustrate this alleged avoidance of "class legislation," and at the same time to serve a useful purpose, by quoting a few details from the United States journals and reports for the last eight or nine years.

At the time of the passing of the English Pharmacy Act, in 1868, there were only four Pharmacy Acts in existence in the States, one for New York City, a second for Lycoming county, Pennsylvania, a third for the State of Georgia, and a fourth for Alabama. The first of these was never enforced; under the second a licence to practise pharmacy was sold by the State for a sum of money; only five persons in a population of five million chose to conform with the provisions of the third; whilst the fourth was not rediscovered until 1874. In 1869, the "urgent necessity" for legislation was recognized, and a series of resolutions was passed by the American Pharmaceutical Association and forwarded with a draft Bill to the speakers of the different Houses of Legislature.

The first result of this movement was that in March, 1870, a law was passed in Rhode Island, based upon these resolutions, and establishing an examining board to be *appointed by the Governor*, and confining the dispensing of medicines and poisons (1) to graduates in pharmacy at some recognized college, (2) to "practising pharmacists" in business at the time of the passing of the Act, and (3) to "practising assistants" who had served an apprenticeship of four years and passed an examination by the board. Appended was a schedule of poisons which were not to be sold without labelling and registration, and this provision applied to patent medicines composed wholly or in part of such poisons. In 1871 some modifications were introduced into this Rhode Island Act, one being the alteration of the term of apprenticeship to three years, another compelling persons who where in business at the passing of the Act to present themselves for examination.

In 1870, too, a law was passed for the city of Baltimore, providing that persons engaging in the business of dispensing or selling medicines in that city should be examined by a board of three examiners to be selected biennially by the Governor of the State of Maryland from ten pharmacists nominated by the Maryland College of Pharmacy. Poisons were not specially referred to. In 1872 this Act was amended so as to require also the registration of managing assistants and the exhibition of the words "Registered Pharmacist" before the pharmacy; a provision was also included that only such diplomas of colleges of pharmacy should be recognized as were based upon a four years' apprenticeship. Last year, however, the restriction was removed from the selling of "patent medicines," of all non-poisonous drugs, and of all compounds in original packages or bottles.

In 1871, a Bill was introduced into the New York legislature professedly to protect the citizens of that city (the home of our contemporary, *New Remedies*) from the "murderous drug clerks;" and notwithstanding the opposition of the principal pharmacists, principally on the ground that the appointment of the examining board was vested in a political officer, it became law. In the next session, however, the New York druggists succeeded in getting this obnoxious provision repealed and the appointment of the examining board was vested in the New York College of Pharmacy. Under this Act, all persons carrying on business in the city of New York, or acting as dispensing assistants, including those in business before the date of its passing, must satisfy the Board as to their competency.

In 1871 a Poisons Act *pur et simple* was passed for Pennsylvania.

In 1872 the California Legislature passed an Act regulating the practice of pharmacy in the city of San Francisco. The Act was based upon the modified New York Act, and the appointment of examiners was vested in the California Pharmaceutical Society. With a few alterations this law was last year extended to the county of San Fancisco.

The same year an Act was passed for Philadelphia, providing for the registration of all pharmacists in business in the city at the time, requiring the registration of all pharmacists and managers entering the business afterwards, but excepting graduates of recognized colleges of pharmacy. It prohibits any person who has not served two years' apprenticeship from dispensing medicines, except under the immediate supervision of a qualified person. In this case, however, notwithstanding strong opposition, the appointment of examiners was vested in the mayor of the city.

In 1873 an Act closely resembling the Philadelphia Act was passed for Ohio, to apply to cities having not less than 175,000 inhabitants.

In 1874 a similar law was passed in Kentucky, applying to towns with more than 5000 inhabitants; but here the Governor of the State, in whom the appointment of examiners is vested, is compelled to select four out of seven of them from the members of the Louisville College of Pharmacy.

St. Louis, Missouri, also obtained a similar law during 1874, the examiners to be appointed by the local college.

New Hampshire was the next to obtain a Pharmacy Act, passed in 1875, and applicable to the whole State. It provided that all persons conducting pharmacies either for themselves or others, except those who had been doing so six months before the date of its passing, should be examined by a board appointed by the Governor of the State.

Last year the pharmacists in South Carolina were admitted to a share in the application of the law to which reference has before been made, the administration of which had previously been entrusted to the medical colleges.

In addition to the foregoing we learn from the current number of the *American Journal of Pharmacy* that a pharmacy law for Maine has been recently passed and received the sanction of the Governor on the 9th ult. According to its provisions three suitable persons are to be appointed by the Governor as "Commissioners of Pharmacy," whose duty it will be to examine every applicant desirous of engaging in the business of an apothecary, and it will be incumbent upon every applicant to have been engaged three years in a store where prescriptions are compounded, or to have graduated in some regularly established medical college or school of pharmacy, and to prove his competence for the business.

The above is possibly not a complete list of all the Pharmacy Acts that have been passed in the United States since 1868, but it is sufficient to demonstrate the limited ground for congratulation—if indeed it be a subject for congratulation—our contemporary has in the freedom of American pharmacists from legislative bonds. But before leaving the subject we may remark that, having to submit to legislative control, it is some satisfaction that its application is entrusted to ourselves, and that the appointment of our examiners is not committed to a political officer with the consequent danger—which has before now been very present to the minds of our American brethren—that he will exercise his trust to secure party objects. On the other hand it is worthy of notice that in the majority of the Acts cited a poison schedule is either absent or plays a secondary part, the restrictions applying to the entire practice of pharmacy, whether by an employer or assistant.

THE EVENING MEETING.

THE last Evening meeting of the Pharmaceutical Society for the present session will be held at 17, Bloomsbury Square, on Wednesday next, the 4th of April. A paper by Mr. B. S. PROCTOR, on "Medicine Measures" will be read. The chair will be taken at half-past eight o'clock.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of the above Association will be held at 17, Bloomsbury Square, on Thursday evening next, April 5th, at eight o'clock, when a paper will be read by Mr. G. W. BULLEN on "Starches."

THE PROSECUTIONS BY THE APOTHECARIES' COMPANY.

WE are informed that an application having been made by the Solicitor of the Chemists and Druggists' Trade Association to the Apothecaries' Company, that its authority may be withheld from further proceedings under the Apothecaries Act until the determination of the appeal to the Court of Queen's Bench in Mr. SHEPPERLEY's case, a reply has been received stating that the Apothecaries' Company will give no such undertaking.

THE AGAVE AMERICANA AS A RUBEFACIENT.

SOME time since we referred to the esteem in which the *Agave americana* is held by the Mexicans and the various uses it is put to by them, and mentioned that it had fallen to the lot of General SHERIDAN to confirm its antiscorbutic properties. It is now brought forward in France as a rubefacient, producing effects analogous to those following the application of mustard flour. In a communication to the Société d'Acclimatation M. DECROIX says that this result is obtained by cutting the agave leaves into small pieces, reducing them to a pulp without heat, and then applying the pulp to the skin. It is said to have been used successfully by the French chasseurs during their campaigns in Algeria, both on man and horse. Several attempts have been made to isolate the active principle, for which the name agavine is proposed, but hitherto without success.

Transactions of the Pharmaceutical Society.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING FEBRUARY, 1877.

	£	s.	d.
Abram, Frederick William, Market Place, East Dereham	0	10	6
Adams, Frank, Stoke-on-Trent	0	10	6
Ashton, William, 77, Lord Street, Southport	0	10	6
Attwood, Alfred, 147, Cannon Street, E.C.	1	1	0
Bagnall, William H., New Street, Lancaster	0	10	0
Baker, Charles P., High Street, Chelmsford	0	10	6
Baker, Garrad, High Street, Chelmsford	0	10	6
Baker, William, Retford	0	10	6
Ball, the Chemists', (Committee of) per Walter Hills, Esq., Secretary	21	0	0
Barlow, Frederick, Stafford Street, Longton	0	10	6
Bartley, George A., 8, Halkin Street West, S.W.	0	5	0
Battersby, Samuel, Cheapside, Lancaster	0	5	0
Baxter, William, Central Public Laboratory, Kennington Lane, S.E.	1	1	0
Beall, George, 25, Sidney Street, Cambridge	0	5	0
Beeby, John, Booth Place, Falkirk	0	2	6
Bell, Thomas, Ambleside	0	10	6
Bennett, William, 2, Castle Gate, Newark-on-Trent	0	5	0
Bird and Storey, 42, Castle Street East, W.	1	1	0
Blackshaw, Thomas, Market Place, Burslem	0	10	6
Bland, John, 57, Penton Street, Pentonville, N.	0	10	6
Borchert, H. T. G., Royal Victoria Hospital, Netley	1	1	0
Borland, John, 7, King Street, Kilmarnock	0	10	6
Bottle, Alexander, 37, Townwall Street, Dover	1	1	0
Bradley, Edwin S., St. John Street, Ashbourne	0	10	6
Broad, John, Rise House, Hornsey Rise, N.	1	1	0
Broad, John Morris, Rise House, Hornsey Rise, N.	1	1	0
Brown, Alfred J., 55, Trafalgar Road, Greenwich	0	10	6
Brown, Hedley O., Barrow-on-Humber	0	2	6
Brown, W. Scott, 113, Market Street, Manchester	1	1	0
Buckle, C. F., 77, Gray's Inn Road	1	1	0
Burdon, John, 14, Claypath, Durham	0	10	6
Burdwood, James, 30, Frankfort Street, Plymouth	0	5	0
Burn, David H., 109, High Street, Arbroath	0	5	0
Buss, Thomas S., Ham Street, Kent	0	5	0
Campkin, A. S., 11, Rose Crescent, Cambridge	0	5	0
Cannell, William, Queen Square, Wolverhampton	0	10	6
Carruthers, Richard B., Dumfries	0	10	0
C. H.	1	1	0
Chamberlain, Arthur G., 3, Market Place, Rugby	0	5	0
Chubb, James C., 29, Old Street, E.C.	1	1	0
Clater, Francis, Market Place, Retford	0	10	6
Clayton, Thomas, 10, Vigo Street, W.	0	5	0
Clift and Crow, Lee Bridge, Lewisham	1	1	0
Clift, Joseph, High Street, Dorking	0	5	0
Cocker, Justus J., 9, Bridge Street, Bradford	0	5	0
Colchester, William M., 2, Crown Street, Hoxton, N.	0	5	0
Colchester, W. M., jun., 6, Marquess Road, Canonbury, N.	0	5	0
Cole, Frederick, Bridge Street, Congleton	0	5	0
Cole, Walter T., 17, St. Mary Street, Weymouth	0	5	0
Constance, Edward, 114, Leadenhall Street, E.C.	0	10	6
Cooling, William John, Castle Gate, Newark	0	5	0
Cooper, Albert H., Bradford-on-Avon	0	5	0
Corner, T. B., 1, Baxtergate, Whitby	0	10	6
Cox, Mrs. J. J., Stoney Stratford	0	10	6
Cracknell, Charles, 217, Edgware Road, W.	2	2	0
Crick, George Edward, Maldon	0	10	0
Crowther, Thomas, Tickhill	0	10	6
Croyden, Charles, 45, Wigmore Street, W.	0	10	6
Dale, George, Chichester	0	10	6
Davenport, Horace, 33, Great Russell Street, W.C.	1	1	0
Davenport, John T., 33, Great Russell Street, W.C.	2	2	0
Davidson, Charles, 205, Union Street, Aberdeen	0	10	6
Davis, David F., 2, High Street, Leominster	1	1	0
Deacon, Mrs. F. E., Fleckney, near Market Harborough	0	5	0
Deck, Arthur, 9, King's Parade, Cambridge	0	10	6
Dunn, Frederick E., Sudbury	0	5	0
Ellis, William, Burnham	0	5	0
Evans, Joseph J. O., Teignmouth	0	5	0
Eve, Charles, Plough Court, Lombard Street, E.C.	1	1	0
Farrage, Robert, Rothbury	0	10	6
Faulkner, Henry, 80, Commercial Road, Newport, Mon.	0	3	0
Field, Ebenezer, 16, Hills Road, Cambridge	0	5	0
Fletcher, Thomas, Leek Road, Smallthorne	0	10	6
Flinders, M. T., 145, Upper Street, Islington	0	5	0
Forrest, Richard William, Gainsborough	0	10	6
Forster, Robert H., 52, Castle Street, Dover	0	10	6
Fowls, Jabez, 45, Kensington Road, Southport	1	1	0
Francis, Brothers and Son, Ashford	1	1	0
Francis, G. Baggett, 5, Coleman Street, E.C.	0	10	6
Frost, George, Derby	0	10	6
Garratt, John C., 3, Market Place, Rugby	0	5	0
Garratt, Samuel, 3, Market Place, Rugby	0	5	0
Garrett, J. O., 171, Commercial Street, Newport, Mon.	0	2	6
Goode, Charles, High Street, Congleton	0	10	6
Goucher, John, 43, High Street, Shrewsbury	0	10	6
Gregory, William, Weymouth	0	5	0
Groves, Henry, Florence	1	1	0
Groves, Thomas B., 80, St. Mary Street, Weymouth	0	10	6
Griffin, Thomas, 3, Wood Hill, Northampton	0	10	6
Guest, George C., St. John Square, Burslem	0	2	6
Hall, Thomas, Westgate, Grantham	0	10	6
Hambrook, John B., 6, Strand Street, Dover	0	5	0
Hardy, George, Wheelgate, Malton	0	5	0
Hatch, R. M., Redland, Bristol	1	1	0
Heanley, Marshall, Market Place, Peterborough	0	10	6
Hey, David, Hebden Bridge	0	10	6
Hey, Thomas K., Hebden Bridge	0	10	6
Hill, A. B., 101, Southwark Street, S.E.	1	1	0
Hill, A. S., Atkins Road, Clapham Park, S.W.	2	2	0
Holl, Edmund, 105A, Crawford Street	0	5	0
Hopkinson, Thomas, Grantham	0	5	0
Horncastle, John, 17, Craven Road, W.	1	1	0
Hugill, John, 147, Cannon Street, E.C.	1	1	0

	£	s.	d.
Huggins, John, Alresford	0	10	0
Humpage, Benjamin, 6, Albert Place, Turnham Green	0	10	6
Ive, William, 115, Gloucester Road, South Kensington	1	1	0
Jackson, William, Crediton	1	1	0
Jackson, William G., Hartlepool	1	1	0
Jarvis, John S., Manor Villa, Lee	0	10	6
Jennings, R., 36, High Town, Hereford	0	10	6
Johnson, Robert D., 59, Camberwell New Road, S.E.	0	10	6
Jones, Owen, Colwyn	0	10	0
Knott, Samuel, 15, Norton Folgate, E.	0	5	0
Lander, Henry, 3, High Street, Rugby	0	5	0
Lee, C. H., College Place, Westbury-on-Trym, Bristol	0	5	0
Leicester, Thomas, Market Place, Burslem	0	10	6
Lewis, Thomas C., 24, Sheep Street, Rugby	0	10	6
Lowndes, Hervey, 7, Hall Street, Stockport	0	5	0
Makinson, Thomas, 26, Chapel Street, Southport	0	10	6
Malden and Co., 195, Brompton Road, S.W.	1	1	0
Marshell, James A., Waltham Abbey	0	10	6
Mather, James, 31, Cross Street, Hulme Street, Bolton	0	10	6
Maunder, Robert, 714, Rochdale Road, Manchester	0	10	6
Mellin, Charles J., 88, High Street, Eltham	0	5	0
Metcalfe, Wilson, High Street, Chelmsford	1	1	0
Miller, Kenneth, 16, Lower Dunber St., Pulteney Wick	0	5	0
Millward, S., 10, Crown Terrace, Upper Holloway Rd., N.	0	10	6
Mitchell, John, 151, Oxford Street, Manchester	0	10	6
Moore, F. S., Castle Cary	0	5	0
Morgan, Mrs. Elizabeth, 111, Commercial Road, Newport	0	2	6
Moverly, Robert, 82, High Street, Lowestoft	0	10	6
Muskett, James, Harleston	0	10	6
Muter, Dr. John, Central Public Laboratory, Kennington Lane, S.E.	3	3	0
Newbigin, James L., Narrowgate Street, Alnwick	0	10	6
Oldham, William, Waterloo Road, Burslem	0	10	6
Orpe, Thomas, M., 329, Old Kent Road, S.E.	0	10	6
Paine, Charles, 3, Commercial Street, Newport, Monmouth	0	10	6
Palmer, F. W., High Street, Ramsey	0	5	0
Parker, William, Cheapside, Lancaster	0	5	0
Pattison, Thomas, 418, High Street, Cheltenham	0	5	0
Peake, Henry, 1, New Bridge, Dover	0	5	0
Pearman, Henry, 11, Commercial Street, Newport, Monmouth	0	10	6
Pearson, Charles J., 4, Russell Street, Swansea	1	1	0
Pearson, F. M., 301, Park Road, Liverpool	0	10	0
Pearse, John, 4, Petty Cury, Cambridge	0	5	0
Phillips, John, 92, Commercial Street, Newport, Monmouth	0	10	6
Philpot, Henry, 84, Praed Street, W.	1	1	0
Pickard, William, 338, Oxford Street, W.	0	5	0
Pidd, Arthur, J., 221, Chester Road, Hulme, Manchester	0	10	6
Plaister and Hillen, 13, Gledhow Terrace, South Kensington	1	1	0
Plomley, James F., High Street, Rye	0	5	0
Price, George, 127, Commercial Street, Newport, Monmouth	0	5	0
Prince, Arthur, G., Market Street, Longton	0	10	6
Rankin, William, 7, King Street, Kilmarnock	1	1	0
Rieveley, Charles, 31, Cleveland Street, Birkenhead	0	5	0
Robinson, James, 2, Orford Hill, Norwich	0	5	0
Robinson, Joseph Spencer, Alfreton	0	10	6
Robinson, William H., Stoney Stratford	0	10	6
Rollin, John G., 3, South Street, Durham	0	10	6
Sadler, William, 15, Norton Folgate, E.	0	10	6
Sandy, Frederick, W., 390, Walworth Road, S.E.	0	10	6
Sarsfield, William, 7, Market Place, Durham	0	10	6
Scawin and Burn, 19, Market Place, Durham	0	10	6
Scott, John G., Church Place, Dumfries	0	10	6
Seath, Alexander, 18, Bridge Street, Dumferline	0	10	0
Selleck, Edward, Apothecaries' Hall, E.C.	0	10	6
Seys, James A., 1, Stow Hill, Newport, Monmouth	0	2	6
Shapley, Charles, 11, Strand, Torquay	0	5	0
Sibary, George, Market Street, Longton	0	10	6
Sidley, Thomas, I., 9, Brunswick Terrace. Stafford	0	10	6
Sims, Joseph, Hirwain	0	10	6
Singer, Robert, Square, Kelso	0	2	6
Skipper, Edward, 4, Dalston Lane, E.	0	5	0
Slater, Thomas, Stone	0	10	6
Slater, Thomas, jun., Stone	0	5	0
Smith, Alfred W., 93, High Street, Rye	0	5	0
Spencer, Thomas, Market Place, Wokingham	0	10	6
Steel, Thomas, Barrow-in-Furness	0	5	0
Stevens, John, High Street, Broseley	0	10	6
Stevenson, John, 1, Baxtergate, Whitby	0	10	6
Stones, William, 113, Market Street, Manchester	1	1	0
Strachan, Alexander, 111, George Street, Aberdeen	0	5	0
Straughton and Brown, Main Street, Cockermouth	1	1	0
Sumners, Michael C., Heckington	0	5	0
Swift, Francis, Spalding	0	10	6
Sykes, Thomas H., 201, Lord Street, Southport	0	10	6
Targett, Charles G., Weymouth	0	5	0
Taylor, Thomas C., Market Square, Aylesbury	0	10	6
Thomas, James, Bridge	0	5	0
Thompson, Andrew, 33, English Street, Carlisle	0	10	6
Thompson, Henry, 101, Southwark Street	0	10	6
Thorne, John, Wellingborough	0	10	6
Tomlinson, James, Tindal Square, Chelmsford	0	10	6
Townley, Thomas W., Keswick	0	10	6
Tugwell. William H., 3, Lewisham Road, Greenwich	0	10	6

	£	s.	d.
Turner, Thomas, Market Street, Longton	0	5	0
Vince, James, Cheapside, Lancaster	0	5	0
Vincent, Lacy A., Watton, Thetford	0	5	0
Walker, Robert, Maidenhead	0	10	6
Walker, William H., 167, Lord Street, Southport	0	10	6
Wallworth, David, High Street, Maldon	0	5	0
Walton, George C., Sandgate	0	10	6
Walton, Ralph, 87, High Street, Maidenhead	0	10	6
Warrior, Charles, Market Place, Northallerton	0	5	0
Warrior, Henry, Market Place, Northallerton	0	5	0
Warrior, William, Market Place, Northallerton	0	10	6
Waters, William A., High Street, Rye	0	5	0
Weatherley, Richard J., 133, Oxford Street, W.	0	5	0
Wellington, Frederick G. N., South Petherton	0	5	0
Wibmer, Lewis M., High Street, Tonbridge	0	5	0
Wilford, Josiah, 104, Snargate Street, Dover	0	2	6
Wilkes, Doctor T., Upton-on-Severn	0	2	6
Williams, Jabez V., Weymouth	0	5	0
Williams, James, Victoria Road, Aldershot	0	5	0
Williams, W. and H., Hereford	0	10	6
Wills, George S. V., 62, Lambeth Road, S.E.	0	10	6
Wortley, John, 1, Old Elvet, Durham	0	10	6
Wright, H., 344, Gt. Horton Road, Bradford	0	5	0
Wynne, E. P., Aberystwith	1	3	6
Yates, Samuel P., Plough Court, Lombard Street, E.C.	0	5	0
Young, John, 20, High Street, Newport Mon.	0	10	6
Youngman, Edward, 19, Meat Market, Bury St. Edmunds	0	2	6

Donations.

	£	s.	d.
A Friend	0	5	0
Bailey, Richard, 125, Holloway Road, N.	0	2	6
Robinson, John T., Compstall	0	2	6

Provincial Transactions.

RYDE, ISLE OF WIGHT.

At the invitation of the local secretary for Ryde to the chemists of the Isle of Wight, a third of their number dined at Wavell's Hotel, Ryde, on March 22nd, when it was resolved to form a local association in connection with the Birmingham Trade Association, and for such other purposes as may be hereafter resolved. Regret was expressed that, from the scattered position of the towns, measures of an educational character were impracticable. Mr. John Wavell was elected president, and Mr. H. H. Pollard treasurer and secretary, and a committee of chemists from the various towns in the Island was appointed to consider what other steps were desirable, and to report thereon. Many members of the trade were prevented, some by unforeseen circumstances, and some by their being alone, from attending, but five-sixths of the entire number in the Isle of Wight had expressed their concurrence in the project by letter.

MEETING OF CHEMISTS AND DRUGGISTS AT NOTTINGHAM.

A meeting of the chemists and druggists of this town, convened by the local secretary of the Chemists' Association, took place at the Flying Horse Hotel, on the 21st inst., to consider various matters of importance affecting the interests of the trade; Mr. W. H. Parker in the chair. The meeting was very numerously attended, nearly forty members being present. The principal topic of discussion was the recent prosecution of one of its members by the Nottingham Medical Defence Association. During the evening, a vote of thanks was unanimously accorded to the Trade Association at Birmingham for the energetic manner in which they had undertaken the defence of simple counter prescribing; and, at the suggestion of the Chairman, subscriptions and donations were solicited, which were generously and freely responded to by all present. After touching upon other subjects, the meeting terminated to the satisfaction of all assembled, and the company dispersed after having cordially thanked the Chairman for the able way in which he had conducted the business of the evening.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

Certain Relations between Plants and Insects.*

BY SIR JOHN LUBBOCK.

The Council of our Society have determined this session to have a certain number of evening lectures, and have done me the honour of asking me to deliver the first. Your Secretary has, moreover, suggested that I should take for my subject a continuation of the lecture which I delivered before the British Association at Belfast, and which I have since expanded into a little book, on the "Relations of Flowers and Insects," and especially on the fertilization of flowers by insects. It would, no doubt, have been easy to occupy not only a single evening, but even the whole time of the course, by descriptions of the various ingenious contrivances through which this is effected. I propose, however, on the present occasion, to ask you to look at the question from a somewhat different point of view, and have taken for my title, "Certain Relations between Plants and Insects." This will include not only the modes of attraction, but the means of defence, which have been elaborated by plants, and also the influence exercised by plants on insects.

Neither plants nor insects, indeed, would be what they are, but for the influence which each has exercised on the other. We know now, for instance, that certain plants produce no seeds at all unless visited by insects. Thus, in some of our colonies, the common red clover sets no seeds on account of the absence of humble bees; for the proboscis of the hive bee is not long enough to effect the object. According to Mr. Belt, the same is the case for the same reason in Nicaragua with the scarlet-runner.

But even in those cases in which it is not absolutely necessary, it is a great advantage that the flowers should be fertilized by pollen brought from a different plant, and, with this object in view, insects are tempted to visit flowers for the sake of the honey and pollen; while the colours and scents are useful in making the flowers more easy to find.

The real use of honey, indeed, now seems so obvious that it is remarkable to see the various theories which were entertained on the subject. Patrick Blair thought it absorbed the pollen, and then fertilized the ovary. Pontedera thought it kept the ovary in a moist condition. Linnæus confessed his inability to solve the question. Other botanists considered that it was useless material, thrown off in the process of growth. Krünitz even observed that in meadows much visited by bees the plants were more healthy, but the inference he drew was that the honey, unless removed, was very injurious, that the bees were of use in carrying it off. Sprengel was the first to show that the real office of the honey is to attract insects, but his views were far from meeting with general consent, and even so lately as 1833 were altogether rejected by Kurr, who came to the conclusion that the secretion of honey is the result of developmental energy, which afterwards concentrates itself on the ovary.

One reason why the earlier botanists missed the true explanation was, perhaps, that some plants secrete honey on other parts besides the flowers. Belt and Delpino have, I think, suggested the true function of these extra floral nectaries. The former of these excellent observers describes a South American species of acacia, which, if unprotected, is apt to be stripped of the leaves by a leaf-cutting ant, which uses the leaves, not directly for food, but, according to Mr. Belt, to grow mushrooms on. The acacia, however, bears hollow thorns, and each leaflet produces honey in a crate-formed gland at the base, and a small, sweet, pear-shaped body at the tip. In consequence, it is inhabited by myriads of a small ant, *Pseudomyrma bicolor*, which nests in the hollow thorns, and thus finds meat, drink, and lodging all provided for it. These ants are continually roaming over the plant, and constitute a most efficient body guard, not only driving off the leaf-cutting ants, but in Mr. Belt's opinion, rendering the leaves less liable to be eaten by herbivorous mammalia.

Delpino mentions that on one occasion he was gathering a flower of *Clerodendron fragrans*, when he was suddenly attacked by a whole army of small ants.

I am not aware that any of our English plants are protected in this manner from the browsing quadrupeds, but not the less do our ants perform for them a very similar function, by keeping down the number of small insects, which would otherwise rob them of their sap and strip them of their leaves.

Mr. Forel watched, from this point of view, a nest of *Formica pratensis*. He found that the ants brought in dead insects, small caterpillars, grasshoppers, cercopis, etc., at the rate of about 28 a minute, or more than 1600 in an hour. When it is considered that the ants work not only all day, but in warm weather often all night too, it is easy to see how important a function they fulfil in keeping down the number of small insects.

Some of the most mischievous, indeed—certain species, for instance, of aphis and coccus—have turned the tables on the plants, and converted the ants from enemies into friends, by themselves developing nectaries, and secreting honey, which the ants love. We have all seen the little brown garden ants, for instance, assiduously running up the stems of plants, to milk their curious little cattle. By this ingenious idea, not only do the aphides and cocci secure immunity from the attacks of the ants, but even turn them from foes into friends. They are subject to the attacks of a species of ichneumon, which lays its eggs in them, and Delpino has seen the ants watching over them with truly maternal vigilance, and driving off the ichneumons whenever they attempted to approach.

But though ants are in some respects very useful to plants, they are not wanted in the flowers. The great object is to secure cross fertilization; but for this purpose winged insects are almost necessary, because they fly readily from one plant to another, and generally confine themselves for a certain time to the same species. Creeping insects, on the other hand, naturally would pass from each floret to the next; and, as Mr. Darwin has shown in his last work, it is of little use to bring pollen from a different flower of the same plant; it must be from a different plant altogether. Moreover, when they quitted a plant they would naturally creep up another close by without any regard to species. Hence, even to small flowers (such as many cruciferæ, compositæ, saxifrages, etc.), which, as far as size is concerned, might well be fertilized by ants, the visits of flying insects are much more advantageous. Moreover, if larger flowers were visited by ants, not only would they deprive the flowers of their honey without fulfilling any useful function in return, but they would probably prevent the really useful visits of bees. If you touch an ant with a needle or a bristle, she is almost sure to seize it in her jaws, and if bees when visiting any particular plant were liable to have the delicate tip of their proboscis seized on by the horny jaws of an ant, we may be sure that such a species would soon cease to be visited.

On the other hand, we know how fond ants are of honey, and how zealously and unremittingly they search for food. How is it, then, that they do not anticipate the bees and secure the honey for themselves? Kerner has recently published a most interesting memoir on this subject, and pointed out a number of ingenious contrivances by which flowers protect themselves from the unwelcome visits of such intruders.

The most frequent are by the interposition of *chevaux de frise*, which ants cannot penetrate, glutinous parts which they cannot traverse, slippery slopes which they cannot climb, or barriers which close the way.

Firstly, then, as regard *chevaux de frise*.

* From the *Journal of the Society of Arts*, February 23, 1877.

In some respects they are the most effectual protection, since they exclude not only creeping insects, but also other creatures, such as slugs.

With this object it will be observed that the hairs which cover the stalks of so many herbs usually point downwards. A good example of this is afforded, for instance, by a plant allied to our common blue scabious, *Knautia dipsacifolia*. The heads of the common carline (*Carlina vulgaris*), again, present a sort of thicket, which must offer an impenetrable barrier to ants. Some species of plants are quite smooth, excepting just below the flowers. The common but beautiful cornflower (*Centauria cyanus*) is quite smooth, but the involucres forming the flower head are bordered with recurved teeth.

In this case neither the stem nor the leaves show a trace of such prickles. In this species the stigma projects about 1-5th inch above the flower, so that if ants could obtain access, they would steal the honey without fertilizing the flower; a flying insect, on the contrary, alighting on the flower, could scarcely fail to touch the stigma.

Kerner has called attention to very interesting illustration afforded by the *Polygonum amphibium*. The beautiful rosy flowers of this species are rich in nectar; the stamens are short; the pistil, on the contrary, projects considerably above the corolla. The nectar is not protected by any special arrangement of the flower itself, and is accessible even to very small insects. The stamens ripen before the pistil, and any flying insect, however small, coming from above, would assist in cross-fertilization. Creeping insects, on the contrary, which in most cases would enter from below, would rob the honey without benefiting the plant. *P. amphibium*, as its name denotes, grows sometimes in water, sometimes on land. So long, of course, however, as it grows in water, it is thoroughly protected, and the stem is smooth, while, on the other hand, those specimens which live on land throw out certain hairs which terminate in sticky glands, and thus prevent small insects from creeping up to the flowers. In this case, therefore, the plant is not sticky, except just when this condition is useful.

All these viscous plants, as far as I know, have upright or horizontal flowers. On the other hand, where the same object is effected by slippery surfaces, the flowers are often pendulous; creeping creatures being thus kept out of them, just as the pendulous nests of the weaver bird are a protection from snakes and other enemies. As instances of this kind, I may mention the common snowdrop, or the *Cyclamen*.

I have elsewhere ventured to suggest that the so-called "sleep" of flowers had reference to the habits of insects, on the ground that flowers which are fertilized by night-flying insects would derive no advantage by being open in the day; while, on the other hand, those which are fertilized by bees would gain nothing by being open at night. I confess that I suggested this with much diffidence, but it may now, I think, be regarded as well established.

Silene nutans, the Nottingham catchfly, is a very instructive species from this point of view, and indeed illustrates a number of interesting points in the relations between plants and insects. Its life history has recently been well described by Kerner. The upper part of the flowering stem is viscid, from which it has derived its local name, the Nottingham catchfly. This prevents the access of ants and other small creeping insects. Each flower lasts three days, or rather three nights. The stamens are ten in number, arranged in two sets, the one set standing in front of the sepals, the other in front of the petals. Like other night flowers, it is white, and opens towards evening, when it also becomes extremely fragrant. The first evening, towards dusk, the stamens in front of the sepals grow very rapidly for about two hours, so that they emerge from the flower; the pollen ripens, and is exposed by the bursting of the anther. So the flower remains through the night, very attractive to and much visited by moths. Towards three in the morning the scent ceases, the anthers begin to shrivel up or drop off, the filaments turn themselves outwards, so as to be out of the way, while the petals, on the contrary, begin to roll themselves up, so that by daylight they close the aperture of the flower, and present only their brownish green undersides to view, which, moreover, are thrown into numerous wrinkles. Thus, by the morning's light, the flower has all the appearance of being faded. It has no smell, and the honey is covered over by the petals. So it remains all day. Towards evening, however, everything is changed. The petals unfold themselves, by eight o'clock the flower is as fragrant as before, the second set of stamens have rapidly grown, their anthers are open, and the pollen again exposed. By morning the plant is again asleep, the anthers are shrivelled, the scent has ceased, and the petals roll up as before. The third evening again the same process, but this time it is the pistil which grows, and the long spiral stigma on the third evening takes the position which on the previous two had been occupied by the anthers, and can hardly fail to be dusted by the moths with pollen brought from another flower.

An objection to the view that the sleep of the flowers is regulated by the visits of insects, might be derived from the cases of those flowers which close early in the day, the well-known *Tragopogon pratense*, or "John Go-to-bed at Noon," for instance; still more, such species as *Lapsana communis*, or *Crepis pulchra*, which open before six and close again before ten in the morning. Bees, however, are very early risers, while ants come out much later, when the dew is off the grass; so that it might well be an advantage to a flower which was quite unprotected to open early for the bees, and close again before the ants were out, thus preserving its honey for another day.

So much for the first part of my subject. I must now pass to the second—the action of plants on insects. It would here, perhaps, be most natural to discuss the modifications which have been produced in insects by the search after honey and pollen, especially the gradual lengthening of the proboscis in butterflies, moths, and bees, to enable them to suck the honey, and the adaptation of the legs of bees to enable them to carry off the more or less dry and dusty pollen. Having, however, already treated of them elsewhere, it will be better for me to take other illustrations, and fortunately there is no lack or difficulty.

Many of the cases in which certain insects escape danger by their similarity to plants are well known; the leaf insect and the walking-stick insect are familiar and most remarkable cases.

The larvæ of insects afford, also, many interesting examples.

I will not, however, refer to isolated cases—however interesting in themselves—on the present occasion, but will take a group and see how far we can explain its various colours and markings, and what are the lessons which they teach us. For this purpose I think I cannot do better than select the larvæ of the *Sphingidæ*, which has just been the subject of a masterly monograph by Dr. Weissmann, the learned professor of Frieburg.

Let me ask you, then, to glance at the diagrams of caterpillars behind me. They are very different in colour—green, white, yellow, brown, sometimes even gaudy, varied with spots, patches, streaks, and lines. Now, are these merely casual and accidental, or have they a meaning and a purpose?

In many, perhaps in most cases, the markings serve for the purpose of concealment. When, indeed, we see caterpillars represented on a white sheet of paper, or if we put them on a plain table, and focus the eye on them, the colours and markings would seem, if possible, to render them even more conspicuous, as, for instance, in this diagram of *D. galii*; but amongst the intricate lines and varied colours of foliage and flowers, and if the insect is a little out of focus, the effect is very different.

Let us begin with the *Chærocampa elpenor*, the elephant hawk moth. The caterpillars, as represented in most entomological works, are of two varieties, most of them brown, but some green. Both have a white line on the three first segments; two remarkable eye-like spots* on the fourth and fifth, a very faint median line, and another more than four inches long. I will direct your attention specially, for the moment, to three points:—What mean the eye-spots and the faint lateral line? and why are some green and some brown, offering thus such a marked contrast to the leaves of the *Epilobium parvum*, on which they feed? Other questions will suggest themselves later, for I must now call your attention to the fact that, when they first quit the egg, and come into the world, they are quite different in appearance, being, like so many other small caterpillars, bright green, and almost exactly the colour of the leaves on which they feed. That this colour is not a necessary or direct consequence of the food, we see from the case of quadrupeds, which, as I need not say, are never green. It is, however, so obviously a protection to them, that the explanation of the green colour of small caterpillars suggests itself to everyone. After five or six days, and when they are about ¼ inch in length, they go through their first moult. In their second stage they have a white subdorsal line stretching along the body, from the horn to the head; and after a few days, but not at first, traces of the eye-spots appear on the fourth and fifth segments. There is also a second pale line running along the side. Please remark these two lines. After another five or six days, and when about ½ inch in length, our caterpillars moult again. In their third stage, the commencement of the eye-spots is more marked, while, on the contrary, the lower longitudinal line has disappeared. After another moult, the eye-spots are still more distinct, the white gradually becomes surrounded by a black line, while the centre becomes somewhat violet. The subdorsal line has almost, or entirely, disappeared, and in some specimens faint diagonal lines make their appearance. Some few assume a brownish tint, but not many. A fourth moult takes place in seven or eight days, and when the caterpillars are about an inch and a half in length. Now, the difference shows itself still more between the two varieties, some remaining green, while the majority become brown. The eye-spots are more marked and the pupil more distinct, the diagonal lines plainer, while the subdorsal line is only indicated on the first three and the eleventh segments. The last stage has been already described.

Now, the principal points to which I desire to draw your attention are (1) the green colour, (2) the longitudinal lines, (3) the diagonal lines, (4) the brown colour, and (5) the eye-spots. There are, however, some other very instructive points to which I should like to draw your attention presently, because they throw much light on this group of insects.

But to return to my five points. As regards the first—the green colour—I think I need say no more. The value to the young insect, the protection it affords, is obvious. We must all have observed how difficult it is to distinguish small green caterpillars from the leaves on which they feed. When, however, they become somewhat larger their form betrays them, and it is important that there should be certain marks to direct the eye from the outlines of the body. This is effected, and much protection given, by longitudinal lines, such as those occurring in the second stage of our larvæ. These lines, both in colour and thickness, much resemble some of the lines on leaves (especially those, for instance, of grasses), and also the streaks of shadow which occur among foliage. If, however, this is the explanation of them, then they ought to be wanting, as a general rule, in very small caterpillars, and to prevail most among those which feed on, or among grasses. Now, similar lines occur on a great number of caterpillars belonging to most different groups of butterflies and moths, as you may see by turning over the illustrations of any monograph of the lepidoptera. We have seen that they exist among the hawk moths, as for instance, in *Ch. elpenor;* they occur in many butterflies, as for instance, *Arge galathea*, which feeds on the cat's-tail grass; and among moths, as for instance, in *Pyrophila tragopoginis*, which feeds on the leaves of the "John Go-to-bed at Noon" (*Tragopogon*). Now you will find that the smallest caterpillars rarely possess these white streaks. As regards the second point also, the streaks are generally wanting in caterpillars which feed on large-leaved plants. The *Satyridæ*, on the contrary, all possess them, and all live on grass. In fact we may say, as a general rule, that these longitudinal streaks only occur on caterpillars which live on or among narrow-leaved plants. We have seen that in a later stage these lines disappear on certain segments, and are replaced by diagonal lines. In this particular species these diagonal lines are faint, but in a great many other caterpillars belonging to the most distinct families of butterflies and moths, they are conspicuous and no doubt important. Now these diagonal lines come off just at the angle of the ribs of leaves, and resemble them very much in general effect. They occur also especially in species which feed on large-leaved plants, and I believe I may say that though a great many species of caterpillars present these lines, they are rarely if ever present in species which live on grass. In this diagram are represented three of such caterpillars, one belonging to each of the three great divisions of lepidoptera, namely, that of the purple emperor (*Apetura iris*) which feeds on the oak, as representing the butterflies; that of the privet hawk-moth; and lastly, that of a moth, the Kentish glory (*Endromis versicolor*), which feed on large-leaved plants, and I believe I may say that, though very frequent, they rarely occur in species which live on grass. It might at first be objected to the view that there are many cases, as indeed in our elephant hawk-moth, in which caterpillars have both. A little consideration, however, will explain this. In small caterpillars these oblique lines would be useless, because they must have some relation, not only in colour, but in their distances apart, to the ribs of the leaves. Hence, while there are a great many species which have longitudinal lines when young, and diagonal ones when they are older and larger, there is not, I believe, a single one which begins with diagonal lines and then replaces them with longitudinal ones. You will also observe that the longitudinal lines still remain in our caterpillar on those segments which have no diagonal ones. This also often occurs, and it is striking where the lines are marked. This is also an advantage, because white lines crossing one another at such an angle have no relation to anything which occurs in plants, and would make the creature more conspicuous. It is an advantage, therefore, that when the diagonal lines are developed, the longitudinal ones should disappear. There is one other point in connection with these diagonal lines to which I must call your attention. In our species they are white, but in some cases, as for instance in the beautiful green caterpillar of the privet hawk-moth, the white streak is accompanied by a coloured one—in that case lilac. At first we might think that this would be a disadvantage, as tending to make the caterpillar more conspicuous; and in fact if we put one in full view out, for instance, on a table, the coloured lines are very striking. But we must remember that the habit of the insect is to sit on the inside of the leaf, generally near the midrib, and in the subdued light of such a situation the coloured lines beautifully simulate a line of soft shadow, such as must always accompany a strong rib, and I need not tell any artist that the shadows of yellowish green must be purplish. Moreover any one who has ever found one of

* The shaded portions, which replace the eye-spots on the other segments are an instance of the general rule that a character which appears on every two segments has a tendency to develop itself on every other segment.

these large caterpillars, will, I am sure, agree with me that it is surprising, when we consider their size and conspicuous colouring, how difficult they are to see.

The next point is the colour of the mature caterpillars. We have seen that some are green and others brown; and the green ones are obviously merely those which have retained their original colour.

Now for the brown colour. It is evident that this makes the caterpillar even more conspicuous among the green leaves than would otherwise be the case. Let us see then whether the habits of the insects will throw any light upon the riddle. What would you do if you were a big caterpillar? Why, like most other defenceless creatures, you would feed by night and lie concealed by day. So do these caterpillars. When the morning light comes they creep down the stem of the food plant, and lie concealed among the thick herbage and dry sticks and leaves near the ground, and it is obvious that under such circumstances the brown colour really becomes a protection. It might indeed be said that the caterpillars having become brown, concealed themselves on the ground; that in fact we were reversing the state of things. But this is not so, because while we may say, as a general rule, that (with some exceptions due to obvious causes) large caterpillars feed by night and lie concealed by day, it is by no means always the case that they are brown, some of them still retaining the green colour. We may then conclude that the habit of concealing themselves by day came first, and that the brown colour is a later adaptation. It is, moreover, interesting that while the caterpillars which live on plants often go down to the ground and turn brown, those which feed on large trees or plants remain on the underside of the leaves, and retain their green colour.

Thus, in *Smerinthus ocellatus,* which feeds on the willow and sallow; *S. populi,* which feeds on the poplar; and *S. tiliæ,* which frequents the lime, the caterpillars all remain green; while in the convolvulus hawk-moth, which frequents the convolvulus, *Chœrocampa nerii,* whtch feeds in this country on the periwinkle; *Ch. celeris, Ch. elpenor,* and *Ch. porcellus,* which feed on galium, most of the caterpillars turn brown.

There are, indeed, some caterpillars which are brown, and yet do not go down to the ground, as, for instance, those of *Aspilatis aspersaria,* and indeed of the *geometridæ* generally. These caterpillars, however, place themselves in peculiar attitudes, which, combined with their brown colour, make them look almost exactly like bits of stick or dead twigs.

(*To be continued.*)

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The Molecule and the Atom.*

BY PROFESSOR G. F. BARKER.

By a resolution, passed at the Detroit meeting of this Association, it was made the duty of the chairman of the Sub-section of Chemistry to prepare an address for the present occasion upon some subject of interest to the section. Before complying with this request, however, and before asking your attention to the few thoughts which I have to offer for your consideration, I desire to congratulate you upon the arrival of the one hundredth anniversary of our existence as a nation and upon the very successful celebration of this important event which is now in progress in the International Exposition at Philadelphia. While the illustrations of chemical industry there exhibited are not as extensive, for obvious reasons, as those which have been seen at previous exhibitions, yet the presence of vanillin and coniferin, of resorcin, fluorescein and eosin indicates great chemical progress even since 1873. Moreover, the excellent character and the magnificent display of pharmaceutical and industrial chemicals from our own country is a matter of pride, as foreshadowing a most brilliant future.

It has also been a matter of great satisfaction to us to receive and to welcome so many chemists of eminence from foreign countries, who came here officially either as commissioners or jurors. The names of Odling and of Lowthian Bell, of Von Wagner, Vogel and Martius, of Nordenskiold and Akerman, of Paterno, Von Baumhauer, De Wilde, Kjerulf, Kittary and Kuhlmann (fils) are well known to us in the literature of our science, and have been worthily enrolled upon the pages of the exhibition record. While it is our sincere regret that so many of them have already been called away by the pressure of home duties, we warmly welcome here to day those of them who have remained to participate in our meeting.

Another event has taken place which is of especial interest to the members of this sub-section. I allude to the formation of the American Chemical Society. The movement originated in the city of New York, and the preliminary meeting was held on the 6th of April last. At a subsequent meeting, held on the 20th, a constitution and bye-laws were adopted and a list of officers elected. The new society commences its existence under the most favourable auspices, about 200 resident and non-resident members being already enrolled upon its books. The most cordial relations exist between the society and this sub-section. To continue these relations, it might be desirable to hold the August meeting of the society jointly with that of this sub-section of the American Association.

With these preliminary remarks, I pass to the consideration of the subject which I have chosen to speak to you upon, and which I trust may prove of interest to the chemists present. I ask you to consider with me some of the ideas which exist to day in science concerning the molecule and the atom, especially as they appear when viewed from the chemical standpoint. Said Professor Cannizzaro, in his Faraday lecture:* "I do not hesitate to assert that the theory of atoms and molecules ought to play in the teaching of chemistry, a part analogous to that of the theory of vibrations in the teaching of optics." Clearness of conception, on our part, being essential to clearness of statement before those whom we instruct, an attempt to state this theory of atoms and molecules cannot fail to be of service in so far as it is successful.

The best evidence for the existence of matter is its necessity. Hence, eminent authority defines it as "that which is essential to the existence of the known forms of energy, without which, therefore, there could be no transformations of energy."† The divisibility of matter is at once a metaphysical and a physical question. It is obvious everywhere that masses of every form of matter known—saving, perhaps the light ether—are capable of division with more or less readiness. But is there any limit to this division other than the imperfection of the means employed? Here physics and metaphysics are at variance, and the former boldly avers that there is a limit. A fragment of salt, for example, sustains subdivision only to a certain extent. Divide it but once again, and the salt as such disappears, and in its place we have the two new substances, sodium and chlorine. This limiting particle is called a molecule. It is the smallest particle of any substance which can exhibit the chemical properties of that substance. The aggregation of molecules constitutes a mass; hence the molecule is the physical unit—the ultimate particle or centre of the physical forces.

What now in the light of modern physics is the

* Address before the Chemical Section. From the *American Chemist*, November, 1876.

* *Journal of the Chemical Society,* xxv., 941, November, 1872.

† B. Stewart and P. G. Tait: 'The Unseen Universe,' 98, 1875.

molecule? What is its size and weight? And is it at rest or in motion? The relative size of material molecules has long been known, and forms the starting-point of chemical investigation. The law of Avogadro, enunciated by him in 1811,* but more recently placed by Boltzmann on a surer foundation,† asserts that in equal volumes of all gases there is the same number of molecules. The proof of this law is found jointly in that of Boyle, published in 1662,‡ and in that of Charles, published a short time after.§ The former of these laws states that the volume of any gas is inversely as the pressure to which it is subjected; and the latter that the co-efficient of dilatation by heat is nearly the same in all permanent gases. Since all gases are alike in these respects, they must be alike in their molecular constitution, upon which the phenomena depend. But if it be true that equal volumes of all gases contain the same number of molecules, it is also true, as a necessary deduction, that all gaseous molecules must be of the same size. The relative size of molecules is therefore determined.

The determination of the absolute size of a molecule, even approximately, would have been but a few years ago an entirely hopeless task. But now the problem has been attacked and solved, and numbers are given for the sizes of molecules which agree excellently well even when deduced from widely different data. The best results of this sort which have been obtained are those of Thomson and Maxwell.|| To comprehend their reasoning it is necessary to premise the heterogeneity of matter. "A body is called homogeneous," say Thomson and Tait,¶ "when any two equal, similar parts of it, with corresponding lines parallel and turned towards the same parts, are undistinguishable from one another by any difference in quality." But if we apply this definition to matter, without any limitation as to the size of the parts, there is no reason to believe that any form of matter known to us is homogeneous. More than thirty years ago Cauchy showed, from a mathematical investigation of dispersion, "that in palpably homogeneous bodies, such as a glass of water, contiguous portions are not similar when their dimensions are moderately small fractions of a wave length of light."** This result, it is evident, is the same with that obtained above, when by continual sub-division of a mass the molecule was reached as a final particle. The heterogeneity of matter then, in this sense, lies in the fact that it is made up of molecules separated by intervening spaces—a structure without which dispersion is impossible. Now, by the discovery of Cauchy just given, inasmuch as we know the length of a wave of light, we may, by assuming the small fraction spoken of, arrive at an approximation to the size of a molecule. Taking the wave length at 1-2000 of a millimeter, and assuming that the distance from the centre of one molecule to the centre of the next cannot be less than 1-10,000 part of this value,†† we have one-twenty-millionth of a millimeter as the diameter of the molecule; *i.e.*, the measure of the coarse-grainedness of matter.

A second method of determining the approximate size of material molecules is one which we owe to Sir William Thomson.‡‡ It is founded on the important fact—asserted by Volta, but denied until put beyond dispute by Thomson—that when a zinc and a copper plate are placed in contact, either directly or by means of a connecting wire, the zinc is positively and the copper negatively electrified. Since, therefore, the two bodies attract each other, it is clearly possible, by measuring the attraction, to calculate the amount of work which would be done by their coming together. A plate of zinc and a plate of copper one centimeter square in metallic connection separated by one-hundred-thousandth of a centimeter attract each other with a force of two grams. The work done in bringing these plates into this position is two-hundred-thousandths of a centimeter-gram. The work done by electric attraction in forming a pile of fifty thousand such plates would be two centimeter-grams. But this work by the law of Joule is equivalent to an amount of heat sufficient to heat the mass 1-16,120 of a degree. If, however, the space between the plates be reduced to a hundred-millionth of a centimeter, the heat generated would raise the mass by 62°; and if to a four-hundred-millionth, by 99 times the amount required to warm it 1° C. Now, as this is a far greater amount than that actually produced by their chemical union, the inference is a fair one that we have exceeded the limit of the heterogeneity in these metals. Hence the coarse-grainedness of this matter, and hence the molecular magnitude does not probably fall below one thirty-millionth of a millimeter.

A third calculation of the size of molecules is founded on data obtained from the soap-bubble film, and is also due to Thomson.* The force with which such a film contracts—shown commonly by using the stream of air issuing from the stem of a pipe on the bowl of which is such a bubble, to blow out the flame of a candle—is a measure of the work done in stretching it in units of force per unit of breadth. In the case of pure water, this contractile force is about sixteen milligrams weight per millimeter of breadth. Hence, the work done in stretching it, measured in millimeter-milligrams, is sixteen times the increase of area in square millimeters, provided only that the contractile force is not reduced by this diminution in thickness of the film. To prevent the fall of temperature which would necessarily accompany the drawing out of this film, it has been demonstrated that about half as much more energy in the form of heat must be supplied to it. Hence, for every square millimeter added to the area of a film of water whose temperature remains constant, its total energy is increased by twenty-four milligram-millimeters. A film one millimeter thick requires, to extend its area ten thousand and one fold, an expenditure of work for each square millimeter of the original film—or each milligram of its mass—of 240,000 millimeter-milligrams. Its thickness would thus be reduced to a ten-thousandth of a millimeter, and the temperature of the whole would be raised by the heat equivalent of this work by only half a degree Centigrade. But experiment proves that there is no diminution of the contractile force with this thinness of film, and hence that the number of molecules in its thickness is considerable. If, however, we extend the film yet more, so that its thickness is reduced to a twenty-millionth of a millimeter, the work expended in doing this is two thousand times greater, and its heat equivalent would be 1130 times that required to raise its temperature by 1° C. Now, since far less work than this would be sufficient in the form of heat to destroy the liquid as such (and of course its contractile force), and convert it into vapour, it is clear that the contractile force of a water-film diminishes greatly before it attains a thickness of one twenty-millionth of a millimeter. As such a diminution is inconceivable so long as there are several molecules in the thickness of the film, it follows that there are not several molecules in the twenty-millionth of a millimeter.

(To be continued).

* *Journal de Physique*, Delamethrie, lxxiii., 38, July, 1811; Ampère, *Ann. Chim. Phys.*, xl., 43.

† Boltzmann, *Ber. Ak. Wien.*, ii., lxiii., 397—418.

‡ 'New Experiments, Physico-mechanical,' etc. 2nd edition. Oxford, 1662. See also Tait's 'Thermodynamics,' Preface, p. iv., 1868.

§ Quoted by Gay Lussac, *Ann. Chim. Phys.*, xliii., 157.

|| Thomson, *Nature*, i., 551, 1870; Maxwell, *Phil. Mag.*, iv., xlvi., 453, 1873.

¶ 'Elements of Natural Philosophy,' 237, 1873.

** *Mémoire sur la dispersion de la lumière.* Prag., 1836; *Nature*, i., 551, 1870.

†† Tait, 'Recent Advances in Physical Science,' 305, 1876.

‡‡ *Nature*, i., 551, 1870; Tait, *loc. cit.*, 305, 311.

* *Phil. Mag.*, iv., xvii., 61, 1859; also *Nature*, i., 552, and Tait, 'Recent Advances,' 312—315.

Parliamentary and Law Proceedings.

CHARGE OF MANSLAUGHTER AGAINST A CHEMIST'S ASSISTANT.

At the Glamorganshire Assizes, on Friday, the 23rd inst., before Mr. Justice Mellor, George Whitfield Williams, chemist's assistant, Grangetown, Cardiff, on bail, was charged with causing the death of Archibald Wm. Hy. Hayward, at Cardiff, on the 6th November, by the administration of a dangerous drug. Mr. H. Allen prosecuted; Mr. Bowen Rowlands defended

Mr. E. Hayward stated that the child whose death prisoner was alleged to have caused suffered from fits about three weeks after its birth, and he consulted Dr. Edgar Jones as to its health. Dr. Jones recommended the child being sent to the Infirmary, and for some time it was treated as an out-patient. When the child was about two months old, witness went to Mr. Yorath's shop, where the prisoner was assistant, in order to get some syrup of rhubarb with a little laudanum in it for the child, as it was then suffering from scab on the head, and he had previously been accustomed to use medicine of a similar description for his children when they were suffering from that disorder. The prisoner said he had no syrup of rubarb, but he could put a little laudanum into some syrup of poppies, and give him that. He asked witness whether that would do. Witness said, "I do not know." Then the prisoner said that all the syrups were much about the same thing, and gave him a pennyworth of syrup of poppies with a few drops of laudanum in it. He labelled the bottle "Syrup of Poppies.—Poison," with a printed dose upon it. He told witness that the dose would be half a teaspoonful. On leaving the shop prisoner said, "Be careful; I think you had better not give the child half-a-teaspoonful, as I have given you nearly ten drops of laudanum." Nothing further was said in the shop, and when witness reached home his wife administered a dose of the medicine to the child, giving it barely half a teaspoonful. The medicine was given to the child in his presence, and he repeated to her the caution he had received from the prisoner. The medicine was given to the child for some time, and witness went to Mr Yorath's several times for a similar quantity of the syrup, always taking the same bottle (his own) to be filled. Finding the child became no better, during subsequent visits to Mr. Yorath's witness told the prisoner that the chemist from whom he had had the medicine before used gradually to increase the laudanum in it, and asked him whether he could increase it in the same manner. Accordingly the prisoner gave him an increase of laudanum in the syrup, gradually increasing the quantity of laudanum up to 20 drops. The child received the medicine for about five months—up to the date of its death in November, in fact. It gradually wasted away. In cross examination witness said that Dr. Jones had told his wife that in his opinion the child was not likely to live. That was about two weeks after its birth. The doctors at the Infirmary said the same thing. Another of his children living had, he had been informed, got at the bottle, and taken some of the syrup the deceased child was taking. At the coroner's inquiry into the circumstances of the death of the child, both witness and his wife were charged with manslaughter.

Mrs. Hayward, wife of the last witness, said that she took the child to Mr. Yorath's shop on several occasions, and the prisoner told her to administer half a teaspoonful as the dose of the poppy syrup, and he said once or twice that as he had began to give the stuff she would have to continue it. Once it began to scream in the shop a good deal, and the prisoner noticing it was very thin and delicate, said he thought it must be in a decline. In cross-examination witness said that the other child who took the medicine drank nearly half the syrup, and its eyes become dull, and it went pale afterwards. She took it down to the chemist's, and he told her to keep it awake, and it would be all right.

Dr. D. E. Jones spoke to being called in to attend the child when it was three weeks old, and subsequently. It was a delicate infant, and he recommended its being taken to the Infirmary. After its death he saw the child, and the result of a *post-mortem* examination was the conclusion that the cause of death was suspicious. He did not find sufficient disease to account for death. The child was very much emaciated, and the lungs and brain were congested. From the appearance of the body, he thought the child had been poisoned by opium. Opium poisoning was very difficult to trace in *post-mortem* examination, and he should not like to swear positively to the results of his examination in such a case.

Without proceeding further, the Judge directed the jury to find a verdict of not guilty. The case was only one of suspicion, and they could only act in such a case as this when the cause of death was assigned with certainty. Accordingly the prisoner was discharged.—*South Wales Daily News.*

POISONOUS CONFECTIONERY.

At the Manchester Police Court last week two confectioners were summoned under the provisions of the Sale of Food and Drugs Act for selling confectionery stained with a substance injurious to health. The purchase of the sweets having been proved,

Mr. Estcourt, the city analyst, said he had found them to contain in one case one fifth of a grain and in the other two-fifths of a grain per ounce of chromate of lead, which was a poison, and would produce the bright yellow colour on the sweets. Witness produced a sample of confectionery coloured yellow and red with vegetable matters, which he said were quite innocuous. The chromate of lead was undoubtedly injurious to health, even in small quantities.

Dr. Legh, medical officer of health for the city, said that the injurious effects of taking the chromate would be cumulative, and might probably end in partial paralysis. The result of a large dose would be that of an irritant poison, vomiting, etc.

Mr. Smith, who appeared for one defendant, admitted the sale, and pleaded that the defendant was unaware of the injurious nature of the chromate of lead, which was commonly used in the trade, and was known by the name of "chrome." Since the proceedings were taken, he had discontinued its use, and was using the vegetable matters.

Mr. Headlam said it was the duty of everybody who used colouring matter to put into food to ascertain very carefully what it consisted of, for everybody knew that a large proportion of colouring substances were poison. As this was the first case under the Act that had come before him, he inflicted the lowest penalty, *i.e.*, £5 and costs in each case.

Review.

MANUAL OF CINCHONA CULTIVATION IN INDIA. By Dr. G. KING, M.B., F.L.S. Office of the Superintendent of Government Printing, Madras.

The author, who is well known as the superintendent of the Royal Botanical Gardens at Calcutta and of cinchona cultivation in Bengal, has presented in the work before us a most interesting and complete history of the cinchona cultivation in India from the commencement of the enterprise until the year 1876. It is divided into seven chapters, in which are traced successively the collection of seeds and plants in South America; their introduction, after numerous failures, into India; the difficulties met with in course of cultivation; the results of chemical and physiological experiments upon the cinchona trees; the different modes of collecting and harvesting the bark;

and the methods of extracting the alkaloid adopted in different localities.

One third of the work is occupied by appendices which present in a tabular form the stock of trees in the Nilghiri and Sikkim plantations; the expenditure and revenue; the prices realized at sales of cinchona bark in London; the quantities of alkaloids supplied to the Indian Government from 1867 to 1873, with the cost of the same, reports upon the action of the mixed alkaloid supplied by the Sikkim quinologist, and meteorological observations made at the several Government plantations.

The style throughout is remarkably clear and concise, and the large amount of information contained in this manual is so well arranged that not only are the author's views readily understood, but one feels after its perusal that the whole subject has been treated in a most masterly manner. The plan which has been adopted of placing a marginal note against each paragraph, renders it exceedingly easy to refer to any point of a particular interest.

The first two chapters, although very necessary to the completeness of the history, are to a certain extent introductory.

The third chapter commences with the cultivation of the cinchona plant in India, Ceylon and British Burmah, and it is here that the reader will look more particularly for details concerning the district which has been more especially under the notice of Dr. King.

In this chapter the author points out that *C. officinalis* and *C. Pitayensis* do not thrive at Sikkim, while *C. Calisaya* promises to do well, and *C. succirubra* flourishes wonderfully, and can be cultivated to any extent that is desirable. By reference to the appendix it will be seen that *C. micrantha* and *C. officinalis* have ceased to be planted, while the worthless *C. Pahudiana* has not been planted since 1866. A new seedling form containing much quinine has, however, received much attention, and in April, 1875, there were 21,000 plants of it under cultivation. Fortunately this valuable species grows well in Sikkim and at a higher level than the *Calisaya*.

A tolerably good idea of the value of the Sikkim plantations may be formed by comparing the statement in the third chapter with the appendix E, in which the area under cultivation at Sikkim is given as 1939·442 acres. Of this amount about three quarters is devoted to red bark, while of the remainder 219 acres contain pale bark, 164 *C. Calisaya*, 31 *C. micrantha*, 4 *C. Pahudiana* and 7 the new variety of *Calisaya* above alluded to.

At the Nilghiri plantations there is shown to be a much less proportion of red bark, nearly one-half of the whole area being planted with pale bark and its more valuable varieties, the remainder being chiefly *C. succirubra*, with a comparatively small proportion of *C. micrantha* and *C. Pitayensis*.

The tendency of the reports, so far as they have gone, appears to show that red bark is by far the hardiest and most easy to cultivate, succeeding in most places where it has been planted, while pale bark flourishes best in the Nilghiris and Ceylon, *C. Calisaya* at Sikkim, and *C. Pitayensis* at the Nilghiris only.

From the fourth chapter, we learn that the careful observations which have been made have added largely to our knowledge of the best method of cultivating the different kinds of cinchona, and that these plants each require a particular method of treatment.

The author expresses his opinion that the fungoid diseases to which the cinchona plants are occasionally subject are by no means likely to prove so serious as at first anticipated by Mr. McIvor, and that they are chiefly due to insufficient drainage of the soil. Full particulars as to the various methods of propagation and the species to which each one is best adapted, as well as of all the details necessary to successful cultivation, will be found in this chapter.

The next chapter, relating to the chemistry of the bark crop, summarizes the results obtained by chemical examination and by the commissions appointed to report upon the relative medical value of the different alkaloids. One point here is especially worthy the notice of experimental chemists. Mr. Broughton's experiments are shown to have led to the conclusion that amorphous quinine is the alkaloid first formed, and that as the bark becomes older, this alkaloid is replaced partly by crystallizable quinine, and partly by cinchonidine. Other points affording valuable hints to the cultivator are that the amount of alkaloids in the bark is increased by deprivation of light; that a high temperature favours the production of cinchonidine, but diminishes that of quinine; that red bark yields its maximum proportion of alkaloids in its ninth year, and that the most vigorous and rapidly growing trees yield the richest bark. The age at which pale bark yields the maximum amount of quinine does not appear to have been ascertained.

In the sixth chapter the processes of mossing, coppicing and uprooting the tree are severally described and commented on. Dr. King does not fully concur with Mr. McIvor as to the value of the mossing process, and however successful it may be at the Nilghiris it had failed entirely at Sikkim from a most unexpected cause. In every tree mossed at Sikkim the renewing bark has been regularly eaten by ants! It is singular that this does not appear to have been the case with those trees which were barked but not mossed. The author seems of opinion that the best plan of procedure is to plant thickly and to cut in alternate rows at four years old and uproot the other rows at eight or nine years old, when the trees would begin to deteriorate.

By this means he considers that the expense of clearing would be avoided and that, including the root bark, the yield would be as good if not better than by any other process yet devised.

The last chapter gives a detailed account of the process employed by Mr. Broughton, at the Nilghiris, in making his "amorphous quinine," but since his product cost more than commercial quinine, and the factory has been closed, it seems almost unnecessary to have entered so fully into its details.

The process introduced by Mr. C. H. Wood, at Sikkim, is one which appears to incur much less expense than that used by Mr. Broughton, and is extremely simple. It consists in exhausting the bark by four macerations with water acidulated with hydrochloric acid, precipitating with caustic soda, redissolving the crude precipitate in dilute sulphuric acid, adding a solution of sulphur in caustic soda to decolorize the liquor, and precipitating the filtered solution by caustic soda. The result is the Cinchona febrifuge.

In order to insure as much uniformity as possible, one kind of bark (red) only is employed, and the root, stem and branch bark are mixed together, in as nearly as possible the proportions in which they are yielded in the plantations. Dried bark is used, and thus the process can be carried on throughout the year. It is found that dried bark yields a much better product than green bark, and quite as large a quantity.

The macerations being made by rotation in sets of three casks, the solutions are obtained in as concentrated a state as possible. The factory consists of wooden sheds and the apparatus of beer barrels, thoroughly cleansed and with the heads removed, and an iron vessel for the soda solution; and Coolie labour is used. The hydrochloric acid is obtained in Calcutta at a cost of 3½ annas per pound, and the caustic soda from England at the rate of £15 to £20 per ton. The febrifuge is to be sold at a rupee an ounce, and the quantity which it is estimated can be turned out, viz., 4800 pounds, will, it is considered, pay the whole cost of the plantations and manufacture for one year. The quinologist intimates that if the product prove of value as a remedial agent, the process could be considerably modified to produce greater economy, although that would involve the use of permanent buildings and machinery.

The full details of the process we have sketched are appended in the form of a fly leaf to Dr. King's manual.

The average composition, in 100 parts, of alkaloid from Sikkim red bark appears to be: crystalline quinine, 15½; amorphous quinine, 17; cinchonine, 33½; cinchonidine, 29; colouring matter, 5; and it is considered that it will be produced at a cost of less than one rupee (two shillings) per ounce. If this be the case and the reports upon its utility continue to be favourable, the object of the Government plantations will to a certain extent have been a success at Sikkim.

By reference to appendix B, however, it will be observed that in 1875, the amount of quinine and other alkaloids purchased by Government had not materially decreased, and that larger quantities had been supplied to Bengal than to any other presidency.

In conclusion, it must be admitted that Dr. King has provided a manual which, for usefulness, conciseness, clearness and scientific value may safely be said to be without an equal in the subject of which it treats. The only drawback is that it is not easy to obtain a copy, only a limited number having been printed.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

Phosphorized Cod-Liver Oil.

Sir,—In the *Pharmaceutical Journal* of the 10th inst., Mr. Martindale mentions the difficulty of preparing Phosphorized Cod-Liver Oil by dissolving the phosphorus in the cod-liver oil direct, instead of in almond oil, owing to the liability to oxidation of the phosphorus, and the formation of pellicles on the surface of the oil and subsequent dark brown deposit on the sides and bottom of the bottle.

During the last twelve months I have prepared a fair quantity of phosphorized cod-liver oil by dissolving the phosphorus in a small quantity of cod-liver oil, and immediately the phosphorus is taken-up by the oil throwing it into the bulk of cold cod-liver oil. I have noticed that if the concentrated oil is allowed to cool for even twenty or thirty seconds, the dark resinous pellicle begins to form, and very quickly increases, but by mixing it quickly with the bulk, I never see a trace of solid matter. I bottle it off for retail, and have always found it remain perfectly bright, forming no deposit whatever, but some that I had from my wholesale druggist deposited in about a month. I placed two ounces of my oil in a six ounce bottle about last September, and now although the oil is not sweet, it is perfectly bright, and the bottle free from deposit.

Respecting the phosphorized cod-liver oil being more palatable than an equivalent dose of phosphorus administered in other forms, on account of the deposit detracting from its strength, I may mention a circumstance that occurred a month or two ago. A customer of mine, who has had plain cod-liver oil from me regularly, came in one evening, and seeing that I was busy with several customers, he took up a bottle of oil, placed it in his pocket, and paid me, for he would not allow me to wrap it up. At the time, I forgot that I had placed some bottles of phosphorized oil near the plain oil, and I afterwards found that he had taken one of them. He called in a few days after, and said he found his mistake when he got home, but thought he would like to try the phosphorized oil, and after taking it each morning, he said he had the taste of lucifer matches in his mouth the remainder of the day. My business does not allow me the time to go deeply into the subject as Mr. Martindale and some other gentlemen have, and there may be some objections to the process I have adopted, which I have not perceived, and if so, I hope some gentleman will kindly point it out.

W. B. Baynham.

6, Rye Lane, Peckham, S.E.

Glycerinum Tragacanthæ.

Sir,—On opening the Journal last week, I was pleased to see the name of J. C. Thresh in conjunction with "the Excelsior pill excipient," Glycerinum Tragacanthæ. I lost no time in digesting the whole thoroughly and now must ask you to give me an opportunity of expressing an opinion. I will set aside Mr. Thresh's valuable experiments, and judge the letter as a condemnation of glycerine and tragacanth as an excipient, for such the last paragraph of letter suggests.

After five years' experience (dispensing alone) with glycerine and tragacanth, I am fully prepared to support those gentlemen who have taken the trouble to commend this preparation to pharmacists and to strongly deprecate the assertions of Mr. Thresh in his last paragraph.

True that Mr. Thresh had a variety of masses made with this excipient and that he found they did not turn out as he had anticipated, this does not prove the worthlessness of the excipient. For my part this would be the last excipient I should think of using for masses I intended to keep as masses; it would suggest itself that a gummy material like tragacanth with moisture would on keeping become very hard and friable. I should say glycerine alone would be far better. Again, Mr. Thresh condemns it on account of it not making the pills of the Pharmacopœia. From my experience, and I do not think it to be so very different from other assistants', where a dispenser sends out one Pharmacopœia pill he sends out a dozen of private formulæ and under those circumstances shall Mr. Thresh say that he (the dispenser) can always find a more suitable excipient? I say most decidedly—No! I admit that the judgment of the dispenser must always be brought to bear in the choice of excipients, but I assert that out of a dozen prescriptions, ten may be judiciously made with Glycerinum Tragacanthæ.

With regard to the dissolving of the pills in warm water, I admit that made with Glycerinum Tragacanthæ, and kept for a considerable time, they do not dissolve so readily as if made with treacle or syrup, but I am not arguing for the use of this preparation in place of the excipients of the Pharmacopœia, but to support what has been said in favour of it in dispensing. When a patient brings a prescription for ½ or 1 doz. pills it is not his intention to keep them locked up for six months or so, but, as the label invariably directs, to take one every or every other night. Under these circumstances let the mass be made as hard as you can,—it will dissolve in hot water.

When I think of the hundreds of masses of valerianate of zinc, oxide of zinc, carbonate of soda and reduced iron, etc., I have made with this excipient, I feel sorry to see the subject handled so roughly and apprentice-like.

I hope Mr. Thresh will forgive my speaking so strongly remembering it was he who first made the assertions.

I would recommend to all pharmacists to rub a little pulv. tragac. with glycerine to form a paste, place it in a pot and in the course of the day it will become a jelly. I am sorry I cannot give a formula, having always made it by rule of thumb; a little practice will suffice. Pills made with this are easily worked up and rolled and in ten to thirty minutes become quite hard.

Suum Cuique.

Union Street, Bristol.

W. S. Rogers.—The regulations could probably be obtained by application at Apothecaries' Hall.

F. C. S.—The summing up of Mr. Baron Bramwell is printed in the *Pharmaceutical Journal* for February 5, 1876, p. 639.

W. Atkinson.—The decision lies with the Inland Revenue authorities; we cannot say whether they would sanction the practice, either by a grocer or a chemist and druggist.

"*Chemicus.*"—There are Schools of Pharmacy in Paris, Lyons, Nancy, Montpellier, and other French cities.

M.—We think the subject is hardly suited for discussion in a pharmaceutical journal.

"*Statim.*"—Probably they could be bleached by treating them with a weak solution of sulphurous acid or chloride of lime.

Communications, Letters, etc., have been received from Professor Dymock, Mr. Fairlie, Mr. John, Mr. Atkinson, Professor Dragendorff, Mr. Tichborne, Mr. Hooper, T. A. H., Chemicus, Negator.

Erratum.—In the Answers to Correspondents on p. 788, col. i., line 2 from bottom, for "℥ij Pulv. Acaciæ," read "ʒij Pulv. Acaciæ."

MEDICINE MEASURES.*

BY B. S. PROCTOR.

Early in last year I drew attention, in the correspondence columns of the *Pharmaceutical Journal*, to the errors resulting from the use of spoons as measures for doses of medicine, with the view of eliciting such expressions of opinion as would enable some practical suggestion to be selected for general adoption. I now return to the subject, having given it deliberate thought and having come to a definite conclusion upon the mode which appears to me to be most desirable and most practicable for getting rid of the difficulty.

I feel no hesitation in saying that the subject is one of grave importance and one which must sooner or later press for a radical change,—the sooner in consequence of the growing disposition to order medicines of virulent character in concentrated form.

So much has been said by others as well as by myself about the discrepancy in the sizes of spoonfuls, that there will be little difficulty in agreeing to the general statement that it is desirable to abandon the use of "spoonfuls" altogether, though it must be admitted that such a change cannot be accomplished all at once.

Any attempt to modify the quantity to be understood by the word "tablespoonful" would only increase the confusion; and to use the term "tablespoonful" to signify a quantity which only half fills a customary tablespoon is no less inconsistent than it is unsafe. It is highly desirable, therefore, to take any step which will promote the adoption of expressions which are free from ambiguity and the use of measures which closely approach to exactness. The different sized spoonfuls should cease to be used *even as the names of quantities*, and the terms half-ounce, quarter-ounce and drachm, should take their place. As it is, we have the tablespoon graduation on the glass measures indicating a quantity which does not fill a tablespoon—the glasses are divided as they should be, into ounces and drachms, but they are marked as they should not be, by tablespoons and teaspoons.

When medicine is ordered by tablespoonfuls, I would write directions in tablespoonfuls, but with the reputed equivalent in ounces written in parenthesis, and I would give a simple cheap measure with the medicine, of such capacity as to hold one dose, and labelled "this measure holds one dose of the medicine," or words to that effect. When this precaution is taken it appears to me that mistake or inaccuracy is almost impossible.

If the prescription directs "℥ss ter die," the label is written "Half an ounce thrice a day," and the half ounce measure is supplied with the medicine and labelled as above. When two or more mixtures are ordered at once with different doses, I would supply a separate measure for each, and mark upon the label of each measure the name of the mixture for which it is to be used; thus one measure may be marked "cough mixture" and another "tonic." Or the measures may bear a number corresponding with the registration number of the mixture.

A correspondent in a recent number of the *Pharmaceutical Journal* prefers to use the term "accurate tablespoonful" rather than half ounce, and thinks that more full directions should be branded upon the measures. Personally I do not feel satisfied with the expression "accurate spoonful," or "measured spoonful" as was suggested by a former correspondent, or with any other words implying that a spoon may be used for measuring. I am quite prepared to find a great diversity in the opinions of pharmacists as to the best mode of expressing what is desirable either on the measure or on the bottle of medicine, and this very circumstance would deter me from advising makers to adopt any full particulars on a burnt-in label.

I anticipate that each pharmacist will prefer to print labels according to his own ideas, and if in course of time physic makers and physic takers should come to a common understanding, a generally approved label burnt into the earthenware will no doubt be the result.

Last April I suggested that the Council of the Pharmaceutical Society should give consideration to this subject, and that it would be desirable to have from them an expression of disapproval of the use of the term spoonful as a measure for medicine, but that when such terms are used by medical men the pharmacist should interpret the tablespoonful to mean half an ounce, the dessertspoonful two drachms, and the teaspoonful one drachm, unless some other interpretation was clearly indicated, and that they should express disapproval of the use of the term "spoonful" on a label as the interpretation of the ounce or drachm mark when such are used by the prescriber. But in the absence of any action on the part of the Council, I now simply make known for the edification of my brethren what course I have concluded to pursue failing any instructions spoken with authority upon these points.

[*The discussion on this paper is printed at p.* 820].

* Read at an Evening Meeting of the Pharmaceutical Society of Great Britain, April 4, 1877.

ELIXIR OF MONOBROMATED CAMPHOR.

BY J. MUNDAY.

As monobromated camphor is a chemical which is likely to become a favourite remedy, especially if it could be given in a liquid form, I have made other experiments since my last note, which was inserted in the Journal of the 3rd of March.

I find that glycerine has not sufficient sweetening properties in itself to overcome the nauseous taste, I now therefore introduce the following formula, which is more agreeable and seems to answer well.

Monobromated Camphor.	℈i
Sp. Cinnamon (1 in 50)	ʒxv
Red Elixir (U. S.)*	ʒxx
Syrup q. s. to make ℥iv.	

Mix the sp. cinnamon, red elixir, and syrup together, and add the monobromated camphor, and dissolve in a flask in a water-bath, taking care to use no more heat than is absolutely necessary, or else the monobromated camphor will recrystallize.

The product contains two grains in each half-ounce, and I think will be found a convenient form for administering this drug where it is preferred in a liquid form.

I also give the formula for a compound elixir of

* See *Pharm. Journ.* [3], vol. iv., p. 682.

the above, which is being prescribed a good deal by the profession here, under the name of

Elixir Camph. Monobrom. Co.

Croton Chloral	gr. iij
Tr. Gelsem. Semper.	♏x
Monobromated Camphor	gr. ij
Sp. Cinnam. (1 in 50)	ʒis
Red Elixir	ʒiss
Syrup ad	℥es

Dissolve the croton chloral in the sp. cinnamon, mix with the red elixir, gelsemium and syrup, and dissolve the monobromated camphor as directed for the simple elixir.

14, *Rue de la Paix, Paris.*

COD FISHING IN NORWAY.

When the old year in England has but a few hours to live, when days are short and dark, and when we take refuge from the outer cold before cheerful fires in holly-decorated rooms—at that time very different scenes are presented in many homes in Norway. There all is vigorous activity. Men are anxiously examining and repairing fishing nets; children are disentangling and stretching fishing lines; women, more active than either, are mending leather clothes, washing woollen shirts, making large rye loaves, rolling out flat flakes of oatmeal bread as thin as wafers, watching the contents of hot ovens, and, as it were simultaneously, packing up quantities of butter, cheese, and dried meats. All this because in a few days the father and breadwinner of the family is about to depart on his annual venture as a fisherman to the Lofoten Islands. By the middle of January all is ready. The weather is then day by day carefully watched until, on the very first favourable opportunity, implements, clothes and provisions are hurried on board the fishing boat, the crew take a hasty farewell of their families, and sail away to dare stormy seas and hostile coasts.

Lofoten is the name of a group of islands extending in a south-westerly direction from 68° 36′ to 67° 25′. The channel that lies between these islands and the Norway coast is called the Westfjord; it has a wide open mouth towards the ocean in the south west, narrowing upwards in the opposite direction towards the north east. The permanent population of these islands is about 25,000 souls. With the exception of a few small farms in the larger islands, only three industries are followed by the inhabitants, fish catching, fish dealing, and lodging letting; these they pursue with equal ardour. In every bay that is at all protected from the violence of Atlantic storms, the native fishermen and fish merchants have built large numbers of huts. These huts, constructed of rough boards and covered with turf, consist generally of two rooms, arranged to hold from six to twelve persons, that is, one or two crews. Round the walls of the living-room is fixed a settle or wooden bench, known as the board-bed, while in the other are stored nets, ropes, lines, clothes, provisions, and empty barrels for roe or oil. As these huts are occupied by a large number of persons, out of all proportion to their size, who moreover habitually hang up their wet and dirty clothes to dry, the air within is naturally extremely bad. But the fishermen care little for this, being well content with a hard bed and a sound roof, knowing well that less fortunate companions outside are passing the night on deep snow, with no other covering than a sail or an inverted boat. Well might these hardy mariners say in the words of the Pilgrim Fathers, "It is not with us as with men whom small things can discourage." Early in the morning all are astir. Before going out to fish every man partakes of hot coffee for breakfast, prepared by one of the boys. Dinner later in the day consists of dried meats with bread or potatoes, and supper of hot fresh fish or boiled fish liver with bread.

The boats engaged in fishing with nets are from 36 to 40 feet long, 9 to 10 feet wide, with a depth of not more than 3 feet. They are provided with only a single mast, about 24 feet high, carrying one large square sail. But each boat has as well ten or twelve oars, by means of which her sturdy crew can propel her against an adverse wind. For fishing with lines, smaller and less costly boats are used.

The crew, usually consisting of five men and a boy, in the first place elect one of their number to be captain. No general of an army is more strictly obeyed than is the captain of a fishing boat, for his men well know that their success, property and often their lives, depend on prompt obedience to his orders. For these reasons in selecting a captain, experience, energy, knowledge of the channels, and coolness in danger, are alone taken into account. Age has no influence, except that no fisherman above the age of fifty is taken as captain, for he is by that time supposed to have lost something of his strength and courage. Still less does property blind the judgment, for it frequently happens that the servant is made captain while the master, who has aided the choice, has to row or work the sail. The selection once made the captain becomes a real chief, not only over the boat at sea, but on shore over all purchases and all sales as well as before the public authorities. No sooner is a fisherman elected to be captain than his gait becomes prouder, his dress smarter and his language more polished than before, conscious that he is raised above the common crowd. Notwithstanding his dignity, the position of captain is only one of honour, and he has no greater share in the produce of the catch than any other of the crew.

In the month of December the first shoals of cod (*Gadus Morrhua*) usually begin to appear on the western banks of the islands, arriving from the open sea. These are soon followed by great masses of fish. But as these western outside shores are shallow, the ports few, and the whole coast exposed to the frequent fury of the North Sea, not more than from six to eight hundred boats venture on the hazards of this early fishery, and their take seldom exceeds five or six millions of fish.

In the mean time the inhabitants on the inner or eastern side, protected from northerly winds, and favoured with many bays of refuge, examine their shores day by day with baited hooks, to discover if the precursors of the dense shoals of cod have yet appeared in the Westfjord, and great is the public exultation when the joyful news of their arrival is announced. This important event takes place generally in the latter end of December, but not before the middle of January do the fish arrive in great masses.

On their approach, the shoals usually choose for their entrance the openings between the islands

Moskö and Röst, or between Röst and Vœrö, all situated at the south-west extremity of this group of islands. No sooner have they entered the West-fjord, than they distribute themselves in prodigious numbers in order to select suitable places for spawning. As the area is great and the fish capricious in their choice, it is not possible for the keenest captain to foresee where the densest masses of cod will accumulate. Generally they make for the eastern and more protected shores of the islands, and for the upper end of the Fjord, but in some seasons they have been known to remain on the outside western coasts altogether.

Although the fish arrive so early in the year, spawning does not actually take place till March, and not then till late in the month. It occurs not at the bottom of the sea, as is popularly supposed, but in the middle of the water, which is made turbid by the clouds of roe and milt. At this particular time the fish are very restless and go easily into the nets.

Codfish are taken by the Lofoten fishermen by three methods:—1, with hand lines; 2, with set lines; and 3, with nets.

Hand lines, requiring small capital and producing small results, are only employed by the poorest fishermen. These are satisfied with 50 fish to each man per day, although occasionally they will capture double that number. They bait with herrings, salt or fresh, and when these are all gone, with the roe of the fish they have caught. Sometimes when the shoals of cod are very thick and dense, the men adopt another method, also with a single line but requiring no bait. Providing themselves with a long cord armed with a large and sharp hook at its extremity, they sink it into the swarming masses below, having first attached to it a couple of feet above the hook, small fishes of tin for the purpose of attracting the cod by their glitter. The fishermen then jerk the hook sharply upwards, occasionally securing a curious fish though cruelly wounding many others that are not taken.

Set line fishing requires larger apparatus: a boat, a crew, and from 500 to 3000 hooks baited at once. The hooks are attached to fine snoods of hemp or cotton, which in their turn are suspended on long lines; each boat puts out at least twenty-four of these lines, every line carrying more than a hundred hooks. Set line fishing usually begins in the afternoon, but in any case only at the time and in the place prescribed by the officers appointed at each station for the purpose. The baited hooks are generally suspended near the bottom, but if there is reason to believe that the fish have risen, as they sometimes will, the lines are shortened and the bait raised to the required height by means of glass floats. They are then left all night. On the following morning the lines are taken in and the crews are well content with an average take of 50 to 60 fish daily on each set of 120 hooks.

Net fishing requires larger capital, and is only followed by the more wealthy fishermen, who provide both nets and lines to be used according to circumstances. When the fish are fat, and especially during spawning season, they will hardly take any notice of the bait; then is the time the nets are used. Every boat carries at least 60 nets of from 10 to 20 fathoms deep. These nets are suspended in the water from floats of wood, cork, or glass. Hollow glass floats are preferred and are almost exclusively used at Lofoten, a most useful application of that water-resisting material, invented by Mr. Christopher Faye, of Bergen. Sixteen to twenty nets bound together in one length are set out in the afternoon, and, weather permitting, are taken up the following morning. A catch of from 500 to 600 cod is considered satisfactory; but if this number is largely exceeded, part are left in the nets till the afternoon, because the boats could not safely carry so heavy a freight together with the crew and wet nets.

The total take of cod by these various methods has ranged during the last few years from fifteen to twenty-five millions of fish per annum.

The cod being thus caught, the first thing the fishermen do after coming on shore is to have their dinner. That concluded, they proceed to clean and prepare their catch.

The livers reserved for the preparation of medicinal oil are all very carefully examined, and those that are poor, have sustained injury, or have portions of gall adhering are removed. The selected are then thoroughly washed and afterwards dried. The fishermen, many of whom make the oil themselves or sell to larger makers, put these prepared livers immediately into open barrels where the oil slowly exudes, and rising to the top is removed with large spoons. It is then when quite cold filtered three or four times through filtering paper and the preparation is complete. Nothing more remains but to pour it into tin cans or oak barrels, and it is ready for market. This oil is described as of a straw yellow, has nearly no smell nor taste, and is known as "natural medicinal oil."

In the mean time other fishermen having carefully sorted, washed, and dried their livers, place them in a pot of tinned sheet iron. This tinned pot is then put into a larger iron pot half full of water, which on becoming heated causes the livers immediately to begin to give out their oil. Other makers introduce steam from a boiler between the two pots, and others let the steam act directly on the livers. The first yield by these methods of regulated heat is also removed by spoons, filtered when cold, and reserved for medicinal use, under the names of "steam-boiled medicinal" and "ordinary bright." The after yield is used in medicine, though somewhat redder: it is called "bright brown."

Finally, those portions of liver that will not dissolve by themselves or by a mild heat, are roughly boiled down to yield dark brown or tanners' oil, the black residue being used with other fish refuse for manure.

As for the fish itself, when the liver and the roe have been carefully removed, the backbone dissected out, and the entrails and head thrown into a waste heap, it is cut open down to the tail, whereby it becomes quite flat, and in that state is either packed away between layers of salt, or is hung up to dry in the cold open air till it becomes as hard as wood, to be henceforth known as—stockfish.

The cod liver oil prepared at Lofoten finds its way in the first stage of its travels to Bergen, where it begins to arrive in May. Here live the merchants who have advanced money, implements and provisions to many of the fishermen early in the season, and who now take a lively interest in the pecuniary results. Many of the fishermen require no advance, and these sell their produce to the highest bidder. The care taken at Lofoten in preparing the medicinal oil is by no means extended to the dark brown or tanners' oil. This is made all along the coast indiscriminately from the livers of cod, coal-fish, ling, tusk, halibut, haddock, skate, and even of the shark. But before exportation every barrel is examined by an official expert at Bergen, who with an iron instrument makes a mark close to the bung indicating the quality.

Early in April the fish begin to leave the Westfjord, and soon after retire towards the open sea in such multitudes that by the end of the month both fish and fishermen have departed; the fishers' huts, so lately swarming with life, are silent and empty, and the Lofoten Islands are left to their permanent inhabitants for the remainder of the year.

Five years ago the number of men engaged in these fisheries exceeded 27,000, owning more than 4000 vessels. In contrasting this amount of labour with its results—fifteen to twenty-five millions of cod fish—it should be remembered that the tempestuous weather usually prevailing in these northern latitudes during the winter months often prevents the fishermen going to sea for weeks together, and that a season that has permitted fishing on an average of two days a week may be considered a favourable one.

Although the cod fisheries of Lofoten are the largest and the most renowned, Norway has many others of great value along her far-stretching seaboard. Opposite the Throndhjem Fjord, and from that to Cape Stat, there are three or four miles from the shore several very rich fishing banks, where cod collect in enormous shoals to spawn, observing the same periods as the Westfjord fish. Again, opposite the Varanger Fjord, from the 59th to the 62nd parallel of latitude, are many good cod banks. From Aalesund now annually go forth daring crews with decked vessels, who fish in the deep sea at a distance of ten or twelve miles from the shore. Their lines are set on a bank at a depth below the surface of from 150 to 200 fathoms, that is to say, from four to six times the height of the London Monument. Exceeding these in importance is a relatively new fishery in the far north in Finmark, which now promises to rival even that of Lofoten itself in its yield. In the latter part of February the appearance of millions of sea-gulls fluttering along the surface of the ocean, with the spouting and blowing of numerous whales in it, announce to the scanty population of Finmark and Cape North, that great shoals of capelin (*Mallotus villosus, Osmerus arcticus*) are approaching the shore. Following these, it is well known, will also be millions of cod fish pursuing their favourite food. So valuable has this fishery become that many of the men after finishing the Lofoten season, now flock to Finmark, and have lately succeeded in taking an after catch of from twelve to fifteen millions of fish. In this enterprise they are favoured by the later migration of the northern shoals, which always continue on those shores till the end of May, and in the Varanger Fjord until June. But in Finmark the harbours are bad and the weather more violent and destructive than in Lofoten; were it not for this the take would be much larger than it is, as the shoals of fish in Finmark appear to rival those of Lofoten in magnitude.

Thus the Norwegian fisheries produce in great abundance not only an invaluable remedy for one of the most fatal maladies that afflicts humanity, but they supply many tons of wholesome and cheap food to the less affluent populations of the whole of Europe. These industries result in a hardly earned income to these hardy Northmen of not less than £2,500,000 per annum, a magnificent sum for a country possessing a population of barely two millions of souls.

The facts in the preceding paper have been gathered by Mr. Robert Howden from an official report, by Mr. Hermann Baars, of Bergen, written originally in the German language, to illustrate the Norwegian Industries at the Vienna Exhibition, in 1873. Subsequently this report was translated into English by Mr. Alfred Sharpe, of Christiania, for the purpose of explaining the same industries at the Philadelphia Exhibition last year. Mr. Baars is a gentleman of intelligence and high culture. He is in no way connected with either pharmacy or commerce, so that his object has been not to inform pharmacists, or any other class, so much as to make a general report on the National Industries of his country. From this work the above particulars have been gleaned; if on the one hand we may regret the absence of some technical details on the other we are largely indebted to him for much new and exact information that is now, through his intelligent industry, submitted to the English reader.

DISTINCTIVE TESTS FOR CARBOLIC AND SALICYLIC ACIDS.*

According to Almén the delicate reaction of ferric chloride with salicylic acid may also be used to distinguish carbolic from salicylic acid in very dilute solutions. Both acids give a violet colour with the iron salt, but, while the utmost limit of perceptibility of the tint in the case of carbolic acid is one in 3000, the colour produced by salicylic acid remains intense in dilutions of one in 100,000, and is still discernible even in solutions containing only one in 1,000,000. The most sensitive test for both acids is said, by Almén, to be the well-known Millon's reagent, prepared by dissolving mercury in ordinary fuming nitric acid and diluting with two volumes of water. The less acid the reagent is, the more delicate a test it is for both salicylic and carbolic acids. Five or ten drops of Millon's reagent are added to about twenty c.c. of a solution of these acids, and the mixture is heated to boiling, which causes the precipitation of a yellow basic salt of mercury. To the boiling hot liquid as much nitric acid is added as is required to redissolve the precipitate. In presence of either acid, the solution assumes an intensely red colour, which increases in depth by standing. The limit of perceptibility of this reaction is one in 2,000,000 for carbolic acid, and but little less for salicylic. In dilutions of one in 400,000, the colour appears instantaneously, in higher dilutions only after the lapse of ten to fifteen minutes. The best method to detect the presence of carbolic in salicylic acid or in salicylates is probably the well known reaction with ammonia and sodium hypochlorite, consisting in the production of an intensely blue colour, which turns red on addition of an acid, and is restored by alkalies. Free chlorine and the presence of free acids interfere with the reaction, especially in warm solution; hence an excess of sodium hypochlorite, especially in very dilute solutions, must be avoided, and a sufficient quantity of ammonia must be added to maintain an alkaline reaction. Solutions of phenol, containing one in 5000, give the reaction at once; dilute solutions, containing one in 30,000, after about fifteen minutes; and even still more dilute solutions, up to one in 50,000, after twenty-four hours. Solution of salicylic acid, even concentrated (one in 1000), does not give this reaction, which enables us therefore to detect the presence of phenol in salicylic acid.

* From *Pharm. Zeit.*, No. 100; reprinted from *New Remedies*, March, 1877.

MANUFACTURE OF ARTIFICIAL BUTTER.*

BY HENRY A. MOTT.

The first matter to be attended to when a good product is to be manufactured is cleanliness. I start off with this most important point, to which the strictest attention must be paid.

Washing Process.—The fat, on arriving at the factory, is first weighed, and then thrown piece by piece into large tanks containing tepid water, care being taken to place all pieces covered with blood in a separate tank to be washed. The fat in the tanks should now be covered entirely with tepid water, and left at rest for about one hour, when the tepid water should be removed and the fat thoroughly washed with cold water, then covered with fresh cold water, and allowed to rest for one hour longer; the water is then again removed, and the fat thoroughly washed, for the last time, with fresh cold water, when it is ready for the next operation.

The *Disintegrating Process* consists in disintegrating the fat by passing it through a "meat hasher." To do this, the fat in the tank is removed by means of a wooden car to the side of the hasher, where it is cut with a knife into pieces about five or six inches square. Piece by piece it is introduced into the hasher, which, by means of the revolving knives within, cuts the fat very fine and forces it through a fine sieve at the opposite end, and finally out of the machine and into a tub. Care must be taken not to introduce the fat into the hasher too rapidly, as the sieve or knife is apt to snap, for it requires considerable power for the disintegration, which is, of course, accomplished by steam power.

Melting Process.—The fat, now in a disintegrated state, is removed to the melting tank, care being taken not to introduce into the tank any of the water which is forced out of the fat during the disintegrating process. The fat is then heated by means of the water surrounding the tank, until the temperature reaches 116° F., when the steam which heats the water is turned off. The water surrounding the tank being much warmer than the molten fat, increases the temperature of the fat to about 122° to 124° F., when the fat completely melts. During the whole operation, from the time the steam is turned on until the melted fat is allowed to rest, the fat must be continually stirred, so that an even temperature may be maintained. The adipose membrane of the fat, called "scrap," separates and settles to the bottom, on leaving the melted fat at rest, and a clear yellow oil floats on top, covered by a film of white emulsion of oil with the water contained in the fat.

When the scrap has completely settled, the thin layer of emulsion is skimmed off, and the clean yellow oil is drawn and received in wooden cars, which, when filled to within one inch of the top, are removed to some place, to allow the oil to granulate. Care must be taken in drawing off the last portion of the oil not to allow any of the scrap to mix again with it. It is better to receive the last portion of the oil and scrap in a small galvanized iron can, and allow it to cool by itself, and when cool to melt it over again by placing the can in one of the washtubs and surrounding it with water heated to about 125° F., and thus separate from the scrap all the oil that is possible.

It sometimes occurs that the scrap refuses to settle, and rises to the surface, forming a layer on top of the clear oil. If such be the case, the melted fat and scrap must be stirred up together for at least ten or fifteen minutes, and then allowed to settle by standing, which it will generally do. If it does not, then it should be again stirred and allowed to stand; and if another failure follows, a quart or two of salt must be thrown on the scrap and the mixture stirred, when the scrap will soon settle to the bottom after standing.

An acid solution of the active principle of the stomach of a calf was used for some time, as proposed by Mége, in the melting process. It was thought to coagulate the "scrap" and cause it to settle more rapidly. Experiments have shown it to be unnecessary, however. The melting process, when conducted with success, occupies about two or three hours. The oil in the cars will require at least twelve or twenty-four hours or more to granulate, and the temperature of the room should be about 70° F. This is a very important operation, and must not be hurried, otherwise the stearin in the fat will not have time to crystallize.

Press Process.—The car containing the solidified oil from the melting process (which for convenience hereafter I will call refined fat) is removed to the press room, which room is kept at a temperature between 85° F. and 90° F.

The refined fat must not be so solid that it cannot be worked with the fingers with ease; if it is, it must be left in the press room until it softens. When in the right condition, it is packed in cloths, set in moulds to form packages about 4 in. wide, 8 in. long, and 1½ in. thick. These packages are then placed on galvanized iron plates in the press, at equal distances apart. The plates are piled one above the other until the press is entirely filled, when the packages are subjected to a slight pressure, which must be increased very gradually, and only after the oil pressed out begins to flow very slowly. The oil is received in a tin vessel, which, when filled, is replaced by another. The pressing is continued until no more oil can be obtained at the temperature of the room. The pressure is then removed and the plates unpacked, when cakes of pure white stearin are obtained, having the dimensions of about 8 in. × 5 in. × ½ in. The stearine, after the removal of the cloths, is ready for sale. The cloths are put into one of the tanks containing hot water, until all the oil and stearin are melted off, when they are washed in another tank, and then hung up to dry. The oil and stearin in the first tank are solidified by means of cold water, collected and sold as soap grease.

The oil obtained from the press is removed to some cool place, until it assumes a temperature of about 70° F., when it is ready for the next operation.

The oil now at the proper temperature (70° F.) is removed to the churning room. One hundred pounds of oil are introduced into the churn at a time, with from fifteen to twenty pounds of sour milk. About 3 or 2½ ounces of solution of annatto, to which has been added from ½ to ¾ of an ounce of bicarbonate of soda, may now be added, and the whole agitated for about ten or fifteen minutes, until milk, colouring matter, and oil are thoroughly mixed together, when the whole mixture is withdrawn from the churn, through a hole at one end, and allowed to fall into a tub containing pounded ice. As the oil flows on the ice, it must be kept in constant motion until the tub is filled with solidified oil, when another tub is put in its place. The graining is by this simple process completely prevented. The solidified oil, which has a slight orange* colour, is left about two or three hours in contact with the ice in the tub, when it is dumped on an inclined table, where it is crumbled up so that the ice may melt and leave the solidified oil, which is then crumbled up fine by hand, and about thirty pounds of it at a time are introduced into a churn, with about twenty to twenty-five pounds of churned sour milk, and the whole agitated for about fifteen minutes, when the solidified oil takes up a certain percentage of the milk, as also the flavour and odour (which were by the ice washed out from the first churning), and pure butter is produced. This is now removed from the churn to the working table, where, after standing and draining for a time, it is salted, to the extent of three-quarters to one ounce of salt to the pound of butter.

After proper working and standing for a sufficient length of time, it is packed into firkins, and is ready for sale. The butter thus produced contains nothing foreign

* Abstracted from a paper in the *American Chemist* for December, 1876.

* The colour is made purposely a slight orange colour, so that in the last churning process just sufficient colour is destroyed to leave the product with the proper colour.

to the very best of butter, and this has been the object to which I have devoted so much attention. When prepared as above, it has always found a ready sale in the market, as its keeping qualities are far superior to butter made by churning milk or cream. The percentage of butyrine, caprine, caproine, etc., it contains is very small (being derived from the milk in the last churning process), not sufficient to make the butter become rancid when decomposed, but quite sufficient to give to the butter the so-much prized flavour and odour.

I sent a sample of butter, made by the above process, to the Hon. X. A. Willard, the President of the New York State Dairymen's Association, who is considered one of the highest authorities in this country on everything connected with dairy products. He says, in a letter to me on the subject: "The sample of butter sent is far superior to any I have seen, in flavour and texture. I have shown it to a number of experts in butter, and they were greatly surprised at its flavour. If you could produce a more waxy texture in the article, it would puzzle *some* to distinguish it from genuine butter." This from a man of acknowledged ability is sufficient to endorse all that I have said with respect to the product. With respect to the waxy texture—this property the artificial product acquires on standing a short time.

Composition of Artificial Butter.—I have subjected a number of samples of artificial butter to analysis, and find:—

Analysis of Artificial Butter.

Constituents.	Good Sample.	Good Sample.	Sample not so good.
Water	12·13	11·88	19·68
Butter—solids . . .	87·87	88·12	80·32
	100·00	100·00	100·00
Fats . . (Olein, Palmitin, Stearin, Butyrin, etc.)	82·41	81·64	75·39
Casein	·63	·86	·91
Salt	4·83	5·62	4·02
Colouring matter . . .	Trace.	Trace.	Trace.
	87·87	88·12	80·32

I find an analysis of artificial butter by Dr. Brown, which I compare in the following table with an average of my first two analyses given above, as also with an analysis of butter made from cream.

Butter Analyses.

Constituents.	Artificial Butter. By Dr. Brown. I.	Artificial Butter. Average of two analyses. By Mott. II.	Butter made from cream. By Mott. III.	Same as III. Calculated to 5·225 per cent. of salt.
Water	11·25	12·005	12·29	11·827
Butter—solids . .	88·75	87·995	87·71	88·173
	100·00	100·000	100·00	100·000
Fats (Olein, Palmitin, Stearin, Butyrin, etc.)	87·15	82·025	86·01	82·765
Casein	·57	·745	·19	·183
Salt	1·03	5·225	1·51	5·225
Colouring matter .	Trace.	Trace.	...	...
	88·75	87·995	87·71	88·173

It will be seen, by comparing the first three analyses in the above table, that the difference in the percentage of fat in my analyses and either of the others is owing to a greater percentage of salt (this is easily seen by comparing No. III. with the last analysis), which element may be reduced or augmented in the manufacture to suit the taste and requirements. The amount of casein is also a trifle higher in the artificial than in the natural product, but not greater than the average amount usually present.

I have carefully calculated the proportion of the different fats with respect to their melting point.*

Analyses of the Fats of Butter.

(*Partly calculated*).

Constituents.	Fats from Natural Butter.	Fats from Artificial Butter.
Palmitin ($C_{51}H_{98}O_6$) . .	20·33	22·32
Stearin ($C_{57}H_{110}O_6$) . .	42·77	46·94
Olein ($C_{57}H_{104}O_6$) . . .	27·71	30·42
Butyrin ($C_{15}H_{26}O_6$), Caproin ($C_{21}H_{38}O_6$), Caprin ($C_{33}H_{62}O_6$), Caprylin ($C_{27}H_{50}O_6$) . .	9·19†	·32
	100·00	100·00

By comparing the constituents of these two analyses, it will at once be seen that the difference in the per cent. of the different constituents arises from the very small amount of butyrine, etc., in the artificial product, and it is for this reason that the artificial butter keeps so much better than natural butter. There is sufficient of the butyrin in the butter to give it the odour, flavour, and taste of butter, but not sufficient, when decomposed into butyric acid, to render the product rancid.

I have calculated the amount of the individual constituents in the fat in my analysis of natural butter and my average analysis of artificial butter, and substituted the same, with the following results:—

Complete Analysis of Butter.

(*Partly calculated*).

Constituents.	Natural Butter.	Artificial Butter (when properly made).
Water	11·827	12·005
Butter—solids	88·173	87·995
	100·000	100·000
Palmitin ($C_{51}H_{98}O_6$) . .	16·826	18·307
Stearin ($C_{57}H_{110}O_6$) . .	35·399	38·502
Olein ($C_{57}H_{104}O_6$) . . .	22·934	24·954
Butyrin ($C_{15}H_{26}O_6$), Caproin ($C_{21}H_{38}O_6$), Caprin ($C_{33}H_{62}O_6$), Caprylin ($C_{27}H_{50}O_6$) . .	7·606	·262
Casein	·183	·745
Sodic Chloride (Salt) . .	5·225	5·225
Colouring matter . . .	...	Trace.
	88·173	87·995

* The specific heats were not considered.

† The butyric acid was ascertained by analysis, which is approximately correct. All volatile fats stated are calculated as butyrin. Heintz has found besides the above fats butin and myristin.

The Pharmaceutical Journal.

SATURDAY, APRIL 7, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

MILK OF SULPHUR PROSECUTIONS.

As predicted by some of our correspondents, the lawyers have made short work of the milk of sulphur question. The decision of the magistrates who convicted Mr. MARSHALL at Runcorn, last December, of selling as milk of sulphur "a drug that was not of the nature, substance and quality of the article demanded," being appealed against, the case was heard on Tuesday last at the Knutsford Quarter Sessions by a very full bench of magistrates, including Lord DE TABLEY, Sir GILBERT GREENALL, M.P., Hon. W. EGERTON, M.P., and Sir RICHARD BROOKE, with Mr. HORATIO LLOYD, barrister, as Chairman. The sessions commenced on Monday, and this being an adjourned appeal case stood first on the list, but there were rumours afloat that the prosecutors were not eager for the fight. When the case was called on there was nobody present to open the proceedings. The inspector was there and the analyst was there, but there was no one to represent the Runcorn magistrates from whose conviction the appeal took place. On being questioned by the Chairman, the inspector and the analyst declined to take any responsibility beyond that which attached in the one case to the collection of the sample and in the other to the analysis and certificate which represented the composition of the sample. The counsel, Mr. CLEMENT HIGGINS (instructed by Mr. GLAISYER, LL.B., on behalf of the Chemists and Druggists' Trade Association), who appeared for the appellant, stated that his client was there with a large number of scientific and other witnesses, who had been brought there at considerable expense, and as several other cases similar to this were standing over to be decided in accordance with the decision in this which was intended to be a typical case, he was anxious not to allow the previous decision to be reversed merely in default of the plaintiffs appearing, but to have the evidence given and judgment recorded on the merits of the case. It was therefore arranged that the case should stand over until the next day, Tuesday, when Mr. MARSHALL appeared as counsel for the plaintiffs.

In addition to the evidence previously given at Runcorn, several fresh witnesses were provided on this occasion by the appellant, who was prepared to show in the most conclusive manner that milk of sulphur containing sulphate of lime is a recognized and officially authorized medicine which the public have for centuries been accustomed to use, that in numerous cases this medicine is not only found to be more easy of administration, but medicinally more efficacious than any of the other preparations of sulphur, and that it has therefore been and still is a favourite remedy which the public and some members of the medical profession require and ought to be supplied with. Members of the drug trade, both wholesale and retail, were called to prove what they understood by the term "milk of sulphur," and what the public expected to receive and were alone satisfied to be supplied with when they asked for milk of sulphur. Evidence of long established custom in these respects among some of the leading London houses with aristocratic connections, as well as among those who principally supply the poor, was adduced or ready for production. In addition to this, evidence was given by Mr. PEMBERTON, of Birmingham, to the effect that medical men, in the treatment of diseases, especially of the rectum, for which sulphur is used, find that milk of sulphur containing sulphate of lime has a specific and beneficial effect which precipitated sulphur does not produce, that the latter by its action on the coats of the intestine often causes irritative diarrhœa, while the former, being modified in its action by the mild aperient properties of the sulphate of lime, relaxes without irritating or purging.

When the evidence had arrived at this point, the Bench adjourned for their luncheon, before proceeding with the examination of Professor REDWOOD, Messrs. SIEBOLD and WOOLLEY of Manchester, Mr. JOSEPH INCE, and other witnesses who were present, and when they returned the chairman said they had availed themselves of the opportunity afforded by their absence from the court for conferring together with reference to the bearing of the evidence already given, and they thought that although the absence of the term milk of sulphur from the Pharmacopœia might be considered to justify the county analyst in the course he had adopted, yet the Bench could not for one moment doubt, after the evidence of Mr. PEMBERTON and others, that in the trade and in the medical profession there were two distinct substances known as *lac sulphuris* and *sulphur præcipitatum*, and that they were supplied to the trade and the public by those names as two distinct things. They therefore thought the case had not been made out, and that the appellant had not committed an offence within the Act. The conviction would therefore be quashed. The appellant's counsel applied for costs, and the chairman said the Bench had considered that point, but as they could not blame the analyst they thought the decision ought not to carry costs.

We feel assured that this decision, emanating from so distinguished a bench of county magistrates will be received as a satisfactory settlement of the question with reference to which so many discordant opinions have been expressed. The public may now continue to take themselves or to give to their children the milk of sulphur they have been used to and prefer, while druggists may satisfy the requirement of their customers in this respect without the fear of a prosecution or the charge of dealing in an adulterated article.

We trust that in future it will be the uniform practice of druggists to act in accordance with the judicial decision thus given, and to recognize *lac sulphuris* and *sulphur præcipitatum* as two distinct substances.

THE ANNUAL MEETING OF THE CHEMICAL SOCIETY.

In another column we print the official report of the anniversary meeting of the Chemical Society, and in a bracketed paragraph we have added Mr. Kingzett's remarks more *in extenso*. It will be seen from reading this report, that there exists a considerable amount of dissatisfaction among a large body of the Fellows regarding the government of the Society, and we believe that we have not yet heard the last of it.

The Society now numbers 919 Fellows, and it is complained in the report that the increase in the number of Fellows during the past year has fallen off compared with a few previous years; the Council therefore regards the state of the Society's income with considerable apprehension! It might be thought that with the manufactories existing in England for the production of science teachers, there could scarcely exist a lack of applications for election into the Chemical Society; unfortunately, however, the President stated that the fact of a man calling himself a science teacher is sufficient, generally speaking, to cause his rejection. However this may be, outside the Society itself the act of characterizing the blackballing as unjust and indiscriminate will be regarded as unconstitutional. The President said he took the responsibility of this statement upon himself; but he did not lay before the meeting the grounds upon which he made it. We quite agree with Professors Williamson and Odling that any interference with the exercise of balloting by the Fellows is unwise and injudicious, for if a Fellow is of opinion that any candidate does not merit election, he has an undoubted right to vote against him; if in fact the Fellows are not to use the ballot box for the purposes it is intended to serve, why have it at all? It cannot be denied that there are some in the Society who ought not to have been elected, and it would appear that the Council has recognized this fact, since it has proposed alterations in the form of recommendation for election, and the wording of the obligation.

We fail to see on what grounds the Society can expect or hope to increase its numbers *ad infinitum*; but this is certain, that the number of applications for elections is greater than ever, which shows that recent purifying influences originating within have been appreciated outside the Society itself.

As regards the Research Fund of the Society, which now amounts to more than £3000, we understand it is intended to sink this capital and to use merely the interest for the encouragement of research. Now, although some of this money which has been given to the Society takes the form of shares or stocks that cannot be realized under the imposed conditions, yet we feel strongly that it would be wise to spend, where possible, the capital itself, for otherwise the money grants will be so small that they will scarcely assist workers in the prosecution of research; moreover we think that the sooner money is wisely distributed, the sooner will it be replaced.

As regards the complaints made by certain gentlemen about the treatment of papers by the Committee of Publication, there appears to be good cause. Papers that are not to be published as they stand ought not to be read as such, that is to say, the control or censorship to be exercised, should be exercised before the reading of the paper. To modify an author's statements after a paper had been read, and to request him to adopt conclusions which do not follow from experimental premises, is not only inappropriate, but, moreover, exceedingly unjust and pernicious. The Fellows of the Society complain that they do not well understand the authority by which the Committee of Publication exists, nor how it seeks to attain its objects.

Those who complain are active working Fellows of the Society, and have, we are convinced, its interests at heart, and they desire to be well governed, but at the same time governed wisely and fairly, and the sooner such a state of things be realized the better for the future welfare of the Chemical Society.

THE BENEVOLENT FUND.

The interest excited by the desire to make the Benevolent Fund Dinner to be held next month a success, has produced a very liberal offer from a member of the trade, which we should be glad to see utilized. A letter that has been received by the Secretary was read at the Council Meeting last Wednesday, containing an offer to give £100 to the Benevolent Fund if forty-nine other persons would volunteer before the 15th of May to give a similar sum; or £50, with ninety-nine other donors. It is also conditional that the donations shall not be given in the names of firms, nor larger sums than those specified given in one person's name.

EARLIER CLOSING.

We take the earliest opportunity of stating that it is intended to hold on Wednesday week, the 18th inst., at 8 p.m., in the Lecture Theatre, 17, Bloomsbury Square, which has been lent for the occasion, a meeting of the Chemists and Druggists of London, for the purpose of discussing what steps can be taken to further reduce the number of hours during which their shops are kept open. At present we are not informed as to who is to preside, or the exact order of business to be followed, but we hope that the gentlemen who have taken the initiative will receive a hearty and general support manifested by a crowded meeting.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, April 4, 1877.

MR. JOHN WILLIAMS, PRESIDENT.

MR. WILLIAM DAWSON SAVAGE, VICE-PRESIDENT.

Present—Messrs. Atherton, Atkins, Betty, Bottle, Cracknell, Frazer, Greenish, Hampson, Hanbury, Hills, Owen, Robbins, Sandford, Schacht, Shaw, and Stacey.

The minutes of the previous meeting were read and confirmed.

NOMINATIONS FOR COUNCIL AND AUDITORS.

The Secretary reported that there had been *thirty-five* nominations to fill the fourteen vacant seats on the Council, and the following *twenty-three* nominees had signified their willingness to accept office if elected:—

Atherton, John Henry, Long Row, Nottingham.
Baildon, Henry C., 73, Princes Street, Edinburgh.
Betty, Samuel Chapman, 6, Park St., Camden Town, N.W.
Bottle, Alexander, 37, Townwall Street, Dover.
Brown, William Scott, 113, Market Street, Manchester.
Bulgin, William, 22, New Road, Gravesend.
Churchill, Walter John, 46, New Street, Birmingham.
Cracknell, Charles, 217, Edgware Road, W.
Cubley, George Arthur, 4, High Street, Sheffield.
Deane, James, 17, Pavement, Clapham Common, S.W.
Gostling, Thomas Preston, Diss.
Greenish, Thomas, 20, New Street, Dorset Square, N.W.
Guyer, James Brett, 11, Strand, Torquay.
Hampson, Robert, 205, St. John Street Road, E.C.
Hanbury, Cornelius, Plough Court, Lombard St., E.C.
Richardson, John Geo. Fredk., Friar Lane, Leicester.
Rimmington, Felix Marsh, 9, Bridge Street, Bradford.
Robbins, John, 372, Oxford Street, W.
Shaw, John, 24, Great George Place, Liverpool.
Stacey, Samuel Lloyd, 300, High Holborn, W.C.
Vizer, Edwin Bennett, Church Rd., Cliftonville, Brighton.
Williams, John, 16, Cross Street, Hatton Garden, E.C.
Wills, Geo. Sampson Valentine, 62, Lambeth Road, S.E.

The following *twelve* nominees declined to accept office, if elected:—

Andrews, Frederick, 23, Leinster Terrace, Hyde Park, W.
Barclay, Thomas, 252, Moseley Road, Birmingham.
Bell, Charles Bains, 6, Spring Bank, Hull.
Carteighe, Michael, 172, New Bond Street, W.
Davenport, Horace, 33, Great Russell Street, W.C.
Earle, Francis, 22, Market Place, Hull.
Frazer, Daniel, 113, Buchanan Street, Glasgow.
Hills, Walter, 338, Oxford Street, W.
Morson, Thomas, 124, Southampton Row, W.C.
Postans, Arthur William, 35, Baker Street, W.
Reynolds, Richard, 13, Briggate, Leeds.
Squire, Peter Wyatt, 277, Oxford Street, W.

The Secretary also reported that the following five members had been nominated for election as auditors and had declared their willingness to accept office if elected:—

Andrews, Frederick, 23, Leinster Terrace, Hyde Park, W.
Barron, Frederick, 2, Bush Lane, Cannon Street, E.C.
Hodgkinson, William, 127, Aldersgate Street, E.C.
Horner, Edward, 20, Bucklersbury, E.C.
Squire, William, 5, Coleman Street, E.C.

The PRESIDENT said he could not but express the regret which he felt sure was shared by the whole of the members of the Council, at the determination of Mr. Frazer not to allow his name to be submitted to the Society for re-election. Mr. Frazer would carry with him the sympathies of all his colleagues and he hoped that at some future time he would see his way to return to the Council.

Mr. FRAZER briefly replied, explaining that domestic reasons made it impossible for him at present to remain a member of the Council.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

Haydon, William Frederic......Birmingham.
Littlewood, John Oscroft ......Sutton-in-Ashfield.
Smith, George ....Monkwearmouth.
Turner, William Spencer.. ......Hingham.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examinations, being in business on their own account, and having tendered the subscription for the current year, were elected "Associates in Business" of the Society:—

Minor.

Barry, Frederic ....Shaftesbury.
Billinge, Mark ....Hyde.
Cattell, Thomas Bellamy.........Birmingham.
Dampney, Richard Shephard ...London.
Day, John......................... ...Dewsbury.
Embley, John ....Brierfield.
Forth, William Pilcher ....South Norwood.
Hoyles, George.....................Hull.
Knight, George James......... ..London.
Nicholson, Walter Joseph ......Birmingham.
Pell, John ....Woolston, near Southampton.
Sargent, John Charles...........Sevenoaks.

Modified.

Harding, Samuel Jervis ....Audlem.
Robertson, John ....Edinburgh.
Scaife, Samuel ....Manchester.
Shemmonds, John ....Bournemouth.

ASSOCIATES.

The following, having passed the Minor examination, and tendered their subscription for the current year, were elected "Associates" of the Society:—

Barron, William ....Leamington.
Cullingford, Louis James.........Bletchingley.
McKnight, John ....Dalston.
Taylor, Charles Edward ....Lancaster.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination, and tendered their subscriptions for the current year were elected "Apprentices or Students" of the Society:—

Bristed, John ....Margate.
Cowie, John ....Glasgow.
Crompton, Wm. Wolstenholme..Bury.
Cuthbert, Sidney Agar............Bedford.
Ellis, John William......... .....Abergele.
Ellis, Richard ....Knaresborough.
Field, George W....................Cambridge.
Foot, Ernest George...............Plymouth.
Hancock, Edwin ....London.
Lowe, Sam Peter .. ..Sheffield.
Sims, George Samuel ....Derby.
Stephens, Stephen ....Llandilo.
Thomas, Frederick William ...Dowlais.
Wright, George......................Sheffield.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was received and adopted and several accounts ordered to be paid.

The Auditors' report was also presented.

Mr. SCHACHT suggested that in future the salary of the Librarian, or at any rate a portion of it should appear under the head of "Library," so that the cost of that branch of the Society's operations should be more clearly seen.

Mr BOTTLE also suggested that the items of expenditure on the North British Branch should be given more in detail.

The Auditors' report was received and adopted.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow of a registered chemist and druggist, aged 67. Applicant's late husband had received two grants of £15 and £10 respectively.

£10 to the widow of a registered chemist and druggist, whose case had been previously considered and deferred for further inquiries.

£15 to the widow of a registered chemist and druggist, whose husband had been in business for thirty-four years.

The report and recommendations were received and adopted, after a long discussion had taken place as to the propriety of removing from the list of annuitants the name of one of the recipients who had been guilty of misconduct. It was ultimately decided not to proceed to such an extreme measure at present.

LIBRARY, MUSEUM, AND LABORATORY.

This report included that of the Librarian, showing the average attendance in the Library, during the previous month, to have been, in the day, 22; evening, 13. Circulation of books, in town, 151; country, to twenty-four places, 42.

The following books were recommended for purchase:—

Brunton's 'Tables of Materia Medica;' Burbidge's 'Cultivated Plants;' Vogl's 'Falschen Chinarinden.'

Mr. Sainsbury had presented two copies of a book just published by him, 'Human Interests, Reflections, etc.'

The Curator reported the attendance in the Museum to have been on the average, day, 18; evening, 8. Also, that the Hanbury Herbarium had been used for reference, and that the Indian Drug Collection had been dried and placed in the museum.

Professor Attfield had reported 73 entries in the laboratory since the commencement of the session; 43 students being now at work.

Professor Redwood had reported the number of students in his class to be the same as last month. Also that the electric light apparatus was nearly ready, and that he intended shortly to give a lecture illustrated by it.

Professor Bentley had reported that the number attending his class was 38.

The report of the Committee was received and adopted.

The SECRETARY read a letter from Professor Redwood, stating that the addition of the electric light would enable him to make use of much of the valuable apparatus belonging to the Society, which had hitherto been of little use. It was decided to request Professor Redwood to give his first lecture to the Society, aided by the apparatus, on Wednesday evening, May 2nd.

HOUSE.

This Committee had held a meeting. A second ventilating shaft had been placed in the library, and was found to work effectively. Sundry recommendations which referred to the better ventilation of various parts of the premises were made, and an estimate for the same, amounting to £13 10*s*., was presented.

The report was received and adopted.

The PRESIDENT reported that the work in the octagon aboratory was nearly finished.

Mr. BETTY asked for an account to be presented at the next meeting of the total sums expended on education and educational arrangements during the past year.

The PRESIDENT said there would be no harm in presenting the return, but it must be borne in mind that the year just closed had been quite an exceptional one, many expenses having been incurred which would not occur again.

LAW AND PARLIAMENTARY.

The report of this Committee included a letter from the Solicitor, narrating the progress which was being made in several matters entrusted to him. In several cases he was awaiting further evidence. Information was also contained in the report with regard to other cases of alleged infringement of the Pharmacy Acts, which had not been placed in the hands of the Solicitor. The case of a co-operative store dispensing medicines containing poisons had been brought under the notice of the Committee. The Committee recommended that the solicitor be instructed to obtain legal evidence of the infringement of the Act, and to report to the Committee. A report had been received from the Sub-Committee appointed to consider amendments to the Pharmacy Acts, enumerating certain suggested alterations which might be introduced into an amended Bill, if a favourable opportunity offered.

Mr. BOTTLE remarked that the report of the Sub-Committee was not quite so full as he could have wished, and he hoped the Committee would be reappointed by the new Council to continue its attention to the subject.

Mr. SCHACHT said the report of the Sub-Committee had been received, but not yet discussed or adopted by the Law and Parliamentary Committee, and he therefore thought the matter was hardly ripe for discussion.

Mr. SANDFORD concurred in this view.

Mr. HAMPSON thought the report of the Sub-Committee should be read.

Mr. ATKINS thought the report of the Sub-Committee should be read if the Sub-Committee had completed its work, but not otherwise.

Mr. SHAW did not see how the Council could consider a report which had not yet been discussed by the Parliamentary Committee to which it had been addressed.

The PRESIDENT after some further discussion, ruled that the report of the Sub-Committee should be read but not discussed, and it was read accordingly.

Mr. BOTTLE moved that the report be referred back to the Parliamentary Committee, with a request to report to the Council at its next meeting.

Mr. ATHERTON seconded and Mr. Betty supported the motion.

Mr. SCHACHT objected to the motion as out of order, inasmuch as the report of the Sub-Committee had not been properly presented by the Law and Parliamentary Committee.

Mr. HAMPSON was anxious that the work already done by the Sub-Committee should not be lost, and that he believed was all that was aimed at by Mr. Bottle's motion.

Mr. SANDFORD saw no necessity for a special resolution asking the Committee to continue their attention to the subject.

It was ultimately agreed that the Law and Parliamentary Committee be requested to continue the appointment of the Sub-Committee.

The report and recommendations of the Committee were then adopted.

The Secretary reported that the certificate presented to Mr. Colegrove on his passing the Minor Examination had been returned and was now in the possession of the Society; and also that Mr. Colegrove's name had been erased from the Register of Chemists and Druggists.

GENERAL PURPOSES.

This Committee had received the reports from the Professors on the class examinations at the end of the first five months' course.

Professor Redwood had reported that thirteen candidates took part in the examination, of whom five had obtained a sufficient percentage of marks to entitle them to recognition.

Professor Bentley had reported that seventeen students of his class had competed, of whom three had obtained a sufficient percentage of marks to entitle them to recognition.

The envelopes bearing the mottoes of the successful competitors had been opened by the Committee, and the names ascertained.

The Committee recommended that in accordance with the reports of the Professors the following awards should be made:—

CHEMISTRY AND PHARMACY.

Bronze Medal	George Frederick Gutheridge.
Certificate of Merit ..	Rawson Parke Francis.
" "	David Avison.
" "	George William Bullen.
" "	Henry Peirson.

BOTANY AND MATERIA MEDICA.

Bronze Medal	George Frederick Gutheridge.
Certificate of Merit...	Rawson Parke Francis.
" "	George William Bullen.

The Committee also recommended that the following grants be made for educational purposes to provincial Associations:—

£50 to the Bristol Pharmaceutical Association, for the purchase of books, including those enumerated in a list accompanying the application. The duplicate specimens of materia medica and of dried plants applied for, to be presented to the Association as far as this can be done without injury to the Society's Museum.

£5 to the Oldham Chemists and Druggists' Assistants and Apprentices' Association.

Mr. SCHACHT on behalf of the Bristol Association, thanked the Council for the grant which had been made and which he was sure would be well used. He would also remark that he had ascertained the proportion of registered persons in various towns, who were connected with the Society. In Manchester the proportion was sixteen per cent. of those on the register; In Sheffield eighteen per cent.; Leeds, nineteen per cent.; Hull, twenty-two per cent.; Liverpool, twenty-three per cent.; Bristol, 30·3 per cent.; London, 30·7 per cent. So that the difference between Bristol and London was only ·4 per cent.

The PRESIDENT said these figures were very remarkable as showing what a large proportion of the trade in London held aloof from the Society. It showed the necessity for some greater efforts being made in the metropolis, as well as other large towns, to enlist the sympathies of chemists and druggists.

Mr. BOTTLE remarked that the per-centage seemed to be greater in small towns than in large towns. In Dover, where there were but fourteen or fifteen chemists, the Society had about seven members.

"PATENT MEDICINES" CONTAINING SCHEDULED POISONS.

The Secretary read a communication from the Hull Chemists' Association enclosing a resolution calling attention to the fact that opium, solid and tincture, is being largely sold by unregistered persons, with a patent medicine stamp, and suggesting that the sale of all articles covered by a patent medicine stamp, containing any of the scheduled poisons, should be strictly confined to registered persons. The communication was referred to the Law and Parliamentary Committee.

THE BENEVOLENT FUND.

The SECRETARY read a letter he had received from a member of the trade, saying he was authorized by a friend to offer a donation of £100 to the Benevolent Fund, provided forty-nine other persons would contribute a like amount before the day fixed for the dinner in May next, or £50, if ninety-nine others would contribute a similar amount; it being understood in either case that the sums be contributed in individual names, and not by firms, and that no larger amount be presented under any one name.

PHARMACEUTICAL MEETING.

Wednesday, April 4, 1877.

MR. JOHN WILLIAMS, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting were read and confirmed.

The following donations to the library and museum were announced, and the thanks of the Society were awarded to the donors:—

Library.—Aiton's 'Hortus Kewensis,' 1789, 3 vols., from Mr. W. Pickard; 'Human Interests, Reflections, etc.,' two copies, from Mr. S. Sainsbury (Author); 'The Lias of Fenny Compton, Warwickshire,' from Mr. T. Beesley (Author); 'Calendar, 1877,' from the Pharmaceutical Society of Ireland.

Museum.—Fine Specimen of Calisaya Bark and Specimen of Mongumo Bark, from Mr. Chantre; very large Crystal of Thymol, from Messrs. Wright, Layman, and Umney; Specimen of Gum Arabic, from Mr. R. H. Parker, Barnstaple; Specimen of Pure Iodide of Potassium, and fine Crystals of Biphosphate of Sodium, from Messrs. Hopkin and Williams; Specimen of Australian Opium and Eucalyptus products, from Messrs. Hearon, Squire and Francis; Measures for Doses of Medicine, from Mr. Proctor; Specimen of Glass Wool, from Messrs. Corbyn and Co.

The CURATOR called attention to the sample of iodide of potassium, which he said was whiter than any he had ever seen before. It would be interesting to watch whether this whiteness was permanent. Three specimens had been given to the museum at different times as pure iodide of potassium and each had become coloured. The sample of gum illustrated the variety which had been met with in the market during the last few years, and which had the curious property of forming with water a mucilage that was gelatinous when concentrated, and glairy, like white of egg, when diluted.

Mr. GREENISH asked Mr. Holmes whether he had examined the specimen of gum arabic under the microscope to ascertain whether there was any cell tissue in it, and whether there was any structural difference between the mucilage formed by the present specimen and that formed by ordinary gum.

Mr. HOLMES replied that he had not examined microscopically the sample before the meeting. Hanbury ('Pharmacographia,' p. 210, note 3) mentioned that if the mucilage of this gum were exposed for some days to a temperature of 95° C., it afforded a solution of the usual character. He (Mr. Holmes) was not aware whether it had been examined chemically for the purpose of ascertaining whether it was a gummate of some other base than calcium and magnesium, or whether there was a chemical difference between it and ordinary gum arabic.

Mr. GREENISH said it would be very interesting if Mr. Holmes would examine it and ascertain whether there were any cell tissue and any remains of starch in it similar to those which could be detected in gum tragacanth which owed its origin to a chemical metamorphosis of the cell and its contents, and to the mucilage of which this bore some resemblance.

The PRESIDENT called attention to the beautiful specimen of so-called "glass wool," presented by Messrs. Corbyn and Co. It consisted of glass spun as fine as the ordinary fibre of wool. It was made in Germany, and was proposed for the filtration of very acid solutions, such as chromic acid, and other solutions of a very corrosive character. It was not altogether perfect as a filtering body, for, on account of the surface being highly extended, the alkaline property of the glass was very highly developed, and it was rather apt to decompose such bodies as hydrocyanic acid. He was sure that, as a specimen of spun glass, that before the meeting would be admired by every one.

Mr. NAYLOR said that the process of manufacture consisted in fusing Bohemian glass and, while in the fused condition drawing it out into threads and winding the threads round hot cylinders. He could confirm what had been said with reference to the utility of this substance as a filtering medium. It was extremely useful in filtering any strongly acid solutions and strongly alkaline solutions, and he had found it especially useful for albuminous solutions. If the wool were well washed with water before being used, it became much softer than it was previously, and formed a more compact filter. This substance had been brought before the Société de Pharmacie in Paris, as reported in the *Pharmaceutical Journal* for October 14th last.

In reply to the President,

Mr. Naylor added that he had tried a specimen with test paper after washing, and that it did not give any alkaline reaction.

The President said that the specimen of iodide of potassium had been made by his firm with a great deal of care and trouble. Pure iodide of potassium was of course perfectly neutral, and should contain no carbonate, sulphate, or iodate; it ought not to discolour by keeping, or when treated with an acid, such as tartaric or hydrochloric. It was, however, difficult to get all these qualities combined in one specimen. It would be interesting to ascertain how long the present specimen would keep white, but that, of course, was a point which could only be decided after the lapse of several years. This sample answered to every test for purity, with the exception of having a slight subiodous smell which rather suggested that there was still some impurity present. He should like also to call attention to the specimen of biphosphate of soda, or acid phosphate of soda. It crystallized with great beauty, and appeared to be a very permanent salt, whereas they knew the ordinary diphosphate of soda effloresced very readily, and had an alkaline reaction. This salt, the biphosphate, was distinguished by not precipitating phosphate of lime from a solution of chloride of calcium until it was neutralized by an alkali. It appeared to him probable that biphosphate of soda might be very usefully employed in medicine. When medical men administered a phosphate what they most required was the phosphoric acid. In making a compound syrup of the phosphates it was an advantage not to have an alkaline phosphate either of potash or of soda. He would suggest the use of this acid phosphate which would not precipitate the other ingredients used in the syrup.

Professor Redwood said he apprehended that the President did not at all contemplate the advisability or necessity of aiming at the great amount of purity which was possessed by the iodide of potassium he had brought under their notice.

The President: Oh, no. It is merely a chemical curiosity, prepared for strictly chemical purposes.

Professor Redwood stated that the amount of purity which the sample possessed would necessarily be purchased at a very high price. With reference to the phosphate of soda, possibly a somewhat similar consideration would arise as to the cost of obtaining it, though he did not apprehend that there would be the same increase of price in the production of a salt of that description, as there would be in the other case. In the ordinary phosphate of soda there were impurities that were admitted according to the Pharmacopœia tests, those impurities being connected with the methods which were adopted for the production of the salt in a cheap manner. He felt that there was a great deal of weight in what the President had stated with regard to the advantage of employing a phosphate of soda which was not alkaline like the ordinary phosphate.

Mr. Hancock exhibited a machine for compounding powders. He demonstrated its use by preparing, in the presence of the audience, a powder consisting of rhubarb and magnesia. He said that the apparatus consisted simply of a slightly conical cylinder into which might be fitted any one of the various sieves which were on the table, the meshes of which varied from thirty up to ninety meshes to the square inch. A brush was fitted to a spindle and placed in the interior of the machine, and a lid was then put on the top; the brush being caused to rotate, mixed together the ingredients of the powder, and at the same time drove them through the sieve.

Professor Redwood said that he had no doubt that the apparatus would be a very useful, convenient and efficient one for preparing many of the powders which were used in pharmacy. It would contribute to the carrying out of one of the three operations which were indicated in the Pharmacopœia for the production of powders, those operations being the mixing of the ingredients, the passing them through the sieve, and then the rubbing them lightly in a mortar. The importance of those three distinct operations was not always sufficiently appreciated. He must admit that there was a defect in the directions given in the Pharmacopœia with regard to passing the ingredients through a sieve. The Pharmacopœia mentioned a "fine" sieve, but there was no indication as to what a fine sieve signified. That was an omission that would have to be remedied some day or other, because the number of meshes to the square inch might be mentioned.

Mr. Greenish thought that the apparatus would be a very useful one for the chemist, but in its present form it had the defect of having a sufficient space between the sieve and the body of the apparatus to allow the passage of particles larger than would go through the meshes of the sieve.

Mr. Hancock said that he did not think that the defect alluded to by Mr. Greenish would be of any consequence, for the space would be speedily filled up by the powder itself. The machine might be made more accurate, but the one object had been to make it cheaply.

Professor Attfield then read a paper on

Medicine Measures.

BY MR. BARNARD S. PROCTOR.

The paper is printed on p. 809.

The President in inviting a discussion remarked that the idea of the author was a most ingenious one, and, whether pharmacists adopted it or not, they would be struck with the fact that it attempted to meet a great difficulty.

Mr. Greenish said it would be recollected that a discussion on this subject took place in the *Pharmaceutical Journal* a few months ago, and the universal opinion then expressed was that there was a very great difference in the size of the teaspoons and tablespoons in general use. His own opinion was that the necessary change must commence with medical men. The physician in writing his prescription ought to order medicines to be taken by the ounce or half-ounce or drachm, as the case might be, instead of by the spoonful, the words "by measure" being added within brackets. He could not clearly see his way out of the difficulty by the use of the measures which Mr. Proctor had recommended. Medicines had to be taken in doses of so many different sizes that chemists would want no end of these measures. He believed that a glass measure, marked with doses varying from a teaspoon to a wine glass, would eventually have to be used. The use of spoons as measures ought to be abolished.

Mr. Bland said that the subject was surrounded with very considerable difficulty. He agreed with Mr. Greenish that so long as the majority of medical men prescribed medicines by the teaspoonful and the tablespoonful, pharmacists would be obliged so to label their medicines when sent out. Many people thought that they could escape the difficulty by using graduated bottles, but he believed that that was almost as great an error as relying upon teaspoons and tablespoons. He had examined a vast number of graduated bottles, and had found that the spaces varied from 38 minims up to more than 80 when they were intended to be all of the same size. Considering the manner in which graduated bottles were manufactured, it was very natural that there should be this discrepancy. He believed that the great expense of furnishing Mr. Proctor's measures gratuitously, as was proposed in the paper, would very much tend to hinder the introduction of such measures. For instance, a person would come and ask for a couple of pennyworth of spirit of nitre, and request to be informed how it was to be taken. Was the chemist to make the customer a present of a measure in such a case? Things of this sort were continually happening in retail shops, though he supposed that they did not occur so frequently among the *dii majores* of the West End. In poor neighbourhoods customers would be neither willing nor able to pay for the measures.

Mr. LONG said that he certainly did not think that Mr. Proctor's plan was at all likely to succeed. In the first place, he did not see how they were to get absolute accuracy in the measures any more than in the spoons. In the second place, thick mixtures would stick to the measure and a good deal would be lost, and nine people out of ten would slop the mixture down the side. The whole question, it seemed to be assumed, was one of cheapness. He did not think that theirs was a vocation into which the question of cheapness ought to enter at all. If people were ill they wanted medicine, and the very persons who would quibble about the price of a bottle of medicine would, if they belonged to the upper classes of society, lavish large sums of money on their exteriors, and if they were in the humbler class, though they would grumble about paying a trifle for their medicine, they would willingly go across the road and spend the same amount in gin. He, therefore, held that chemists ought to introduce the best appliances which could be got for measuring medicines, and that the consideration of cheapness ought not to enter at all. He believed that graduated bottles ought to be done away with. There was already too much complication in their business, and they had bottles graduated to all imaginable doses. They ought to insist that those who could afford measuring glasses should use them. Doctors had no right to prescribe mixtures in a concentrated form, to be diluted with water by the patient. A serious accident had occurred in Edinburgh through a lady taking an overdose of liquor strychniæ, which had been prescribed for her in five-drop doses. The practice of prescribing medicines in the concentrated form arose from a desire for economy. But why should not the druggist have his chance of getting a living with the rest of the world? What with co-operative stores and parsimonious doctors, he was at a great disadvantage in this respect.

MR. BLAND said that if he had to dispense a very powerful medicine he carefully graduated the bottle with diamond marks, and then attached to the outside of the bottle a strip of paper with marks corresponding to the diamond marks to indicate the separate doses.

Mr. MARTINDALE considered that it would be better to stamp the measures proposed by Mr. Proctor, "one drachm," "half-ounce," and so on, rather than "one teaspoonful," "one tablespoonful," etc. Spoons had been much increased in size of late years, and he (Mr. Martindale) had accordingly suggested, as a remedy for the present state of uncertainty, that a teaspoonful should be regarded as $1\frac{1}{2}$ drachms, and a tablespoonful as 6 drachms. No doubt even the moderately poor could afford to provide themselves with measuring glasses; but perhaps a third of the medicine taken in London was supplied from the out-patients' department of the hospitals, to persons who were too poor to buy measures of any kind. In France it was understood that a tablespoon contained 20 grammes of water, equal to about 5 drachms and 40 minims, and a teaspoon 5 grammes, equal to about 85 minims. He had pointed out to Mr. Proctor the desirability of providing the measure with a spout, but Mr. Proctor had told him that the spout would greatly increase the cost of the measure and cause inaccuracy in the size. While on this subject, he would ask Professor Redwood what chance there was of introducing in a new edition of the Pharmacopœia the metric system. In doing so there ought to be some fluid measure introduced, as well as measure by weight, and he hoped that, if the metric system were adopted, it would not be in the form introduced into the German Pharmacopœia, which consisted in casting the whole Pharmacopœia into parts by weight.

Professor REDWOOD said that a reprint of the Pharmacopœia had appeared within the last two months, and although it contained no material alteration, yet the fact of many thousand copies having been printed would stand in the way of a new edition coming out shortly. Independently of that difficulty, there were probably others quite as influential. As a rule he thought the medical men of this country were satisfied with the work in its present form, and they said that it contained, in an intelligible form, a fair representation of the medicines which they required to prescribe. There seemed to be a greater indisposition towards a new edition than there was four or five years ago. Passing to the subject before the meeting, he must confess that he had been unable to understand the advantage which Mr. Proctor's method possessed, in any respect, over the use of graduated measuring glasses which had already been adopted to a great extent. The graduated measuring glass would be an individual standing in the place of a little regiment of measures which would be introduced under Mr. Proctor's system. In households where medicines were constantly being delivered the measures would accumulate to such an extent that they would be a source of much confusion, though they might form very nice toys for the children. The labels would very soon become obsolete, and there would be a danger of the larger measures being used in the place of the smaller ones. On the whole it appeared to him that graduated glass measures, having the different spoonfuls indicated on one side and the quantity in ounces indicated on the other, would be the safest and most convenient appliance for the measurement of doses.

Mr. PLOWMAN said that practical experience enabled him to appreciate the difficulty which Mr. Martindale had referred to in connection with hospital practice. He (Mr. Plowman) thought that Mr. Proctor's suggestion must be laid aside entirely as regarded hospital outpatients. A couple of gross of Mr. Proctor's measures would have to be given away daily, on an average, at a hospital of fair size. The suggestion of Mr. Martindale that the tablespoon should be reckoned as six drachms was a very good one, if that measure was correct. He should like to ask that gentleman whether he had ascertained from actual measurement that the modern tablespoon contained six drachms. This suggestion of Mr. Martindale was the only one of those which he (Mr. Plowman) had heard that evening which was at all likely to meet the difficulty of hospital out-patients.

Mr. MARTINDALE, in answer to the last speaker, said that he had ascertained, from actual observations, that six drachms was the average capacity of tablespoons. He had had his observation in this respect confirmed by that of an ironmonger. When he (Mr. Martindale) was connected with a hospital he found that a bottle of mixture intended to last a week would sometimes be exhausted in four or five days. The way in which he partially got over the difficulty was to have printed on the labels "small tablespoonfuls." In the hospital with which he was connected the average dose for an adult was one ounce, and that was always taken to be two tablespoonfuls.

Mr. HILLS said that he had never found any difficulty with graduated bottles. If they were inaccurate let them be returned to the makers. He had always recommended to medical men that they should never make the doses less than a tablespoonful. In order to encourage the use of measuring glasses among medicine takers, he had made it a practice to supply those articles at as low a price as possible.

Mr. LONG said, that he had sometimes given a $\frac{1}{2}$ oz. or 1 oz. bottle to poor people to be used as a measure. He had found great difficulty with graduated bottles.

The PRESIDENT said that he thought that the conclusion at which they must all arrive was that a graduated measuring glass was the most advisable thing for public use in the present condition of affairs. One point which had come out in the discussion was that medical men acted very foolishly, or even very wrongly, in prescribing medicines in a concentrated form for the general public. There was no doubt that the public gained a little economy by such a practice, but they did so at the risk of their lives; and whether it was worth while to take such a risk for so trifling an advantage, was a question which ought to be brought very strongly before not only the public, but the medical profession. No doubt the public safety was best cared for in the old days of 2 oz. draughts, or when, as a rule, mixtures containing dilute medicines were prescribed and a little more or less taken in the dose would make no practical difference. A very concentrated medicine involved the patient in great risk.

Mr. HOLMES said he thought that the chemists were somewhat to blame for the introduction of concentrated medicines, because mixtures were generally charged for according to the size of the bottle. If they were charged for according to the number of doses contained in the bottle, a very great difference would be made by medical men in the size of the doses which they ordered.

Mr. GREENISH said that the theory of charging by the dose was a very pretty one, but it was utterly impracticable.

Mr. LONG said that the practice was very general.

Mr. M. CARTEIGHE said that if the charge were not based upon the number of doses he did not know on what basis it could be put. As to the size of the dose, the primary responsibility rested on the prescriber. In these railway times everything was wanted in the most portable form. Physicians were affected by the times, and they sometimes prescribed doses in a form which in his judgment as an individual and a pharmaceutist was distinctly dangerous. The practice of ordering concentrated doses of potent medicines was a subject of serious importance to the physician. It was a source of anxiety to the pharmaceutist, and fraught with considerable danger to the public.

GLYCERINUM TRAGACANTHÆ.

MR. GREENISH said that at the Pharmaceutical Conference at Glasgow there was a great deal of discussion upon the use of an excipient of glycerine and tragacanth for pill masses. Mr. Thresh, who was present at that conference, had since gone very fully into the subject, and had published a paper in the *Pharmaceutical Journal* of last week. He had come to the conclusion that tragacanth with glycerine was not at all adapted for the pill masses of the Pharmacopœia. On this point, he (Mr. Greenish) had no experience. But Mr. Thresh, in his concluding paragraph, stated that that compound was really not so good for general purposes as many other excipients. With this statement he (Mr. Greenish) totally disagreed. He believed it to be one of the best excipients which they could possibly have on the dispensing counter. The proportion which he used was 1 drachm by weight of tragacanth and 8 drachms by measure of glycerine. The ingredients were rubbed in a mortar and allowed to stand a day or two, to gelatinize. This excipient was specially useful for quinine, and exceedingly useful for valerianate of zinc. It was also specially good for sulphate of iron and aloes. It had also the advantage that there was no colour attaching to it, as for instance, it was desirable to have quinine pills as white as possible. Confection of roses had a certain amount of colour. Pills made up with the tragacanth and glycerine did not become at all damp.

LECTURE BY PROFESSOR REDWOOD ON SPECTRUM ANALYSIS.

The PRESIDENT announced that on Wednesday, the 2nd May, Professor Redwood would deliver a lecture on "Spectrum Analysis," illustrated by the Society's new apparatus.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

Thursday, March 29, 1877. Professor Abel, F.R.S., President, in the chair.

ANNIVERSARY MEETING.

At this meeting the President delivered his annual address, giving an account of the progress and present state of the society, from which it appears that the increase during the past year has only been thirty-five, making the total number of Fellows 919. The losses by death have been sixteen: Messrs. T. Charlesworth, F. C. Devigne, H. Deacon, Paul de la Rue, David Forbes, A. Harvey, J. Hearder, F. H. Hobler, A. S. Hobson, C. Lambert, L. A. Lucas, M. Lichtenstein, G. Parry, Alfred Smee, F. Smith and T. H. Wyndham, besides one foreign member, M. Balard, the distinguished discoverer of bromine. Seven foreign members have been elected, viz.: Professors Bäyer, Butlerow, Cooke, Friedel, Heintz and Thomsen. The number of communications brought before the society last year was seventy, being more than in any previous year, besides two lectures, the one "On Certain Methods of Physico-Chemical Research," by Professor Andrews, and the other, "On the Theory of the Bunsen Flame," by Professor Thorpe. The fund for the promotion of chemical research has made very satisfactory progress and now amounts to more than £3000, including the munificent donation of £1000 by Dr. Longstaff and a like amount given by the Goldsmiths' Company. The state of the ordinary income of the society, however, is much less favourable, owing to the small increase in the number of Fellows as compared with former years, being less than half what it was last year, and less also than in any of the four previous years. There is but little doubt that the cause of this very serious falling off is to be ascribed not only to the blackballing which has been taking place for some time past, but to the effect which certain instances of manifestly unjust exclusion by this means has had in deterring candidates from offering themselves for election. This system of blackballing is pursued by a small section of those Fellows who regularly attend the meetings, as is evident from the fact that the number of black balls does not exceed eight or nine. As, however, one-fourth negative balls suffices to exclude a candidate, this ensures the blackballing of the candidate unless the attendance of Fellows is numerous at the commencement of the meeting. It was to be hoped, however, that the injurious effects of their mode of action, which is most seriously imperilling the future prosperity of the society, would induce them to give the matter their serious consideration. The President then gave an account of the negotiations which had taken place between the Council and the Committee for Organization amongst Professional Chemists, which had since developed into the "Institute of Professional Chemists," and noticed the alteration which had been made in the Fellows' certificate for election, and the reasons which had induced the Council to propose the alterations in the bye-laws which were to be submitted to them that evening.

The Treasurer then read his report; Messrs. Carteighe, Friswell and Nicholson being Auditors.

Mr. E. Neison said he would like to draw the attention of the Fellows to two or three matters before the adoption of the President's report was moved, and then pointed out: 1. That although the general index to the society's journal had cost a large sum, £282, comparatively few copies had been sold. He thought it would be advisable to distribute the index gratuitously to the Fellows. 2. He stated that the laboratory was very insufficiently supplied with apparatus and chemicals, and suggested that when the society granted money to chemists for assisting them in conducting original research, they might at the same time place the laboratory at their disposal.

3. That a very long time, three to four months or more, elapsed between the reading of a paper at one of the society's meetings and its appearance in the journal, and concluded with some remarks on the blackballing which had recently taken place in the society.

Professor Williamson remarked that it was most important that some appropriate occasion should be offered for the discussion of various matters affecting the welfare of the society, and was very glad that they now had an opportunity of talking over this matter of the blackballing together. He was very jealous of the privilege, or rather duty, of the Fellows of excluding those candidates who were not properly qualified, but at the same time this function should be exercised with the greatest discretion. No doubt this action had been taken on some principle, but it was a principle which he did not understand, and if instead of producing the effect they desired, it had produced others of an unexpected and perhaps disastrous character, he hoped those members who had exercised this privilege would reconsider their mode of action, which, if continued, would produce very serious injury to the well-being of the society.

Mr. Kingzett made some remarks on the subject of blackballing, and also complained that a paper, by Dr. Hake and himself, read before the society in January last, had been returned to him by the Committee of Publication, with suggestions that he should make certain alterations in it before it was published in the society's journal. [He said if it were true that the blackballing, of which complaint had been made from the chair, was the work of less than ten Fellows of the society, and if it were right to characterize their action as "unjust and indiscriminate," it was much to be regretted that the said Fellows could not be expelled from the society; but in his opinion it was rather an injustice to characterize in this way the exercise of a privilege appertaining to the Fellows of the society. Besides, as a matter of fact, he remembered one occasion when there was a largely attended meeting of the society, and then three out of five candidates for election were blackballed, a result which signified that at least twenty men, not eight or nine only, had taken part in the blackballing. He considered it was unjustifiable that in the President's address the action of any Fellows of the society in the exercise of their privilege should be commented upon in any way whatever. He reminded the meeting that at one time the influx of unqualified men into the society had become so notorious, that a so-called doctor who sold bogus degrees would have been elected, had it not been for the fact that the Fellows of the society were roused to a sense of duty. It could not be admitted that there had been anything unjust or indiscriminate in the blackballing, and it was an unconstitutional act on the part of the council who prepared the report so to speak of it. He did not defend every case of blackballing, but he accepted it as the result of a spontaneous evolution of conscience. As regarded the journal of the society, Mr. Kingzett pointed out that in 1876, between the nominal date of publication and the time of delivery to the Fellows, there was an average interval of forty days. Then again, the abstracts were not what they should be; for instance, taking the last number of the journal (March) there was given in it an abstract of a paper by M. Hardy on Jaborandi which was published before January, 1876, in which month an abstract of it was printed in the *Pharmaceutical Journal*. Further, it was scarcely fair to authors that their papers, read before the Society, should be sacrificed to the interests of others; as it was, three or four months now elapsed before authors' papers were printed. He now came to the most important matter. The Fellows would remember that during last January, Dr. Hake and he had read a paper before the society which elicited at the time some discussion. Since then the paper had been returned to the speaker with various undermarkings in blue pencil, and queries placed against conclusions drawn from experiment! Moreover he had been requested to alter the title, abbreviate the paper and pledge himself to conclusions which he could not entertain and which could only be put forward by reason of a non-comprehension of the meanings of experiments and facts. Dr. Hake and he had absolutely refused to make a single alteration regarding their paper, and if the society would not publish it as it stood they (the authors) would publish it elsewhere. The speaker went on to say he recognized one method of criticism only in science, viz., the method of experiment, and he invited the gentlemen who had abused his paper to resort to that method. Finally, he wished to ask a few questions. By what authority did the Committee of Publication exist? Why is its composition a constant? Who attended the meetings? and, How did it perform its functions?]

Dr. Thudichum made a similar complaint. Several of his communications had been treated in the same way. He had addressed a solemn letter to the Council on the subject, but had received no reply.

Dr. Odling said that the management of the affairs of the society was entrusted to the Council by the Fellows. Some of the papers were undoubtedly delayed, but only those papers which the Publication Committee did not at first see their way to recommend for publication, and which were referred to be specially reported on. Some sort of censorship must be exercised: it would be very unreasonable to ask them to undertake to publish indiscriminately every paper which might be presented. With regard to the blackballing he quite agreed with Dr. Williamson that it was most important that the privilege should be exercised with the greatest discretion, but in this case it was evident that a small section of the society, a minority of eight or nine members, who regularly attended the meetings, were thwarting the wishes of the majority, since one black ball in four was sufficient to reject a candidate.

Mr. E. Riley thought it would be far better to adjourn this discussion and proceed with the business of the evening: he therefore begged to second the motion that the Report of the President be received.

It was moved by Mr. Kingzett, as an amendment, and seconded by Dr. Thudichum, that the words "unjust" and "indiscriminate" in the report, as applied to the blackballing, be omitted.

The amendment was then put by the President, but only twelve members voted for it out of the crowded meeting; the original motion was put and carried.

The election of officers and Council for the ensuing year was then proceeded with, Messrs. Riley, Carteighe and Neison being appointed scrutators. The following gentlemen were elected:—President, Dr. J. H. Gladstone; Vice-Presidents, Messrs. F. A. Abel, Sir B. C. Brodie, Warren de la Rue, E. Frankland, A. W. Hofmann, W. Odling, L. Playfair, A. W. Williamson, T. Andrews, W. Crookes, F. Field, J. H. Gilbert, H. E. Roscoe, J. Stenhouse; Secretaries, Messrs. W. H. Perkin and H. E. Armstrong; Foreign Secretary, Mr. H. Müller; Treasurer, Mr. W. J. Russell. The other members of Council are, Messrs. J. Attfield, Lowthian Bell, A. H. Church, C. E. Groves, W. N. Hartley, C. W. Heaton, T. H. Hills, David Howard, G. Matthey, J. A. Phillips, R. V. Tuson and C. R. A. Wright.

A vote of thanks to the retiring President, Professor Abel, which was received with acclamation, was proposed by Professor Williamson and seconded by Dr. Warren de la Rue. There were also votes of thanks to the officers and Council, proposed by Mr. Carteighe and seconded by Mr. Tennant; to Mr. Watts and the Abstractors by Dr. Odling and Mr. Crookes, and to the Auditors by Dr. Russell and Dr. Paul.

Professor Abel then dissolved the meeting, and resolved it into a special general meeting, to consider some alterations in the bye-laws, when the new President, Dr. Gladstone, took the chair.

Mr. Neison proposed some verbal alterations. A discussion arose as to these resolutions being brought forward without notice, Mr. Neison ultimately agreeing to postpone the matter until the next annual meeting.

The following alterations in the bye-laws, proposed by the Council, were then put to the meeting and carried unanimously:—

In paragraph II. of the bye-law relating to Associates, (*a*) The words at the commencement of the second paragraph to be "Associates shall pay an annual subscription of one pound." (*b*) The following words to be added at the termination of the second paragraph: "But they shall have the option of paying an annual subscription of thirty shillings in place of one pound, for which subscription they shall be entitled to a copy of the society's journal, in addition to the ordinary privileges of Fellows, with the exceptions hereinbefore specified."

Also the new form of obligation to be signed by Fellows on their admission (the words in italics being the additions to the old form):—

"I, the undersigned, do hereby engage that I will endeavour to promote the interests and welfare of the Chemical Society; *that I will* observe its laws, and *to the utmost of my power maintain* its dignity, as long as I shall continue a Fellow thereof."

The meeting was then adjourned until Thursday, April 5.

SOCIETY OF ARTS.

Certain Relations between Plants and Insects.*

BY SIR JOHN LUBBOCK.

(*Continued from p.* 804.)

The last of the five points to which I called your attention was the eye-spots. In some cases spots may serve for concealment, by resembling the marks on dead leaves. In *Deilephila hippophæ*, which feeds on the hippophæ, or sea buckthorn, a very grey green plant; the caterpillar, also, is a very similar grey-green, and has, when full grown, a single red spot on each side, which, as Weissman suggests at first sight much resembles in colour and size one of the berries of the hippophæ, which, moreover, are present, though not ripe, at the same period of the year. Again, in *Chærocampa tersa*, there is an eye-spot on each segment, which mimics the flower of the plant on which it feeds (*Spermacoce hyssopifolia*). White spots, in some cases, also resemble the spots of light which penetrates the foliage. In other cases, however, and at any rate in our elephant hawk-moth, the eye-spots certainly render the insect more conspicuous. Now in some cases, as Wallace has pointed out, this is an advantage rather than a drawback. Suppose that from the nature of its food, or any other cause, as for instance from being covered with hair, a small green caterpillar was very bitter, or in any way disagreeable or dangerous as food, still in the number of small green caterpillars which birds love, it would be continually swallowed by mistake. If, on the other hand, it had a conspicuous and peculiar colour, its evil taste would serve to protect it, because the birds would soon recognize and avoid it, as Weir and others have proved experimentally. We have a striking case of this among the hawk-moths in *Deilephila euphorbiæ*, which feeding on the Euphorbia with its bitter milky juice, is very distasteful to birds, and is thus actually protected by its bold and striking colours. The spots on our elephant hawk-moth caterpillar do not admit of this explanation, because the insect is quite good to eat—I mean for birds; we must, therefore, if possible, account for them in some other way. There can, however, I think be little doubt that Weissmann is right when he suggests that they actually protect the caterpillar by frightening its foes.

Everyone must have observed that these large caterpillars have a sort of uncanny, poisonous appearance; that they suggest a small thick snake or other evil beast, and the eyes do much to increase the deception. Moreover, the segment on which they are placed is swollen, and the insect when in danger has the habit of retracting its head and front segments, which gives it an additional resemblance to some small reptile. That small birds are, as a matter of fact, afraid of these caterpillars (which, however, I need not say are in reality altogether harmless) Weissmann has proved by actual experiment. He put a caterpillar in a tray in which he was accustomed to place seed for birds. Soon a small flock of sparrows and other small birds assembled to feed as usual. One of them lit on the edge of this tray, and was just going to hop in, when she spied the caterpillar. Immediately she began bobbing her head up and down, but was afraid to go nearer. Another joined her, and then another, until at last there was a little company of ten or twelve birds, all looking on in astonishment, but not one ventured into the tray, while one which lit in it unsuspecting, beat a hasty retreat in evident alarm as soon as she perceived the caterpillar. After watching for some time, Weissmann removed the caterpillar, when the birds soon attacked the seeds.

Other caterpillars also probably, of nearly allied species, are protected by their curious resemblance to spotted snakes.

There are many—very many—other points connected with the colouring of sphinx caterpillars, to which I might refer if time permitted. I will only allude to two. The peculiar hues of the death's-head hawk-moth caterpillar, which feeds on the potato, and unites so beautifully the brown of the earth, the yellow and green of the leaves, and the blue of the flowers, that, in spite of its size, it can scarcely be perceived unless the eye be focussed exactly upon it. The other is the anceryx. The caterpillars of this genus differ in style of colouring from all other sphinx larvæ, having longitudinal bands of brown and green. Why is this? Their *habitat* is different. They feed on the leaves of the pinaster, and their peculiar colouring offers a general similarity to the brown twigs and narrow green leaves of a conifer. There are not many species of lepidoptera which feed on the pine, but there are a few, and I have here diagrams of two, *Achatia spreta* and *Dendrobinus pini*, both of which, as you will see, have a very analogous style of colouring, while the latter has also tufts of bluish green hair which singularly mimic the leaves of the pine. I have added also the larvæ of a species of saw-fly (one of the hymenoptera), which also attacks the pine, and you will see that here also the colouring is curiously similar (*Lophyrus socia*).

But, as Wiessmann points out, we may learn another very interesting lesson from these caterpillars. They leave the egg, as we have seen, a plain green, like so many other caterpillars, and gradually acquire a succession of markings, the utility of which I have just attempted to explain. The young larva, in fact, represents an old form, and the species in the lapse of ages has gone through the stage which each individual now passes through in a few weeks. Thus the caterpillar of *Chærocampa porcellus*, the small elephant hawk-moth, a species very nearly allied to *Ch. elpenor*, passes through almost exactly the same stages as that of *Ch. elpenor*. But it leaves the egg with a subdorsal line. No one can doubt, however, that there was a time when the new-born caterpillars of *Ch. porcellus* were plain green, like those of *Ch. elpenor*. In this respect, then, *Ch. porcellus* is a newer specific form than *Ch. elpenor*. Again, if we compare the mature caterpillars of *Chærocampa* we shall find that there are some forms, such as *Ch. myron* and *Ch. chœrilus* which never develope eye-spots, but correspond to the second stage of *Ch. elpenor*. Here then we seem to have a species still in the stage which *Ch. elpenor* must have passed through long ago.

The genus Deilephila, of which we have in England

* From the *Journal of the Society of Arts*, February 23, 1877.

three species—the euphorbia hawk-moth, the galium hawk-moth, and the rayed hawk-moth, is also very instructive. The caterpillar of the euphorbia hawk-moth begins life of a clear green colour, without a trace of the subsequent markings. After the first moult, however, it has a number of black patches, a white line, and a series of white dots, and has, therefore, at one bound, acquired characters, which in *Ch. elpenor*, as we have seen, were only very gradually assumed. In the third stage the line has disappeared, leaving the white spots. In the fourth the caterpillars have become very variable, but are generally much darker than before, and have a number of white dots under the spots. In the fifth stage there is a second row of white spots under the first. The caterpillars not being good to eat, there is, as has been already pointed out, no need for, nor attempt at, concealment. Now, if we compare the mature caterpillars of other species of the genus, we shall find that they represent phases in the development of *D. euphorbiæ*. *D. hippophaæ* for instance, even when full grown, is a plain green, with only a trace of the line, and corresponds, therefore, with a very early stage of *D. euphorbiæ; D. zygophylli*, of South Russia, has the line, and represents the second stage of *D. euphorbiæ;* another Deiliphila has the line and row of spots, and the third stage; lastly, *D. vespertilio* and *D. galii* have progressed further, and lost the longitudinal line, but they never acquire the second row of spots which characterize the last stage of *D. euphorbiæ*.

The larvæ of insects teach us, indeed, many instructive lessons. It would be a great mistake to regard them as merely preparatory stages in the development of the perfect insect. They are much more than this, for the external circumstances act on the larvæ as well as on the perfect insect, and both, therefore, are liable to adaptation. In fact, the modifications which insect larvæ undergo may be divided into two kinds—developmental, or those which tend to approximation to the mature form; and adaptational or adaptive—those which tend to suit it to its own mode of life.

It is a remarkable fact, and except on those principles with which the name of our great countryman, Mr. Darwin, are justly united, I do not see how it can be accounted for, that the forms of larvæ do not depend on that of the mature insect. In these diagrams, for instance, are represented some very familiar larvæ, and the very dissimilar perfect forms which they ultimately assume. In other cases similar, or comparatively similar, perfect insects have very dissimilar larvæ. Indeed a classification of insects founded on larvæ would be quite different from that founded on the perfect insects. The *Hymenoptera*, for instance, which, so far as the perfect insects are concerned, form a very homogeneous group, would be divided into two—or rather one portion of them, namely, the saw-flies, would be united to the butterflies and moths. Now, why do the larvæ of saw-flies differ from those of other *Hymenoptera* and resemble those of butterflies and moths? It is because their habits differ from those of other *Hymenoptera*, and they feed on leaves like ordinary caterpillars.

From this point of view the transformations of the genus Sitaris, which has been very carefully investigated by M. Fabre, are peculiarly interesting.

(*To be continued.*)

Parliamentary and Law Proceedings.

Death from Chloral Hydrate.

On Saturday, March 31, Dr. Elliot, city coroner, held an inquest on the body of George Barling, aged forty-two years.

Catherine Brown, who had been nurse to the deceased for about nine months, said deceased had been in the habit of taking chloral hydrate every night when he could get it since witness went to attend on him, and sometimes he ate nothing for three or four days together, when he took mostly whiskey and chloral hydrate. Deceased always took the chloral hydrate himself and he would not allow anybody to see him taking it or in what quantity. About two months ago he asked witness to get for him 160 grains of chloral hydrate, but she refused, as deceased's wife, who often cautioned him not to take the chloral hydrate, desired her not to go. When she refused deceased said, "Oh, it will do no harm, I am used to taking it." Witness still refused to go, and he went out himself, and came back in about an hour and a half.

Twenty-three bottles were produced, only one of which had contained whiskey, all the others having been used for chloral hydrate, chloroform water, etc., but of the twenty-three two only were labelled, the first being from N. Taylor and labelled "Hydrate of chloral, 30 grs.," and the other from M. H. Pattinson and labelled "Solution of chloral: one tablespoonful contains ten grains of chloral."

Dr. Carlyle said that the bottle which was shown him that had contained chloral hydrate, and found in the bed of the deceased, was a six oz. bottle, but most of the others were four oz. bottles.

Hugh Jones, nineteen years of age, said he was an assistant druggist with Mr. N. Taylor. He had been three years in the trade altogether, but only two months with his present employer. He first saw deceased about a fortnight ago, when he came into the Abbey Street shop, and asked for 120 grains of chloral hydrate and four ounces of chloroform water. He asked Mr. Taylor, who was in the shop at the time, if he should supply him with it, and Mr. Taylor told him to give him 60 grains. Witness was labelling the bottle, but deceased prevented him, as he said it was for himself. He did not explain to deceased that he had given him 60 grains instead of 120. A jurymen: Of course he would know by the price that you only gave him 60 grains? Witness: No; I charged him the full amount. Deceased gave no prescription. The last time witness saw deceased was on Thursday, about five o'clock, the night before his death. He came into the shop and asked for two bottles of chloral hydrate, containing 150 grains each. Witness inquired of him why he wanted so much, and deceased said his wife was taking it also. He served him with 130 grains in two bottles, 65 grains in each, and four ounces of chloroform water. He labelled them both "Chloral—poison," but deceased pulled the labels off and said, "It is no use you labelling them; I know what it is too well." In answer to the Coroner, witness stated that it was on the representation that deceased wanted it for his wife that he gave him such a large quantity.

The Coroner expressed his surprise that this large quantity should have been supplied to deceased, and turning to witness he said: I want to impress upon you that this is not the way to dispense medicines, especially poisons. You must remember what it is that you are dealing in. It is a very frightful thing to have youths of your age dealing in these deadly poisons for the sake of a few pence, handing them out with as much freedom as if you were only selling turnip seed. A man asking for such a quantity ought to have put any person on his guard—300 grains!—and especially you who had read about chloral hydrate, and knew what chloral hydrate was.

A juryman said that the Coroner's remarks ought to have some effect, but he was of opinion that the blame rested with the master, and the foreman hoped that what had been said would be brought under the notice of other assistants, and that it would be a caution to them also.

The Coroner said that the law was inadequate to put a stop to cases of this kind. He mentioned this because it was not the first nor the second of these cases he had had, and it was not six months since he had held an inquest under exactly similar circumstances. The law would require to be amended, and he had taken steps to bring that about immediately after the last inquest in September, but nothing as yet had been done, and at present they had no power to prevent this being repeated to-morrow. He hoped that before long steps would be taken to render such things entirely impossible. This was not like an ordinary mistake which might be made by a druggist in dispensing medicine, but a person handing out freely large quantities of a most deadly agent.

A juryman asked the Coroner if there was not an examination to pass before a person could deal in drugs? Dr. Hair said that there was before he could deal, but he could dispense under an experienced chemist and druggist.

A juryman (to witness): Was there any qualified person in the shop when you dispensed this chloral?—Witness: No.

Witness in answer to other questions put by the jury, stated that Mr. Taylor had three shops in which were assistants, but Mr. Taylor was the only qualified person, as the assistants had not passed their examination.

A juryman asked if it would be a breach of the law for Mr. Taylor to have three shops, and he himself be the only qualified person to attend to them. Mr. Taylor could not be in three places at one time.—Dr. Hair said there was no law regulating the sale of chloral, because it was not included in the list of poisons.

Dr. Carlyle said that, in conjunction with Dr. Hair and Dr. Walker, he made a *post-mortem* examination of the body, and after reading the report which he had made, he said that their opinion was that death resulted from fatal fainting or syncope affecting the heart, which was loaded with fat and so feeble that chloral hydrate would act more powerfully on that account, and had so paralysed the heart as to cause death.

The inquiry was then adjourned until half-past ten o'clock on Monday morning.

Mr. Taylor was then sworn. He said he was a duly qualified druggist under the Pharmacy Act, and had been so since 1869. He had three shops; one in Botchergate, one in Abbey Street, and one in Castle Street. In the Botchergate and Castle Street shops he had in each an assistant and an apprentice; but he himself attended chiefly to the Abbey Street shop. He had also an assistant who was not stationed at any particular shop, but attended to any of the three when required. His assistants had all passed their Preliminary examination but not the Modified examination.

The Coroner explained that the Preliminary examination had nothing to do with their drug knowledge. It was merely something that they must go through before they commenced to learn their business.

In answer to a juror, Mr Taylor said he was perfectly acquainted with the Act—he had not gone into the business ignorantly—and according to it it did not matter whether they were qualified assistants or not. The Act merely stated that they could not carry on business for themselves. Even supposing he had qualified assistants in his shops that would not alter the state of things if anything occurred, as he himself was the responsible party. He could carry on a dozen shops if he wished, and not have a qualified assistant in one of them. He had no doubt but that his assistants were able to pass for qualified assistants, but they did not push for it.

The Coroner said that what they wanted to impress upon Mr. Taylor was that although chloral was not down in the list of poisons that fact should not weigh with him at all. A man's conscience ought to be a law to himself, and he should not be bound down because chloral hydrate is held by the Privy Council not to be a poison. Chloral was as dreadful a poison as opium, but it acted strangely and capriciously, and paralysed the heart, and the system could not resist it as it could do opium. Death in most cases of chloral poisoning was very sudden.

Mr. Taylor said he was very strict with regard to the sale of any poisons. They were locked in a place by themselves, and he used very great caution when he dispensed them, and so far as he knew, his assistants did the same. He could not use any more precaution than he did.

The Coroner summed up in private, and the jury returned a verdict that "Deceased came to his death through paralysis of the heart, produced by his having inadvertently taken an overdose of chloral to relieve pain." They also appended to their verdict that "they wished steps to be taken by the Coroner for including chloral in the list of poisons in Schedule A of the Pharmacy Act." —The jury, we understand, exonerated Mr. Taylor from all blame.—*Carlisle Journal.*

A Disputed Milk Analysis.

A case of alleged milk adulteration has been heard in the Salford Borough Police Court, in which the defendant put forward a singular plea. A milk dealer was summoned for selling milk adulterated with 11 per cent. of water. Two samples had been taken by the officer from cans in the defendant's cart, and Mr. Carter Bell deposed that these samples had been examined by him: one he found to be comparatively pure and passed it, but the other contained 11 per cent. of water. The standard he had adopted was 9·2 per cent. of solids not fat, and in this case he had found but 8 per cent. On the part of the defendant it was sworn that he had removed the seals from the sealed portions left in his possession in the presence of a witness, and taken the milk to the Town Hall to have it analysed, and that Mr. Bell's own certificate, which was produced, stated that both samples were pure. Mr. Bell was recalled and said that he was positive the two samples left on the 27th February were not of the same quality as those he analysed on the 21st. On his behalf it was requested that the third sample of milk taken by the inspector might be sent to Somerset House to be analysed. Eventually the bench decided that there was a doubt as to the commission of the offence and dismissed the case.

Several other milk cases were heard at the same sitting in which there were convictions, and one in which the analyst's certificate as to adulteration had been confirmed by the chemical department at Somerset House.

Poisonous Coatings for Hams.

At Liverpool on the 28th ult., Henry Thompson, provision merchant and Italian warehouseman, was summoned before Mr. Raffles, for exposing for sale hams which had been "coloured, stained, and powdered" with chromate of lead, so as to render the hams injurious to health.

Inspector Luya proved going to the defendant's shop and purchasing a ham which was wrapped in a cloth covered with red powder. Witness cut the ham in three parts; gave one part to Dr. Brown, one to the defendant, and retained the other.

Dr. Campbell Brown said he received from the inspector the ham. Witness took it out of the canvas and looked to see whether any of the powder with which the canvas seemed to be saturated was upon the ham. There was some of the powder upon the cut surface and the under surface of the ham. He had some of the ham cut up, and always found a small portion of the powder upon the cuts. He analysed the powder which was upon the canvas, and found it was chromate of lead, which is an active poison, and produced colic.—Mr. Raffles: What is the object of putting on the powder? Dr. Brown: I don't know, except it is to make it gaudy.—Mr. Thompson: The hams in question are as I bought them. You will find the same hams in fifty places in Liverpool.

Dr. Brown, in reply to Mr. Raffles, said he did not suppose the powder would always be found upon the ham, but it was liable to be there. It was a very dangerous poison, and a large quantity of it was upon the canvas.

Mr. Raffles (to the defendant): What is the object of putting the powder upon the canvas? Mr. Thompson: I don't know any object except to protect it from flies. The hams are highly recommended, and persons inquire for them.—Mr. Raffles: What do you call them? Mr. Thompson: Sugar-cured American hams. In New York nothing else is sold for home consumption.—Mr. Raffles: Packed like this? Mr. Thompson: Yes.—Dr. Brown said the ham itself was very good.

Dr. Taylor, the deputy medical officer of health, said chromate of lead was a corrosive irritant, and produced inflammation of the bowels. It was equally dangerous as packing the hams in arsenic.

Mr. Raffles said the prosecution would have done better if they had brought a batch of the persons who sold these hams; it seemed like making one person a victim. He questioned whether the case came under the section. The defendant did not sell the article coloured in this way. The covering is not an article of food. It was no doubt a practice that should be stopped, and he thought the prosecution a very proper one, but he could not say that it was an article sold that was mixed, stained, or coloured. The summons was therefore dismissed.—*Liverpool Daily Courier.*

Attempted Suicide with Vermin Killer.

On Saturday week a man was charged before the Hastings magistrates with attempting to commit suicide by taking a portion of a packet of Battle's vermin powder. Evidence was given by Mr. Mackenzie that he had sold a packet of Battle's vermin killer to the prisoner, who said he wanted to poison a dog. The packet was labelled "poison," and witness cautioned him to be very careful with the poison, and to destroy any he might have left. The prisoner was committed for trial.

Review.

On Fermentation. By P. Schutzenberger (Director at the Chemical Laboratory at the Sorbonne). H. S. King and Co. London: 1876.

This work forms the 20th volume of the International Scientific Series, and as might be expected from the pen of the author, it constitutes an excellent digest of all that is known regarding the complicated phenomena of fermentation. Besides being complete in comprehensiveness, it is most readable and is enriched by the incorporation of the well known researches of Schützenberger.

The work before us is divided into two books, the first comprising thirteen chapters and the second, three chapters; there are further given a number of figures chiefly in illustration of the various kinds of ferments, and to show the processes of budding and spore formation.

Regarding fermentation as a particular instance of a biological reaction, manifesting itself as the result of the special force residing in organisms, Schützenberger adopts as nearly as possible the well known theory of Pasteur, and gives to that of Liebig little attention beyond enunciating its main features.

After briefly describing some historical observations in regard to fermentation, the author proceeds to consider more especially alcoholic or spirituous fermentation, and concludes that this is brought about through "a special mechanical action, exercised on the ultimate particles of the compound matter" (sugar), the result of which is that the sugar is split up into alcohol and carbonic dioxide, while glycerine and succinic acid are formed also at the expense of the sugar; besides this the sugar gives up matter to form new ferment. The lactic acid which generally accompanies alcoholic fermentation is considered is proved to be due to the presence of a minute amount of a foreign ferment.

Now Pasteur regards fermentation as essentially "a correlative phenomenon of a vital act, beginning and ending with it," so that wherever there is fermentation, there is organization, development, and multiplication of globules of the ferment itself. Liebig on the other hand neglected the element of life and regarded fermentation as due to a disturbance of equilibrium imparted to the elements of bodies by virtue of an existing change or motion in other bodies. Pasteur and Liebig have at no time in the history of the discussion between them relative to this matter agreed, and the last paper written by the illustrious Liebig was a refutation of some of the later inferences drawn by Pasteur on this subject.

Schützenberger says Liebig's theory was borrowed from Willis and Stahl; possibly, but no one can dispute the right to it, the German chemist acquired by constructing through his own work the basis upon which he accepted and defended it. And after all there is remarkably little real difference between the theories of Pasteur and Liebig. Take that form of fermentation which is supposed by Bernard to cause the transformation of the glycogen of the liver into glucose; this effect of hydration is considered by Pasteur and his allies to be due to the influence of a special ferment in the blood, which, while it causes this change, reproduces itself from a part of the matter it influences. Well, Liebig would rather have viewed the change apart from a vital process; it was enough for him to perceive the conditions existing necessary for the starch to take up water and becomes sugar—he did not see the necessity for believing the result due to a form of life; all that was required was the presence, the contact, of a body itself in process of change. One of his favourite illustrations of the theory bearing his name, was the reaction which occurs between peroxide of hydrogen and argentic oxide, which, when mixed, produce metallic silver and give off free oxygen, $H_2O_2+Ag_2O=H_2O+Ag_2+O_2$. The peroxide of hydrogen being unstable, is constantly undergoing a change from the moment of its formation, which is attended with the liberation of oxygen, and immediately it is brought in contact with oxide of silver it gives to that body the same tendency; more, it causes its reduction to metal.

Brodie has explained this result on the hypothesis that the second oxygen in the peroxide of hydrogen is in a different polar condition to that of the oxygen in the silver compound, and that the two thus have an attraction for each other. However this may be, it deals rather with first causes of attraction, while the fact itself remains.

To conclude this digression, we may say that the only difference of note between the theories of Pasteur and Liebig is this, that while Pasteur cannot conceive an act of fermentation apart from life as a cause, Liebig would not admit this as a necessity while he recognized a cause; in both instances it will be seen that the direct cause is *something in change.*

Schützenberger then goes on to describe the life processes of yeast cells and their multiplication by budding and throwing off spores, after which he treats of their actual composition.

With regard to the inorganic side of this question, nothing can be more easily determined; it is known for instance that the ash of yeast consists essentially of phosphoric acid and potassium, together with a little magnesium and a trace of lime. And from this knowledge it is easy to make a medium in which yeast will flourish and reproduce itself, so far. But it is in regard to the nitrogenous substances in yeast that we know so little; even here, we can construct a solution containing nitrogen in various forms which is capable of being assimilated as food. Of the actual nature of the albuminous part of the yeast we know extremely little beyond that it is albuminous.

We cannot pause to consider with Schützenberger the various condition upon which the life, health, and disease of yeast and other cells depend, but one experiment that he describes is so beautiful that we state it. It must be understood that Pasteur has established the fact that yeast respires like the higher animals, and that when free oxygen is not available, it can derive it from sugar. This attraction, or rather necessity for oxygen, Schützenberger illustrates by causing red arterial blood to circulate through a sufficiently long system of hollow tubes constructed of goldbeaters' skin, and immersed in a mixture of yeast diffused in fresh serum, without globules, at a temperature of 35°C. (95°F). Under these conditions the blood gives up its oxygen to the yeast through the walls of the tubes, and then passes out black and venous at the other extremity.

Incidentally, Schützenberger introduces some researches of his, relative to the determination of dissolved oxygen, which tend to show that in contact with sodic hyposulphite, it is divided into two parts, one of which goes to oxidize the hyposulphite, and the other to form peroxide of hydrogen. This, however, is a subject to which we hope to return on a future occasion. After describing and discussing the various other forms of fermentation, *e.g.*, viscous or mannitic, lactic, ammoniacal, butyric, etc., he considers fermentation by oxidation, and finally comments upon the application of Pasteur's researches. In the second book he treats of the nature of albuminoid substances, or proteids with the view to understand the origin of ferments, and shows how impossible it is to do so, while our knowledge of the chemical constitution of albuminous substances is so meagre. He recapitulates the sum of our information on these headings and further gives the results of his own investigations made by decomposing various forms of albumin with baryta water, a method which as nearly as may be, when in conjunction with a mild form of oxidation, imitates the wear and tear processes of life, those processes which give rise in the body to decomposition products of the living principles. This employment of baryta water is not new; others have used it before and since, but Schützenberger has certainly extended the results obtained by this method of inquiry. Thus, after confirming what was previously known, he details evidence to show that the albuminoids are constructed upon an association of urea and amido-acid combinations of various series. Schützenberger rests his discovery of the presence of the urea group in the albuminoids upon the fact that he has obtained ammonia and carbonic acid from them in the proportions necessitated by this assumption. He has also recognized among the decomposition products of albuminoids, guanine, sarcine, and xanthine. In this latter respect, however, he is not alone; simultaneously Thudichum arrived at similar results and has even gone further in certain directions.

Schützenberger gives also a chapter on soluble ferments and indirect fermentation and concludes his book with a review of the various views and researches relative to the origin of ferments.

We cannot close our notice without saying how well the book we have reviewed repays reading.

Obituary.

Notice has been received of the death of the following:—

On the 10th of November, 1876, Mr. Richard Thompson, Chemist and Druggist, St. Helen's, Lancs. Aged 55 years.

On the 3rd of April, 1877, Mr. David Dandie, Pharmaceutical Chemist, Perth. Mr. Dandie had been a Member of the Pharmaceutical Society since 1852.

Notes and Queries.

[543]. GOUT PILLS.—Can any reader of the *Pharmaceutical Journal* inform me of a good recipe for Gout and Rheumatic Pills which will not run together after rolled?—T. G. C.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

Prescribing Chemists.

Sir,—In the Advertising Sheet to the Journal of the 24th ult., at page xvii,—"Assistants Wanted,"—I was pleased to see the following statement in one of the advertisements, viz., "The principal objecting to counter practice, a knowledge of prescribing is not required."

Now, surely this ought to be the rule among chemists, although it appears to be the exception in the trade. When I see in chemists' windows certificates of examination from the Pharmaceutical Society, I infer progress in knowledge; and if a chemist proceeds in his studies and obtains his diploma as M.D., I greatly admire his abilities.

But, if the prescribing chemist points to his pharmaceutical examination as his only authority for prescribing, he may choose three mallards for his trade mark, with the motto, Quack! Quack! Quack!

I am aware that there are occasions when the chemist is urged to prescribe, as I have been myself, on board ship, at sea, with no medical man to consult, but I trust the Pharmaceutical Society is not to be screwed down like a trades' union, and bound to support the prescribing chemist in his attempts to supersede the certificated medical man. The faculty may not be always infallible; but that is not our business.

JOSEPH LEAY.

Chilcompton, Bath.

Hydrobromic Acid by Fothergill's Process.

Sir,—I wish to supplement my letter printed in the *Pharmaceutical Journal* for March 17. I now find that the residue left on evaporation by hydrobromic acid made by Fothergill's process does not consist of acid tartrate of potassium, as a partial examination of it led me to suppose, but of bromide of potassium and free tartaric acid. Moreover, when acid tartrate of potassium (freshly precipitated and well washed) is suspended in water, and hydrobromic acid added drop by drop until complete solution is effected, the residue obtained by evaporating such solution is of the same composition as that obtained by evaporating Fothergill's acid, and, when ignited, yields not carbonate but bromide of potassium. It seems indeed likely that hydrobromic acid, even in the cold, decomposes acid tartrate of potassium, forming potassic bromide and tartaric acid, and that in Fothergill's process the further reaction of the last named substance, and precipitation of cream of tartar, is prevented when a certain quantity of hydrobromic acid has been generated. A sample just examined gives 9·3 per cent. hydrobromic acid, 8·11 per cent. tartaric acid, and 7·46 per cent. bromide potassium.

ALFRED N. PALMER.

69, Market Street, Manchester.
April 2, 1877.

"*Juvenis*" (who should have sent his name and address).—The answer would depend upon the terms of the indenture and whether the apprentice was engaged in a place subject to the provisions of the Factory Act.

C. E. Palmer.—*Cochlearia officinalis.*

H. O'N.—Methods of pill coating will be found described in vol. iv., pp. 575 and 953 of this series of the Journal.

C. Brown.—Ganot's 'Elementary Treatise on Physics' (Longmans).

A. W.—See the *Pharm. Journ.* for March 18th last, p. 758.

Negator.—The publisher of the *Journal de Pharmacie* is G. Masson, Boulevard St. Germain, Paris.

B. Hooper.—We do not think the formula has been published.

J. C. Reinhardt.—You are recommended to communicate your offer to the Secretary.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Moss, Mr. Moore, Mr. Downes (Dublin), Mr. Mee, Messrs. Leath and Ross, Mr. Allen.

EXAMINATION OF SOME COMMERCIAL SAMPLES OF CITRATE OF IRON AND QUININE.

BY B. H. PAUL.

The results obtained in the examination of some samples of citrate of iron and quinine which I have recently received from different sources are such as to show the necessity of exercising particular caution in regard to the scale preparations, and the desirability of obtaining a specific guarantee that they are not only what they ought to be, but also what they profess to be.

The particular preparation now referred to should contain 16 per cent. of quinine, and the test to which the Pharmacopœia directs that it should be submitted is one by no means severe, but rather likely to make any sample appear fully as good as it can claim to be. It is true that the precipitate obtained on adding ammonia to the solution of the citrate does not contain all of the quinine, and that some quinine is retained in solution in the ammoniacal filtrate, but the proportion of the alkaloid thus failing to be weighed is very small in all cases, and with reasonable precaution in operating it does not seriously affect the value of the result obtained, even when the precipitate is well washed and thoroughly dried.

There is, however, another circumstance connected with the Pharmacopœia test which operates so much in favour of the sample examined by that method, that it goes far to counterbalance any deficiency in the weight of the quinine precipitate resulting from the retention of some small proportion of the alkaloid in solution. I refer to the state of dryness, or rather of hydration, in which the quinine precipitate is directed to be weighed. Quinine thus precipitated and dried by exposure to the air, even in a moderately warm place, would probably consist of the trihydrate of the alkaloid, which contains upwards of 14 per cent. of water, and the weight of the precipitate would therefore indicate a proportionately greater amount of quinine than is really present in the preparation tested.

It may be in some cases that the amount of water retained by the quinine precipitate is not so large, and that the somewhat uncertain conversion of trihydrate into monohydrate may take place while the precipitate is being washed and exposed to the air; but even in that case it would still retain upwards of 5 per cent. of water, an amount which exceeds that of the quinine held in solution in the filtrate.

Consequently, the precipitate obtained according to the directions of the Pharmacopœia from fifty grains of citrate of iron and quinine ought not to weigh less than eight grains, if the preparation has been made in such a way as to be entitled to rank as a Pharmacopœia preparation.

It is a common thing to hear the statement that although in making citrate of iron and quinine the proper proportion of alkaloid is used, it is impossible to obtain from the finished product the same quantity of quinine. I am disposed to think that this opinion rests solely upon misconception, either in regard to the proportion of citrate scales obtained from a given quantity of quinine being greater than it should be, or some analogous circumstance. Judging from various experiments that I have made with the object of ascertaining whether quinine experiences any alteration when the citrate is prepared, I am decidedly inclined to think that it does not change, but that any discrepancy between the amount of alkaloid in the finished preparation and the proportion used in making it must be due to some unobserved augmentation in the quantity of the product.

Having thus pointed out that the results to be obtained by the application of the Pharmacopœia test to samples of citrate of iron and quinine are likely to be rather in favour of the quality of the article than otherwise, I will now give the results furnished by three samples lately tested.

Sample No. 1 was contained in a one-ounce bottle, bearing the label of a wholesale druggist in London, with the name and address of the firm, and describing the preparation as "Citrate of Iron and Quinine, British Pharmacopœia." The bottle was sealed with a seal, on which were the words, "Citrate of Iron and Quina." On testing this sample, according to the directions of the Pharmacopœia, it gave a precipitate amounting to 9·3 per cent. instead of 16 per cent., or little more than one half as much as it should be. On testing this sample by another method, and carefully extracting the alkaloid by means of ether the total amount of dry alkaloid was 8·96 per cent. A further examination of this alkaloid showed that it was not entirely quinine, but that nearly one fourth of it consisted of cinchonidine with some amorphous alkaloid and cinchonine. The actual proportions were as follows:—

Quinine	6·80
Other alkaloids	2·16
	8·96

Sample No. 2 was also in a one-ounce bottle; it bore a label describing it as "Citrate of Iron and Quinia, British Pharmacopœia," and the seal on the cork bore the words "Citrate of Iron and Quina."

By the Pharmacopœia test this sample gave a precipitate amounting to 11·7 per cent.

When tested with ether, the dry alkaloid extracted in this way amounted to 9·7 per cent., and on further examination of this alkaloid it proved to contain, as in the previous instance, other alkaloids besides quinine; the actual figures being as follow:

Quinine	7·08
Other alkaloids	2·62
	9·70

Sample No. 3 was received in a paper packet, and had already become somewhat damp. When tested by the Pharmacopœia method it gave a precipitate which in drying gave indications that it was not quinine. This precipitate amounted to 8·87 per cent. The alkaloids extracted from this sample by treatment with ether and drying thoroughly amounted to 6·96 per cent., and this consisted chiefly of amorphous alkaloid; the actual figures being as follow:

Quinine	1·69
Other alkaloids	5·36
	6·96

The fact that in two cases the preparations here referred to professed to be in accord with the requirements of the British Pharmacopœia renders these facts especially noteworthy. There is here evidently no room for the excuse sometimes made with justice that manufacturers of scale preparations are required to make them of inferior quality, since there is no conceivable justification for labelling such articles "British Pharmacopœia."

GLYCEROLE OF NITRATE OF BISMUTH.

BY W. WILLMOTT.

A few weeks since Mr. Balmanno Squire introduced to the readers of the *Pharmaceutical Journal* a preparation of nitrate of bismuth in glycerine to which he gave the name, "Glycerole of Nitrate of Bismuth." After an able comment on its great probable value, and the expression of an opinion that the nitrate should be kept by every chemist in the kingdom, he wrote as follows:—

"I accordingly lay the results of my investigation before the pharmaceutical body in the confidence that they will soon develop its capabilities (*i.e.*, the capabilities of the glycerole) in a very considerable degree."

This invitation was promptly responded to, and at a meeting of the Society held on the evening of December 9th, 1876, the preparation received due consideration. Some exceedingly interesting reactions were shown by the President, and it was pointed out by him that, in order to avoid precipitation of the bismuth, the preparation should be made without heat. He stated, however, that, notwithstanding this precaution, the glycerole seemed to acquire the condition necessary to cause precipitation when diluted with water after about three weeks keeping. The exact nature of this compound was then fully discussed, and it was left in considerable doubt as to how far it really represented the preparation which Mr. Squire intended it should be. The following remarks are offered with a view to throw some light on the subject, and, in point of fact, if possible, to answer the question, What *is* glycerole of nitrate of bismuth? In the first place I would direct attention to the ready solubility of the nitrate in mixtures of glycerine and water, or, as I should prefer to put it, in glycerine when diluted with water. And I may say at once that I do not think this ready solubility arises from any solvent power which such mixtures may possess *per se*, but that the glycerine by being spread out, so to speak, or thinned down, or by having its density lessened, is brought into the best condition to exercise its solvent action; and in the present instance it does this in a rather remarkable manner. For instance, a mixture of glycerine and water containing only 15 per cent. of the former, or a little more than a drachm to the ounce, readily takes up double its own weight of the salt; so that the glycerine in this thin or attenuated condition dissolves, without the slightest difficulty, no less a quantity than from 12 to 14 times its own weight of the crystals of nitrate of bismuth. In this proportion the bismuth is subsequently thrown down and a gas resembling one of the lower oxides of nitrogen is disengaged. Contrary to what might be expected the solvent action of the mixtures referred to decreases in proportion as the glycerine increases, until, in glycerine itself, in its pure and undiluted form, weight for weight dissolves only with difficulty and after some considerable time. The whole of the solutions so prepared, as will be readily understood, throw down the bismuth on the addition of water in certain proportions according to the quantity of glycerine contained in them. This, however, will be rendered clearer if we take smaller quantities of the nitrate as shown in the table below. The precipitate occurs in more or less time when the water is added in certain proportions only, and not when it is added in either small or large quantities. The following are approximately the proportions as attained by experiment:—

Strength of Glycerole.			Proportions of Glycerole to water within which precipitate occurs.*				
Nitrate.		Glycerine.		Glycerole.	Water.	Glycerole.	Water.
1 oz.	in	1 fl. oz.	= from	1	× 4 to	1	× 384
½ oz.	„	1 „	= „	1	× 4 „	1	× 192
2 drs.	„	1 „	= „	1	× 4 „	1	× 96
1 dr.	„	1 „	= „	1	× 4 „	1	× 48
40 grs.	„	1 „	= „	1	× 4 „	1	× 32
20 grs.	„	1 „	=	No appreciable precipitate in any proportion.			

It will be seen from this table that when the glycerine is present in the water in the proportion of 20 per cent., or when the glycerole is diluted to that extent (1 to 4), the whole of the nitrate in each case is retained. At this point the basic properties of the water come into play and precipitation goes on, slowly or otherwise, until the water itself, by repeated additions, becomes the solvent, assisted to some slight extent by the glycerine which, as regards time, plays the part of a modifier of the whole process. I do not say that this solvent property of the water, small though it be, is retained indefinitely; but it exists for a considerable time, nevertheless, and cannot be altogether overlooked. The smaller the proportionate quantity of nitrate present in the glycerole, the longer the glycerine retains its hold, or exerts its protective influence, and the sooner of course the solvent action of the water becomes apparent. In this process, as shown in the table given, we have, in fact, glycerine working at one end and water at the other.

The solvent properties of the water and glycerine respectively may be clearly determined by the following simple experiments:—

1. (*Water*).—To ten minims of the glycerole prepared by dissolving 1 dr. of nitrate of bismuth in 1 fl. dr. each of Aq. Dest. and glycerine previously mixed together, add water *very carefully* (about ʒj) until a precipitate is thrown down. Then continue *at once* the addition of the water up to 2 fluid ounces or more, and the precipitate will be re-dissolved.

Note.—This reaction is liable to vary somewhat from very slight causes.

2. (*Glycerine*).—To the clear solution thus obtained add caustic potash. The precipitate will not be dissolved in excess of the potash, but will be readily taken up by the addition and admixture of glycerine.

It will be observed that in the glycerole of 20 grs. to the ounce there is no appreciable precipitate, *i.e.*, for a considerable length of time, in any proportion of water that may be added to it, because, before the glycerine loses its hold on the nitrate the water grips it—if I may be allowed the expression—and prevents it from falling. As this proportion would no doubt be considered too weak for a glycerole for ordinary use, the 40 grs. strength would probably be unobjectionable as regards the precipitation, and upon this hypothesis I venture to suggest the following formula:—

℞ Nitrate of Bismuth . . . . . ℥ss.
Distilled Water . . . . . ʒij.
Price's Glycerine . . . . ad ℥vj.

Dissolve the nitrate of bismuth in 2 fluid drachms of the glycerine previously mixed with the distilled water; then add the solution to the remainder of the glycerine and mix well together.

This is prepared *at once* and without the slightest

* Temperature 50° to 60° Fahr. Time indefinite.

difficulty. It contains five grs. of the active ingredient in each fluid drachm, and is most convenient for prescribing. Even therapeutically the addition of the water is an advantage, since, as in the cases of tannin and borax, the density of the undiluted glycerine prevents the action of the remedy from coming readily into play. It is better in each case to dilute with a little water before using. This addition in the formula given may or may not affect the result as regards stability, but the difference in this respect (if any) with so small a proportion will be comparatively trifling.

Effect of heat.—The effect of heat on the glycerole appears to be this. A portion of the nitric acid is separated and retained *pro tem.* by the glycerine. If the process be stopped here, we have a glycerole which smells strongly of nitrous acid, and which no doubt soon acquires the condition in which a precipitate is thrown down directly on the addition of water. Other combinations of nitrogen and oxygen are possibly formed, as the case is one in which different conditions very readily produce different results. But if the heat be continued or increased, nitrous acid fumes are disengaged with violent ebullition, and there is left in the dish a soft pasty mass consisting for the most part of oxide of bismuth and glycerine. By carrying the process still further in a higher degree, we arrive at the phenomena so graphically described by Mr. Postans on a former occasion. It is clear, therefore, as pointed out by the President, that heat should not be employed in the preparation of the glycerole of nitrate of bismuth.

Reactions.—The reactions exhibited by this compound resolve themselves to a great extent into a question of proportions. If we take a concentrated glycerole and precipitate it from its solution in water by caustic potash, the precipitate is not re-dissolved in excess of the potash, the glycerine being proportionally too small, but if we employ a weaker glycerole (one dr. or two drs. to the oz.) the precipitate is re-dissolved immediately under similar circumstances. This, however, does not occur in the absence of the glycerine. A precipitate thrown down by potash from a solution of the nitrate in water, is not taken up by excess of the alkali; but the addition of a small quantity of glycerine immediately dissolves it. The glycerine appears here to act as a solvent in the presence of a slight excess of potash. No such effect as this follows the employment of ammonia. Glycerine is powerless in the presence of this reagent, probably because the ammonia more completely withdraws the nitric acid from its combination with the bismuth; but whether the precipitate be thrown down by ammonia, or by potash, or by a glycerole of long keeping, it is at once restored by the free addition of nitric acid. From this it may fairly be inferred that the glycerine in this preparation is simply acting the part of a solvent, similar to water, and that its protective influence, due possibly to its great density, is a question of time only. The reactions are complicated and sometimes obscure, but, bearing in mind the nature of the substance with which we are dealing, this is precisely what we should expect.

As the result of the attention I have given to the subject (limited it is true), I think it more than probable that the glycerole is what Mr. Squire intended it to be, namely, "a simple solution of the salt in glycerine." At the same time, all my experiments tend to corroborate the opinion of Professor Redwood, that "the nitrate of bismuth being an acid salt, in which the greater part of the nitric acid is held by an affinity so weak that water itself is capable of removing it, the glycerole is rarely likely to be uniform in its composition."* To this Mr. Squire replies (*Pharm. Journ.*, Dec. 16, 1876), "If the preparation will not keep for many weeks unchanged, no more will any of the infusions which are so largely prescribed, and no more will sulphurous acid solution."

Whether, therapeutically, this new compound will justify the sanguine anticipations with which it was introduced, I am not prepared to say, but there can scarcely be a doubt that all will welcome any addition to the deservedly recognized value, which, in the practice of medicine, the preparations of bismuth most indisputably possess.

King's College Hospital.

AN EASTER HOLIDAY IN LIGURIA.†

BY PROFESSOR FLÜCKIGER.

The strip of land that extends round the Gulf of Genoa from Spezzia to Nizza, is rightly called simply "The Shore" (*Riviera*). But where again is there such a diversified abundance of landscape beauty poured out? Perhaps the double gulf of Naples and Salerno outbids the Genoese coast in soft grandeur, but not in loveliness of form of mountain and sea, or in the variety and fulness of its flora. Not till four degrees further south does the plant-world again find itself under equally favourable conditions for the unfolding of the southern characteristics that so much attract the Northerner, and doubly fetter him if privileged to shelter himself upon that sunny coast from the last wild storms of winter.

By the end of March, or beginning of April, the umbrageous westerly and south-westerly portions of the Lombardy plains are already rejoicing in a fresh, if not a varied green, which in a very short time reaches the sea by the Turin and Savona road. The Ligurian Alps are still covered with snow, and from ravines and valleys turbid streams rush southward, and, conducted through widely ramified artificial channels, fill numberless reservoirs from which in summer time the olive and lemon gardens are refreshed. The snow covering becomes thinner and thinner; the bare chestnuts and miserable pines are replaced by olive thickets and the glossy foliage of the *agrumi*, where aromatic lemons, mandarins and oranges make their appearance in thousands. Savona is more than superficially connected with these, for a burgher of that pleasant city, Georg Gallesio, cannot remain unmentioned when speaking of our botanical knowledge of those noble economic plants, since he contributed to it a still valuable book, 'Traité du Citrus' (Paris, 1811). Gallesio rightly traced back their numerous cultural varieties to the few principal species of *Citrus;* for instance, in his opinion the bergamot is a hybrid between the orange and the lemon. According to him, also, lemons and citrons were cultivated in Savona in the middle of the fifteenth century.

Charming as is this locality, the beauty of the coastline and the mountains westward increases considerably. The stages between San Remo and Bordighera to Nizza may be described as the most magnificent portion of the whole Riviera; and if one single point is to be preferred, it is the district of Monaco. But it would be a fastidious undertaking to attempt to separate the most beautiful from the perfectly lovely. In respect to climate, however,

---

* The case, probably, may be stated thus. The glycerine being a powerful solvent and of great density, is slow to bring about those changes which, with the difference due to rapidity of action, are effected by water alone.

† From the *N. Repertorium f. Pharmacie*, vol. xxv. 1876.

a sharp boundary can be drawn. The mildest portion is the strip between Ventimiglia and Beaulieu, or Villafranca, in which, near Monaco and Mentone, landscape beauty and softness attain their most complete expression. Only rarely are a few snow-flakes seen at Mentone, and the number of days upon which rain falls (not rainy days) is about sixty; but at Nizza it is at least eighty. These figures illustrate clearly the considerable difference between Mentone and Nizza. At Nizza the sheltering mountains recede, the back ground is more open, and the outlook extends to the lofty summits of the Maritime Alps; the district is therefore more accessible to wind and weather.

Between Ventimiglia and Villafranca the country is level only where the rivers have broken their banks and left deposits of detritus. The mountains consist of hard Jurassic limestone, soft marly deposits, and much distorted strata of crumbling numulitic limestone, presenting a sufficiently large surface to the attack of water to form excavations, which sometimes recall—as in the Val di Latte—the famous "Karrenfelder" of the Alps, and impart to the coast a wild craggy formation. The principal action of the water probably occurred far back in prehistoric times, and it stands out in striking contrast to the present poverty of water in the district.

As in many southern lands, so also in the Riviera, the heights put off their forest adornments for the longest time; only isolated patches of pine, consisting mostly of weakly trees, are to be seen on the upper mountain slopes. Somewhat denser and more stately clumps here and there adorn the shady sides of the more craggy valleys, which are not suited to cultivation. The magnificent *Pinus Pinea*, L., is absent from the western half of the coast, the Riviera di Ponente; on the eastern half, the Riviera di Levante, as at Sestri, beautiful groups of this species occur; but not until considerably farther south, as at Viareggio, near Pisa, is there an opportunity of admiring its full effect as a forest tree. By far the most prevailing conifer in the Riviera is the *Pinus halepensis*, Mill., much less picturesque than the mighty *Pinus Pinea*, though always affording a beautiful prospect, from the light green of its soft, thin, outspreading tufts of needles. Even the smallest trees bear comparatively numerous cones, which are at first very slender and acutely conical, but after the falling out of the seed, through shrinking, come to look shortened and rounded, and remain on the weather-beaten trees. They are always sharply recurved, the scales broad and not pointed. This maritime pine is distinguished from other species by its less rigid growth; the stems and branches often assume the most fantastic contortions from the direction given to the south-west wind by rocky angles exposed to it. *Pinus Pinaster*, Solander, generally known under the name of *Pinus maritima*, Poiret, occurring more isolated in the Riviera di Ponente, is of more regular growth and rigid appearance, to which the stiff divergent spines, 3 millimetres thick and 25 centimetres long, especially contribute. In no part of the country do these coniferæ occur in such number or of such size as to favour their use in the production of resin or turpentine.

The northern juniper is in these sunny climes replaced by the far more handsome *Juniperus Oxycedrus*, L. Its somewhat broader and shorter needle-leaves do not differ very much from those of the *Juniperus communis*, but from the greater prominence of the white bands on the under side they produce a different impression. Moreover, the much more plentifully developed ramifications of this tree do not tend upwards, but form dense rounded crowns of vigorous appearance; consequently it differs essentially from the compact pyramidal growth of the *Juniperus communis*. The berries of *J. Oxycedrus* attain a size of 17 millimetres by 15 millimetres, but are sometimes much smaller; they are red-brown when ripe, and usually proceed from three carpels like those of *J. communis*. Göppert has described a variety of the latter as *J. duplicata*, in which two whorls of three leaves grow adherent to the fruit. This condition occurs frequently in the cones of *J. Oxycedrus*, and the grey-blue hoary sutures of the carpels contrast strongly with the brown epidermis. The fruit encloses only three seeds, which, as in *J. communis*, are supported by the sides and back of the hollow resin vessel. Opinions may differ as to the delicacy of the smell, but it is undeniable that this southern conifer is much less aromatic than its northern sister. The epicarp is also tougher, and the light yellow fleshy portion of the fruit is drier and coarsely fibrous. The undoubtedly smaller proportion of oil present in the berries of *J. Oxycedrus* allows their sweetness to become more manifest, although they may contain less sugar. The contents of the resin vessels are nearly solid and tasteless, and consist just as little as in *J. communis* of volatile oil. The reply to an oft-repeated inquiry whether the juniper or its berries were in any way used in this district, was always positively negative. If the Pharmacopœa Germanica derives its oleum juniperi empyreumaticum (oil of cade) from the wood of *Juniperus Oxycedrus*, it cannot, at any rate, be drawn from the Riviera, and it is probable that the tree does not occur commonly anywhere else.

The mastic tree (*Pistacia Lentiscus*, L.) in this district no longer merits the name of tree, since as a mere bush it forms the chief constituent of the underwood, and its glossy evergreen leaves cling to the dryest rocks. One exception is the magnificent mastic tree of the Villa Giribaldi, in Bordighera, probably one of the largest specimens at present in existence; for throughout the Mediterranean district the scarcity of fuel has pressed hardly upon this tree. The mastic tree at the above villa stands upon a rather elevated spot, it appears as if the earth is heaped up round about the stem, so that only the strong boughs, bare underneath, are visible, these are much branched, and form a beautiful leafy shade, about 10 metres in diameter. The smooth branches are prettily bent, and form an elegant crown, adorned even on the 8th of April with racemes of male flowers. From the slow growth of this species an age of several decades may be ascribed to the Bordighera tree. Even the owner was not exactly informed upon the subject, but gave the promise henceforth to pay more attention to it. In Chios, which island is famed for mastic resin, many of these trees were killed in 1850 by frost; the tree at Bordighera, although standing in a position by no means particularly sheltered, remained uninjured, which is a striking testimony to the mildness of this strip of coast.

A very usual companion of the mastic bush is the myrtle (*Myrtus communis*, L.), the ornamental flowers of which do not appear until late in summer. At present the plant has not a specially cheerful look, as it only bears a few shrivelled berries, and the evergreen leaves present no fresh colour at the commencement of April. A somewhat less massive, but not quite dissimilar form of bush appears in the slender *Daphne Gnidium*, L., the flowering time of which is already past. Its bark is used in Italy, France, and the north, like that of *Daphne Mezereum*. Both plants are distinguished, amongst other characteristics, by a very remarkable growth. *D. Gnidium* occurs frequently with a stem more than a metre long; at the end only of which are a number of nearly whorled compressed branchlets; but the true leathery leaves are arranged at wide intervals nearly throughout its height. Gnidium bark is therefore easily recognized by the arrangement of its leaf scars, and moreover it is never so broad as Mezereum bark, since the stems seldom exceed a centimetre in diameter, which in the knotty *Daphne Mezereum* is frequently the case.

Buxus sempervirens, L., is entirely absent from the coast, but grows beautifully in the cool well-watered valleys. Thorns and prickles prosper in this country better than in the north. In this respect the *Smilax aspera*, L., is guarded in a prominent manner, and is of unparalleled importunity, being a disagreeable evil throughout all the Mediterranean. On the rocks it forms, with its prickly leaves and stems, a dangerous thicket, but an *Oxycedrus juniper* ensnared and overgrown by *Smilax* is unapproachable. It costs considerable trouble to obtain for the herbarium good specimens in which the tough tendrils, the elegant drooping bunches of red-black insipid berries, and the many-shaped leaves can be shown uninjured. More difficult still is it to obtain the root-stock, which does not resemble sarsaparilla. The part above ground, however, does so very much, recalling the *Smilax officinalis*, and giving a very good idea of the appearance of the sarsaparilla plants. Of course, the leaves of *S. aspera* are much smaller; but in good soil and rather moist spots they attain a diameter of 10 centimetres and a length of 12 centimetres, and might very well then be compared with the leaves of the South American species, the obtusely cordate outline of which they completely share. *Smilax aspera* possesses a tolerably elongated woody root-stock, which is absent from the corresponding roots of the officinal Radix Sarsaparillæ. It has not been demonstrated whether these root-stocks contain the same frothing substance (parillin, smilacin) as is present in sarsaparilla. "Radix Sarsaparillæ, Smilacis asperæ, Peruvianæ," which occurs in the medicine tariffs of the seventeenth century, as, for instance, in that of Nordhausen (1657), shows that already this similarity had been noticed. It is more remarkable perhaps to find in a Nuremberg tariff of 1652, "Baccæ Smilacis asperæ." This plant, in respect to the number and form of its leaves, stalks and runners, shows as many variations as our blackberry, and was doubtless specially favourable to the setting up of a good number of species and varieties.

Smilax forms the most formidable bulwark of thorn-bush when it is combined with *Spartium spinosum*, L. (*Cytisus spinosus*, Lamk.), and *Sp. junceum.* The golden blossoms of these two even now adorn the uncultivated slopes and crags, just as in South Germany they are covered at Easter by the nearly allied *Sarothamnus scoparius*, Koch. (*S. vulgaris*, Wimmer). The representative of the elastic pliable stems of the latter are in the *Spartium spinosum* shorter and more woody, and hence more offensively rigid; their points of similarity can however usually be detected.

Beautiful as are the above-mentioned Papilionaceæ, and some other bushes of ths same family that also make their appearance at this time, they are far excelled by the perhaps less plentiful *Euphorbia dendroides*, L., an indescribably elegant bush when in full bloom. All the German euphorbias, even the *Euphorbia palustris*, have only a simple herbaceous stalk; but the stem of this species, which at the base is some centimetres thick, is quite woody, and rises in most elegant three-forked branches to a most beautiful light false umbel, at the height of a man. The bark and the herbaceous portions are full of milky juice, and it would not be difficult to collect sufficient for comparison with that of the official euphorbium. In the summer all its magnificence is dried up and withered, and the arid branches of the *Euphorbium dendroides* then no longer attract notice.

Among the indigenous shrubs the *Coriaria myrtifolia*, L. also takes a prominent position. Its long, and generally bowed and nodding stems, are usually almost smooth at the end of March, but in the first days of April the succulent light green leaflets and insignificant blossoms shoot forth very rapidly into luxuriant fulness. The crystallizable bitter principle of this plant (coriamyrtin) possesses poisonous properties, recalling to some extent those of picrotoxin. Coriaria blends the form of the bramble, as *Smilax* and *Rubus*, with the marked rigidity of *Spartium.*

The most generally diffiused shrub is the *Rosmarinus officinalis*, L., which is everywhere distributed in masses from the coast to the hilltops. The rosemary has peculiar claims to be considered the distinguishing plant of the western Mediterranean countries, as it is not even wanting in the Sahara. The Northerner sees with interest the carefully protected and poetically celebrated acquaintance of his native land, here growing luxuriantly and in perfect riot as vigorous underwood to a height of $1\frac{1}{2}$ metres. Nevertheless, the woody stems of the rosemary are neither truly erect nor truly bent, the flowers are neither blue nor white, the leaves are neither grey nor green; in short, it is difficult to recognize in this plant, peculiarly deficient in features noteworthy to the eye, one held in high esteem from ancient times, and possessing also chemical interest. The stearoptene of rosemary oil appears to consist of two varieties of camphor rotating a beam of polarized light in opposite directions.

Rosemary cannot be mentioned without the thoughts reverting to *Thymus vulgaris*, which on this coast occupies a similar place, although not so conspicuous on account of its small size, it only attaining a height of about four decimetres. But thyme is a much more spreading plant, its knotted stems are singularly bent; from the dull grey of the leaves the beautiful reddish flowers stand out brightly; and the aroma of the little shrub is as peculiar as it is powerful. The name *Rosmarinus* is indicative of the preference of this plant for the immediate neighbourhood of the coast; the *Thymus vulgaris*, on the other hand, rises in this, as in the Aragon districts, to an elevation of upwards of 1000 metres in the mountain regions, and makes a most lovely appearance in the valleys of the Maritime Alps, where the rosemary no longer occurs, although in the Balearic isles it attains an elevation of 1300 feet. With this is connected the greater power of resistance possessed by the thyme. The far more vigorous rosemary cannot endure the German winter; but the little thyme is not injured by the winter of Christiania, and as an annual garden plant flourishes at a latitude of 65° to 70° in Sweden, in Iceland, on the mild Norwegian coast even at 70°, and at the other extreme in Morocco. So extremely differently do these two labiates behave that in the Riviera grow in the closest association, though singularly enough almost entirely wanting in Greece. The insignificant thyme remained a stranger to the Romans and in the middle ages, whilst the rosemary was distinguished in many places in Latin literature as a popular plant, and was also esteemed by the Arabs. This explains how Charles the Great, in the year 812, included "ros marinum" in the list of South European economic plants, the cultivation of which should be attempted on this side of the Alps, but did not include thyme, which probably first obtained its position as an aromatic kitchen herb since the middle ages.

With the thymol generated by the chemical activity of the *Thymus vulgaris* money might be made, as probably it possesses antiseptic properties similar to those of other allied substances. But nobody thinks of such a thing here; nowhere throughout the Riviera is the distillation of essential oils energetically carried on as in Mentone. In the Val di Latte, near Ventimiglia, rosemary, lavender, and thyme are occasionally distilled in a very crude fashion, but in inconsiderable quantities; the production of oil of neroli, however, in the Riviera di Levante does not fall off.

Lavandula vera, DC. (*Lavandula officinalis*, Chaix, *L. angustifolia*, Mönch.), has in March and April only old rosettes of leaves and flower-stalks to show. It is much less frequent and does not occur so plentifully as rosemary and thyme. *Lavandula* shuns the sea-coast here decidedly, and appears first on the borders of the olive region, at an altitude of 500 or 600 metres; it cannot therefore be taken into consideration in picturing the spring vegetation of the Riviera.

Besides the plants already mentioned, the shore is chiefly enlivened by the *Zostera oceanica* (?), the ligulate leaves and strong rhizomes of which tossed upon the beach by the breakers become bleached and weather-beaten. Further, there are the two Cruciferæ, *Moricandia arvensis*, DC., and *Crambe maritima;* also *Crithmum maritimum*, L., *Thelygonum Cynocrambe*, L., some species of *Statice* and *Atriplex*, the *Galactites tomentosa*, with white besprinkled leaves, and the beautiful *Lavatera maritima*. Of Algæ there are not many to be found here; the larger fucoids especially are wanting.

(*To be continued.*)

THE DISTRIBUTION OF CARDIAC POISONS IN THE VEGETABLE KINGDOM.*

BY PROFESSOR T. HUSEMANN.

3. Ranunculaceæ.

(*Concluded from page* 796.)

The only known cardiac poison existing in this family is helleboreïn, occurring in *Helleborus viridis*, L., *H. niger*, L., and *H. fœtidus*, L., and accompanied by the narcotic glucoside helleborin.† According to Schroff's investigations, the same glucosides, or at least very similar bodies, appear to exist in many other species of *Helleborus*. A closer examination of the latter would be highly interesting, as it might throw some light upon the history and action of *Helleborus orientalis*, Lam., which was the cardinal remedy for psychical affections among the Greeks, and the reputed brilliant effects of which are unattainable with the ordinary species mentioned above.

Nearest related to *Helleborus* is the genus *Eranthis*, the sole representative of which, *Eranthis hiemalis*, Sal., was included in the genus *Helleborus* by Linné. Vauquelin found in it a soft resin, which he called helleborin, but it remains very doubtful whether this plant contains any glucosides analogous to those of *Helleborus*.

There is hardly occasion to suspect any cardiac poisons in other members of the sub-class Helleboreæ, although some of them are decidely poisonous, as for instance, *Caltha palustris*, L., which contains, according to Spiritus (1827), an acrid poison acting upon kidneys and skin, while other species of Caltha, as *C. Cadua*, Ham., and *C. Bishma*, Ham., are more probably to be referred to the genus Aconitum.

4. Leguminosæ.

Only quite recently has there been found a cardiac poison among this family. It is a proximate principle contained in the bark of *Erythrophlœum Guineense*, G. Don. (*E. judiciale*, Procter), growing near Cape Palmas and in Sierra Leone, and used by the natives as an arrow-poison and in ordeals. It is also known as Mancona bark or Teli. Gallois and Hardy discovered in it an alkaloid‡ acting similarly to digitalis. Their physiological experiments, however, were not made with the pure principle, but with the extract, and an exhaustive chemical analysis of mancona bark has not yet been made. Although the sub-order Papilionaceæ, which is so rich in esculent plants, contains more poisonous individuals than is generally supposed, we have no reason to suspect in it the presence of any cardiac poisons. Erythrophlæum is included in the third sub-order of the Leguminosæ, the Mimoseæ, and is nearest related to the genus *Parkia*, species of which furnish the so-called Sudan Coffee. A few Mimoseæ are emetic; so the root of *Adenanthera Pavonina*, L., growing upon Hayti. The bark of *Pithecolobium salutare*, Benth., of Columbia, is diuretic; and *Malvia judicialis*, of Mozambique, is used, like mancona bark and calabar bean, in ordeals.

Of domestic Leguminosæ, only a few deserve investigation. *Ononis spicata*, L., is known as a diuretic, and contains a glucoside, ononin,§ which, however, does not appear to have any cardiac effects. The same may be said of scoparin, the supposed active diuretic principle of broom, which contains besides an alkaloid, spartein, certainly not a cardiac poison.

5. Artocarpeæ.

From this family* we have to mention only one representative, the *poison-tree* of Macassar, *Antiaris toxicaria*, Lessh., containing a glusoside, antiarin, which is the active principle of the well-known Asiatic arrow-poison, *antiar*, and forms probably also the main constituent of the arrow-poison "dayaksh," used by the Orangdayas or Dyaks, and of some other similar poisons used by the Yatruns and Mintras of Malacca.† *Antiaris toxicaria* appears to be the only Artocarpea which produces remote poisonous effects. Rumph, who first described the tree, mentions besides an "Arbor toxicaria femina" occurring upon Timor, which was named *Antiaris innoxia* by Bluhme, because it is said to be much less poisonous.

These five families of dicotyledonous plants are the only ones containing cardiac poisons, and if we were to judge from the great superiority in numbers of poisonous dicotyledonous over monocotyledonous plants, we would hardly expect any cardiac poisons among the latter. But we know with certainty two families furnishing representatives.

6. Smilaceæ (Asparagus).

The cardiac poison belonging to this family is convallaramin, existing in *Convallaria majalis*, L., lily of the valley, alongside of the drastic purgative glucoside convallarin‡. Whether other species of Linné's genus of Convallaria contain the same glucosides remains to be investigated, but it is quite probable. The flowers and berries of *Convallaria Polygonatum*, L., the root of which was used for a long time as medicine under the appellation "Radix Sigilli Salomonis," are emetic and cathartic; and the same is probably the case with *Convallaria multiflora*, L.§ Another poisonous plant belonging to this family, and known from olden times, is *Paris quadrifolia* L., one berry, or true love, the berries of which were called in ancient medical works "baccæ *Solani* quadrifolii," showing that they were considered very active and efficacious. Our knowledge of the toxic action of this plant is, however, very limited, and the only reasons for suspecting it to contain a cardiac poison are its emetic effects, and the discovery therein by Walz of two glucosides, paridin and paristyphinn,|| possibly analogous to those in Convallaria.

Two other species of Paris, growing in northern Asia, namely *P. obovata*, Led., and *P. polyphylla*, Sm., said to contain an acrid narcotic principle, are likewise deserving of investigation. To these must be added some North American Smilaceæ, related to the genus Paris, namely *Medeola Virginica*, L., which, on account of its reputed emetic and diuretic effects, may possibly contain a cardiac poison, and certain species of Trillium, as *T. erectum*, L., and *T. grandiflorum*, Sal., possessing emetic properties, although in the latter the *acridity* of root and berries is mentioned as principal characteristic.

7. Liliaceæ.

According to Professor Husemann's own investigations, made with the Extractum Scillæ of the German pharmacopœia, this family contains an exquisite cardiac poison in *Scilla maritima*, L., well known to be an active emetic. The cardiac principle is chiefly contained in the alcoholic extract, and is not identical with the commercial sub-

---

* Abstract of a paper in *Archiv der Pharmacie*, Nov., 1876.

† See *Pflanzenstoffe*, pp. 796-800.

‡ Professor Husemann is somewhat astonished at the discovery of an *alkaloid* in this plant by Gallois and Hardy. He should have expected, and even yet suspects, *glucosides*.

§ *Pflanzenstoffe*, 675.

* Often counted as a sub-order (II.) of Urticaceæ.

† See Husemann, *Handbuch d. Toxicologie*, Supplement, pp. 62, 63.

‡ *Pflanzenstoffe*, 1041.

§ This is actually the case. See King's 'Dispensatory.'—Ed. N. R.

|| *Pflanzenstoffe*, 1042.

stance scillitin, which was found to exert no toxic action on rabbits, nor to affect the cardiac functions of the frog.

The family of Liliaceæ is known to contain a large number of congeners or surrogates of squill, principally belonging to the sub-order Asphodeleæ, and mostly included in the genera Scilla and Ornithogalum. Such are the East Indian *Scilla Indica*, Roxb., the South African (Cape) *Ornithogalum Lassoni*, Gm., and *O. scilloides*, Jacq.; besides *Drimia altissima*, Ker., which is used as a substitute for squills at the Cape; the South European *Agraphis nutans*, Lk., and finally *Muscari moschatum* and other species of Muscari. The analogous therapeutic use permits the conclusion of analogous physiological action; in other words, to assume the presence in these plants of a principle augmenting the blood-pressure, and possibly also accounting for the diuretic action of *Anthericum ramosum*, L., *A. Liliago* L., and *A. Liliastrum*, L.

Still more weighty are the reasons for assuming the presence of a cardiac poison in the bulbs of *Fritillaria imperialis*, L., belonging to the sub-order of Tulipaceæ, which appears certainly to belong to the acrid narcotics, as it is reported to produce emesis as well as trembling and subsultus in animals, and phenomena resembling conium-poisoning in man. Orfila has shown that the bulb of this plant produces no *local* effects, but that its action is altogether remote. The bulbs of *Tulipa silvestris*, L., and *T. Gesneriana*, L., act likewise as emetics, and *Erythronium flavum*, Smith, is said to have the same property. But it is not unlikely that in these last named plants the effect may be due to local irritation, as we are tolerably certain is the case with the best known poisonous liliaceous plant, *Gloriosa superba*, S., superb lily, native of Ceylon and Malabar.

Although these two monocotyledonous families are the only ones which certainly contain cardiac poisons, Professor Husemann, is inclined to suspect the presence of others in the family of Amaryllidaceæ. Several exotic species of the genus Amaryllis have long been known as violent poisons, although our information is rather vague and uncertain. One of these is *Amaryllis disticha*, L. (*Hæmanthus toxicarius*, Ait.), growing at the Cape, the juice of which, inspissated by exposure to the sun, is said to be used by the Hottentots as an arrow-poison, and the bulb of which is used as a drastic cathartic, according to Rosenthal. The same uses and properties are ascribed to the Brazilian and West Indian *Amaryllis Reginæ*, L., and *A. princeps*, Vell. *A. Belladonna* L., another native of the West Indies, is said to be an emetic, and in larger doses an active poison, three gm. of the dried bulb having been known to produce death in three hours. *A. Sarniensis* L., the so-called Jersey lily, growing at the Cape, *A. equestris*, Ait., the South American funnel lily, and *A. pudica*, L., the red Cayenne lily, appear to have similar properties.

More probable yet is the presence of a cardiac poison in various species of the genus *Crinum*, as *C. Zeilanicum*, L., and *C. Asiaticum* L., the latter being known under the name bakoun, as a Malay antidote against intoxication by poisonous fish, crabs and serpents, or poisoned arrows. Both are held to be emetics, and *C. Zeylanicum* is used in China and Cochin China exactly like our squills. Several species of *Hymenocallis* and *Pancratium* partake of the same properties; of the latter particularly the Mediterranean *P. maritimum*, L., the bulb of which has now and then been used as a regular substitute for squill, and was even known as "Radix scillæ minoris."

Of European Amaryllidaceæ, the most likely to contain a cardiac poison is *Narcissus pseudonarcissus*, L., or daffodil, if we may draw a conclusion from the effects obtained by Orfila upon dogs, namely repeated emesis, intoxication with consciousness, deep inspirations, falling upon the side, dyspnœa, and death free from convulsions. The same effect is probably inherent in *N. poeticus*, L., cases of poisoning by which are on record; and possibly also in *Leucojum æstivum*, L., *L. vernum*, L., and *Galanthus nivalis*, L.

All these facts make it probable that among the hitherto known, but unstudied, poisonous plants, there are many which must be classed with the cardiac poisons. At the same time, we see how fragmentary is our knowledge of the physiological action of plants, and how large a material for pharmacodynamic investigations remains to us for study. In conclusion, Professor Husemann hopes that some of the problematical plants mentioned may be made the subject of closer investigation.

EMULSIONS.*

BY EDMUND GREGORY.

There exists so much difference of opinion as to the comparative success of various methods for producing emulsions, that it gives rise to a suspicion there may be an equal difference in the estimate of what qualities are essential to the constitution of a perfect emulsion. Hence the necessity of a fixed standard of excellence. Such a standard we find in the milk of the cow. An emulsion, then, should be white as milk, and should have its fat-globules too small to be visible to the unassisted eye, and so well suspended that, although on standing a cream-like layer may rise to the top, it will readily reunite on shaking. Adopting this standard the writer will endeavour to enumerate the various methods proposed for making emulsions, and to give the results of actual experiment. Considering oil of turpentine as a fair type of the volatile oils, and that they are the most difficult class of substances to operate with, researches have been mostly confined to that drug. Premising these remarks, I proceed to consider:

1. The method which directs that equal parts of mucilage of acacia and oil should be put into a bottle and well shaken together, the requisite quantity of water being gradually added. If the mucilage be fresh, the bottle only partially full, and the shaking very vigorous, tolerable results can be obtained with castor oil, moderate results with balsam copaiba, and with oil of turpentine a total failure. But in all cases the oil-globules are distinctly visible to the naked eye.

2. Equal parts of oil and mucilage are put into a mortar together, and briskly triturated.

This gives barely tolerable results with the balsams and thicker oils, but with oil of turpentine it is a total failure, no amount of labour producing the slightest effect.

3. Equal parts of oil and mucilage, the oil to be gradually added, triturating briskly after each addition until the portion added is emulsified.

A fair result can be obtained by this process if the operator have plenty of patience and a liberal supply of muscle, but the product is too dark in colour. The oil-globules are not visible to the naked eye, but can be easily seen with a magnifying power of three diameters. It separates into two layers in two and a half hours, the lower layer being dark but not watery.

4. The next process is that wherein equal parts of mucilage, water, and oil are put into a suitable vessel, and agitated with an egg-beater until emulsionized.

This yields a tolerable result, is simple, and requires no skill, but is rather laborious, and yields a product very dark in colour. The oil-globules are not visible to the naked eye, but quite distinctly under a power of three diameters. It separates into two layers in three hours, the lower layer being very watery.

5. The next process tried was that of Mr. Charles F. Hartwig (published in the *Pharmacist*, October, 1875), in which one part of mucilage and one part of water are put into a suitable vessel, thoroughly mixed by being drawn up into and ejected from a small vaginal syringe, and one part of oil having been added, the emulsion is produced by the use of the syringe alone in the same way.

* Read before the American Pharmaceutical Association, in reply to a query, How much acacia is needed to emulsify perfectly the fixed or volatile oils and balsams?

This process yields excellent results, but the emulsion is not quite as white as it should be; the process is rather tedious and the after-cleaning very troublesome. It is the best of the processes in which officinal mucilage is employed. The oil-globules are invisible to the naked eye, but are distinctly seen with a power of three diameters. It separates into two layers in twenty hours, the lower layer being milky in appearance.

6. A process, published in the *Journal of Pharmacy*, in February, 1872, by Mr. J. Winchell Forbes, and apparently designed more especially for oil of turpentine, in which he directs that one part of oil shall be put into a bottle and shaken, then one eighth part of pulverized acacia, and after thorough agitation half a part of water added, the whole to be then vigorously shaken until emulsified.

The resulting emulsion is deficient in whiteness. The oil-globules are distinctly visible, as a multitude of gem-like points, under a magnifying power of three diameters, and are also visible to the naked eye if a drop be placed on a plate of glass and held up between the eye and the light. It separates into two distinct layers in fifteen minutes, the lower layer being quite watery, but it easily reunites on shaking.

7. If, however, in the preceding process, three eighths of a part of pulverized acacia be used instead of one eighth, a very good result is obtained, the product being much whiter, the oil-globules about half the size, and quite invisible to the naked eye. It now takes twelve hours to separate into two layers, the lower layer, however, being still watery.

8. The next process for consideration is described on page 343 of Mohr and Redwood's 'Pharmacy,' English edition of 1849, in which one part of pulverized acacia and one and a half parts of water are put into a mortar, and after thorough trituration three parts of oil are added gradually, each separate portion being emulsified before another is added.

The results are admirable, the product being white as milk. The oil-globules are not visible to the naked eye, but slightly so under a power of three diameters, and it does not separate into two layers under twenty-four hours, the lower layer having the appearance of milk.

9. The last process which will be referred to is recommended by Mr. Hans M. Wilder, in the *Druggists' Circular* for December, 1874. One part of pulverized acacia and two parts of oil are put into a mortar and rubbed together; one and a half parts of water are then added at once, and with a few revolutions of the pestle the whole is emulsified.

It has yielded in my hands the very best results. The emulsion is beautifully white, scarcely to be distinguished from milk, and the necessary manipulations are very speedy and simple. The oil-globules are totally invisible to the naked eye, and not very perceptible with a power of three diameters. It separates into two layers in twenty-four hours, the lower layer being quite like milk, whilst the upper would pass for cream, and at the time of writing this, four days after making, retains the same appearance, and is by far the best out of six samples that are standing undisturbed before the writer.

In summing up results, the conclusion must be arrived at that those who desire an unexceptionable emulsion must abandon those processes in which officinal mucilage is used, and adopt one which calls for pulverized acacia. Any inquirer, who will take the pains to prepare a series of emulsions according to the formulas given above, and will set the bottles in a row before him, will in a few hours receive a very striking lesson. Of these, the process No. 9, of Hager and Mohr, noticed by Mr. Hans M. Wilder, is the quickest, is simple, demands no apparatus that does not exist in every pharmacy, and yields unexceptionable results. Next to this comes process No. 8, taken from Mohr and Redwood's 'Pharmacy,' which yields an admirable product, but is a little more tedious than the preceding. No. 7, Mr. Winchell's process improved, is admissible when a pestle and mortar cannot readily be obtained from any accidental cause, but it will scarcely succeed with the more viscid oils or balsams, such as castor oil or balsam copaiba. Of the processes using officinal mucilage, the only one yielding a good result is that of Hartwig, No. 5, in which the vaginal syringe is used.

In answer, then, to the query at the head of this paper, the writer would say, that three drachms of acacia in fine powder are necessary to emulsify one ounce of any of the volatile oils, and that a little less (about two drachms) will answer for the fixed oils and balsams. And that to this quantity of gum four drachms and a half of water must be added (no more and no less), and that either the water or the oil may be added first to the gum, but it is quickest to add the oil first, and well triturate before adding the water. Less gum can be made to yield a good result by a careful operator, but as a general practical working rule it may be said that three drachms are necessary for one ounce of oil.

INDIAN HEMP AND ITS ACTIVE PRINCIPLE.*

The home of hemp is Persia and the high plateau of Northern India, whence it has gradually spread to other countries, so as to be domesticated at present everywhere. Its narcotic properties, however, are only developed fully in its native home in Asia, and in certain parts of Africa, where it is used as a narcotic stimulant and intoxicant by nearly 300,000,000 of inhabitants.

A preparation, called Madjoun is sold in Algiers, which is powdered *Cannabis sativa* boiled with honey for a longer or shorter time, according to the desired consistence. Usually it is kept mixed with a certain portion of *Ras-el-hanout*, a spice-compound, containing nutmeg, cinnamon, cloves, various peppers, ginger, galangal and Guinea grains. This mixture is also called *Kif*. The dose varies from the size of a hazel to that of a walnut, according to the age, sex, and tolerance of the person using it. Most eaters of hashish also smoke the dried leaves of the plant, either alone or mixed with the so-called "tobacco of the desert," which, according to Dr. Guyon, is a species of hyoscyamus.

Dr. Preobraschensky, who accompanied the expedition to Chiwa in 1873, furnishes the following information on the hashish of Central Asia. "This article occurs in the bazaars of large cities of Middle Asia in the form of plates, or cakes of various shapes, mostly five to fifteen inches long, five to ten inches broad, and one to three inches thick; externally they are dark brown, internally greenish or brownish, of firm consistence, very tough, and almost incapable of being broken, but easily cut into fine shavings. They are prepared as follows: The resinous juice from the fresh unripe flower-tops is collected during spring, mixed with sand and water to a doughy mass, which is spread upon a surface of clay and dried until it can be cut with a knife into plates. In a few days more the excess of water has evaporated, and the substance is ready for use. It is called hashish by the Russians, Nascha by the natives, Bang and Gunjah by the Persians, and is exported from Bochara to Chiwa, Tashkend, Kokant (Chokand) and other places.

The active principle of hashish has been supposed to be resin. Dr. Preobraschensky has, however, lately subjected hashish to a chemical analysis, and has found an alkaloidal body—not only in the commercial substance, but also in the flower-tops of hemp itself, and the pure extract prepared from it—which was recognized as *nicotine*. 150 gm. of the herb, distilled with water, furnished 25·4 mgm. of nicotine; 50 gm. of the herb, distilled with caustic lime and potassa, yielded 335·28 mgm.; 5 gm. of the extract of *Cannabis Indica*, dissolved in alcohol and distilled, yielded a distillate containing 91·14 mgm. of nicotine, and 2 gm. of the extract, distilled with caustic lime and potassa, furnished 63·5 mgm. of the same alkaloid

* From *Pharm. Zeit. f. Russl.*, 1876, 705, reprinted from *New Remedies*, March, 1877.

The Pharmaceutical Journal

SATURDAY, APRIL 14, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

DECEPTIVE SCALE PREPARATIONS.

THE importance of the results obtained in the examination of some specimens of so-called citrate of iron and quinine, which are recorded on another page, will not be ignored by the careful pharmacist. Of course we know that there is no novelty in the suggestion that citrate of iron and quinine as sent in by a manufacturer may not contain 16 per cent. of alkaloid; still, an approximate check for this is provided in the Pharmacopœia test. But there is the additional danger that a considerable part of the alkaloid precipitate yielded by that test, and even the greater part, may not be quinine, but may consist of one or more of the other cinchona alkaloids. It is obvious that should such a specimen fall into the hands of a competent public analyst, and result in proceedings under the Sale of Food and Drugs Act, there might be some difficulty in proving that it was of the nature, substance, and quality of the article demanded, although it might pass the Pharmacopœia test; and the great difference in the money value of the several alkaloids would, if stated in evidence, be liable to create in the mind of the magistrate an ugly prejudice against the defendant.

It must not be forgotten that the law as it stands not only applies to the wilfully fraudulent, but also to the negligent dealer. As a matter of convenience, many pharmacists buy their scale preparations from the wholesale manufacturer; but with this convenience there is associated a fresh responsibility, that of ensuring that they are getting what they ask for. Some will be content to trust to the manufacturer in this respect, and we are glad to believe that if they are prepared to pay a fair price and go to a respectable house they may do so with comparative safety. But, especially now that quinine fetches such an enormous price, it having trebled in value during the last three months, it will be well to remember that a low-priced article may not be the cheapest, and to take precautions accordingly.

In connection with this subjct we notice a statement made by Dr. DUPRÉ in *The Analyst* for the present month, that as public analyst he has analysed a certain number of drugs and found 43 per cent. more or less adulterated. We repeat here what we have said before, that such statements are very unfair when made by a public official in the absence of any proceedings that would appear to be demanded if those statements are well founded, for they justly raise the inquiry whether there has been excessive officiousness on the part of the analyst or remissness on the part of the local authority since these cases have not been carried into Court. Such sweeping statements ought not to be made without giving a fair opportunity of testing them, and we would remind Dr. DUPRÉ that a public analyst's evidence in the witness box does not always bear the test of a cross-examination. We note also that at the last meeting of the Society of Public Analysts it was announced that the Council had ceased to have any proprietary right in *The Analyst*, and, in fact, it is now edited by Mr. G. W. WIGNER and Dr. MUTER, and published by Mr. BAXTER. We hope that this change of proprietors is not to be synchronous with the starting of a policy of sensational attacks on chemists and druggists or any other class.

THE BENEVOLENT FUND DINNER.

IN our Advertising Sheet this week will be found an announcement concerning the Dinner in aid of the Benevolent Fund which is to take place on Tuesday, the 15th of May, together with a First List of Stewards. We think that the fact of the list including nearly two hundred and fifty names of gentlemen more or less connected with pharmacy, who have come forward to show their sympathy with this effort on behalf of distressed chemists and druggists, their widows and orphans, augurs well for the length of the list of donations to be read by the President after the Dinner. It will be noticed that gentlemen unable to attend the Dinner may send to the Secretary, 17, Bloomsbury Square, their donations for the President's list any time before the 15th of May.

EARLIER CLOSING.

WE are glad to learn that MR. GEORGE WEBB SANDFORD has consented to preside at the meeting in respect to earlier closing that is to be held in the theatre of the Society's House, 17, Bloomsbury Square, on Wednesday evening next. The hours of business for pharmacists, notwithstanding some improvement has taken place during the last few years, are still so unreasonably long, and this involves so much overwork both of mind and body, that we hope this favourable opportunity of discussion as to the best way of mitigating the evil will be utilized by a large number of chemists and druggists from all parts of the metropolis. We need hardly add that the meeting is not to be one of the members of the Pharmaceutical Society specially, but will be open to every member of the trade who chooses to attend. The chair will be taken at half-past eight o'clock precisely.

QUICKSILVER HOARDING.

THE *Public Ledger* last week quoted some curious evidence which tends to show that the well-known passion of the Asiatic for converting his surplus wealth into gems and the precious metals, and hoarding it up with a characteristic contempt for interest, has manifested a considerable development in investments in quicksilver. It is stated, apparently upon good authority, that the stock of this metal in the warehouses of Hong Kong on the 1st of February was 11,000 flasks, and that subsequent shipments from San Francisco to that port have raised that amount to 19,500 flasks. As the most careful estimates give the total consumption of quicksilver in all China at 100 flasks per month, it is clear that the stock in hand in February, without the subsequent shipments, would have been sufficient to provide for the Chinese consumption during several years. What then is to become of all this quicksilver, for it is to be presumed that the San Francisco merchants have some idea of what they are about in sending so much across the Pacific? Is this metal destined to play a *rôle* similar to that of its sister silver, which for so long was poured into the Asiatic continent without an apparent return? This theory finds some support from an assertion, which however requires further confirmation, that 16,000 flasks of quicksilver were recently uncovered in "one of the towns in India."

THE ROYAL INSTITUTION.

THE "probable arrangements" for the Friday evening meetings for the remainder of the session are announced to be as follows:—April 13th, "Experiments with a Great Induction Coil," by W. SPOTTISWOODE, LL.D., F.R.S.; April 20th, "Spinoza," by F. POLLOCK, M.A.; April 27th, "The Physical Causes of Indian Famines," by Lieut., General RICHARD STRACHEY, R.E., F.R.S.; May 4th, "Researches on the Origin and Development of Minute and Low Forms of Life," by the Rev. W. H. DALLINGER; May 11, "The Intellectual Movements and Secret Societies in Russia," by D. MACKENZIE WALLACE, M.A.; May 25th, "The Evolution of Nerves and Nervo-Systems," by G. J. ROMANES; June 1st, "The History of Education," by OSCAR BROWNING; and June 8th, a Lecture by Professor TYNDALL.

YORKSHIRE COLLEGE OF SCIENCE.

THE Council of this College have received a communication from the Worshipful Company of Clothworkers to the effect that the Court of that Company has decided upon expending a sum of £10,000 in providing adequate and permanent accomodation for the textile industries department in the College. The conditions attached to the grant will be laid before the Board of Governors at its annual meeting on Monday next.

APPOINTMENT OF ANALYSTS.

AT the Quarterly Meeting of the West Riding Magistrates, held at Wakefield on April 2nd, Mr. A. H. ALLEN, of Sheffield, was appointed Analyst for the West Riding, at a salary of £250 per annum, and 6*s.* for each analysis. At the same meeting the appointment of Mr. WILLIAM BAKER as Analyst for the division of upper Strafforth and Tickhill was revoked.

ERRATUM.—p. 657, col. 2, line 1, *for* Abergele *read* Liverpool.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The eleventh general meeting was held at the Royal Institution, March 15th, 1877. The President, Mr. A. H. Mason, F.C.S., in the chair.

The minutes of the previous meeting were read and signed.

The following queries were found in the question box. No. 1. "Among the tests for liq. am. fort. given in the British Pharmacopœia is the following—Dilute with four times its volume of water it does not give a precipitate with lime water. This test was applied to a sample of ammonia and no precipitate was produced. Air was then blown through the ammonia from the lungs with the expectation that sufficient carbonic acid would be absorbed to give the reaction with the lime water. This was not the case as no precipitate was produced. Upon warming the mixture, however, the precipitate appeared. Can anyone explain this?"

Mr. E. Davies, F.C.S., said that time, very probably, was an element operating in this reaction, and heat also had an effect in inducing the change, giving as instances the precipitation of strontium sulphate, calcium oxalate, and other reactions that similarly depend on the conditions mentioned.

No. 2. "In the report of the recent prosecutions at Salford of the sale of adulterated balsam copaiba it is stated that all the tests applied by the analyst were fallacious. As the published authorities recommend several of these processes, what is a reliable test for balsam copaiba?" A lengthy discussion took place on this question in which the President, Messrs. Abraham, Davies, Tanner, Dr. Brown, Dr. Symes and others took part.

Mr. Michael Conroy, F.C.S., said that most of the tests given in text books and works on materia medica, especially those known as the magnesium carbonate and ammonia tests are entirely misleading from the fact that copaiba naturally varies in composition, the amount of resin ranging from 20 to above 70 per cent. in samples from different sources. The magnesium carbonate test is that genuine copaiba dissolves one-fourth of its weight of carbonate of magnesia by heat and remains transparent. The resulting compound being copaivate of magnesium dissolved in the essential oil, but since the resin of copaiba consists almost entirely of copaivic acid it is evident that a sample of copaiba containing say 30 per cent. of resin will not dissolve as much magnesium as a sample containing 70 per cent., therefore this test only proves that the copaiba does or does not contain a large amount of acid resin and in no way proves the sample to be adulterated. The ammonia test for similar reasons cannot be applied indiscriminately to all samples of copaiba. The tests given in the British Pharmacopœia are almost useless, for a sample would pass as genuine which contained almost any amount of fixed oil. The heat test is evidently intended to distinguish between gurgun balsam and copaiba but a sample of the latter containing from 10 to 20 per ent. of gurgun balsam does not gelatinize. He agreed with Dr. Campbell Brown that it is absurd to attempt to prove the genuineness of copaiba by the application of empirical tests and that the only plan of operation should consist in looking for all possible adulterants. The adulterants known to be used are, fixed oils, crude turpentine, oil of turpentine and gurgun balsam. The presence of a fixed oil can readily be found by heating a drachm or so on a watch glass or in a small porcelain dish so as to drive off the whole of the volatile oil, when a brittle and pulverizable resin will remain if the sample be free from fixed oil. A sample containing 5 per cent. of oil leaves a soft "birdlimy" substance. Even with 1 per cent. a brittle but *not a pulverizable* resin is obtained. A good plan to adopt is to place a drop of the melted resin on a piece of well glazed writing paper, and allow to cool when, if the sample is perfectly free from fixed oils the spot of hard resin can be rubbed into a very fine powder with the finger.

During the evaporation of the volatile oil in conducting the above experiment, the presence of turpentine can be detected by the odour if the sample is adulterated with that article. The same applies to the oil of turps. As the odour of turpentine is so totally distinct from that of oil of copaiba, the presence of 1 per cent. can be detected. The presence of gurgun balsam may be detected by the almost entire *insolubility* of this substance in *alcohol*, whereas copaiba is almost entirely soluble. Absolute alcohol only is that which can be used for this test, and the appearance of a slight milkness may be disregarded as most samples of old balsam do not dissolve perfectly clear in alcohol. He was indebted to Mr. Siebold for the following which is also an excellent test for gurgon balsam, viz. :—Its slight solubility in rectified petroleum spirit, or what is commonly known as benzoline. As copaiba is almost completely soluble in this menstruum, the presence of a very small percentage of gurgun balsam is easily detected. In reply to Mr. Tanner, Mr. Conroy said most samples of copaiba are fluorescent, and that about 96 per cent. of the resin found in copaiba consists of copaivic acid. The other resin found in copaiba he considered was formed by the oxidation of the volatile oil, for he found that old samples contain more of this particular resin than new ones. He stated that it was through using *rectified* spirit instead of alcohol, that the Salford analyst reported the samples in question to be adulterated with what he supposed to be a foreign volatile oil.

Dr. J. Campbell Brown, D.Sc., F.C.S., etc., exhibited and explained the "Geisler's Vaporimeter," and demonstrated the practical application of the same in the estimation of dilute spirit by taking the vapour tension of the mixture, after which he exhibited Duboscq's New Polariscope, "Saccharimètre à Pénombres," upon which he read the following notes:

Duboscq's New Polariscope.—"Saccharimetre a Pénombres."

BY DR. J. CAMPBELL BROWN, D.SC., F.C.S., ETC.

The polariscope for saccharimetric and similar purposes is founded on the property which sugar and some other substances possess of turning the plane of polarization of a polarized ray of light passing through them, either to the right or left, through a certain angle, depending on the nature of the substance and its quantity.

The usefulness of the instrument depends on the degree of precision with which you can measure the angle of rotation of the plane of polarization.

The first polariscopes were the same in arrangement as those used attached to microscopes. The substance was placed between the polarizing and analysing prisms when they were so placed as to produce darkness without the object; and the rotation of the analysing Nicol's prism necessary to restore darkness was taken as the indication of the quantity or thickness of the substance when its specific rotatory power was known.

But it was extremely difficult to know when the point of maximum darkness was reached, even when monochromatic light was used, obtained by placing red copper glass behind the polarizer.

Those who are accustomed to use the instrument of Soleil will only require to be reminded of the means employed for rendering the observation more accurate.

(1) He fixed upon a certain purple tint, which is not only most remarkable, but which changes most rapidly, when the analyser is revolved, to red on one side and to violet on the other. This tint is called "sensitive tint" or "transition tint," and is produced by placing a plate of quartz, 3·75 mm. thick, between the polarizing prism and the analysing prism, set with their principal sections parallel.

The interposition of the sugar solution causes this tint to change and the rotation is measured by the number of degrees through which the prism must be turned to restore the transition tint.

2. Greater exactness still was obtained by using a double plate of quartz, 3·75 mm. thick, one half being composed of left-handed and the other of right handed quartz. This plate exhibits the transition tint on both halves when the polarizing and analysing prisms are placed with their principal sections parallel, but when the analyser is revolved or the sugar is introduced, the one semi-disk appears red and the other violet, so that on inserting the sugar solution the analyser must be rotated to restore the transition tint to both halves.

When the rotation is great an error arises from the different angles of rotation imparted to different coloured rays, and the consequent interference with the transition tint.

3. The third improvement, which is peculiarly Soleil's, obviates this difficulty. Instead of rotating the analyser, he adjusts and fixes it before inserting the sugar solution, and after inserting the sugar solution he restores the transition tint by introducing what he calls a compensator, that is two quartz prisms of small angle set perpendicularly to the axis, and which can move over one another in contrary directions so as to vary the thickness through which the modified light has to pass. They are moved by a toothed pinion to which the vernice and scale is attached: so that the rotation caused by the sugar is measured by the thickness of quartz required to compensate it.

This is a beautifully and ingeniously complicated instrument. First, the light passes through a polarizer consisting of an achromatized calc spar Nicol's prism then through a double plate of quartz 3·75 mm. thick, one half of which is dextro- and the other lævo-rotatory; then through the sugar tube; then through a quartz plate cut perpendicularly to its axis and the compensator of quartz prisms of contrary rotation to the plate and of maximum thickness equal to that of the plate; then through the analysing Nicol's prism, and finally through a telescope.

For coloured solutions another quartz plate and Nicol's prism are made to revolve so as to neutralize the colour of the solution.

The defects are—

(1) The interference which coloured liquids introduce.

(2) The fact that different substances affect the rotation of different rays in different ratios renders it useless for any other than one kind of substance.

(3) The fact that the eye cannot distinguish differences of colour so delicately as differences of depth of shadow, especially when the eye is tired; and colour-blind persons cannot use the instrument at all safely.

(4) The less degree of movement in the compensator as compared with the revolving analyser.

Duboscq's Saccharimètre à Pénombres is beautiful for its simplicity; it is a partial return to the original form:—

Description extempore—

(1) Monochromatic light.

(2) Double quartz plate of right and left-headed quartz retained.

(3) Compensator discarded, and the rotation measured by actual rotation of the analyser.

If the substance contains only cane sugar and no other substance which acts upon light, dissolve 16·35 or 16·2 grams in water and make up to 100 c.c.; place the solution in the 20 c.m. long tube.

Turbid or gummy solutions may be mixed with one tenth volume of isinglass solution, and then one and a half volume alcohol, and filtered; or add two or three c.m. of saturated solution of acetate of lead, and filter. If coloured decolorize by charcoal, rejecting first fourth.

If the substance contains any other sugar as well as cane sugar, the rotatory power is observed before and after the inversion.

(1) Observe before inversion in the usual manner, then take 50 c.c. of the same solution, add 5 c.c. of pure fuming hydrochloric acid, warm in a water-bath to 68° then remove and cool the solution, filter if necessary, and observe in a tube 22 c.m. long, lined with glass, and bearing a thermometer; the index must now be turned to the right instead of to the left as before inversion.

Since the rotatory power of the solution cooled to the original temperature (the observations being made in a tube one-tenth longer than the former), remains unaltered in so far as it was due to glucose or other substance, whereas the cane sugar has been replaced by inverted sugar $\left(\begin{matrix}\text{dextrose and} & \text{lævulose}\\ +56^\circ & -106^\circ\end{matrix}\right)$ the amount of cane sugar may be calculated from the rotatory power peculiar to invert sugar.

The rotatory power (a) observed first was made up of the molecular rotatory power (c) of the cane sugar (C) and that (g) of the grape sugar or other substance (G).

$$a = cC + gG.$$

The rotatory power observed after is made up of the unaltered rotatory power of the grape sugar and that of the inverted sugar.

$$a' = iC + gG.$$

hence

$$a - a' \text{ the difference} = cC - iG.$$

$$\text{or } C = \frac{a - a'}{c - i} \quad i\,c = \frac{a - a'}{73{\cdot}8 + 25}$$

because i is 25 at 15° C., but varies with the temperature, hence the tables of Clerget.

In general, when ordinary sugar solutions are to be estimated (a) is a + quantity, and (a') is a — quantity; so that the cane sugar is found by adding the two observations together and looking up the sum in Clerget's table under the column corresponding to the temperature of the second observation.

In default of tables:—

T = temperature.
S = the sum or difference of the two observations.
P = the rotatory power.
R = the quantity of sugar per litre of solution.

$$P = \frac{200\ S}{288 - T}$$

$$R = \frac{P \times 16{\cdot}2}{10} = P \times 1{\cdot}62$$

Diabetic Sugar.

Diabetic sugar : Cane sugar :: 73 : 100. Hence each 1° on scale must be multiplied by 2·243 to give parts per litre.

Various queries asked by members at the conclusion as to the instruments were answered by the Lecturer. And on the motion of Mr. J. T. Armstrong, F.C.S., seconded by Mr. E. Davies, F.C.S., a cordial vote of thanks to Dr. Brown for his very interesting and instructive lecture was carried by acclamation.

PLYMOUTH, DEVONPORT, AND STONEHOUSE CHEMISTS' ASSOCIATION.

A general meeting of the members of the above Association was held at the Exmouth Hall, Stonehouse, on Wednesday evening, April 4th, the President, Mr. F. Codd, in the chair, for the purpose of considering the position of the trade with reference to the recent prosecutions, and to appoint a local committee to make arrangements for receiving the Pharmaceutical Conference.

The minutes of the previous meeting having been read and approved, the following resolutions were unanimously passed:

Moved by Mr. A. P. Balkwill, seconded by Mr. J. Allen, and resolved—That this meeting is of opinion that any prosecution of chemists and druggists for ordinary counter prescribing is contraryto the spirit and intention of the Apothecaries' Act, and the enforcement of such restrictions would be an unjust interference with the rights of the public, and the privileges of the trade.

Moved by Mr. H. T. Netten, seconded by Mr. S. B. Turney, and resolved—That this meeting desires to express its approval of the action now being taken by the Chemists and Druggists' Defence Association, and earnestly recommends all members of the trade to join the Association at once, and thus assist in strengthening its efforts to protect the interests of the trade.

Moved by Mr. G. Breeze, seconded by Mr. J. Allen, and resolved—That the secretary be instructed to forward copies of these resolutions to the Birmingham Trade Defence Association, the Council of the Pharmaceutical Society, and to each of the trade journals.

Moved by Mr. J. Allen, seconded by Mr. H. T. Netten, and resolved—That as the coming annual meeting of the Pharmaceutical Conference will be held in Plymouth, it is desirable that every effort be made to receive its members in a cordial and enthusiastic manner, and that this meeting pledges itself to render every assistance to that end.

Moved by Mr. S. B. Turney, seconded by Mr. J. Dampney, and resolved—That with a view to carry out the foregoing resolution, a local committee of the following gentleman be formed with power to add to their number, viz.:—Allen, Plymouth; Balkwill, Plymouth; Breeze, Devonport; Burdwood, Plymouth; Clark, Plymouth; Codd, Devonport; Coker, Plymouth; Elliott, Plymouth; Geldard, St. Austell; Guyer, Torquay; Hearder, Torquay; Hearder, Plymouth; Hemmings, Penzance; Netten, Stonehouse; Percy, Truro; Riches, Torquay; Rowe, Devonport; Rowe, Redruth; Smith, Torquay; Snell, Stonehouse; Turney, Plymouth; Woods, Plymouth.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this society was held on April 5th, Professor Odling, F.R.S., in the chair. After the announcement of visitors, the minutes of the previous, the anniversary, and the extraordinary general meetings were read and confirmed. The names of the following candidates for election to the fellowship of the society were read for the first time:—H. R. Hind, A. Watt, G. A. Milne and Dr. A. E. M. Franchimont. A lecture

On the Discrimination of Crystals by their Optical Characters.

BY PROFESSOR N. S. MASKELYNE, F.R.S.,

was then delivered:—

The methods of investigation, the description of which is the purpose of the discourse, are in their more practical aspect *qualitative* methods. The practical application of them being that of determining the kind of symmetry which a crystal obeys, *i.e.*, the system to which it belongs. An attempt is being made, by the introduction of *quantitative* measurements into these methods, to get some insight into the nature of molecular structure. Thus far the physical and morphological properties of crystals have not been brought into very distinct correlation and if, as is probable, the *intro*-molecular co-ordination of atoms and of groups of atoms within the unit molecule of the crystal may have to be invoked to unravel what a purely symmetrical *inter*-molecular distribution of the centres of mass of the unit molecules themselves may not be competent to explain, the result cannot fail to be of interest to the chemist, to whom the function discharged by special atom-groups in his compound molecules is becoming every day a more important question.

Reverting, however, to the practical side of the methods to be discussed, it will be seen that by a judicious use of the aid which, polarized light affords, the chemist, who is continually forming crystals of new and remarkable substances, will be enabled to obtain rapidly valuable information about these crystals without having previously to become an adept in crystallography. The different systems of crystallography are distinguished by the character of their symmetries. For the purposes of optical comparison, as a cubical crystal acts on light as an isotropic body we may omit the *cubical* system. The *tetragonal* and *hexagonal* systems may be grouped together. The *prismatic* or orthorhombic, the *oblique* or clinorhombic and the *anorthic* systems will be treated of separately. The *orthorhombic* system, which may be termed the orthosymmetrical system, has three perpendicular planes of symmetry which are not congruent, *i.e.*, with respect to which the morphological and physical characters are dissimilarly distributed. The perpendicular axes in which these three planes intersect are the morphological axes of the crystal and are coincident in direction with the three principal axes of the ellipsoids which represent optical, thermic or magnetic properties. The *oblique* or monosymmetric system has a single plane of symmetry, its normal is one of the axes of the different ellipsoids which represent physical characters and it is also that crystallographic axis which is perpendicular to the other two. The *anorthic* or centrosymmetrical system presents the smallest amount of symmetry possible, viz., that to a centre; the repetition of any morphological element is therefore simply that of the feature presenting itself on opposite sides of the crystal.

The influence of the crystalline arrangement of the ponderable matter upon the luminiferous ether results in the elasticity of this medium varying in different directions or in its degree of condensation being different, or in both; and it also results that the directions of elastic strain and stress only act upon the same line when that line is parallel to one of the three perpendicular directions which are called the axes of optical elasticity. While in ordinary media the direction of a ray is normal to the tangent to the front of the wave to which the ray belongs, in the general case within the crystal the ray is oblique to the wave normal. The cases in which it is not so being those of the axes of elasticity and certain other exceptional directions of the optic axes. As the result of the peculiar distribution of optical strains in a crystal, an ideal wave of light would, in the general case move forward with two velocities and would present two wave-fronts, one lagging behind the other. If we consider the path of a ray belonging to any point of one of these wave-fronts, it will be seen, that it must have bifurcated, one branch of it meeting the other wave surface; but the normals to the wave surface at the two corresponding points are connected by the fact of their being parallel to each other. The swings of the vibrations at these two points are perpendicular to each other and to the wave normal. Wire models were exhibited in which the intersections of this wave surface with the principal sections (*i.e.*, with the intersecting planes perpendicular to each axis) were seen to compose in two cases a kind of ring, formed by a concentric circle and ellipse in the third case, the figure produced was that formed by the intersection of a circle and an ellipse, the principal axes of the ellipse being in the ratios of the greatest and of the least, while the radius of the circle represented the intermediate parameter of the three velocities along the several axes. A tangent drawn to the circle and ellipse near their point of intersection meets in the case of the circle a ray, which is coincident with the wave-normal, and the lip or margin of a conoidal depression in this part of the wave surface is circular in form and touched by the same tangent plane, which contains the tangent to the circle and ellipse. To every point of this circle there belongs a portion of a ray and if a section be cut in a crystal parallel to this tangent plane, these rays will emerge with a common wave front, the normal of which will now be coincident with the rays as they emerge into an isotropic medium, while the oscillations are performed in the case of each ray in a plane passing through the wave normal and the centre of the margin-circle. The light thus emerging has therefore lost its polarized character, and the direction of the wave normal is a primary optic axis of the crystal. The radius of the circle at the point of intersection with the ellipse where the two figures have a ray in common, is a secondary optic axis. From the symmetry of the figures there are two primary axes, differing in the angles which they enclose, according to the ratios of the three constants representing the velocities along the three axes. These three axes will now be called the two mean lines and the normal; the *first mean line* bisects the acute angle between the optic axes; the *second mean line* bisects the obtuse angle; the *normal line* is that axis which is perpendicular to the other two. The orientation of the mean lines, *i.e.*, their relative situations in parallellism to one or another crystallographic axis, is the first problem in the study of the optical characters in a crystal. Next, we have to determine the angle between the optic axes, and here the dispersion, *i.e.*, the difference of angle for different colours has to be taken into account. In connection with the first of these problems we have to contemplate the cases in which the angle between the optic axes becomes *nil*—the axes themselves coinciding with the first mean line. Let, for instance, $a=b$ (where a, b, c, are the three velocities represented in the order of magnitude). In this case, then, the ellipse has b and c for the ratios of its principal axes, the radius of the circle being represented by b; the wave surface then becomes defined by a sphere, and a prolate spheroid touching the sphere internally, the common axis of the two figures being on the axis of least velocity. This then would be a uniaxal crystal, positive in optical character, the ordinary ray being the quicker and represented by the (external) sphere. Where $c=b$ the crystal is negative; the common axis is that representing the greatest wave velocity; the ellipse is external to the sphere and the ordinary becomes the slower wave. So, too, a biaxal crystal will be conventionally termed positive or negative, according as its first mean line coincides with the axis of least or greatest elasticity.

Returning to the subject of dispersion it was shown that this character presented itself under two conditions, one in which the directions of the axes of wave velocity were the same for all colours, the other in which the directions of those axes were not coincident. Without entering upon an explanation of the beautiful isochromatic curves and the black cross or black hyperbolas intersecting the optic "eyes" of a crystal when examined in a polarizing apparatus, it was shown that whereas in the case of the plane containing the optic axes lying in or being perpendicular to the plane of polarization, the figure for any one colour, say red, would be black at the point if emergence of an optic axis but red around it, and then rings alternately *black* and *red*; in the case of the plane being at an angle of 45°, the axial point would be red surrounded by a black ring, and then rings alternately *red* and *black*. The result of this last case is that if the blue "eyes" were external to the red, the "eye" which is black, as far as the red is concerned, would be illuminated by the first blue ray, etc. Whence the character of the dispersion may be predicated as being in the inverse order of the colours which fringe the hyperbolas on their inner and outer edges as they traverse the "eye" of the section.

As to the kind of symmetry which crystals may present, it will be obvious that in the orthorhombic system, dispersion of the optic axes is alone possible, the mean lines necessarily coinciding in direction with the crystallographic axes. Thus sections of crystals of cerussite arragonite, and barytes were exhibited on the screen by means of the electric light and polarizing apparatus, the first illustrating the case where the red rays are more dispersed than the blue, whilst in the second and third the blue rays are more dispersed than the red. Sections of brokite and ammonio-magnesic-chromate were shown to illustrate the case of crystals in which the first mean line for red coincided with one axis, that for blue with an axis perpendicular to it. In the oblique system with its single plane and single axis of symmetry, the conditions for dispersion are more widely varied; in this system besides the dispersion of the optic axes we have three kinds of dispersive distribution of one or other of the mean lines. 1. The first mean line may coincide with the axis of symmetry, the second mean line and normal line lying in the plane of symmetry, in which they may be distributed. This is the *crossed dispersion* of Des Cloizeaux; it was illustrated by a section of a crystal of borax; the isochromatic figures in this case are centro-symmetrical. This may be termed *centro-symmetrical dispersion.* 2. The second mean line coincides with the axis of symmetry; the first mean line being distributed in the plane of symmetry. In this case, the figures presented are symmetrical to a line perpendicular to the line that would join the optic axis for any particular colour. It is the *horizontal dispersion* of Des Cloizeaux. It was illustrated by Adularia. It might perhaps be more correctly called *perpendicular dispersion.* 3. The first and second mean lines are distributed in the plane of symmetry; the figures are in this case symmetrical to the line passing through the centres of all the "eyes," which is the trace of the plane of symmetry, this is the *inclined dispersion* of Des Cloizeaux, and might be called *euthy-symmetrical dispersion.* This variety was illustrated by a section of gypsum, and the effect of heat in changing the character of the dispersion into a dispersion of the horizontal kind was most beautifully shown, the optic axis closing in upon the centre of the figure, but unsymmetrically, by reason of the axial dispersion, and then opened out again along a line perpendicular to their former direction. In the anorthic system where there is no coincidence of the mean lines with any crystallographic axis, either of the kinds of dispersion last described may concur together with axial dispersion.

The Lecturer then proceeded to discuss the mode of determining the symmetry or system of a crystal by finding the directions in it or in sections cut from it in, and perpendicular to, which light vibrations will be performed, *i. e.*, the determination of the directions of maximum darkness, when the crystal or the section is turned round between crossed Nicols. The first thing to know is the plane of polarization of the entering light, which we will suppose to be indicated by a vertical spider-line in the eye-piece of a microscope, a minute crystal or crystals may now be placed on the stage of the microscope, and the stage revolved until the light ceases to pass through one or other of the crystals. With the aid of a rotating spider-line and a graduated circle, the direction of any of the edges of the crystal may now be determined in respect to the vertical spider-line, *i. e.*, in respect to the directions of the principal sections of the particular section of the crystal. By comparing the results obtained in this way from the various crystals with the kinds of symmetry which prevail in different systems it is often possible to determine the system to which the crystals belong. Where we are dealing with crystals in which the optical characters have been determined, it is generally possible to identify the substance, provided its crystallography and optical characters have been well studied. A beautiful application of this principle, in the latter form, is that by which Des Cloizeaux discriminated between the felspars, by determining the angle in which the trace of the plane of the optic axes intersects with the edge formed by the planes of cleavage. Sections of the felspars were exhibited on the screen, including some of microline, the felspar in which Des Cloizeaux has recently recognized a potash isomorph of albite, so that the potassium felspar is now known to be dimorphous. The method of determining the exact position of maximum darkness in a section or a crystal has recently been greatly enhanced in delicacy by M. Emile Bertrand, by means of a quadrant biquartz plate, with the aid of which the slightest deviation to right or left of the crystal from its true position imparts tint to the little plate which is placed in the focus of the eye-piece. This instrument was exhibited on the lecture table.

Professor Odling, in proposing a vote of thanks (which was carried by acclamation), said that the Fellows must feel greatly obliged to Professor Maskelyne for his endeavours to reassociate chemistry and crystallography, and all must have appreciated the lucid and earnest lecture, as well as the novel and beautiful illustrations.

In his reply to the unanimous vote of thanks, Professor Maskelyne mentioned that a Crystallological Society had been formed to carry out some of the objects which he had mentioned in his lecture; it consisted of chemists to make suitable groups of crystals and of crystallographers to examine the crystals when made.

The society then adjourned to Thursday, April 19th, when the following papers will be read:—

"On the Estimation of Manganese in Spiegeleisen and of Manganese and Iron in Manganiferous Iron Ores," by E. Riley.

"On Certain Bismuth Compounds, Part V.," and "On a Method for detecting small quantities of Bismuth," by M. M. Pattison Muir.

SOCIETY OF ARTS.

Certain Relations between Plants and Insects.*

BY SIR JOHN LUBBOCK.

(*Concluded from page* 825.)

The genus *Sitaris* (a small beetle allied to *Cantharis*, the blister-fly, and to the oil-beetle) is parasitic to a kind of bee (*Anthophora*), which excavates subterranean galleries, each leading to a cell. The eggs of the sitaris, which are deposited at the entrance of the galleries, are hatched at the end of September or beginning of October, and M. Fabre not unaturally expected that the young larvæ, which are active little creatures with six serviceable legs, would at once eat their way into the cells of the anthophora. No such thing: till the month of April following they remain without leaving their birthplace, and consequently without food; nor do they in this long time change either in form or size. M. Fabre ascertained this, not only by examining the burrow of the anthophoras, but also by direct observations of some young larvæ kept in captivity. In April, however, his captives at last awoke from their long lethargy, and hurried anxiously about their prisons. Naturally inferring that they were in search of food, M. Fabre supposed that this would consist either of the larvæ or pupæ of the anthophora, or of the honey with which it stores its cell. All three were tried without success. The first two were neglected, and the larvæ, when placed on the latter, either hurried away or perished in the attempt, being evidently unable to deal with the sticky substance. M. Fabre was in despair: "Jamais expérience," he says, "n'a éprouvé pareille déconfiture. Larves, nymphes, cellulles, miel, je vous ai tous offert; que voulez-vous, donc, bestioles maudites!" The first ray of light came to him from our countryman, Newport, who ascertained that a small parasite found by Leon Dufour on one of the wild bees, was, in fact, the larva of the oil beetle. The larvæ of sitaris much resembled Dufour's larvæ. Acting on this hint, M. Fabre examined many specimens of anthophora, and found on them at last the larvæ of his sitaris. The males of anthophora emerge from the pupæ sooner than the females, and M. Fabre ascertained that, as they come out of their galleries, the little sitaris larvæ fasten upon them. Not,

* From the *Journal of the Society of Arts*, February 23, 1877.

however, for long: instinct teaches them that they are not yet in the straight paths of development; and, watching their opportunity, they pass from the male to the female bee. Guided hy these indications, M. Fabre examined several cells of the anthophora; in some, the egg of the anthophora floated by itself on the surface of the honey, in others, on the eggs as on a raft, sat the still more minute larva of the sitaris. The mystery was solved. At the moment when the egg is laid, the sitaris larva springs upon it. Even while the poor mother is carefully fastening up her cell, her mortal enemy is beginning to devour her offspring; for the egg of the anthophora serves not only as a raft, but as a repast. The honey which is enough for either, would be too little for both; and the sitaris, therefore, at its first meal, relieves itself from its only rival. After eight days the egg is consumed, and on the empty shell the sitaris undergoes its first transformation, and makes its appearance in a very different form.

The honey, which was fatal before, is now necessary; the activity, which before was necessary, is now useless; consequently, with the change of skin, the active, slim larva changes into a white, fleshy grub, so organized as to float on the surface of the honey, with the mouth beneath and the spiracles above the surface: "grâce à l'ebonpoint du ventre," says M. Fabre, "la larve est à l'abre de l'asphyxie." In this state it remains until the honey is consumed; then the animal contracts, and detaches itself from its skin, within which the further transformations take place. In the next stage, which M. Fabre calls the pseudo-chrysalis, the larva has a solid corneous envelope and an oval shape, and in its colour, consistency, and immobility reminds one of a *Dipterous pupa*. The time passed in this condition varies much. When it has elapsed, the animal moulds again, again changes its form; after this it becomes a pupa, without any remarkable peculiarities. Finally, after these wonderful changes and adventures, in the month of August the perfect sitaris makes its appearance.

In fact, whenever in any group we find differences in form, or colour, we shall always find them associated with differences in habit.

To return, however, to my principal subject, the sphinx caterpillars. For such an inquiry as this, the larvæ of Lepidoptera are particularly suitable, because they live an exposed life; the different species even of the same genus often feed on different plants, and are therefore exposed to different conditions; and last, not least, because we know more about the larvæ of the Lepidoptera than of any other insects. The larvæ of ants all live in the wet; they are fed by the perfect ants, and being therefore all subject to very similar conditions are all very much alike. It would puzzle even a good naturalist to determine the species of an ant larva, while, as we all know, the caterpillars of butterflies and moths are as easy to distinguish as the butterflies and moths; they differ from one another as much as, sometimes more, than the perfect insect.

There are five principal types of colouring among caterpillars. Those which live inside wood, or leaves, or underground, are generally of a uniform pale hue; the small leaf-eating caterpillars are green, like the leaves on which they feed. The other three types may, *si parva licet componere magnis*, be compared with the three types of colouring among cats. There are the ground cats, such as the lion or puma, which are brownish or sand colour, like the open places they frequent. So also caterpillars which conceal themselves by day at the roots of their food-plant tend, as we have seen, even if originally green, to assume the colour of earth. The spotted or eyed cats, such as the leopard, live among trees; and their peculiar colouring renders them less conspicuous by mimicking spots of light which penetrate through foliage. Lastly, there are the jungle cats, of which the tiger is the typical species, and which have stripes, rendering them very difficult to see among the brown grass which they frequent. It may, perhaps, be said that this comparison fails, because the stripes of tigers are perpendicular, while those of caterpillars are either longitudinal or oblique. This, however, so far from constituting a real difference, confirms the explanation, because in each case the direction of the lines follows those of the foliage. The tiger that walks horizontally on the ground, has transverse bars; the caterpillar, which clings to the grass in a vertical position, has longitudinal lines, while those which live on large veined leaves have oblique lines like the oblique ribs of the leaves.

Thus then, I think, we see reasons for many at any rate of the variations of colour and markings in caterpillars which at first sight seem so fantastic and inexplicable. I should, however, produce an impression very different from that which I wish to convey, were I to lead you to suppose that all these varieties have been explained or are understood. Far from it, they still offer a large field for study; nevertheless I venture to think the evidence brought before you to-day, however imperfectly, is at least sufficient to justify the conclusion that there is not a hair, or a line, not a spot or a colour, for which there is not a reason, which has not a purpose and a function in the economy of Nature.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of the above Association was held at 17, Bloomsbury Square, W.C., on Thursday evening, March 22, 1877, when a paper was read by Mr. A. P. Luff, F.C.S., "On the Common Metals, and their Chief Uses," of which the following is a short abstract:

The substances to which the term metal is applied all belong to the class of bodies known as elements. All elements, however, are not metals, but they consist of two classes—metals and non-metals. Of the sixty-six elements fifty-two are metals; of these fifty-two metals only about twenty-four have received any practical applications. Generally when a metal unites with a non-metal, the product does not possess any metallic characters; to this there are some noteworthy exceptions. Steel consists of iron united with about one per cent. of the non-metal carbon; phosphor bronze consists of brass united with a small percentage of the non-metal phosphorus, yet they both possess metallic characters to a high degree. The metals which are found in nature in the free state are bismuth, copper, gold, iron, mercury, platinum, and silver: three of these, viz., gold, platinum, and silver are "noble metals," that is, they possess only a feeble affinity for oxygen. Whenever a metal displaces another metal from one of its compounds, evolution of heat takes place. For instance, copper will displace mercury from a solution of mercuric chloride, because the copper in uniting with the chlorine evolves more heat than mercury does in uniting with chlorine. One property possessed by metals when in a compact state is that of lustre, or the power of reflecting light. Metals, however, in a fine state of division do not possess lustre; for instance, platinum black, which consists of finely divided platinum, is quite black. Another example is found in Faraday's ruby gold, where very fine particles of gold suspended in water communicate to the liquid a ruby colour. Most metals are white, but copper possesses a reddish colour, and gold a yellow colour. Metals are generally opaque, but gold when beaten into leaf the $\frac{1}{200000}$th of an inch in thickness, transmits light, and this transmitted light is of a green colour. Metals vary very much in their density. Of the common metals, aluminum is a very light one, and on account of this property it is frequently used in the construction of the tubes of telescopes. Perhaps the most valuable quality possessed by any metal is that which steel possesses of acquiring and retaining magnetism, for by this means the magnet, so invaluable to man, can be constructed.

Experiments were shown, and reference was made, to the squirting of metals into wires and pipes, the conduction of heat and electricity by metals, the Davy lamp, the sonority of metals, the founding of metals, the formation of alloys and the separation of their constituents, fluid-pressed steel, annealing, hardening, tempering, electro-gilding, electro-silvering, use of metals in coinage, pewter, britannia-metal, and tin-lined lead tubes.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE MOLECULE AND THE ATOM.*

BY PROFESSOR G. F. BARKER.

(*Continued from p.* 805.)

The fourth and last method is one based by Thomson,† and subsequently by Maxwell,‡ on the phenomena of gaseous diffusion. It is well known that if one gas be placed in presence of another, the lighter being uppermost, after a time, longer or shorter according to the density of the individual gases mixed together, they will be found thoroughly intermingled. Loschmidt, in 1865,§ from his experiments, and subsequently Clausius,‖ on theoretical grounds based on the theory of molecular motion in gases, which we shall presently refer to, has proved that "the average length of the free path of a particle from collision to collision bears to the diameter of each molecule the ratio of the whole space in which the molecules move, to eight times the sum of the volumes of the molecules." Hence the number of molecules in the unit of volume is equal to the square of this ratio, divided by the volume of a sphere whose radius is equal to the average length of free path. If we assume with Maxwell, that in a liquid the volume of any substance is nearly that occupied by the molecules themselves in contact, we see that, since experiment renders doubtful the condensation of any known gas to one forty-thousandth of its volume without reducing it to a liquid, the ratio of the volume of a gas to the combined volume of all the molecules contained in it is as 40,000 to 8 or as 5000 to 1. But this, by the statement of Clausius above given, is the ratio which the length of the free path of a molecule of gas bears to the diameter of this molecule. If then we accept one ten-thousandth of a millimeter as the length of a free path, which is the value given by Joule and Maxwell, it follows that as this length is five thousand times that of the diameter of the molecule, the diameter of the molecule must be one fifty-millionth of a millimeter.¶

Moreover, the number of molecules in a cubic centimeter of any gas, being the quotient of the square of the above ratio $(5000)^2=25,000,000$, divided by the volume of a sphere whose radius is one hundred-thousandth of a centimeter, cannot be greater than six thousand million million million (6×10^{21}). In the case of liquids and solids, which vary in density from five hundred to sixteen thousand times that of atmospheric air, the number of molecules in a cubic centimeter may vary from three million million million million to a hundred million million million million (3×10^{24} to 10^{26}). And the distances from centre to centre of these molecules, assuming that they are arranged in the form of a cube, would be from one fourteenth-million to one forty-six-millionth of a millimeter.

From the rather remarkable coincidence of the results which have just been obtained from independent and widely different data, it may be concluded with a high degree of probability that in ordinary liquids or solids the diameter of the molecule is less than the ten-millionth and greater than the two hundred-millionth of a millimeter.

The next point of interest concerning the molecule is its weight. The relative weight of molecules is readily determined, and is frequently used in the fixing of rational formulæ. From the deduction from Avogadro's law already given, that equal volumes of all gases contain the same number of molecules, it necessarily follows that the weight ratios of equal volumes of all gases must be also the weight ratios of their molecules, which is Gay Lussac's law.* Because, for example, a liter of hydrogen weighs ·0896 gram and one of oxygen weighs 1·4298 gram—the weight ratios here being 1 : 16—it follows that the molecule of oxygen must be sixteen times as heavy as the molecule of hydrogen. If the hydrogen molecule be assumed as a standard, the molecular weight of any gas will be represented by its weight-ratio. Since, for reasons presently to be given, the molecular weight of hydrogen is called two, the molecular weight of any other substance in the state of gas will be twice the weight-ratio; *i.e.*, twice the density. As the molecule does not lose or gain matter when the physical state is changed, the molecular weight of a body in the liquid or solid state is the same as in the gaseous. As to the absolute weight of a molecule, it may be readily obtained, of course, by dividing the weight of a cubic centimeter of the substance in the gaseous state by the number of molecules contained in that volume of hydrogen, as already given. This has been done for several gases by Professor Maxwell.†

There is one circumstance connected with the question of molecular weight which deserves some attention. I refer to physical isomerism. Several years ago, in his excellent researches on radiant heat, Tyndall observed discrepancies between the absorptive power of gases for heat as obtained by experiment, and that which would have been predicted on the theory of molecular structure thus far assumed.‡ If it be true, as the modern theory supposes, that radiation is but the communication of molecular vibrations to the ether, and absorption, which is its precise correlate, only the reception of motion from it, then it is obvious that radiating and absorbing power should be increased by molecular complication. And this in general is what Tyndall's experiments showed to be true, olefiant gas being a better absorber than marsh gas, marsh gas than carbon dioxide, and carbon dioxide than nitrogen or any simple gas. But there are exceptions to the rule; thus, the absorption of hydrogen being unity, that of chlorine is 60, that of bromine is 160, and that of hydrobromic acid is 1005, although the molecular structure of all these bodies is commonly regarded as similar. A consistent application of the theory of molecular complication would require us to suppose aggregations of simple molecules which exist and act as the absorbing and radiating particles. This opens the question at once: Is the chemical molecule, which is defined as the least collection of atoms which can exist in the free state, identical with the physical molecule? Or are there varieties of the latter made up of several of them united into one? The assumption that there are such varieties is the basis of the theory of physical isomerism. It has been invoked to account for the different rotatory action on polarized light of chemically identical forms

* Address before the Chemical Section. From the *American Chemist*, November, 1876.

† *Nature*, i., 552, 1870.

‡ *Phil. Mag.*, iv., xlvi., 453, 1873.

§ *Ber. Ak. Wien*, ii., iii., 395-413; lxi., 367-380, 395, 1870; *Zeitschr. f. Math.*, 1865, 511-512.

‖ *Pogg. Ann.*, No. 10, 1858; *Phil. Mag.*, iv., xvii., 81, 1859; see also *Stoney*, *Phil. Mag.*, iv., xxxvi., 132-141, 1868.

¶ Loschmidt (*loc. cit.*) gives one-millionth of a millimeter as the diameter of an air molecule. Maxwell (*loc. cit.*) gives one two-millionth of a millimeter as the diameter of a hydrogen molecule.

* 'Memoires d'Arcueil,' ii., 207, 1809; *Nouv. Bull. de la Soc. Philom.*, l., 298; *Gilb. Ann.*, xxxvi., 6.

† *Phil. Mag.*, iv., xlvi., 468, 1873.

‡ 'Contributions to Molecular Physics,' 69-144, 1873.

of amyl alcohol and other bodies.* But the most remarkable instance of it, and one which, it must be admitted, goes far to establish the hypothesis, is the recent discovery by Laubenheimer† of four forms of nitrometa-chlornitrobenzene, three of which are solid and one liquid. All these forms are chemically identical, and indeed are capable of conversion by very simple means the one into the other. But physically they are entirely distinct. Of the solid forms, two crystallize in the monoclinic system, though with different axis ratios and different angles of inclination; the other crystallizes in the orthorhombic system. The α form fuses at 36°·3, the β form at 37°·1, and the γ form at 38°·6. The discoverer explains these phenomena very properly upon the hypothesis of Naumann,‡ that the crystal molecule of the more stable modification is formed from a greater, the less stable from a smaller number of chemical molecules.

A final question remains to be asked concerning molecules: Are they at rest, or have they relative motions among themselves? Just at the close of the last century, Rumford§ proved most conclusively that work could be converted into heat. And as the conversion seemed perpetual, he argued most acutely that heat was not matter, but motion. It is entirely unnecessary for us to stop here to give the proofs of the dynamic theory of heat. The magnificence of the science of thermo-dynamics which rests upon it is the best evidence of its truth. But there is one phenomenon worth considering for a moment, because it furnishes direct proof of this motion. This is the phenomenon of diffusion. The interpenetration of one gas by another, even through a porous partition, is due, according to the kinetic theory of gases of Clausius,‖ to the actual passage of molecules from one into the other in virtue of their actual velocities. In gases all molecules move in straight lines, and hence impinge against each other, and against the walls of the containing vessel. The pressure, then, which a given volume of gas exerts upon a given surface is a function both of the number and of the velocity of the molecules. If we increase the number of molecules in a given volume, *i.e.*, the density, we increase the pressure proportionately. This is the law of Boyle.¶ If we increase the velocity of the molecules, *i.e.*, the temperature, we cause expansion, since the number of impacts is increased. Moreover, since all gases have the same number of molecules in equal volumes, they all expand equally for an equal increase of temperature. This is the law of Charles.** In liquids as well as in gases, we have the phenomenon of diffusion due to the same cause. But since the molecular motion is very much restricted, the diffusion takes place with corresponding slowness.

Granted now the motion, what are its quantitative relations? How fast do molecules move? The first answer to this question was given by Joule,†† who sought to ascertain, by calculation, what the molecular velocity must be in hydrogen to produce in a given volume the pressure observed. The result showed that in this gas, at the ordinary temperature and pressure, the velocity of mean square of the hydrogen molecules was 6097 feet per second, or about seventy miles a minute. As they move in straight lines, and as the length of the free path between two successive encounters is only from one twelve-thousandth to one twenty-thousandth of a millimeter, it may easily be calculated that the number of collisions made by each hydrogen molecule in a single second is seventeen thousand seven hundred million. Maxwell has calculated these values for oxygen, carbonic oxide, and carbonic dioxide.* Calling the velocity of hydrogen 1859 meters per second, that of oxygen is 465 meters, that of carbonic oxide 497, and that of carbonic dioxide 396. The number of collisions made by each molecule per second is, for oxygen 7646, for carbonic oxide 9489, and for carbonic dioxide 9720 millions. In air, the number of collisions made by each molecule is only one half of that above given for hydrogen, and the average molecular velocity one fourth as great as for the latter gas.

Having now discussed pretty fully the molecule, we come to ask of it as we did before of the mass—Is it divisible? In the case of the salt, to use our previous illustration, we observed that so soon as the molecule was reached, further subdivision produced particles of matter entirely unlike salt, called chlorine and sodium. The evidence that these particles are really smaller than molecules, is found in Hofmann's argument for the composition of hydrochloric acid.† Suppose a certain volume of hydrogen to contain 1000 molecules, then the same volume of chlorine will contain 1000 molecules also. If now these two volumes be mixed and then caused to combine, there will result two volumes of hydrochloric acid gas containing 2000 molecules. If now the new gas be analysed, each molecule of it will be found to contain both hydrogen and chlorine. The particles of chlorine and the particles of hydrogen must therefore be less than the molecules of which they are parts. As each molecule of the compound gas contains one atom of chlorine and one of hydrogen, the 2000 molecules must contain 2000 of each. But the 2000 atoms of hydrogen came from the 1000 molecules, and the same is true of the chlorine; hence, a molecule of hydrogen is composed of two atoms. An atom, then, is the smallest portion of matter which can be reached by nature's processes of subdivision. It is generally defined as the smallest particle of simple matter which can enter into the composition of a molecule.

Let us pause here a moment to say that no metaphysical conception at all attaches to the modern idea of atom. With the question whether it can be divided, chemistry does not concern itself. The word atom came into use to express a universally conceded fact expressed in the law of definite proportions, namely, that a certain definite quantity of matter by weight combines with a similar definite quantity of some other matter. The smallest quantity of any substance which is found ever to enter into combination is called an atom. No real objection, it would seem, can lie against the idea of atom when defined in this way. If we concede that the molecule has as real an existence as a mass, I see no reason for not conceding the same to the atom.

The first point of chemical interest about an atom is its weight. The relative weight of an atom referred to that of hydrogen as the unit is called its atomic weight, and is one of the most important of chemical constants. To ascertain the atomic weight of an element, two distinct processes are required: First, the ratio in which it combines with some other substance whose atomic weight is known, is necessary; and second, the molecular weight of the compound analysed must be obtained. Thus, given marsh gas to fix the atomic weight of carbon: Analysis shows that in 100 parts of marsh gas, there are 75 parts of carbon, and 25 of hydrogen, which is in the ratio of 3·1. Three parts of carbon then unite with one of hydrogen. By the balance, one liter of marsh gas

* Pedler, J., Chemical Society, ii., vi., 74; Watt's Dictionary, 1st Supplement, 106-107.

† *Ber. Berl. Chem. Ges.*, ix., 760, 1876; *Am. J. Sci.*, iii., xii., 214.

‡ 'Ueber Molekulverbindungen nach festen Verhältnissen,' 1872, 63; 'Gmelin-Kraut's Handbuch der Chemie,' 6, Aufl., i., i., 293.

§ 'Philosophical Transactions,' 1798.

‖ Krönig, *Pogg. Ann.*, xcix.. 315; Clausius, *Pogg. Ann.*, c., 353, 1857; *Phil. Mag.*, iv., xiv., 108; Maxwell, *Phil. Mag.*, iv, xix., 19, xx., 21, 1860.

¶ 'New Experiments, Physico-mechanical, etc.' Second edition. Oxford, 1662.

** *Ann. Chim. Phys.*, xliii., 157.

†† Mem. Lit. and Phil. Soc., Manchester, Nov., 1851; *Phil. Mag.*, iv., xiv., 211, 1857.

* *Phil. Mag.*, iv., xlvi., 468, 1873.

† 'Einleitung in die moderne Chemie.' Fifth ed., 238.

weighs 0·716 gram, or eight times as much as a liter of hydrogen. Hence, its molecule must be eight times as heavy; and as the hydrogen molecule weighs two, the molecular weight of marsh gas is sixteen. Now, of these sixteen parts, we have shown above that three fourths is carbon and one fourth hydrogen. One molecule of marsh gas contains, therefore, twelve parts of carbon, and four parts of hydrogen. On comparing this quantity of carbon with that contained in other single molecules into which carbon enters, it is found to be the smallest. By our definition therefore, twelve, being the smallest quantity by weight in which carbon enters into the formation of a molecule, is its atomic weight.

The absolute weight of an atom is a datum of no practical value at present in chemistry. Yet as a matter of curiosity as showing the minuteness of the quantities with which we are dealing, it may be worth while to calculate it from the data already given concerning molecules. If we take Thomson's estimate, a cubic centimeter of hydrogen cannot contain more than six thousand million million million molecules. As now this cubic centimeter weighs ·0896 milligram, it is obvious that the weight of one molecule of hydrogen is ·0896 divided by $(6 \times 10_{21})$ milligrams. This is equal to $·015 \times 10_{21} = ·000,000,000,000,000,000,000,015$. As a hydrogen atom weighs one half as much as its molecule, we infer that its weight cannot be less than ·000,000,000,000,-000,000,000,0075 milligram, being seventy-five ten-million-million-million-millionths of a milligram. On Maxwell's hypothesis,* that a cubic centimeter of hydrogen contains but nineteen million million million molecules, the weight of an atom would be considerably more, namely, two hundred and thirty-five hundred-thousand-million million-millionths of a milligram, or about three hundred times as great.

(*To be continued.*)

* *Phil. Mag.*, iv., xlvi., 463, 1873.

Parliamentary and Law Proceedings.

Illegal Sale of Poison at Sutton-in-Ashfield.

At the Mansfield Petty Sessions, on Thursday, Mar. 29, before Colonel Salmond and Captain Need, R.N., Henry Slack, described as a shopkeeper, was summoned for that on the 13th of February, 1877, he did unlawfully sell a certain poison, to wit, "laudanum," which poison when sold was contained in a bottle, and which bottle was not distinctly labelled with the name of the article and the word "poison," and that the name of the said Henry Slack, the seller of such poison, was not placed upon the bottle.

This was a case which arose from an inquest held upon a child, in which the mother had given it a dose of laudanum, mistaking it for cordial, there being no label on the bottle, which was procured from defendant's shop, and the present proceedings were instituted at the suggestion of the Coroner (Mr. Heath).

Mr. Hibbert, of Mansfield, appeared for the defence, and said he pleaded guilty on behalf of the defendant to save the trouble of going at length into the case. Colonel Salmond asked if he were going to say anything in defence. —Hr. Hibbert: I shall wish to make a few remarks.

Mary Ann Bilton, a married woman, living at Sutton-in-Ashfield, was then called, and said on the 13th February, she asked a Mrs. Turner if she would let her little boy fetch her a pennyworth of cordial and some butter. In about an hour after the boy brought what she supposed to be the cordial, and during the night she gave it her child, which afterwards died. Was sure she sent for cordial.

Superintendent Bexon: Was there anything on the bottle; any label of any description?—Witness: No, sir. (The bottle was here produced.)

George Turner, a little lad, aged nine years, spoke to going for the cordial, and in reply to Mr. Hibbert said he was quite sure he did not ask for laudanum.

Superintendent Hallam produced two bottles, which he received from Dr. Harding. He had shown them Mrs. Bilton, and she identified one as that from which she gave the laudanum. The other was a bottle containing poison, and which he took possession of. It was labelled with the words "Laudanum—Poison."

Mr. Hibbert, in addressing the bench, said he did not wish to take exception to anything that had been said, although there was nothing to show that the compound was absolutely laudanum. The defendant regretted that this accident should have happened, and as they had it in evidence that it was sold by the daughter and not by himself, he asked them to be as lenient as they possibly could. Defendant was not at home, and he had assured him (Mr. Hibbert) that the laudanum was kept there for his own use, as he was troubled very much with rheumatics, and he had kindly sold it to colliers and others when they had been injured. Defendant also assured him that he had given instructions that it should not be sold, but the daughter had been away from home and did not know. She was also under the impression that laudanum was asked for, but if her father had been at home he would not have allowed the sale. He desired him (Mr. Hibbert) to express his deep regret for what had happened, and that it was not his intention to keep any more laudanum in his house.

Colonel Salmond said it made no earthly difference who it was sold by, whether daughter, son, or servant, as he was quite as responsible as a publican was for the order of his house, and he would have to pay £3 and costs. The money was paid.—*Nottinghamshire Guardian.*

Suicide with Prussic Acid.

On the 28th ult. an inquest was held by Mr. Heath at Mansfield Woodhouse, touching the death of Rebecca Bowler, aged 39 years. It appeared that the deceased, who lived as housekeeper to Dr. Curran, had on the previous Sunday had some angry words with her employer, and afterwards was found dead in her bed with a bottle containing prussic acid, which had been taken from the surgery, close by her. The medical evidence left no doubt that prussic acid had been the cause of death. The jury returned a verdict that deceased died from a dose of prussic acid, but that there was not sufficient evidence to prove her state of mind when she took it.

Review.

Year Book of Pharmacy: Comprising Abstracts of Papers relating to Pharmacy, Materia Medica, and Chemistry, contributed to British and Foregn Journals, from July 1, 1875, to June 30, 1876. With the Transections of the British Pharmaceutical Conference at the Thirteenth Annual Meeting, held in Glasgow, September, 1876. London: J. and A. Churchill.

At last the 'Year Book' for 1876 is ready, and we hope that now its prompt delivery, together with the Editor's apology for the delay in its appearance, will be successful in smoothing the sadly ruffled feelings of at least those of the many members of the Conference who have confided to us their distress because of its non-reception.

As is known, the volume supplied annually to the members of the Conference consists of two principal sections, the 'Year Book' proper, which this year is the work of Mr. Louis Siebold, and the 'Transactions,' for which the honorary secretary, Professor Attfield, is responsible.

So far as we are able to judge from a rather hasty inspection, the new volume in both its sections will be a worthy companion of its predecessors as a record of the progress of pharmacy, and as a handy-book of reference on the pharmacist's book shelf.

The first section contains 380 pages, or about 24 pages less than last year, and includes an "Introduction" and a large number of well-prepared abstracts of British and Foreign papers on a wide variety of subjects allied to pharmacy. These we consider to be very thoroughly representative of the literature of the twelve months ending June, 1876. Of course, considering that this includes a period now a year and three quarters distant, whilst the most recent papers date nine months back, many of these abstracts will suggest "auld lang syne," but to a very considerable extent this is unavoidable under the conditions of the case. One of them, however (Méhu on Iodized Cotton, p. 361), proved to be a very "auld acquaintance," having appeared in this Journal in September, 1871, and subsequently in the 'Year Book' for 1872 (p. 375). But, French in its origin, it has recently become rejuvenescent in a German medium, through which it is now quoted. This, however, is only one of numberless similar traps that lie round the feet of an editor of a Year Book, and the wonder is that he is not caught more frequently.

Although we consider the work to be very creditable to all who have taken part in it, we shall venture, as the book is placed in our hands for criticism, to make one or two queries and suggestions which may be taken for what they are worth. First, is an "Introduction" desirable, and if so, what should be its nature? In our opinion, it is, but it should not—even in part—be a mere recapitulation of the principal facts recorded during the year; this story would be sufficiently, and, indeed, better told by the abstracts themselves, were they systematically arranged. If, however, it were limited to the linking of current investigations or reports with work done in former years, and the discussion of their mutual bearings, and the record of the personal experience of the editor in respect to some of them, such as occur here and there in the present volume, it would, we think, become more useful and interesting. For an indication of what we mean, we would refer to the Introduction to the Yearbook for 1872. We recently alluded to this question, when noticing the American volume, and pointed out how such recapitulations might degenerate into cataloguing and involve repetitions, and in the present case it allows us to be told twice in twenty lines, that M. Comaille has made out the solubility and fusing-point of caffeine, and suggested a method for its detection.

Again, would it not be better to drop the title "Pharmaceutical Chemistry" for one of the divisions in favour of the simple one of "Chemistry," placing such portions as have a specially pharmaceutical bearing under the existing head of "Pharmacy?" Of course, there are reasons why this should not be; but we confess we do not quite understand why a note on Gallium should be classed under "Pharmaceutical Chemistry," one on the Poisonous Properties of the Alkali Metals under "Pharmacy," and one on the Reaction of Hydrocyanic Acid with Calomel under "Notes and Formulæ."

With respect to the 'Transactions' we have little to say. The papers read at Glasgow have already appeared in this Journal, and they have evidently been carefully seen through the press. But as a final query, we would ask whether it is worth while to print the names of the members twice over, or whether the space occupied by one list might not be more usefully devoted to the bibliography of the year, or even saved altogether.

Obituary.

Notice has been received of the death of the following:—

On the 16th of March, 1877, Mr. James Nichols, Chemist and Druggist, Tideswell. Aged 76 years.

On the 2nd of April, 1877, Mr. Charles Edward Bishop, Chemist and Druggist, Oxford Street, London. Aged 23 years. Mr. Bishop had been an Associate of the Pharmaceutical Society since 1871.

On the 10th of April, 1877, Mr. Francis Thomas Atkins, Pharmaceutical Chemist, Lewisham High Road. Aged 87 years. Mr. Atkins had been a Member of the Pharmaceutical Society since 1842.

On the 6th of April, 1877, Mr. Stephen Carr Sagar, Chemist and Druggist, Sevinton. Aged 66 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication but as a guarantee of good faith.*

Medicine Measures.

Sir,—I trust it will not be considered an unprofitable occupation of your space if I reply to some of the criticisms passed upon the note on medicine measures, which, in my absence, Professor Attfield was so good as to read for me at the late Pharmaceutical Meeting.

If I were to consider myself only in the matter I would be content with my own experience and the satisfaction I have felt in the actual use of the measures which I had begun to experience before I wrote the note, and which is participated in by many of my customers. But so long as Mr. Martindale and Mr. Plowman advocate a change in the official value of the terms teaspoon and tablespoon, and so many others advocate a retention of the use of these terms, to express their old value, I feel that a further effort is still called for to clear away the difficulties—principally imaginary—which attend the little change which I have advocated.

There is so strong a tendency to magnify the difficulties of a prospective change, and to overlook the incongruities of an old custom, that I am by no means surprised at the hesitation expressed regarding the desirability of the suggested change, while at the same time I am satisfied that it only requires trial to prove its very great superiority to the present custom.

Mr. Greenish's difficulty—that we should require so many sizes, and that a graduated glass will eventually have to be used—does not interfere at all with my custom; those who will buy glass measures and understand them will not be put to any disadvantage by a new form of measure being at their disposal. There will be no more difficulty in using a graduated glass or a wine-glass, as a measure, consequent upon the substitution of a half-ounce measure for a tablespoon, but there will be inextricable confusion and difficulty if graduated glasses continue in use indicating half an ounce by the term tablespoonful, and medical men adopt the same term to mean 6 drachms, as Mr. Martindale and Mr. Plowman think should result from hospital experience, or if dessertspoon were to be the translation of ℥ss, as I before stated, was the custom with one of our local practitioners.

Mr. Bland's objection that so long as medical men prescribe by spoonsfuls the pharmacist would be obliged so to label does not militate against the suggestion I made that the label should be written "a tablespoonful (half an ounce) thrice a day."

He also objects to the expense of supplying measures *gratuitously*, which is not part of my suggestion. My custom in dispensing is to give, but if I found the giving too burdensome, I would prefer in most cases still to supply a measure, but to regard it as part of the cost of the dispensing, and to charge accordingly, and in any case I should think a simple and cheap measure a less serious outlay than the careful graduation of the bottle with a diamond, which Mr. Bland says he adopts. Mr. Long, on the other hand objects to entertaining the consideration of cheapness, and seems to think the form of measure I have adopted will be wanting in accuracy.

Though I have adopted a particular form with the view to cheapness and accuracy, if that form were unsuccessful, it would militate against a point of detail in my working, but not against the general principle advocated; but at the same time, I must suppose that Mr. Long spoke without full knowledge, for the measures I had made were produced by a method which secures greater uniformity than it has been my fortune to observe in graduated glasses The clay being turned down by a template produces a vessel in the first place more accurately uniform than could be produced by almost any other mechanical operation, but the clay in drying and burning contracts, and the contraction varies a little according to the temperature of the furnace. The thickness of the glaze will also vary to a small extent, but so far as my examination has gone, these sources of error are too small ever to be a serious objection to the use of earthenware measures if turned under a template.

Professor Redwood suggests that in a household where medicine is much in use, the measure-cups would accumulate and become nice playthings for the children; if so, they will learn in the infant school or nursery the meaning of ounce and drachm, a species of knowledge which the pharmacist often finds great difficulty in instilling into the understanding of his adult customers who have to use graduated glasses and the coming generation would thus be better prepared for any form of measure for small quantities of fluids. I regard Professor Redwood's suggestion to have graduated glasses marked by ounces on one side and spoonfuls on the other as very desirable for adoption during a transition period, provided he can come to terms with Mr. Martindale and Mr. Plowman as to where the spoonful graduations are to stand, whether the teaspoon is to be ʒi or ʒiss and the tablespoon ʒiv or ʒvi. I have advocated the discontinuance of the terms teaspoon and tablespoon, and I do not know that any more effectual mode of effecting their disuse could be adopted than the change advocated by Messrs. Martindale and Plowman.

I thank Professor Redwood for his suggestion, which I think really suited to the circumstances of the times, and likely to be useful to such patients as will pay for graduated glasses and learn to use them. Perhaps before long I may have to thank also Messrs. Martindale and Plowman for the beautiful confusion which will expunge spoonful graduations altogether.

Newcastle. BARNARD S. PROCTOR.

Sir,—The subject of medicine measures brought forward by Mr. Proctor at the evening meeting on Wednesday last, is one of considerable importance, alike to the prescriber, the compounder, and the patient. As far as we, the compounders, are concerned, it is our duty to make the directions of the prescriber as intelligible as possible, so that the exact quantity ordered shall be taken. I am of opinion that the measures introduced by Mr. Proctor would have the effect of complicating rather than simplifying the matter.

Mr. Martindale's suggestion that because spoons have much increased in size of late years a teaspoonful should be regarded as 1½ drachm and a tablespoonful 6 drachms would lead to much confusion. The question is not as to what is meant when a tea, dessert, or tablespoonful is ordered, as it is well understood to mean respectively ʒi, ʒii, ʒiv, but as to the best way of putting it so that the patient shall take the proper dose. Undoubtedly the use of the spoon should be abandoned in measuring medicines; as to whether prescribers use the term spoonfuls on the symbols is of little importance.

Graduated bottles of sufficient accuracy are easily obtained, and answer well; when greater accuracy is needed, as in the case of concentrated medicines, we have graduated glasses. As to the prescribing of concentrated medicines, it is often done as a matter of convenience to the patient, and should be charged for according to the number of doses contained in the bottle. We have no right to dictate to prescribers how they shall order medicines, neither does it lie in our power to insist upon the use of measuring glasses, as propounded by Mr. Long.

51, *Judd Street.* FELIX STEVENS.

COUNTER PRESCRIBING.

Sir,—It is the opinion of Mr. J. Leay, who I presume has, by means of the pharmaceutical ladder, attained to the position of M.D. or M.R.C.S., that all chemists should discourage prescribing and counter practice, and that the Pharmaceutical Society ought not to be "bound to support the prescribing chemist in his attempts to supersede the certificated medical man." If he knows anything of the policy or antecedents of that Society he must be aware that there is no probability of its being bound to support anything of the kind, and as for chemists generally, I am not aware that they are at all desirous of "superseding" the doctor.

With regard to counter prescribing, I differ entirely from Mr. J. Leay, and consider that an assistant, otherwise competent, who can prescribe, is more valuable than one ignorant of that art. I, without adopting "three mallards" for my crest, or "Quack! Quack! Quack!" as my motto, hold that it is the duty of every man to make himself as useful as he can to his fellow men in that sphere of life in which his lot is cast, and if a chemist, botanist, eclectic, allopath, or any other "path," has a knowledge, acquired by study, observation and experience, of drugs and their action in the cure or alleviation of suffering, it is his right and duty to use it. The knowledge that quinine is a remedy for neuralgia, opium for pain, sulphur for the itch, etc., is not the exclusive property of the "certificated medical man," and he who possesses it and uses it as occasions arise is not (Mr. Leay notwithstanding) to be branded as a "quack." With encroachments on our business, daily increasing in all directions, let not our foes be they of our own household; let us not stultify ourselves by rejecting counter prescribing, the right to which we have acquired by long years of usage, and which judiciously cultivated is a lawful source of profit to ourselves and of advantage to the public.

Harrow Road, W. WM. YOUNG, M.P.S.

EARLIER CLOSING.

Sir,—It was with great pleasure that I read in the Journal of Feb. 24th, that the chemists and druggists of Bayswater and Notting Hill have been roused from their lethargy by the Early Closing Association, and that they have at last found out that "the hours of business which have hitherto prevailed amongst chemists and druggists are unnecessarily prolonged and beyond what the public convenience requires."

It is with still greater pleasure that I read in the Journal of to-day that a meeting of the chemists and druggists of London is to be held for the purpose of discussing what steps can be taken to shorten the hours of business. I trust it will meet with the support it deserves and that every master and assistant who is fortunate enough to be off duty will be present.

My object in writing to you, however, is to suggest that some decision should be arrived at with regard to the supply of medicine, etc., after the shop is closed. I think it will be admitted by all that at least three-fourths of the prescriptions brought after business hours might be brought sooner, and would be if the invalid (real or imiginary) knew the medicine could not be procured, or that a higher price must be paid. The practice of bringing prescriptions late I attribute chiefly to two causes,—first, neglect of servants,—second, forgetting to take the prescription to the stores to be dispensed when the other goods were purchased in the day time. The remedy I suggest is this, that chemists should take down their present brass-door plates on which are usually engraved the inviting words—"Medicines may be obtained at any time by ringing the bell," and substitute plates with words something like the following—"Medicines urgently required may be obtained by ringing the bell, an additional charge of 50 per cent being made on usual prices. This would no doubt have the effect of curing the neglect of servants—the supporters of cooperative stores no chemist would sympathize with, and in cases of sudden illness the public would not grudge the extra charge.

A WEST END ASSISTANT.

"*Juvenis.*"—(1) We cannot answer your question, since we do not know what construction you would put upon the words "whole holidays." Certainly you would not be entitled to absent yourself from business on some so-called holidays without the permission of your master. (2) The publishing office of the *Lancet* is No. 423, Strand, W.C.

"*Quærens.*"—Bichromate of potash in no doubt poisonous, death has been known to follow in five hours after the taking of two drachms. According to Taylor the treatment consists in the administration of emetics, and a paste of carbonate of magnesia or chalk with milk, albumen or water.

M. P. S.—The chemical formula for sodium salicylate is $NaC_7H_5O_3$.

"*Omega.*"—It would be impossible to say without having some knowledge of the nature of the colouring matter.

COMMUNICATIONS, LETTERS, etc., have been received from Professor Dymock, Mr. Clayton, Dr. Davy, Mr. Horton, Mr. Summers, Mr. Hayden, Mr. Postans, Mr. Bostock, Syrupus, A. Y. Z., J. N. B.

THE PRESENCE OF AMMONIA IN BISMUTHI SUBNITRAS.

BY W. G. PIPER.

Sometime ago my attention was called to a prescription containing bismuthi subnitras, sodæ bicarb. and borax. When these were rubbed together a decided smell of ammonia was given off and as I could find no explanation of the circumstance in books, I determined to try and find out where the ammonia came from and how it got there.

I found from experiments detailed below (*a*) that the ammonia noticed was evolved from the bismuthi subnit.; (*b*) that it was present in most samples of that substance to a small but variable extent; (*c*) that the ammonia was formed by the action of the bismuth on the nitric acid during solution.

The formation of ammonia during the solution of metals in nitric acid was first noticed in connection with zinc and has since been found to take place with many other metals. I have never up to the present heard of its formation during the solution of bismuth in HNO_3. The following equation or some similar one would probably represent the reaction.

$$2Bi_2+15HNO_3=4Bi3NO_3+6H_2O+NH_3+N_2O_3$$

Bismuth and nitric acid give bismuth nitrate, water, ammonia, and nitrogen trioxide.

To the presence of nitrogen trioxide (N_2O_3) in solution, I attribute the green colour seen in unboiled solutions of bismuth in nitric acid, for although N_2O_3 is decomposed by contact with water, yet, it is, I believe, more permanent in the presence of nitric acid. The green colour referred to might easily be mistaken for that caused by the presence of copper, did it not entirely disappear on boiling.

Even though ammonia were formed in considerable quantities, yet it might be supposed that the subsequent precipitation and washing with water would remove every trace of it. We may explain the fact of its remaining in one of two ways. Either the ammonia is retained by the well known mechanical action of powders, which enables the soil to retain for the use of plants the traces of ammonia carried into it by the rain and which makes it next to impossible to remove every trace of ammonia from ferric hydrate or other substances precipitated by its aid. The chief objection to this explanation is that the quantity of ammonia formed in the act of solution is so small as almost to be lost on the precipitation of the bismuth. alb. with water. Or on the other hand we may imagine that a difficultly soluble ammonio-nitrate of bismuth is formed, which is only partially removed by subsequent washings. The tendency of bismuth to form double salts supports this suggestion, but the fact that no such double salt is known militates against it.

My aim in conducting the following experiments, was simply to prove the presence of ammonia in commercial samples of $BiONO_3$, to determine comparatively the quantity present, and to trace it to its source. My experiments therefore were not conducted with the minute accuracy and excessive care necessary in determining atomic weights or molecular composition.

Sample A. referred to below, was purchased at a good retail shop in Norwich, price 10*d*. an ounce.

B., a sample from a similar house, price 6*d*. an ounce.

C., from one of the best shops in the city: Howard's manufacture; 4*d*. an ounce.

D., from a London wholesale house, which bears a better reputation for cheapness than for quality or honesty.

The method by which the ammonia was finally estimated was a modification of that of Wanklyn and Chapman for the estimation of free ammonia in potable waters. Though this method does not give strictly accurate results, yet they are reliable for comparison, and are sufficiently delicate for my purpose. Half a gram of $BiONO_3$ was added (with 25 c.c. of saturated solution of carbonate of sodium) to a quantity of water free from ammonia in a retort connected with a Liebig's condenser. Heat was applied and the distillate collected 50 c.c. at a time in suitable jars. The ammonia was then estimated, as in water analysis, by comparing the colour in the distillate and in 50 c.c. of a solution of ammonia of known strength given by 1½ c.c. of Nessler's reagent.

Starting from the mixed "Bismuth Powders," I had to determine which constituent yielded the ammonia. The borax and bicarbonate of soda yielded no ammonia on heating with caustic potash, but the bismuthi subnit. yielded it distinctly though not freely.

To determine the quantity present, one gram of the bismuth subnitrate was placed in a suitable flask, so arranged that all ammonia given off would be absorbed by a known quantity of normal sulphuric acid (*i. e.*, a solution containing the molecular weight in grams of univalent H_2SO_4 in a litre of water; 49 grams real H_2SO_4 in one litre). Caustic soda was then added in excess from a pipette fixed in the cork, and the whole boiled to drive off every trace of NH_3. Twenty-five c.c. of normal acid were taken, and it was found that they required 25 c.c. normal ammonia to neutralize them, showing that the ammonia present in one gram $BiONO_3$ was not appreciable by ordinary volumetric methods of analysis.

A weighed quantity (about 5 grams) was then treated in the same way, and yielded NH_3=·04 per cent.

To determine the ammonia present, more accurately, the method above described was resorted to.

½ gram A treated by distillation yielded in the

1st 50 c.c. of distillate	·18	milligrams NH_3
2nd „ „	·085	„ „
3rd „ „	·035	„ „

½ gram $BiONO_3$ yields: ·3 milligrams NH_3 =·06 per cent.

½ gram B gave in—

1st 50 c.c. . .	·2	mgm. NH_3
2nd „ . .	·04	„
3rd „ . .	·01	„

½ gram yields: ·25 mgm. NH_3=·05 per cent. NH_3

½ gram C gave in—

1st 50 c.c. . .	·03	mgm. NH_3
2nd „ . .	·01	„
3rd „ . .	—	
	·04 „	=·008 per cent. NH_3

½ gram D gave in—

1st 50 c.c. .	·31	mgm. NH_3
2nd „ .	·06	„
3rd „ .	·31	„
4th „ .	—	

½ gram yields ·38 „ =·076 per cent. NH_3

The above results sufficiently prove the frequent presence of ammonia in commercial samples of white bismuth.

To discover how the ammonia came there bismuth was dissolved in nitric acid and water as directed in the Pharmacopœia and the solution decanted from the scanty black flaky precipitate. Ten c.c. were taken, neutralized by carbonate of sodium, and distilled as before.

1st 50 c.c. yielded	·05 mgm.	NH_3	
2nd " "	·01	"	
	·06	"	= ·6 per cent. NH_3

in the solution before precipitation with water.

It follows from this that much of the ammonia formed is removed by the wash-waters, but at the same time the bismuth retains an undue proportion. The better the sample is washed the less ammonia it retains (compare for this the history of C and D).

The presence of ammonia in this substance can only be regarded as an accidental impurity, and it is never present in sufficient quantities to excite the ire of a public analyst. My only object in bringing it before the pharmaceutical world is to add my mite to the history of drugs.

ADULTERATED DRUGS.

BY PROFESSOR ATTFIELD.

I think it desirable to strengthen the warning given to pharmacists in the last number of the *Pharmaceutical Journal,* respecting some unprincipled manufacturer who is endeavouring to palm off Citrate of Iron and Quinine of half the official strength by labelling it "British Pharmacopœia." Samples sent to me for analysis by different dealers during the past few weeks have each yielded quinine of what may be termed average commercial quality, but in only half the official proportion, namely, little more than eight per cent. instead of sixteen. Now, although I am not aware that there is a demand at the present time for any other than the official article, it is just conceivable that a medical practitioner might desire a weaker preparation; hence I have nothing to say just now against such a compound *per se,* if its label correctly describes its character. But distinctly to label parcels of half the official strength with the words "British Pharmacopœia" as was done in these cases, and to sell under such false colours, is simply to commit fraud. The bottles were sealed over with reddish-brown wax, impressed with the words "Citrate of Iron and Quina," while the label bore the words "Citrate of Iron and Quinia. British Pharmacopœia." The maker's name was not given. In one case the label was absent; but any use of an official name for an article of unofficial strength, at all events unless the strength is stated on the label, is, in my opinion, *suppressio veri* tantamount to *suggestio falsi.*

Attention having been drawn to the presence amongst us of an enemy to the public welfare and to the prosperity of British pharmacy, for such is the character of the drug adulterator, of course he will at once retreat. But it is more than ever necessary that British pharmacists, wholesale and retail, should exercise that vigilance which has hitherto characterized them, in themselves detecting and exposing any tampering with medicinal substances. For although it would perhaps have been unwise and impolitic to object to and resent the indignity of being placed under an Adulteration Act, no just man can expect that pharmacists will long continue to submit to the insult to their good faith and to the liability to vexatious annoyance which are involved in this position. Up to the present time they have well stood the ordeal. They have only to maintain that denunciation of adulteration and all such malpractices which they have hitherto carried on, more especially since the Pharmaceutical Society and Pharmaceutical Conference were instituted, and then application sooner or later for a repeal of the Food and Drugs Act, so far as they are concerned, will be irresistible.*

NOTE ON GLYCEROLE OF SALICIN AND GLYCEROLE OF PEPSINE AND SALICIN.

BY A. W. POSTANS, F.C.S.

A few years ago salicin (which has the chemical formula $C_{13}H_{18}O_7$ and, as is known, may be obtained from various species of *Salix,* especially the *Salix alba*) was but little used by the medical profession, and it was every now and then found as an adulterant of quinine.

In Phillips's translation of the Pharmacopœia Londinensis for 1851, the following method is given for its detection: Dissolve half a drachm of the salt in three drachms of sulphuric acid; if it strikes a red or red-brown colour salicin may be suspected; dilute this solution with six fluid drachms of water, which will precipitate the salicin, and this, slightly washed with water, may be recognized by the bright red colour it produces with concentrated sulphuric acid.

Twenty-six years ago, Phillips recorded this test for salicin as a common adulterant of quinine. Now, however, the scene has changed and we find this white crystalline substance amongst the fashions of physic holding a foremost place, and, having recently been asked to prepare some of it in the liquid form, I am induced to bring before your readers my result, which affords another instance of the wonderful power of glycerine as an almost universal solvent.

The solution I made was of the strength of five grains to one fluid drachm.

The salicin and glycerine were first rubbed together in a glass mortar, then transferred to a porcelain dish and a gentle heat applied until complete solution was effected. It was found that one drachm would not take up ten grains, or rather that about one-half of it separated again on cooling, whereas the five grains remain in perfect solution.

This I have called glycerole of salicin. I am desirous, however, of suggesting the formula for a combination of this salicin solution with glycerinized pepsine. To obtain this solution of pepsine the fresh stomach of the pig is washed in water until all particles of food are removed, and, the cardiac end being rejected, it is cut into slips and digested for a week in as much glycerine as will entirely cover it, then strained and filtered. The solution is about the consistence of simple syrup, of a pale sherry colour; it has a sweet taste, with the characteristic flavour of pepsine. This process was given by Mr.

* Even "lac sulphuris" should either be placed in the Pharmacopœia or its sale be gradually discountenanced altogether. The *bona fides* of the pharmacist must not only be beyond attack but beyond suspicion.—J. A.

Edward Long, L.A.H., Dublin, in the *Medical Press and Circular*, vol. viii., p. 300, and the digestive power of the preparation is considerable. One drachm of it mixed with one ounce of water acidulated with 15 minims of muriatic acid dissolves 700 grains of moist fibrin at 100° F.

If equal proportions of these two solutions are mixed together a most valuable and excellent preparation results, possessing those tonic and digestive properties which in many cases are so much desired by physicians, and this I have called glycerole of pepsine and salicin.

35, *Baker Street, W.*

AN EASTER HOLIDAY IN LIGURIA.*

BY PROFESSOR FLÜCKIGER.

(*Continued from p.* 834.)

But the plant which above all other determines the appearance of the entire country is the olive tree (*Olea europœa*, L.). At this time of the year its fresh young blossoms begin to unfold; its thick evergreen leaves cover the landscape with their solemn grey, which accords so well with the cloudless sky, the bare mountain tops, and the blue-green sea. The cheerful light green of northern more delicately foliaged trees would be far less suitable than these mighty trunks, endowed with such tenacious power of life, which almost alone lift on high their far extending branches. It is in such a landscape as this especially in the lower valleys, that the olive tree must be seen to be properly valued. Neither age nor injury from axe or from storm appears to be capable of extinguishing its vital forces. So long as the trunk exists it sends out its knotted branches, or emits shoots from its wide extending roots which with wonderful power insinuate themselves into the wildest rocks as soon as they bear the slightest covering of fertile soil. In fact, the olive trees of the Riviera have attained a size that is not met with again in Central Italy, but only in the south, as at Sorrento. The pleasant semi-shadow of the olive groves calls to memory the German fruit gardens, or the dense foliage of the German forests, the peculiar charms of each only gaining by the comparison. Where the ground is too steep and bare, the industrious Italian cultivates terrace above terrace in order to provide space for the olive, vine, and fig tree. These artificially graded walls (*muricciuoli*) allow the most favourable devolopment of the peculiarities of the olive tree. The planting of the olive is easy, as every one of the numerous spreading rootlets has the power of development. The *Olea europœa* may take quite another from, or, rather, revert to its original form; the trunks and boughs grow straight; the leaves remain shorter; and the branches run out into thorny points. These degenerated bushes, *Olea oleaster*, are improved by grafting. For the completion of the picture is wanted the oil mill, which is always constructed in the simplest fashion, and so placed that at the proper time the requisite quantity of water can be conducted to its overshot wheel; for which cause the number of these mills is rather limited. They do not serve as dwelling places, but contain only the two millstones and the rude screw press. The crushed fruit is packed into sacks, and yields first the finest and thinnest oil; the press residues are then worked with hot water to obtain the inferior oil. "Fex olei seu amurca, Baumölhefen," mentioned in a Frankfort tariff of 1612, referred to such a very impure oil, which in olden times found many applications. In front of the larger oil mills are to be seen a number of open quadrangular receptacles, constructed of rude brickwork, which serve to hold the residues from the first or second pressings, belonging to different proprietors, until separated for further working. The entirely exhausted mass, consisting principally of kernels, is used for manure, and most probably exercises a very long continued influence, since the olive stones being only incompletely crushed by the millstones, open up slowly in the dry soil. The olive stones also render good service as fuel.

The produce of the olive tree fluctuates considerably both as to the quality and the quantity of the oil; even the variety of the tree has its influence. The wild tree, or that which has been allowed to return to a wild state, distinguished as *olivastro*, produces a small, oblong, very bitter fruit; its shoots are therefore improved by grafting when it is only two years old. The particularly large delicate olives of a variety distinguished by their long willow-like leaves, called in this country *punginaire*, are principally used for preserving. The ripest fruits yield the finest oil. In the Riviera district, between Nizza and Ventimiglia, the full devolopment of the olive can be peacefully awaited, but on the coast lying farther westwards the French are frequently compelled to commence the harvest prematurely, in order to prevent the olive being spoilt by the cold winds (*mistral*) of the latter part of the year. Upon the same ground, the olive trees there are supported by props, in order to produce a somewhat denser and better shelter of foliage. In the Riviera nothing of this is known, and certainly it adds not a little to the beauty, or at least to the peculiarity of the tree, that it is left to attain a perfectly natural development. However, here it is not quite safe from insects; on the coast frequently a large quantity of fruit is spoilt through being pierced by mosquitoes. The oil from the higher lying districts is therefore of greater value, since that insect is not harboured there. The harvest extends from November to April. This spring, however, no olives are to be seen, last year having been in this respect one of those perfectly unsuccessful years which unfortunately almost alternate in equal numbers with the good harvests. From old olive trees there sometimes separates a substance (gum resin) which formerly, though probably only very seldom, was kept in pharmacies as "Gummi Oleæ," but up to the present has not been exactly examined. In 1816 Pelletier prepared from it a bitter crystalline substance, named by him "olivil," the composition of which, according to the analysis of Sobrero, of Turin (1843), agreed with the formula $C_{14}H_{18}O_5$. Submitted to dry distillation olivil yields an oily liquid which would appear to present a great similarity to eugenol (caryophyllic acid). A more exact comparison of these two substances would be very interesting. In the Riviera this exudation from the olive tree is unknown. From the older literature it appears that formerly it was collected in Sardinia and South Italy, but this has not been done for a long time, so that it might now be very difficult to meet with this substance in sufficient quantity. Dioscorides mentions that the tears exuded from the Ethiopian wild olive tree were used as a medicine, and Pliny calls the olive resin occurring in Arabia, and used as a vulnerary, "*enhaemon.*" In the pharmacy of the middle ages this product was called "elemi," a name, as is known, since transferred to quite a different resinous substance. It scarcely requires to be mentioned that the olive tree of Ethiopia and Arabia was possibly not the *Olea Europœa*, so that the elemi of the earlier centuries may be as little referable to the gum resin of the olive tree as that of to-day. Still it is questionable what Pliny may have understood by Ethiopia, and to be remembered that in the district northwest of the Red Sea the *Olea europœa* grows wild. As two noteworthy facts in plant geography it may be mentioned that in the middle ages the olive culture was carried on for some time at the Lake of Geneva, but appears to have then been annihilated by the frosts, and, on the other hand, that at one time olives occasionally reached maturity in very favourable situations in London. The leathery evergreen leaves of the olive attracted attention in the old pharmacies. The Leipzig *Apothekertaxe*

* From the *N. Repertorium f. Pharmacie*, vol. xxv. 1876.

for 1699, for instance, has "folia oleæ, Olivenbaumsblatter."

As to the beauty of the olive tree the opinions of northerners are divided. One must wander and rest in the olive groves near Mentone, Monaco or Villafranca, in order to become acquainted with the charms that are peculiar to it. The venerable trunks, which have already bestowed food, fuel and valuable timber upon generations and generations, will have to be viewed in the diffused sunlight, with glimpses here and there of the sea. Just now its dull foliage stands in vivid contrast to the fresh grass which flourishes admirably in the slight shadow. Between the broad leaves of the different species of oat and other grasses rises a profusion of the *Allium neapolitanum*, nearly allied to the *Allium ursinum*, but more elegant, vigorous, and scarcely giving off the usual odour from the parts above the soil. Associated with these are the colour-gems of the gorgeous *Anemone coronaria* and *A. hortensis*, the *Tulipa Clusiana*, *Gladiolus segetum*, and *Centranthus ruber*, the well-known odour of *Cheiranthus Cheiri*, which disputes the precedence with the small profusely blossoming *Lobularia maritima*, Desv. (*Alyssum maritimum*, Lam.). German home memories are stirred by the *Anemone Hepatica*, *Bellis*, *Ajuga*, and *Helleborus fœtidus*, to which the semishade of the olive groves is suitable. More pharmaceutico-chemical considerations arise when the edges of the terraces and banks shine with *Iris*, *Ruta bracteosa*, *Verbascum sinuatum*, *Anchusa italica*, and *Euphorbia serrata*, or when *Hyoscyamus niger*, *Solanum miniatum*, *Ecballium Elaterium*, and *Mentha rotundifolia* show modestly in the back ground of manure and rubbish heaps. But mostly a speedy end is made to these floral beauties and grassy carpets, the soil round the stems being dug up and loosened in order to prepare it to take up manure or to expose it to the action of the atmosphere. But grass and vegetables may be seen under the olive trees as permanent plantations.

Many trees in this district correspond perfectly to the striking picture of the Greek olive trees drawn by J. F. Julius Schmidt, the Director of the Observatory at Athens. "Wonderful is the appearance of the very old olive trees to be seen here. With their lower stems, sometimes burst asunder, sometimes opening like an archway, twisted spirally, then again fashioned pyramidally, covered with knots, with hemispherical and quite irregular stone-coloured excrescences, the lower part often resembling a large block of stone, from the crevices in which rises a freshly foliaged thicket. Notwithstanding its wasted foundation, in which frequently tall shining green aroids and other plants lie hidden in spacious cavities of the trunk, protected from the vehement north wind, the aged tree supports a privileged existence. In its life and vigour it equals its younger neighbours and shows no signs of diminishing vitality."

The discovery of the original home of the more important cultivated plants has latterly awakened an enhanced interest, and botanists have not been deterred from the investigation of this question notwithstanding its difficulty. The olive tree appears probably to have been originally limited to the south-eastern countries of the Mediterranean basin, and at a very early period to have spread westward. Willkomm is of opinion that it occurred in the countries all round the Mediterranean Sea and in its islands. He finds one support for this opinion, among others, in the certainly not strictly proved presumption, that, for instance, in olden times entire forests of wild olive trees (*oleaster*) existed in Majorca. The same may be asserted of Sardinia and Corsica, though it appears with certainty, from Roman records, that the introduction of the olive into Corsica cost much labour. Already in the earliest period of western cultivation the countries of the Upper Indus to the Suleiman mountains possessed in the *Olea ferruginea*, Royle (*Olea cuspidata*, Wallich), a species very similar to the olive tree of the Mediterranean district. In the former, however, the thorns of the oleaster are wanting and the leaves are shining on the upper side and rust-coloured beneath. The fruit of this tree is smaller than the cultivated olive, but rich in oil. Is the rusty-leaved olive-tree the original form of the *Olea europæa* of to-day? In the modern tendencies in these questions probably the habit is not too carefully considered. The Garden of the Palazzo Orengo will yield probably at a not very distant period valuable data in this direction. The specimens of *Olea ferruginea* there are meanwhile still weak pot plants, the leaves of which present no very decided character.

In the olive forests of the Riviera, which cover mountain and valley, a visible change is becoming manifest far and wide. The light green leaf-lobes are just beginning to unfold on the grey, plump, fantastically intertangled branches of the fig trees; these, however, are only isolated, starting here and there sufficiently from masonry or rock to show through the grey green foliage of the olive groves without becoming a special feature. The fig forms so important a portion of the food of Italy that our chemical ignorance in respect to this valuable fruit is very astonishing. Whilst the olive has found an observer in the Neapolitan chemist, De Lucca (1864), who has pointed out a connection between the mannite generally so abundant in the family of the Oleaceæ and the fat oils, we are lacking any knowledge of the chemical antecedents in the fig, or even trustworthy analyses of it. Before maturity the fig abounds in a disagreeably tasting milky juice and contains much starch; what eventually becomes of this? Is the sugar from the commencement only grape sugar, or is its subsequent exudation something more than a purely mechanical appearance? Is the sugar accompanied by much or little protein matter? Such questions have to be investigated in order to obtain a glimpse into the consideration of this important food material.

Very usually the leaf-tufts of the sea onion (*Urginea maritima*) grow luxuriantly at the foot of the fig tree where it is seen by the peasants with pleasure. When in the summer the blossoms of the sea onion appear on stalks a metre in height, the insects show a special predilection for them and spare the ripening figs. This bulb is thus met with in regions much further removed from the coast, as it grows also throughout the south of Spain and Portugal, in inland districts of Greece, Cyprus and in the Balearic islands, at an elevation of 800 metres. Impossible as it is to cultivate this plant in the north, Charles the Great had the idea (in 812) of transplanting the "*squilla*" to Germany, a certain indication that the fig and the laurel were afterwards to follow. As little can we impeach the German father of botany of inaccuracy when he opportunely gave the names "earth onion" to the "scilla." As cultivated in this country the entire bulb is below the soil; it belongs to the form with white, not red, scales, and occurs on the coast much more rarely than in the higher ground. By the sea is met with here and there *Pancratium maritimum*, an amaryllidaceous plant, the bulb of which, considerably smaller than that of the *Urginea maritima*, appears to resemble it in chemical respects, and formerly was usually known as *Scilla minor*.

The distinguishing trees of this plant region bear evergreen stout leathery foliage; only a few other trees belong with the fig to the minority which cast their leaves every year. Thus there is the now miserable-looking pomegranate tree, with its slender young shoots, at first brown coloured, the thin naked ramifications of which do not produce a pleasant impression. Near it frequently stands the much more peculiar looking thorny jujube tree (*Zizyphus vulgaris*, Lamk.); the lanky branches of which, cracked here and there, at present show no leaves. Like the *Olea ferruginea*, and *Punica Granatum*, the *Zizyphus* is a native of Northern India, and yields there a very agreeable acid fruit, whilst the Italian jujube has a rather insipid sweetish taste.

Still more in the summer time do the vine and the *Arundo Donax*, indispensable to the vine cultivator, contribute to the peculiar appearance of the landscape; at present both of them are only beginning to sprout, and they always take up far less space than the olive tree.

Here and there a dense crown of foliage rising from powerful knotted stems shines out in the midst of an olive grove, or alone on the sunny shore the tree spreads out its half-bared roots often over a surprising circuit. It is the St. John's bread tree, *Ceratonia Siliqua*. Certainly it is to be found nowhere else in Upper Italy or in the Central provinces, but probably in the south of the peninsula. However the Riviera di Ponente, especially the country round Monaco, has trees to show which equal those of the *piana* of Sorrento and Amalfi. This tree is decidedly less hardy than the olive, but it comes from Central Africa, where the olive is not known. On the Ligurian coast it bears the historic name of "caruba," an Arabic designation recalling a people to whom Sicily at one time owed a season of prosperity, during which not only Islam but also trade and valuable economic plants were introduced into Spain and Southern Italy. The *Ceratonia* can only be reckoned an economic plant, however, to the extent that the pods are given to horses. It appears remarkable that artificial cultivation has not yet succeeded in improving it so as to give a savoury fruit. Even the St. John's bread from South Italy and Cyprus is always a truly leathery dainty. Would not an attempt to obtain a better product from this stately tree be remunerative?

The multiplication of so conspicuous an evergreen tree would also suit the landscape to a high degree, since in respect to its rich full green foliage, which may be compared to that of our oaks and apple trees, it stands in striking contrast to the olive tree. The long rigid petiole, not unfrequently a foot in length, is provided with three to five, but most frequently with four pairs, of sessile leaflets, which are often nearly round, but mostly ovate. The breadth of the entire leaf at its base, *i.e.*, the length of the lowest pair of leaflets, frequently reaches seven inches, so that notwithstanding the leaves are only simply pinnate, the impression of a very complex ramification is produced. As it does not, like so many other pinnate leaves, bear a terminal leaflet, the enormous head of foliage assumes a rounded outline, which would appear to be somewhat too regular, did not the separate leaves by their variation in colour and shape exclude uniformity. The divisions of the leaf are not spread out flat, but incline somewhat towards one another, and on the under side are of a lighter though duller green than on the upper. The two surfaces also differ in their behaviour in other respects. The upper surface can easily become moistened with various liquids,—dilute alcohol, for instance; not so the under side. The leaf tissue is of very firm texture, but each separate leaflet is always in motion, which even in a calm gives to the whole foliage a lively appearance.

Many other trees of the same division of the Cæsalpineæ possess, in contrast to *Ceratonia*, doubly pinnate leaves. Indeed in examining the St. John's bread tree critically exceptions to the ordinary form of leaf are not unfrequently found, especially where one of the lowest leaflets is replaced by one consisting of two to four pairs of leaflets, usually not quite opposite, and often with a terminal one. Frequently the second leaflet of the lowest pair is also transformed. The variations from the ordinary leaf form are, however, never sufficiently numerous to influence the appearance of the tree. It presents, therefore, very great peculiarity quite apart from the flowers and fruit, which also have characters repeated in no other instance. On these accounts the genus *Ceratonia* was rightly set up for the sake of this tree only, and it has not since been enriched by a second species. This explains the remarkable fact that botanists have not found leisure to endow it with several names, and it is everywhere called by the name Linnæus gave to it. At present, in April, the tree shows neither blossom nor ripe fruit; only exceptionally are found isolated belated but still quite young crooked pods, which explain far better than the ripe ones why the Greeks named the tree *Ceratonia* (horn-fruit tree).

The *Nespole di Giappone*, the evergreen Japanese medlar tree (*Eriobotrya japonica*, Lindley; syn. *Mespilus japonica*, Thunberg) makes an appearance here and there, scattered singly in the olive groves, especially in the neighbourhood of houses. Although not an absolutely tall tree, the *Eriobotrya* attracts the eye through its beautiful foliage, consisting of simple leaves, closely crowded together, the upper side of a shining dark green colour and the underside grey. The rather stout lamina is very strongly developed, attaining a length of 16 inches and a width of 5 inches; it is very slightly serrate and beautifully marked with a delicate network of veins. Not only is the yellow subacid fruit, which ripens in early summer, prized in the Riviera and the mountain villages, but it has also been plentifully cultivated for a longer time in South France (*bibassier*) and India. Our earliest acquaintance with this fruit tree, indigenous to China and Japan, we owe to the traveller, Engelbert Kämpfer, who has unmistakably described it under the name of "*bywa*," in his "Amœnitates exoticæ" (Lemgo, 1712, p. 800).

(*To be continued*).

COLOGNES FOR THE SICK-ROOM.*

BY GEORGE LEIS.

There is, undoubtedly, a want felt, if not expressed, among the people as well as our practitioners, for a preparation that shall at once serve as a pleasing perfume, an antiseptic deodorizer, and a medicated cosmetic lotion.

Such a lotion the writer has endeavoured to place before this Association, after having made numerous experiments, results of which are given below in as brief a form as possible.

Pharmaceutists are well aware of the fact that during the past years we have had innumerable compounds and chemicals offered as antiseptics, the merits of each being vaunted and extolled in its turn. After repeated trials of these new remedies, there is still a feeling predominant among those interested in the subject, that the desideratum has not yet been acquired. Some of the best disinfectants are in themselves objectionable; they either possess a disagreeable odour, or will stain and corrode. Ferrous sulphate (copperas) and manganous sulphate, though not really offensive, are comparatively inert. Iodate of calcium prevents decomposition, but if used as a local application causes too much pain. Acetic acid or vinegar is at first grateful and refreshing, but becomes sickening. Chloride of lime (erroneously so-called) as the formula shows, Ca (OCl) Cl, is an uncertain compound, whose virtue depends wholly upon the amount of free chlorine it liberates; chlorine being an irritant, corroding gas, no one would desire to have it in a room containing articles of vertu or delicate metallic ornaments. Permanganate of potassa is also a very good disinfectant; but unless sprinkled and brought into contact with the air, is not so effective as thought, and in sprinkling the solution, it will necessarily produce stains upon everything it may come in contact with; hence this is not at all desirable. Hydrate of chloral is quite offensive, and the vapour stupefying. Carbolic acid or phenol, to which so much has been ascribed, is perhaps the best antiseptic we have in use at the present day, but its odour is certainly intolerable to an invalid; its preparations are the less useful as they are less offensive.

I have now fully delineated the objections to the various disinfectants for the use of the sick-room. What we need, in my opinion, is a preparation that shall possess

* Read before the American Pharmaceutical Association.

equal, if no greater, efficacy than any now in use, without irritant properties and unpleasant odour. Such a body, we hope, is to be found in salicylic acid.

Salicylic acid seems to be related, to a certain extent, with many organic disinfectants now in use, and we may, perhaps, consider the efficacy of such disinfectants to depend on their near relationship to salicylic acid. For instance, oleum gaultheriæ procumbentis (oil of wintergreen), said by some chemists to possess remarkable absorbent and deodorizing powers, consists almost entirely of methyl salicylate. Oleum spirææ ulmariæ (oil of meadow sweet), also considered of value, is generally regarded as the aldehyde of salicylic acid. Oxybenzoic acid is isomeric with salicylic acid, $C_7H_6O_3$. Salicylic acid is intimately related to the aromatic series of acids, most of which possess antiseptic properties in a greater or less degree. Carbolic acid itself may be obtained from salicylic acid by dry distillation.

Numerous experiments made recently by the writer have fully corroborated those made by others. Salicylic acid has proved itself to have undoubted properties to prevent putrefaction and check the development of organic growths and parasites. Meat, lightly covered with salicylic acid in substance, remained sweet, while similar portions, in the same atmosphere, become offensive. Meat dipped in an aqueous solution of the acid, made the strength of 5 gr. each of salicylic acid and borax to 1℥ of water, also remained wholesome. The putrefying process was easily arrested in several compounds made for the experiment, by a free use of the salicylic acid.

No theory as to the manner in which salicylic acid exerts its influence has been advanced, but it probably acts as an antiferment, and in this manner annihilates the organic bodies produced by fermentation.

The following formulas are such as I have experimented with to my own satisfaction, and only hope they may prove as effectual and as satisfactory in the hands of others:

No. 1 ℞—Acidi Salicylici . . . . ʒ ss.
Spiritus Vini Rectificati . . . . f ℥ iv.
Olei Cinnamomi . . . . gtt. j.
„ Bergamii . . . . gtt. xv.
Balsami Peruani . . . . f ʒ ss.
Make a solution.

In order to make a solution of the above formula, dissolve the balsam of Peru in the spirits and filter, then adding balance of ingredients. The aromatics used in perfuming the above solution are as nearly chemically compatible to salicylic acid as practicable.

No. 2. ℞—Acidi Salicylici . . . . gr. xx.
Olei Gaultheriæ . . . . . . gtt. v.
Spiritus Vini Rectificati Diluti . f ℥ ij.
Mix.

In the above recipe, in the place of olei gaultheriæ the same amount of olei anisi may be added, which is also of itself a powerful deodorizer, and may be preferred by many.

The basis of these solutions is salicylic acid, and any other combinations of odours can be added if desired which would harmonize with the salicylic acid. I give one for an example:

Salicylic Acid . . . . gr. xx.
Farina Cologne . . . . f ℥ ij.
Mix.

Any one of the above recipes will be found adapted for the use in sick-chambers, to neutralize the infected atmosphere attending fevers. In typhoid fever they will neutralize the fecal evacuations, which are pre-eminently contagious. In rooms that have been closed for months, without necessary ventilation, they would destroy the microscopic fungous growths inevitably present. The lotion should be diffused in the room with the aid of a spray tube or atomizer. Its presumptive analogy to benzoic acid would suggest its application as a cosmetic, the lotion to be added to the water used for ablution. A dilution applied to erysipelas is productive of ease to patients. Its balsamic properties promote the healing of cuts and sores, besides freeing them from morbid atmospheric influences.

I hope I have shown the many advantages and powers of salicylic acid over other disinfectants to the entire satisfaction of the readers.

Although owing to the comparatively high cost of salicylic acid, it would possibly not be brought into general use, yet for minor purposes of disinfection its introduction in such a form will doubtless be met with a fair demand.

The name of such a preparation might be appropriately called *Lotio Antiseptica Fragrans* (Fragrant Antiseptic Lotion), which, in my opinion, gives the properties of the lotion in its name.

NOTES ON THE JOYOTE OF MEXICO.*

BY PROFESSOR ALFONSO HERRERA,

Member of the Mexican Society of Natural History.

In the damp, hot regions the fertile mountains of the great Mexican Cordillera grows a tree remarkable for its thick foliage, the elegance and beauty of its golden coloured flowers, and the uncommon form of its fruit. The Aztecs called it *Joyotli*, hawks-bell, on account of the use they made of the nuts as bells, but others say that it takes its name from the property of the seeds to cure the bite of the Crotalus, rattlesnake; and the wise physician, Felipe II., says: "The ancient Mexicans made use of the milky juice that the tree produces in abundance, for curing deafness and cutaneous diseases. They applied the leaves topically in toothache, and as an emollient and resolvent to tumours, and lastly, they used the fruit to heal ulcers."

At present the fruit is called huesos ò codos de fraile, bones or friar's elbow, perhaps for its resemblance to the human elbow. Among the people these seeds have a great reputation in hemorrhoids, and are applied topically after being triturated and mixed with suet.

The joyote is the *Thevetia yccali*,† DC., Cerbera thebetioides H. B., nat. ord. Apocynaceæ, tribe Carisseæ, an elegant tree whose numerous branches are covered with a greenish silver-grey epidermis, with grey wrinkles, longitudinal furrows and protuberances somewhat spirally arranged; its leaves are sessile, linear, acuminate, dark-green above and pubescent and of a lighter colour beneath, with some prominent transverse veins; the margin is entire and revolute; size, fourteen centimetres long and seven millimetres wide. Inflorescence cymose, calyx five-parted, lobes lanceolate, acuminate and beardless, corolla salver-shaped, pubescent in the lower part of the tube and throat, the tube widened above to bell-shape, the throat with five ovate appendages covered with white hairs; beneath are the stamens alternating with the lobes of the corolla; anthers sessile and lanceolate, opening with two lateral fissures. Ovaries two, united at the basis and free above, flat on the face and convex on the back, unilocular and biovulate, united on top by a fleshy ring with five incisions alternating with the lobes of the calyx. The stigma is black, head-shaped, with ten ribs at the base and a bilobulate conical top. The ovules are amphitropous, sub-globular, of parietal placentation, equidistant between the base and top of the ovary. Drupe ovoid-globular, green, with a large crest about the middle extending to near the base, but more prominent above, and with a slight furrow, and terminating in two small nipples on each side. Epicarp smooth and green; mesocarp greenish-white, very laticiferous; endocarp woody, of a dirty yellow colour, and the same form as the fruit, pro-

* From the *American Journal of Pharmacy*, April, 1877.

† Hernandez has corrupted the word *Foyotli* of the Aztecs into *iccotli*, and De Candolle used the latter as the specific name of this plant.

vided with a complete woody partition in the direction of its small diameter, and with two false ones in the other direction; corresponding with the latter towards the apex is a furrow, and near the base another one, corresponding to the true partition. Seeds four, commonly two abortive, inserted near the middle of the false partitions, on the margin with a small wing; spermoderm thin and papery, endopleura distinct and reticulate. Albumen none, radicle eccentric, horizontal, conic and short; cotyledons orbicular, unequal and oily, the internal surface transversely wrinkled; near the centre in the direction of the radicle a prominent crest; flowers in July.

Mr. Berlandier found, near Tampico, a variety of this species, to which he gives the name of *glabra*, because it has smooth leaves. We have also *Thevetia ovata*, DC., which is readily distinguished by its ovate-elliptic leaves, white-tomentose on the under surface. Somewhat westward the *Thevetia cuneifolia* is found; its flowers are called *Meriendita*. The variety *anclieuxi* is found about Tonatepec. All these species and varieties are commonly known only by the vulgar name given above, but in the State of Talisco they are called *Narcisos amerillos*.

The excessive acrimony of the seeds of the joyote attracted my attention, and induced me to investigate them. The small quantity at my disposal and other circumstances have prevented a fuller investigation, but incomplete as it may be, it may well serve as a basis for further observations.

The seeds of the joyote were conveniently divided, and by pressing in a common press, yielded 40 per cent. of oil resembling almond oil; its density at 20° C. is 0·9100; at 10° it becomes turbid, and at 0° C. it acquires the consistency of common lard. Concentrated sulphuric acid imparts a yellow, changing to rose colour, and afterwards into deep orange-red; it is a non-drying oil, and appears to be composed of olein and palmitin. The residual powder was percolated with ether, and the liquid evaporated left a residue of about the same quantity as the oil previously obtained. Distilled water was afterwards used to extract albuminous and extractive matters, and finally the exhausted substance was treated with 85 per cent. alcohol. The filtered liquid was evaporated spontaneously, and yielded a white substance, crystallizing in four-sided prisms. These crystals were inodorous, but excessively acrid, insoluble in water, and very little soluble in ether, bisulphide of carbon, fixed and volatile oils; but easily soluble in alcohol; not volatile, and not combining with acids or bases. When treated with dilute sulphuric acid, they decompose into glucose and a resinoid substance; the principle is, therefore, a glucoside. Its solution is not affected by nitrate of silver, the chlorides of platinum, gold or iron, iodide and iodate of potassium, tannin, potassa, ammonia, the alkaline carbonates, or by ferro- and ferrid cyanide of potassium. I propose to call it *thevetosin*, although *thevetin* would probably be a more appropriate name for this principle.

Some experiments made on various animals by Mr. Luis Hidalgo Carpio with the active principle of the Thevetosa Iccotli (Codo de Fraile) seeds seemed to prove that, (1) the thevetosin is very venomous; (2) that it has a violent emetic action depending upon the nervous system, like tartar; (3) that it acts on the respiration, making it difficult by paralysis, more and more complete on the external muscles of respiration.

These experiments, made on different kinds of animals, indicated that the emetic action of the different products of the joyote seeds is constant in all animals that can vomit; that the muscular system of respiration becomes paralytic, and that this paralysis can extend in some cases to the other muscles. The author thinks that thevetosin, acting so powerfully upon the animal economy, may probably become of importance, and be employed more advantageously than curare.

MEETING TO PROMOTE EARLY CLOSING.

A numerously attended meeting of chemists and druggists, convened for the purpose of considering the subject of early closing, was held in the theatre at the house of the Pharmaceutical Society, 17 Bloomsbury Square, on Wednesday evening last. The chair was taken at half-past eight by Mr. George Webb Sandford.

The CHAIRMAN, in opening the proceedings, said that there were many persons who could have filled the chair on the occasion better than he could do it, and perhaps there were many who were more enthusiastic, but he knew that there were none who were more earnestly desirous to promote the cause of early closing than he was himself. He had had a very long experience of the question of early closing, and he had, for himself, overcome the difficulties attending it, and he would ask other persons engaged in the same business also to endeavour to overcome them. When he first made his appearance in Piccadilly, the business was carried on from half-past six in the morning till eleven at night, but he was happy to say that twenty years ago he began to close at nine o'clock, and for the last four years his shutters had been closed at seven o'clock, and the shop had been finally closed at eight. He mentioned that as something which he had been able to do quite irrespective of his neighbours, and he had no occasion to repent in the smallest degree of the step he had taken. Of course he had always somebody in attendance after the shop was closed. He felt that chemists stood in a peculiar relationship to the public, for they were appealed to in certain emergencies, and it would be almost inhuman of them to refuse to supply medicines at any time at which they might be wanted. He was aware that there were differences in different neighbourhoods, and that while a business in the city might be closed at seven o'clock, a business in another neighbourhood might necessarily be kept open till nine o'clock. He, therefore, hoped that those who spoke that evening would not attempt to fix on the meeting a hard and fast line as to the hour of closing. What they wanted to do was to enlist every chemist and druggist to give his moral support to the early closing movement. He held in his hand a note which he had received, since he came into the room, from Mr. Felix Stevens, of Judd Street. Mr. Stevens expressed sympathy with the meeting, and wished it success. He had been instrumental in obtaining early closing at Clifton, and it was found to work well. United action, said the writer, was what they wanted. He had another letter which had been sent to him by Mr. Hills, who was one the most earnest supporters of the movement. Mr. Hills began by saying that he thought that the best way of carrying out the early closing movement was for chemists to cultivate a better knowledge of each other; and while he thought it advisable that they should be as obliging as possible to their customers, at the same time, if they adopted an earlier closing of their window shutters, they would be educating the public to supply their wants in medicine at the same time as they did their general shopping. The writer added that some kind of provision must be made for emergency. Mr. Shaw, of Liverpool, had written to him (the chairman), to state that some two years ago, a movement was made in Liverpool, and a small bill headed, "Notice to the Public," was issued to the customers. As far as educating the public was concerned, he (the chairman) had found, in his own experience, that they were very easily educated. When he was a young man the shops in London kept open till eleven or twelve o'clock. They must all admit that the wear and tear of chemists and druggists was very far beyond that of other tradesmen. They had to attend to a responsible business all day long, and to keep at it until eleven o'clock was, he might say, a very great danger to the public. There was a very great strain in the dispensing of medicines, and it behoved shopkeepers to provide as much relaxation as they could for their assistants. In taking the position of chairman that evening, he did so as an individual, and he was not there to represent the Council of the Pharmaceutical Society; but in saying that he by no means wished to imply, for a moment, that the Council were not favourable to the movement. They gave it their moral individual support, although they felt that if they took it up in their collective capacity as a council, and told a man when he must shut up his shop, they would introduce discord.

Mr. HARRIS (Highgate) moved the first resolution:—

"That the earlier closing of shops and offices of other trades having become almost universal, and many chemists and druggists having adopted earlier closing with advantage, this meeting deems it desirable to extend further so beneficial a change, and suggests to their brethren, chemists and druggists generally, an adoption of shorter hours of business."

Mr. LOWE (Portland Place) seconded the motion. He entirely concurred with the remarks which the chairman had made with regard to the necessity of unity. He did not see much difficulty in getting earlier closing if druggists were united, although he was afraid that it would be difficult to obtain unity in some neighbourhoods.

Mr. GREENISH (Dorset Square) said that for a period of five and thirty years he had been identified, more or less, with early closing. About five and thirty years ago he formed one of a deputation to the Council of the Pharmaceutical Society to ask them to give their moral support to the question. The answer was, and the deputation expected and wished for no other, that they would do all in their power as regarded exercising their moral influence, but they could do nothing as a council. He could bear out the statement of the chairman that at that time business began early in the morning and often extended till after twelve o'clock at night. He and other assistants had had to take out medicines after that hour, and that had happened in one of the historic houses of London. Upon going into business for himself he carried out the views which he had always held by closing his shop at an earlier hour on week days, and during almost the whole period he had closed it altogether on Sundays. He had not put a brass plate on his door to state that medicines could be obtained at any hour, but he had given his customers distinctly to understand that his establishment was never left without himself or one of his assistants being within reach. He had adopted the plan of putting up his shutters at eight o'clock, and closing finally at half-past eight, and that practice had never been attended with any inconvenience. He was only too happy to have the opportunity of following certain pursuits which were not immediately connected with his business and which were, perhaps, a little more congenial to his feelings than the vulgar habit of earning a living. The practice of putting up the shutters before the shop was finally closed tended to educate the public on the subject. Many, he had no doubt, would leave that meeting brimful of good intentions with respect to early closing, but if they went out the next night and saw a red light or a window shutter down their resolution would give way. What he would recommend each of them to do would be to go home and put his own shutters up, and, others doing the same, early closing would be an accomplished fact.

The resolution was carried unanimously.

Mr. W. C. JONES (Bayswater Road) moved—

"That this meeting is of opinion that the window shutters might be closed at 8 o'clock, and the doors at 8·30 without inconvenience to the public, and that even on Saturdays, with due regard to the requirements of the neighbourhood, an abridgment of the hours of labour might be effected."

He thought that the time had come when chemists and druggists could close shops earlier than formerly without inconvenience to the public. The matter only wanted unanimity on their part in order to be carried out.

The motion was seconded by Mr. WHITE (Regent's Park).

Mr. OWEN (Islington) did not at all believe in putting the shutters up half an hour before the door was closed. If they were going to put their shutters up at eight o'clock he should be very glad indeed if they would close their doors at the same time. To put up the shutters without shutting the doors was a mockery and a delusion, and it was an inducement to prolong the hours to an indefinite time. He had always shut customers and everybody in at nine o'clock and let them out at the side door. He should be glad to adopt an earlier hour. He believed that there was no good in the late hours. The public would appreciate those who took care of themselves.

Mr. HAMPSON (St. John Street Road) said that he closed his place of business earlier than his neighbours closed, but he did not judge his neighbours harshly on that account. Districts differed in their character and circumstances, and perfect unanimity in the time of closing could not be expected. He thought, however, that meetings of that kind would be very beneficial in promoting something of a right kind of opinion amongst druggists themselves, and he hoped that there would be some efforts made in the various localities of London to bring the chemists together to discuss the matter amongst themselves. Let chemists begin in their own localities and find what could be done. He earnestly desired to initiate some effort in his own neighbourhood, and he believed that if his friend, Mr. Owen, would join him they would be able to do some good, and he had great pleasure in supporting the resolution.

The motion was then carried unanimously.

Mr. POSTANS (Baker Street) moved—

"That while suitable arrangements should be made to supply the necessary requirements of the public on Sunday, this meeting recommends that door shutters as well as window shutters should remain closed on that day."

He said that they must not lose sight of the fact that early closing like all real progress was of slow growth. Whatever resolution they might pass they must not be deluded into the idea that they would find all shops closed at eight o'clock on the following night. The note from Mr. Hills which had been read by the chairman was so thoroughly practical in every respect that he (Mr. Postans) might be pardoned for alluding to it. He agreed with the writer that it was especially necessary that the public should be educated in the movement. It was also necessary that chemists and druggists should be thoroughly organized. As a stepping-stone towards success they had, as the chairman had told them, the sanction of the Council of the Society, which was shown in the fact that the use of the theatre had been granted for the present meeting. The approval of the Council must add very considerable to the weight of the object of the meeting. He confessed that he did not quite see why it was that they in England were so late in their business, when they were by no means so late in other countries. In Dublin and Edinburgh all druggists' shops were closed at eight o'clock, and he believed that in many districts they were closed at seven.

The motion was seconded by Mr. COOPER (Gloucester Road).

Mr. BETTY (Camden Town), thought there might be some difficulty in carrying out at once the last resolutiou passed, that they should close their shops at a specific hour, though he believed that they could all act up to the spirit of the resolution. But there was no doubt as to the motion now before them, which was that they should keep their shops closed the first day of the week, and that Sunday should be observed by chemists and druggists in the same way as it was observed by the great majority of the trades of the country. He was rather averse to half measures. If a chemist did business on Sunday let him proclaim the fact at once by taking all his shutters down instead of adopting the present practice of taking down one or two shutters, which made the shop look as if some one was dead there. The practice of keeping up a portion of the shutters on Sunday was most absurd. Let them either proclaim honestly, as the publicans did, that they were prepared to do business on the Sunday, or let them join in the general practice of observing the first day of the week.

Mr. ANDREWS (Leinster Terrace) was glad to find that the Sunday question was not to be left out. The resolution was not uncalled for. One Sunday a little while ago he went through a considerable partion of London, and found a very large proportion of chemists' shops with either some of their window shutters down or the door shutters down, and he found this to be the case in some of the larger shops at the west end of London. He did not wish to bring any odium upon individuals, but he wished to throw a little odium on the principle, which was a very bad one.

Mr. STACEY said that he could support the motion very heartily, as he could every resolution that had been passed that evening. Mr. Andrews had referred to the fact that some of the west end houses had their shutters down. It was, however, almost a matter of necessity in some cases that the shutters should be down, but it was his desire to discourage Sunday trading to the utmost. Chemists, however, had a public duty to perform or, otherwise, he should have closed his shops on Sunday long ago. They were bound to have some one on the premises to attend to the necessary requirements of the public in dispensing. In some houses it was almost impossible to avoid having the door open. Where iron shutters were in use they were obliged to have the shutters up in order to obtain light, although they kept the door upon the spring. To the passer-by it looked as if the shop was courting business although that was not the case. As the owner of a tolerably large business in three different houses in London it was his most decided wish to close those houses entirely on Sunday, and if he could have seen his way he should have done so long ago. But he did not think that chemists were justified in taking such a step. However, he cordially supported the idea that Sunday trading should be discouraged to the utmost extent. With regard to the general subject, he had very great sympathy with the early closing movement. When he went into business first he worked from seven in the morning till eleven at night, but for several years he had locked up at nine o'clock. He agreed with Mr. Greenish that it was very desirable to put the shutters up half an hour before the door was closed. It helped the business very much if the porters or the boys could do a certain amount of work in the evening instead of leaving it until the next morning, and that work could be done if the shutters were put up while it could not be done if the shop was kept fully open. His aim was to let every assistant out as early as possible although it was not desirable to expose to the public the fact that the shop was bare. The practice of having the shutters up before the door was closed also tended to educate the public, and he believed that it was one of the most important means of helping to educate them. It might be very easy indeed for those who were not in the west end of London to educate the public, but it was not easy in the west end where the public were composed of a different character and element of beings from those anywhere else. At the west end they had to deal with the aristocracy and with gentlemen and with "gentlemen's gentlemen." The manservant would receive a prescription to be made up, perhaps at five o'clock but he did not choose to bring it until he had served up his coffee and could light his cigar and fetch the medicine. This was a great difficulty at the west end, and it lay more with the servants than with the masters. It might be taken as a rule, however, that a chemist who closed at eight o'clock would do an equally good business with his neighbour who kept open till ten or eleven.

Mr. OWEN said he thought that Mr. Stacey must have forgotten while making his remarks on Sunday closing, that the chairman was in business at the west end. If the chairman had closed on Sunday, Sunday closing among druggists at the west end could be carried out. As to their opening their shops on Sunday, Mr. Betty had pointed out that they ought to do it entirely, or not at all. He (Mr. Owen) had shut up thoroughly on Sundays for nearly twenty-five years, and he had never had a single complaint of his shop being closed on Sunday. The few shillings he used to earn on Sunday were entirely made up during the week. He believed most absolutely in shutting up on Sunday, and giving every possible chance to their young men to go to a place of worship. If they failed to go, the responsibility was their own.

Mr. ANDREWS said that when he spoke, he was alluding in no way to the practice adopted by Messrs. Corbyn.

Mr. HORTON objected to the idea that those who kept their shops open on Sundays did so for the sake of the few shillings which they might obtain. But he remembered that, when he was an apprentice, an early closing movement was started, and it was agreed by the chemists in the town in which he lived, that they would close at eight o'clock. For a short time the arrangement worked very well, but at length the apprentices were sent round to see whether the shutters of all the shops were up, and when a man found that his neighbour failed to close, he refused to close his own shop. He believed that they must not be guided by their neighbours, but they must determine that they would endeavour to close at a proper hour themselves. He had latterly been putting up his shutters on a Sunday, for the sake of educating the public. When he went away from the present meeting, he would endeavour to make arrangements to avoid taking down the shutters at all on Sunday.

Mr. GEORGE HARRISON said that he was not a chemist and druggist, but he took a very great interest in early closing, and he had done so for more than a quarter of a century. As to educating the public, the chemists and druggists appeared to have been doing that for the last twenty-five years and they had achieved very little. Were they going on for another twenty-five years? The time of closing rested with chemists themselves. It was true that their business was entirely different from many other businesses, but he believed that if the assistants had stirred themselves in that matter they would have got earlier closing very soon. He would say, respectfully, to chemists and druggists that he was ashamed of them as a trade for not closing earlier. They ought to close at seven o'clock, although, no doubt, it was right that medicines should be supplied at all hours of the night in case of need.

Mr. POUND (Leather Lane) said that when he first went into business the time for closing in his street was eleven. He had brought it down to ten and subsequently to nine o'clock. If he could get another man in the street to close at eight he would close himself at that hour. [A voice, "Close without him."] In his neighbourhood a great deal of money was taken between eight and nine.

Mr. WILSON wished to make a few remarks from an assistant's point of view. It behoved proprietors as much as possible to endeavour to shorten the hours of business. He had lived in the west end for some time; and the hours there were from half-past seven till ten o'clock, the shutters being put up at nine o'clock. He was now in the city where the hours of business were from nine in the morning till eight at night. Three-fourths of the assistants left at six o'clock. Of course the city could not be made a rule for the west end. It was found that more work was done between nine and six than used to be done formerly between nine and eight. With regard to closing entirely on Sundays he did not think the difficulty was so great as Mr. Stacey seemed to imply.

Mr. HORTON said that it was a fact that a great number of assistants were very fond of closing early, but when they got into business for themselves many of them showed a great tendency to keep open late.

Mr. TAYLOR (Baker Street) said that there was no one more desirous than himself to close early. He put his shutters up at eight o'clock, and he had gone to the expense of about £24 to have his shutters altered so that he could wind them up himself, but as a rule he did not shut the door till ten o'clock. For a time he had the door closed earlier, but he was so much annoyed by persons knocking at the private door that he was at last glad to get back to the old system, but still he should try the new system once more. When the shutters were up his assistant left him all the work to do.

Mr. TURNER (Great Russell Street) said that four years ago he began the practice of putting up his shutters at eight o'clock, and closing the door at half past nine. He thought he could now safely close finally at nine o'clock. He had always kept his shop closed on Sundays.

Mr. TAYLOR added that he received many prescriptions by post at eight o'clock in the evening and they had to be made up the same night. It was impossible to legislate strictly for such a business as that of druggist.

Mr. SMITH said that his experience was similar to that of Mr. Taylor. He believed that as long as the door was open the public would come.

The resolution was carried unanimously.

Mr. LONG proposed—

"That with a view to carrying out the previous resolutions, Messrs. Hills, Sandford, Carteighe, Stacey, Greenish, Hampson, Owen, Horncastle, Andrews, W. G. Jones, Long, Butler, W. O. Jones, Stockman, Matthews, Drury, Postans, Taylor and Betty, be appointed a committee, with power to add to their number, to take from time to time such steps as they may deem expedient."

He said it was now about twenty-six years ago since Mr. Kennedy, the secretary of the Early Closing Association came to the place where he was then an apprentice. On that occasion he was innoculated with early closing principles which he had ever since believed in and acted upon. Some fourteen years since a large public meeting was held at the Kensington Vestry Hall, when the numbers were so large, that if he remembered rightly, all could not obtain admission. At that meeting it was resolved that every respectable person would purchase before, and every respectable tradesman would close at eight. The meeting was productive of much good, which had not entirely died out; not wishing to be considered otherwise than respectable, he (Mr. Long), closed the next evening at eight, and had done so ever since. The association had visited Notting Hill again, and feeling interested in the movement, he attended their meeting, and like other trades the chemists had formed a committee and held several meetings, among others, that which was reported in the Journal in February, at which it was resolved to hold a general meeting, which had resulted in the meeting that evening. He hoped that now there would be a good strong committee formed to prevent previous efforts being lost, and it remained for each individual to aid the movement, and then when they were asked "Well, what have you done?" they would be able to point to a united, friendly, and influential body who had found the advantages of early closing. There had been a preliminary meeting to decide on the resolutions that evening, and like the protocol they had been very much modified and reduced to the most modest resolutions possible. It was originally proposed to close shutters at seven, and door shutters at eight, but it had been deemed advisable to propose in the first instance eight for shutters and eight thirty for door shutters; but he need hardly say that any one wishing to close earlier or already so doing, acting as pioneers in their neighbourhood, should do so. It must be apparent that as long as they kept the shop open it was an invitation to the public to come, and many persons made a practice of coming at the last moment; but he believed the general public to be most anxious to comply with all reasonable regulations. He sincerely trusted that ere long they would be able to close at an earlier hour still, and he was not introducing a chimerical idea, for in many large provincial towns they closed at seven, and had done so for a long time and had a half holiday in the week.

Mr. BUTLER seconded the resolution. He mentioned that he was one of the persons that had prepared the resolutions for the meeting. When they were under discussion it was suggested that seven o'clock should be the hour mentioned in the resolution as the time for closing the shutters, but he had protested against the proposition, because he felt that it would not be carried. He submitted that eight o'clock was the best time to put up the shutters and half-past eight to close finally.

Mr. KENNEDY (Secretary of the Early Closing Association) said that he felt pleasure in being present that night by invitation to represent the Early Closing Association. The Notting Hill and Bayswater committee of the Early Closing Association had been the instrument through which the present meeting had been convened, and he thought that there was very great praise due to the whole of the gentlemen forming that committee, for the zeal which they had manifested, and the success which had attended their operations. He believed that the effect of this meeting would be very beneficial indeed over the whole of the metropolis. Chemists and druggists were almost the latest in closing, of any tradesmen in London, and he had often thought that when the hours were prolonged, the business was absolutely degraded in the estimation of the public. The artisan worked only fifty-four hours and a half in the week, while the chemist, at a moderate calculation, worked eighty hours, to say nothing of Sunday. His conviction was that chemists might close at an earlier hour without any loss. With regard to servants, if those persons knew that the shops would be closed if they come late, they would be obliged to go in proper time. He believed, as one of the speakers had said, that a very great deal of practical good would come of local meetings. The board of the Early Closing Association would be happy to give any assistance in their power in aid of any steps that might be taken to bring about a curtailment of the present protracted hours of business.

The motion was carried unanimously.

Mr. HORNCASTLE moved

"That the best thanks of this meeting be and are hereby given to the Council of the Pharmaceutical Society for kindly granting the use of their theatre for the present meeting."

He cordially agreed with most of the remarks that had been made that evening, and he was pleased to observe that so strong an appeal had been made to introduce individual effort in the matter. It was by such effort that so much progress had been made hitherto in the matter of early closing. They were deeply indebted to those gentlemen who had led on in the matter and who by their example had smoothed the way for smaller members of the trade to follow.

The motion was seconded by Mr. MATTHEWS and carried unanimously.

On the motion of Mr. STACEY, seconded by Mr. GREENISH and supported by Mr. LONG, a vote of thanks was accorded by acclamation to the chairman, Mr. George Webb Sandford, for his kindness in presiding over the meeting and for his able conduct of the business.

The CHAIRMAN in acknowledging the vote said that at the beginning of the meeting he felt very diffident about taking the chair, but whatever feeling of that kind he might have had had entirely vanished through what he might call the success of the meeting. It had been a very great pleasure to find them all so well disposed towards promoting an object which he had very much at heart. In this movement there must be mutual forbearance and individual action. If their neighbours did not do right let them set their neighbours a good example.

The Pharmaceutical Journal.

SATURDAY, APRIL 21, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

EARLIER CLOSING.

THE very successful and unanimous meeting held last Wednesday at the Society's House will undoubtedly give fresh impetus to the movement in behalf of the earlier closing of chemists and druggists' shops. Considerable concurrence of opinion at a meeting upon this question might of course have been safely predicted, but the harmony that prevailed, and the cordial approval accorded to all the resolutions brought forward, was due manifestly to the tact with which the promoters of the meeting had drawn up their propositions, anything like what might have appeared to some to be an extreme course being carefully avoided. Eight o'clock for putting up the window shutters, and half-past eight for closing the door, were the times to which the meeting gave its adherence, and to secure which a systematic effort is now to be made. In many establishments, this plan already obtains, and thus its feasibility is demonstrated. But it will be a great gain to have it more uniformly adopted throughout the metropolis, and then those who have so far acted as pioneers may feel justified in making a still further advance.

One great encouragement to persevere in the agitation until a satisfactory conclusion is arrived at is to be found in what has been already accomplished. Long as are the hours to which we are now habituated, it is rather startling to be reminded that a quarter of a century ago the business in some first-rate pharmaceutical establishments began at seven in the morning and lasted until eleven or twelve at night. We do not doubt that the shortening of these hours appeared to many employers of that time impracticable, but the result has been attained, and such days have gone never to return. Nor can we doubt that the time will come when the pharmacist will have as much faith as the linendraper in himself and his brother tradesmen, and will decline to have the standard of his day's labour fixed by the whims of servants or the vagaries of a few Ishmaelitish competitors. But the rate at which that good time shall approach will depend very much upon the manner in which individuals carry out deliberately the resolutions arrived at during the excitement of a public meeting. As was well remarked by one speaker, there is a danger of persons who leave such a meeting as that of Wednesday last, full of good intentions as to putting up the shutters henceforth at an earlier hour, having that enthusiasm sadly checked by the apparition of the coloured shadows of their neighbour's carboys on the pavement.

Scarcely second in importance was the subject of the third resolution, that relating to Sunday closing. The united testimony of Messrs. OWEN, GREENISH, HAMPSON, BETTY, and others, showed its practicability; as to its desirability there can scarcely be any controversy. As was unanimously conceded, arrangements should always be made to allow of the supply necessary medicines; but, in our opinion—unless Sunday trading be really desired—everything suggestive to the public that dealing in drugs or medicines on that day is courted or favoured should be carefully put out of the way. But we are afraid that Mr. BETTY's sarcastic challenge, either to shut up entirely, or to take down the shutters entirely and trade openly on Sundays, like the publican, was not wholly undeserved in some quarters.

In order to secure the advance already made, and to favour fresh progress, an influential Standing Committee was appointed by the meeting to watch the progress of the movement. We would suggest that a small handbill, similar to that used in Liverpool, should be drawn up under the sanction of this Committee, and that this should be taken as the platform at the local meetings which we hope will now be organized.

PHARMACY IN VICTORIA.

AT last the efforts, spread over several years, of the pharmacists of Victoria have been successful, and an Act to regulate the practice of pharmacy in that colony has passed the Legislative Assembly and Council. This law, as will appear in our *résumé* applies to the practice of the business of a chemist and druggist generally, and it was supplemented later in the same session by one dealing specially with the sale of poisons.

The new Act, which was to come into operation on the first day of the present year, is divided into four parts. Part One relates to the establishment of a "Pharmacy Board of Victoria," to consist of a President and six other members. The first Board is to be appointed by the Governor in Council, and is to consist entirely of persons who would be entitled to registration under the terms of the Act; this appointment is to be for three years, after which time the Board will be elected by the registered pharmaceutical chemists of Victoria from their own body according to regulations to be made by the Board and sanctioned by the Governor in Council. Power is given to the Governor to remove the President or any other member of the Board. The persons nominated to form the first Board are Mr. J. BOSISTO, Member of the Legislative Assembly, whose name is well known in connection with the *Eucalyptus* industry; Mr. C. R. BLACKETT, Honorary Secretary of the Pharmaceutical Society of Victoria; Mr. W. JOHNSON, Government Analyst, and Messrs. H. BRIND, G. E. GREEN, J. HOLDWORTH and G. LEWIS. The Board is to have the power to appoint a Registrar and other officers necessary for the purposes of the Act.

Parts Two and Three provide for the keeping of a correct "Pharmaceutical Register of Victoria," and persons enrolled on this Register are to be described in all regulations, etc., as "Registered Pharmaceutical Chemists." This Register is to contain the names of persons not less than twenty-one years of age who have (1) at any time before the commencement of the Act kept open shop for not less than two months as chemists and druggists or homœopathic chemists engaged in the dispensing of prescriptions of legally qualified medical practitioners; (2) those who have previous to that time been employed as dispensing assistants for not less than three months in such a shop, or for not less not less than three years as dispensing chemists in hospitals, benevolent asylums or other public institutions; (3) those who hold certificates of competency as chemists and druggists from the Pharmaceutical Society of Great Britain or any College or Board of Pharmacy recognized by the Board; and (4) those who have served not less than four years' apprenticeship with a registered pharmaceutical chemist, attended one course of lectures and passed examinations in materia medica and medical botany, and practical chemistry at the University of Melbourne or other recognized college and passed examinations under the superintendence of the Board in practical pharmacy and any other subjects prescribed by the Board and approved by the Government. This latter examination, however, is not to include the theory and practice of medicine, surgery or midwifery. A rejected candidate may present himself for re-examination after six months.

The Fees payable under the Act are, for examination before the Board, as above specified, Three guineas, after which the successful candidate is to be registered for a further payment of One guinea. The fee for registration of persons who are not compelled to be examined is Two guineas.

Amongst the miscellaneous topics dealt with in Part Four, it is provided that upon the death of a registered pharmaceutical chemist actually in business at the time of his death it will be lawful for any executor, administrator or trustee of his estate to continue the business under the superintendence of a registered pharmaceutical chemist for a period of twelve months, and no longer, unless by permission of the Board of Pharmacy. The penalty for any unregistered person carrying on the business of a chemist and druggist or assuming any variation of the title is to be ten pounds for each offence and he may also be committed to prison for six months.

The Poisons Act restricts the sale of the poisons mentioned in a schedule to legally qualified medical practitioners, registered pharmaceutical chemists, and dealers in poisons holding a certificate from the Pharmacy Board. These certificates are to be issued by the Board under certain guarantees, and upon the payment of one guinea, to persons living in places at least four miles distant from any city, town, or borough, and in which no registered pharmaceutical chemist has an open shop.

The Schedule of Poisons is divided into two parts and varies but little from the English schedule. Chloral hydrate is included in the first part, and "cyanide of potassium and all metallic cyanides," is remitted to the second. The second part also includes the line, "Arsenical preparations except green and other coloured paints and pigments." Besides the restrictions as to registration, labelling, etc., found in the English Act, no sale of a poison in the first part of the schedule is to be made in Victoria to a person under eighteen years of age, and strychnia, as well as arsenic, is to be coloured before sale, except where such colouring would render it unfit for the purpose required.

The Act does not extend to the sale of poisons contained in medicines compounded according to the prescriptions of medical men, or to homœopathic medicines, except the crude mother tinctures or when of a greater strength than the third decimal potency; neither is it to interfere with the sale of patent medicines, photographic materials, veterinary medicines, fly and similar poisons, except poisoned seed for vermin. Wholesale transactions are also exempt, provided the dealer has a written order for the supply of the poison, and that the sales be recorded and the packages be labelled "poison."

AN ACTIVE CANTHARIDAL VESICANT.

A "COUNTRY CHEMIST" recommends in the *Pharmacist* an "acetic cantharidal vesicant," prepared by exhausting the flies with acetic ether, as was suggested in the paper read by Mr. JAMES DEANE at an evening meeting of the Pharmaceutical Society last session. But the testimony he brings as to the efficacy of the preparation has a little more novelty. A physician who had kindly undertaken to give it a "proofing" applied for a second supply, which he received in a bottle. Being on his way to pay a professional visit several miles distant, he deposited the bottle in his coat-tail pocket. When he reached home he was in a position to testify to the efficiency of the preparation and had satisfied himself that "half an ounce would produce a good sized and very lively blister."

It will not be out of place to refer here to a statement, recently made, that in Algeria the military surgeons meet with cases of cantharidian cystitis among the soldiers, produced by eating the flesh of frogs, which in the months of May and June feed almost exclusively upon species of cantharides.

CINCHONA CULTIVATION IN JAVA.

The report given of the bark harvested during the latter part of last year in Java is scarcely so favourable as those previously published. The total quantity of bark obtained during 1876 was about 2000 pounds and to obtain that quantity upwards of 56,000 trees were stripped. Greater part of this bark was obtained from the *Cinchona succirubra* and *C. Calisaya* (*javanica*), and it contained an amount of quinine ranging from 0·58 to 1·27 per cent. together with from 0·18 to 4·78 per cent. of cinchonidine, small amounts of quinidine and some cinchonine. The Schukraft bark was poor in alkaloids. The Ledger bark, amounting to 1862 pounds, contained from 3·38 to 7·22 per cent. of quinine. The Crown bark contained between 3 and 4 per cent. of quinine.

During the last three months of the year 4432 plants of *C. Ledgeriana* and 2279 plants of *C. officinalis* were planted out, and in the nursery there are 205,030 seedlings of *Ledgeriana*.

INTERNATIONAL CONGRESS OF BOTANISTS AND HORTICULTURALISTS.

The Botanical Society of France and the Central Society of Horticulture have resolved to hold a Congress on the occasion of the International Exhibition in Paris between the 16th and 22nd of August, 1878, and a circular has been sent out inviting the cooperation or botanists and horticulturalists. The Organization Committee includes the names of Dr. Baillon, Dr. Chatin, M. Planchon, and several other botanists of eminence; the President is M. Lavallee, and the Secretary is M. Mer.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of the above Association will be held at 17, Bloomsbury Square, W.C., on Thursday evening next, April 26th, 1877, at eight o'clock, when a paper will be read by Mr. H. G. Greenish on "Oxalate of Cerium," and Mr. R. H. Parker will show some experiments on the presence of Cinchonidine in Quinine.

LEGACY TO THE BENEVOLENT FUND.

A legacy of £10 to the Benevolent Fund has been received from the Executor under the Will of Mr. Joseph Bower Williams, Associate in Business of the Pharmaceutical Society, of Kinver, near Stourbridge, formerly of Kingswinford, Staffordshire.

Mr. James Dewar, Jacksonian Professor of Natural Experimental Philosophy in the University of Cambridge, Honorary Member of the Pharmaceutical Society of Great Britain, has been elected Fullerian Professor of Chemistry at the Royal Institution, in the place of Dr. Gladstone, resigned.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

The seventh meeting of this session was held in the Society's Rooms, 119a, George Street, Edinburgh, on Wednesday evening, 13th April. The chair was occupied by Mr. William Gilmour, President of the Branch—

The subject of the evening was:—

Experimental Illustrations of Recent Modes of Water Analysis.

BY J. FALCONER KING, F.C.S

Analyst for the City of Edinburgh.

One of the most important applications of chemistry to technical purposes is in the examination of substances intended for common consumption. For many years the processes which we possessed and employed in this department were of a very crude and unsatisfactory description. Of late, however, these old processes have either been entirely discarded and replaced by others, or have been very much improved. As examples of this improvement, I may mention my friend Dr. Muter's process of butter analysis. Ten or twelve years ago an analysis of butter was confined to determining the amount of salt, water, curd, etc., and no attention worth speaking of was directed to what is by far the most important adulterant viz., foreign fat, and the reason of this most serious neglect was simply our inability to detect or estimate with any degree of certainty, any of this ingredient which might be present. Then, again, take the important article of food, bread. We all know that this substance at one time, at all events, was occasionally adulterated with alum, etc., but as no short reliable process was known for the detection and estimation of this salt when occurring in bread, the law was rarely brought to bear upon defaulters who endangered the public health by adulterating in this way the staff of life. Now, however, things are changing; we have now an admirable and easily workable process for the detection and estimation of alum in bread, so that this form of adulteration is, I believe, rapidly disappearing.

It used to be said of some of the old processes for the detection of alum in bread, that they were so good and delicate, that they not only never failed to detect alum when it was present, but even often succeeded in doing so when there was no alum present at all. I might enumerate some more of these processes, such as those employed in the examination of wine, whisky, etc., but my time is short enough for the work proper which is before me. I merely mentioned these one or two improvements to introduce that which is a short experimental illustration of the great improvements which have taken place in late years in our modes of water analysis. It would be almost amusing, if it were not such a serious matter, to think of and criticize these old processes, such as that for the detection of alum in bread, but when what used to be and in some quarters was until quite recently, the process of water analysis, the process by which such an important article as water was declared to be suitable or the reverse for domestic purposes is described, one is apt to be disgusted rather than amused. Formerly, either from some wrong ideas or from inability to detect or estimate certain substances, that which is frequently the most potent cause of bad water was seldom or never determined. The results of an analysis of water, as reported by chemists a few years ago and as reported by some even yet, show with great minuteness the amounts of the different salts which are present, a matter, the determination of which is a tedious and, unless in very exceptional cases, a useless operation. Besides the entries showing the amounts of the different salts present, there was introduced at the end of the analysis a figure which was supposed to represent the amount of organic matter which the water contained. It would be difficult indeed to say what this figure really did indicate, but not so difficult to say what it did not. Whatever it was, it was certainly not organic matter. It was arrived at by noting the loss, after certain deductions and allowances had been made, which a water residue suffered when it was exposed to a red heat. There could hardly be a greater mistake, as I dare say all who hear me now will admit, than to imagine that the loss of weight here really represented the amount of organic matter present in the water; or even supposing that it did correctly show the amount of this ingredient, there could hardly be a greater fallacy than to regard it as a correct mode of judging of the suitability or unsuitability of a water for domestic use. I should here mention, however, that tonight I am to be understood as speaking simply of the analysis of waters intended for domestic use, and not of such as are intended for manufacturing operations, such as brewing, tanning, paper-making or the like.

In table B I show the mode in general use in former years, and which is still used in some cases, in reporting the results of an analysis of water. From that table it will be seen that by far the greatest amount of time and labour has been bestowed upon ascertaining the exact amount of calcium carbonate, etc., which the water contained, and also upon eliciting other similar information, all of which is of little or no value, while the ingredient which should have had most attention is pushed in at the end as if it was of little or no consequence.

When I say that a knowledge of the exact amount of the different lime and magnesia salts in a water intended for domestic use is not of much use, I do not wish it to be understood that my opinion is that the character of a water as a beverage is not influenced by the presence or absence of these ingredients. We all know for example that it is not a proper thing to imbibe in the water we use large quantities of carbonate or sulphate of lime or other earthy salts; but what difference does it make, whether the water we drink contains two or four grains per gallon of carbonate of lime or sulphate of lime, and yet the only information we get from such an analysis as this is in regard to these points. As showing in any way the quality of the water, the item at the end, the so-called "Organic Matter" is simply absurd. It is so in the first place, as it does not show in any way the amount of organic matter present; and it is so in the second place because even though it was a correct measurement of the real amount of organic matter present, it tells nothing whatever of the nature of that.

It would then simply show the quantity and not the quality of that. Reporting in this way is something the same as if a chemist who had analysed the contents of a stomach, reported that he found so much foreign matter present without mentioning whether the foreign matter was pea soup or prussic acid.

We are all aware that certain kinds of organic matter are perfectly harmless, while others we know certainly are very deteterious.

For example one water we will say is mixed to a small extent with gum arabic or wheat starch, and another is contaminated by some decomposing animal matter. By this mode of analysis both of these substances would be described as organic matter and if the former water contained twice as much as the latter of this organic matter, it would be condemned as being the worst; whereas we all know that the reverse would be true. A grain or two per gallon of such things as sugar or starch would not do much if any harm, while even an exceedingly small quantity of decomposing animal matter we are well aware is by no means an unimportant element of impurity in a water intended for use as a beverage.

The peculiarity of the mode of water analysis which I have adopted is that while a proper amount of attention is given to the saline constituents, such as carbonate of lime, chloride of sodium, etc., the most important part is determining the quantity of deleterious matter present, I do not pretend to estimate the total amount of organic matter, indeed I question very much whether that could be done, but even though it could it would not, as I have already indicated, be of much use in enabling us to arrive at a safe conclusion as to the suitability of a water for domestic use. What we want is the amount of really deleterious matter present, and the estimation of that in such forms as nitrogenous organic matter, nitric acid, iron, lead, copper, arsenic, etc., occupies the principal share of my attention in making an analysis of water.

My analysis when finished is reported in the form exhibited in table B. There it will be seen I set forth, 1st. The amount of total solid residue, which is divided into volatile and fixed. The fixed residue is next tested, and if from the results thus obtained it is deemed necessary, the principal salts are determined and the result written out, either *in extenso* or in the short form given in the table.

I will now proceed to demonstrate experimentally, as far as time will allow, the modes I pursue for the determination and detection of the different ingredients named in the table.

1. Total residue—by evaporating one pint carefully in a platinum basin in a place free from dust; carefully weighed, ignited and again weighed; noting carefully any peculiar change which may may take place on ignition.

2. Residue dissolved in dilute acid; any insoluble filtered off and examined; most likely silica: ammonia and ammonium chloride added to filtrate; any precipitate filtered off and examined; lime and magnesia then estimated and if those when calculated into salts fall much below the saline residue a fresh portion may be evaporated and further examined.

3. Saline and albumenoid ammonia as follows. Process described.

4. Nitric acid. Qualitative and quantitative. Process described.

5. Chlorine. Process described.

6. Iron. Process described.

7. Lead, copper, arsenic, etc. Process described.

8. Hardness. Process described.

9. Colour. Process described.

Mr. H. C. Baildon proposed, and Mr. John Nesbit, Portobello, seconded a vote of thanks to Mr. King for his interesting exposition, which was warmly responded to by a large and appreciative audience.

The Hon. Secretary announced the following donations: To the museum: Specimen of Radix Aconiti Heterophylli, from Dr. Moinet; Algarobilla Beans, from Mr. William Wallace, of Glasgow.

To the Library: 'The Year Book of Pharmacy for 1876,' from the editor.

The Chairman intimated that the last meeting of the session would be held on Monday, 23rd April, when Dr. A. P. Aitken, chemist to the Royal Agricultural Society, and Dr. William Craig, Lecturer on Materia Medica, Edinburgh School of Medicine, had promised to give papers.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The usual monthly meeting of this Association was held in Anderson's College, on the 11th inst. Mr. Kinninmont, vice-president, presiding. The business of the evening was the reading of a paper on "Paracelsus," by Mr. Samuel McCall Frazer. The paper gave a brief but interesting sketch of the life and career of Paracelsus as a physician, and the great opposition he had to contend against in endeavouring to establish the use of such chemicals as mercury and sulphur in the treatment of disease. Mr. Frazer also touched upon the philosopy of Paracelsus, and concluded by referring to the more important discoveries he made in the domain of medicine and pharmacy. At the close Mr. Frazer was awarded a warm vote of thanks for his most interesting paper.

The arrangements for the botany class, to be commenced on the 17th inst., by Professor Keddie, in the Free Church College, were then announced and the assistants connected with the Association urged to take advantage of it. Attention was also called to the announcement made in the report of the last meeting of the Council of the Pharmaceutical Society that Mr. D. Frazer had decided not to stand for re-election, and after some of the members had expressed their regret that Mr. Frazer had come to such a decision and their high appreciation of his work as a member of the London Council, the following motion was unanimously agreed to:—"That this meeting sincerely regrets the President's decision to retire from the London Council at this time, and instructs the secretary to convey to Mr. Frazer its warmest thanks for the great service he has rendered the trade generally, and especially the druggists of the West of Scotland, by the earnest and disinterested manner in which he has discharged his duties as a councillor at the London Board, since his first election in 1871; and trusts that he may, at some future time, be induced to stand for re-election."

Two new members were proposed and the proceedings were brought to a close.

REGISTERED CHEMISTS' ASSOCIATION OF LIVERPOOL.

The second annual meeting of the Registered Chemists' Association of Liverpool was held at the Royal Institution, Colquitt Street, on Thursday, April 5, at three o'clock, p.m., when the report of the committee and the treasurer's financial statement, duly audited by two members, were read and adopted. Mr. Abraham was unanimously re-elected president, and Messrs. Woodcock, Shaw, Fletcher, Blackbourn, Mackinlay, Stewart, N. Joseph, Wm. Evans, and Wm. Wright, were elected members of committee, in place of those who retired by seniority, and to fill two vacancies which had occurred. At a meeting of the committee on the 17th inst., Mr. Redford was unanimously re-elected vice-president, Mr. Shaw, treasurer, and Mr. Benjamin Dickins, hon. sec., in place of Mr. Wharrie who retired from the office. It was resolved that a second and re-arranged edition of the 'Retail and Dispensing Price Book' should be at once got up.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of the above Association was held at 17, Bloomsbury Square, W.C., on Thursday evening, April 5, 1877, when a paper was read by Mr. G. W. Bullen on "Starches." The author explained at the commencement that he had not treated the subject with reference to any particular branch, but in as general a manner as possible as he thought that would prove of most benefit and use to them as students. The following is a short abstract:—

"The substance known as starch or fecula is a highly organized body, occurring almost universally in the vegetable kingdom. It is incapable of assuming the crystalline condition, but has a cellular structure and is not producible by artificial means but only under the influence of the so-called vital force. Starch is found in greater or less abundance in all parts of plants, more especially in those organs that are of matured growth and excluded from the light. Starch is not, however, confined to the vegetable kingdom, as a substance almost identical with it has been found in certain animal tissues, as the brain, spleen, kidneys, etc., but this variety differs in being more or less associated with azotised matters. Starch belongs to the class of bodies termed carbo-hydrates, its formula being $C_6H_{10}O_5$. There are several other substances having precisely the same formula as starch, viz., dextrin, inulin and cellulose, which resemble one another in many respects; *e.g.*, they all possess the same percentage composition, each one is also capable of being converted into sugar, and upon treatment with nitric acid, oxalic acid is one of the products in the case of each. The character of these isomerisms is not as yet understood, so that they are provided with identical formulæ.

"Starch is almost always deposited in the form of granules, which vary very much in size and shape according to the source from whence they are obtained and the inequality of pressure and growth at different parts of the surface. The smallest granules are obtained from maize, rice and cereals generally, the largest from columba root, tous-les-mois, potato and maranta. With reference to the mode of development of the starch granule, several theories are maintained. Some observers, and, among others, the late Dr. Pereira, believed that the granule was composed of concentric scales of deposit of varying thickness, and that the striated lines were due to the edges of the scales being visible. Others consider the granule to be composed of an external membrane containing within it granular matter and describe the concentric lines as corrugations of the investing wall. According to Nägeli and Sach the granules are developed by internal deposition or intussusception. This theory is mainly founded upon the distribution of water through the granule, the exterior being supposed to be denser and less watery than the interior and the striated lines to be formed by sharply defined watery layers. The most popular theory is that which maintains the development by external deposition, and, from what has been written up to the present, this one seems to have the preference. Starch exhibits varied and numerous phenomena when placed under the influence of certain chemical and physical agents, such as polarized light, heat, nitric and other acids, both concentrated and diluted, iodine, etc.

"The method of obtaining starch varies according to the source. One of the simplest is that adopted for obtaining it from the potato. The tubers are first washed and cut into slices or rasped by machinery; the pulp thus obtained is placed upon a sieve and repeatedly washed by a stream of water; the starch passing through is allowed to settle, washed and dried. Potato starch is principally used in the manufacture of dextrin and glucose syrup. In obtaining starch from wheat a more complex method is requisite, because in wheat the starch is accompanied by an azotised material termed gluten. The grain is first coarsely powdered, wetted with water and allowed to ferment. It is then transferred to a large vat, mixed with a large quantity of water and the fermentation allowed to proceed for three or four weeks. During this operation the gluten of the grain undergoes putrefaction and by its action converts the sugar of the seed and part of the starch into lactic and acetic acids, which dissolve that portion of the gluten which has escaped putrefaction. The starch thus obtained is repeatedly washed, then drained, cut into square pieces, which are placed upon half burned bricks so that they absorb the moisture. It is then packed in paper, labelled, and placed in a stove, where it splits up into characteristic columnar masses, the cause of which phenomenon is not conclusively known. In the preceding process much of the starch is wasted, the whole of the gluten is lost, and offensive gases are also evolved from the putrefying nitrogenous matter. These losses and inconveniences were met by Mr. O. Jones, in 1840, when he took out a patent which he applied to the manufacture of starch from rice. The value of this process consisted in dissolving out the gluten by means of a weak alkaline ley, consisting of about 200 grs. hydrate potassium or sodium to one gallon of water. The gluten may be recovered by neutralizing the alkaline liquor with sulphuric acid.

"The majority of the valuable dietetic starches, as Maranta starch, from *Maranta arundinacea*, Portland arrowroot, from the tubers of *Arum maculatum*, East Indian arrowroot, from the rhizomes of *Curcuma angustifolia*, Brazilian arrowroot or tapioca meal and tapioca, from the juice of *Manihot utillissima*, Tahiti arrowroot, from the roots of *Tacca oceanica*, sago, from the interior of the stems of several species of sago palm, tous-les-mois, from several species of *Canna*, are all obtained from their respective sources, either directly, according to one of the two methods adopted for obtaining it from the potato or from wheat, or a modification of those methods."

A vote of thanks was then accorded the author for his interesting paper; also, votes of thanks to Professor Attfield and Mr. Holmes for microscopic slides and diagrams.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The Molecule and the Atom.*

BY PROFESSOR G. F. BARKER.

(*Continued from p.* 846.)

Our second question concerning the atom refers to its motion: Have the atoms within any molecule a motion independent of that of the molecule itself? Since, while all molecules in the gaseous state are of the same size, they contain widely different numbers of atoms, and thus without interfering apparently with each other, it follows that the spaces separating the atoms within the molecule must be far greater than the diameter of the individual atoms. The *à priori* argument, therefore, renders highly probable the existence of atomic motion within the molecule. And the actual facts observed justify this conclusion. Clausius has shown on the dynamical theory of heat that the total energy of all the motions in a gas is proportional to the absolute temperature.† But the total energy of a gas is made up of that due to the progressive motion of the molecules as a whole, and of that arising from the vibratory and other motions of the constituent atoms. And as these are parts of a connected system, it is evident that there must be a definite ratio between the total energy of any gas, and the energy of the progressive motion of its molecules, which is the measure of the temperature. This ratio has been actually measured in the case of air and of several other permanent gases. The most satisfactory evidence, however, of the existence and of the nature of atomic motion is afforded by the phenomena of spectrum analysis.‡ Since within certain limits the atoms within any molecule do not part company, it is clear that their motion must be of the nature of a vibration or a rotation while that of a molecule is progressive. It is obvious then that molecular motion must be excessively complicated, and its expression entirely beyond the powers of analysis. But, on the other hand, atomic motion is simple, being either directly harmonic, or capable, by Fourier's theorem, of resolution into a definite number of harmonic motions. Consider now what takes place in a gas at ordinary temperatures. The molecules, moving with great velocity, are continually impinging upon each other. The shock of the impact not only alters the direction of the moving molecule, but it sets into motion its atomic system; and this vibration, which is harmonic, preserves its character during the whole of the free path it traverses, or until the next encounter. While, therefore, the amplitude of the vibration is determined by the force of the collision, the period is fixed by the constitution of the molecule. If, now, the temperature of the gas be raised, the velocity of its molecules will be increased, and with the increased force of collision the amplitude of the atomic vibration will become greater. And if this vibration, when its amplitude becomes sufficient, be communicated to the surrounding ether, it will produce therein waves of a definite length and refrangibility. These, when analysed by a prism, will give a spectrum consisting of bright lines corresponding to these refrangibilities. The spectrum lines of the elements, then, represent simply disturbances of the ether by regularly vibrating molecules. Hence, the spectrum becomes a test for the vibration of the atoms within the molecules; and, therefore, since the period of vibration is fixed for every atom, a test for the atoms themselves wherever situated, provided only their light can reach the eye. The period of the hydrogen atomic motion in the laboratory coincides exactly with that which takes place on the sun, on Sirius, or even in the remotest nebula of space.

The greater the tenuity of the gas, the longer, obviously, is its free path, and the greater the time during which the harmonic vibration is uncomplicated by collisions. Hence the purity of the spectra of rare gases such as hydrogen, and of all gases when rarefied artificially. If, on the other hand, the density of a gas be increased, the free path is shortened, the collisions become more frequent, the regularity of the vibration is disturbed, and the spectrum lines widen to bands. Finally, the molecule has little or no free path, its motion becomes complicated, waves of all lengths are produced, and, as Frankland and Lockyer have shown,* the spectrum becomes continuous. The same result is attained by an increase of temperature. The increased velocity of the molecule increases the shock of collision, and consequently the amplitude of the vibration. At the same time waves of shorter period are developed, so that the final result is a continuous spectrum as before. In the case of liquids and solids, as we have seen, the molecules have scarcely any free paths. Whence it follows that liquids and solids, when incandescent, can give only continuous spectra. This is a well-known fact.

A third argument for the existence of atomic motion is based on the phenomenon of dissociation and on the mechanical theory of electrolysis. The opinion has been expressed by Clausius† that under certain circumstances the atomic vibration developed by molecular collision may be so intense as to overcome the attraction by which these atoms are held together, so that they go wandering about seeking new partners. If the conditions are such that during a given interval of time as many of these atoms unite as separate, and this in the same way, then evidently there will be no change in the composition of the gas. But if the temperature is so high that there are more separations than unions, the unions being less complex, then there is dissociation. The same assumption Clausius makes use of to explain electrolytic decomposition.‡ If, while this rapid decomposition and recomposition of molecules is taking place, some directive force be introduced, tending to urge certain of the atoms in one direction, and others in the opposite, there will obviously be a tendency for similar atoms to unite, since they find themselves associated. Hence, electrolysis produces simpler molecules from complex ones. Wiedemann has adopted this hypothesis, and has extended it, by compar-

* Address before the Chemical Section. From the *American Chemist*, November, 1876.

† *Phil. Mag.*, iv., xiv., 211, 1857.

‡ Maxwell, 'Theory of Heat,' 306, 1871; Tait, 'Recent Advances,' 245 et seq.; Hoppe-Seyler, *Pogg. Ann.*, cxlvii., 101.

* 'Proc. Roy. Soc.,' xvii., 288; Plücker and Hittorf, *Phil. Trans.*, 1865, 1; Wüllner, *Pogg. Ann.*, cxlvii., 321.

† *Phil. Mag.*, iv., xv., 101; xxiii., 417, 512; Williamson, *Phil. Mag.*, IV., 1850, 350.

‡ *Pog. Ann.*, ci., 338, 1857; *Phil. Mag.*, iv., xv., 94.

ing the phenomena of electrolysis to those of diffusion.* He believes that the electric conductivity of an electrolyte depends upon the coefficient of diffusion of its constituent elements through each other.

The power of atoms to enter into combination with each other is usually ascribed to a force of attraction resident in them. The combining power of an atom is distinguished: first, by the quality of its action; and second, by the quantity of this action. The first of these was prominently recognized in Berzelius's electro-chemical system,† and the elements were classified as relatively positive and negative, according as they were evolved in electrolysis at the negative or the positive pole. The entirely distinct character of these two parts which the elements may play, and the wide differences of properties which are apparently due solely to this difference of quality in the combining power, go far to give it a prime importance. But why, for example, the union of hydroxyl to chlorine should yield an acid, and to potassium a base, we cannot as yet form any idea. The quantity of the combining power possessed by an element, as at present used in chemistry, is somewhat ambiguous, it being employed in two different senses. In the first place, it signifies the quantity of a standard element, with which the atom can combine, and under this definition is commonly called equivalence. Its second signification refers to the strength of the attraction with which an atom holds another of whatever kind; this conception is fixed in the word chemism. There is at present no known relation between the two quantities now defined. An atom may have a large equivalence, and at the same time its chemism may be very feeble. Indeed, from certain facts it would appear that in a certain sense the chemism of a body is inversely as its equivalence.

The equivalence of an atom is measured always by the number of hydrogen atoms with which it can combine or which it can replace. But as the whole value of the idea depends upon the invariability of the standard, and as there is no good reason why the hydrogen atom alone of all the sixty-four at present known should have an invariable equivalence, it cannot be long before the conception of equivalence will be merged in some higher generalization. There is no question that the theory now under discussion has been and still is of the greatest service in chemical science, the whole superstructure of organic chemistry resting on the tetrad character of carbon first established by Kekulé.‡ Notwithstanding all this, it is impossible to form any conception of its real essence. Why, for example, should the equivalence of an atom vary by two, so that when once even it always remains even? Again, what shall determine the upper limit of equivalence? The highest equivalence of any atom which has thus far been directly ascertained is six in tungsten, when it forms the hexachloride; though indirect evidence renders seven and even eight probable. Clarke, in a paper read before this section last year,§ came to the conclusion, from geometrical considerations, that the highest equivalence possible to any atom is twelve.

We have already defined chemism as an attraction between atoms, in view of which they unite with one another. Relatively, approximate measures have been made of the value of the chemism for different atoms; but no determination of its absolute strength has yet been given. One of the most successful early attempts to measure the chemism of atoms is that of Berthollet. In his 'Statique Chimique'‖ he formulates the two laws known by his name, which have been of much service,

* 'Die Lehre vom Galvanismus und Electromagnetismus.' 2te Aufl., I., 626, 1872: *Pogg. Ann.*, lxxxvii., 321.

† 'Lehrbuch der Chemie,' 5te Aufl., I., 105, 1843.

‡ *Ann. Chem. Pharm.*, cvi., 136; Jahresb., xi., 221, 1858.

§ 'Proc. Am. Assoc.,' xxiv., 99, 1875.

‖ 'Essai de Statique Chimique.' 2 vols. Paris, 1803.

especially as modified by Dumas.* He rejected the idea of an "elective affinity," and showed that when a base in solution was acted on by several acids, it was divided among them, the activity of each acid being proportional to its chemical mass; or, as we should say to-day, to the product of the reciprocal of its equivalent by the number of equivalents.† In the light of present science, we see that he mistook physical for chemical phenomena, and that his laws are founded upon molecular rather than upon atomic attraction. Let me observe here that the tables of affinity so called, found in text-books, though now fortunately more rare than formerly, are useless for the same reason.

For nearly all the light which has been thrown in recent years upon chemism, we are indebted to electrical and thermal investigations. The magnificent development given to the science of energy during the past one or two decades, while it has not enabled us to approach nearer to the essence of attraction, has yet enabled us to measure it accurately in terms of work. The strength of gravity is expressed in units of work or foot-pounds, the force being greater according as more work must be done against it in moving a body of given weight through a given distance. But as Joule has shown that one heat-unit is mechanically equal to 772 foot-pounds,‡ it is evident that the force may be measured in terms of the heat absorbed in overcoming it, or in terms of any other force so employed.

Considering in the first place electrical investigations in this direction, we find that the force of chemism has been shown by Thomson to be capable of expression in a perfectly definite measure, that measure being electromotive force.§ The numerical value, he says, of the electromotive force which expresses the resultant chemism involved in a given reaction is equal to the mechanical value of the whole heat evolved during this reaction, when one electro-chemical equivalent of each substance entered into the combination. The electro-chemical equivalent here referred to is the same as that derived by Faraday from electrolysis, and according to which he classified the elements.‖ It may be defined as that quantity of matter which has the same combining or replacing power as one part of hydrogen by weight. If, for example, an electric current of precisely the same strength acts upon hydrochloric acid, water, and ammonia, for every molecule of hydrochloric acid decomposed, one half of a molecule of water and one third of a molecule of ammonia will suffer decomposition. It will be noticed that the quantity of hydrogen set free is the same in each case, and hence that that of the other constituent, being the quantity which combines with one part of hydrogen, is its electro-chemical equivalent. By this rule, therefore, the quantities represented by H, Cl, $O_{\frac{1}{2}}$ $N_{\frac{1}{3}}$ $(SO_4)_{\frac{1}{2}}$ are electro-chemical equivalents of these bodies. Precisely as, in accordance with the theory of energy, force is evolved in chemical union, so in electrolytic separation it is absorbed. Hence there is developed in the circuit a counter electromotive force which is proportional exactly to that fraction of the energy which is transformed into chemism.

In case there is no resistance in the external circuit, and consequently no work done there by the current, all the heat evolved appears in the battery cells themselves; while if chemical decomposition takes place in the external circuit, there is less heat in the battery, the kinetic energy of heat being converted into the potential energy consumed in overcoming chemism.

But the most light which has been thrown on chemism has been that derived from thermo-chemical investiga-

* 'Leçons sur la Philosophie Chimique.' Paris, 1836.

† Berthelot, *Ann. Chim. Phys.*, V., iv., 206, 1875.

‡ *Phil. Trans.*, 1850, 61; Q. J. Chem. Soc., iii., 316.

§ Mechanical Theory of Electrolysis, *Phil. Mag.*, Dec., 1851; Report on Elec. Standards, 'Proc. Brit. Assoc.,' 1863, Art. 54.

‖ 'Experimental Researches in Electricity,' Ser. vii., Par. 824, 846, Jan., 1834.

tions, particularly those of Berthelot* and Thomsen.† In these investigations the object has been to make a careful study of the thermal changes which take place during chemical reactions. The results which have been obtained are formulated in three most important laws by Berthelot, which are as follows: ‡

1st. The amount of heat set free in any chemical reaction whatever is a measure of the total work, both chemical and physical, accomplished in the reaction.

2nd. If a system of bodies, either simple or compound, taken under definite conditions, undergoes physical or chemical changes capable of bringing it to a new state without producing any mechanical effect exterior to the system, the amount of heat which is set free or absorbed as the effect of these changes depends only on the initial and final state of the system; and remains the same, whatsoever be the nature or the order of the intermediate stages.

3rd. Every chemical change which is effected without the aid of foreign energy, tends to the production of that body or system of bodies which evolves the most heat.

The value of these laws to the elucidation of all questions of chemical dynamics can hardly be over estimated. We have now, however, to concern ourselves only with the third, in illustrating the subject under discussion. In the first place, it should be observed that this law is a necessary consequence of the theory of energy. The amount of energy which a body has is a measure of the force with which it can combine. If such a body in combining does not part with all its heat, it will have the power of entering anew into combination, *i.e.*, it will be unstable. Hence, the larger amount of heat which the body loses in combining, the more stable the compound which is formed. The analogy with mechanical equilibrium is complete.

(*To be continued.*)

Parliamentary and Law Proceedings.

Attempt to Poison by a Servant.

On Tuesday, at the Manchester Police Court, Martha Baker, 59 years of age, was charged with attempting to murder her mistress, the wife of Mr. French, an accountant carrying on business in Manchester. Mrs. French being unwell on Wednesday morning, the prisoner was sent to the surgery of Mr. Rix for a bottle of medicine. Mr. Rix gave the prisoner the medicine, and when she returned home the prisoner said Mr. Rix had told her to make Mrs. French take the medicine, and that she must not mind if it made her sick. Mrs. French took two doses, and the result was that she was rendered very ill, and on the bottle being sent back to Mr. Rix he found red precipitate in such a quantity as to cause death if Mrs. French had taken much of it. The precipitate had been put into the bottle after it left his hands. He denied that he told the prisoner that the medicine would make Mrs. French sick, or that she was to make her take it. After giving Mrs. French the medicine, the prisoner told Mr. French that she was afraid to stay in the house alone as his wife might die at any moment. On being apprehended the prisoner said she did not administer the poison, and then asked, "Have you found out where I bought it?" She was remanded. —*Times.*

* Favre and Sibermann, in *Comptes Rendus*; Berthelot, in *Ann. Chim. Phys.*, Ser. iv.

† Thomsen, in *Pogg. Ann.*, *J. Pr. Ch.*, and *Ber. Berl. Chem. Ges.*

‡ *Ann. Chim. Phys.*, V., iv., 5, 6, Jan., 1875.

Review.

TABLES OF MATERIA MEDICA. A Companion to the Materia Medica Museum. By T. LAUDER BRUNTON, M.D., F.R.S., etc. London: Smith, Elder and Co. 1877.

The avowed object of the author has been to make these tables useful as a companion to the materia medica museum, so that by using this little work the student may be able not only to recall what he has learned from lectures and text-books, but to marshal the knowledge he has obtained. The principle which the author has built upon throughout is the law of association. The articles are grouped together in such a way that the student takes first in order the substance from which the other compounds are derived; thus among the acids sulphuric is taken first because it is used in the preparation of all the other acids. In this way the student learns first the tests for the most frequent impurities; for instance, after having glanced through the reactions of sulphuric acid, the use of the chloride of barium test for all the other acids becomes apparent and the fact is thus classified in his memory. In the introduction the student is directed how to use the tables, and we must confess that if he conscientiously follows out the author's directions he will find the tables exceedingly useful and will feel that he has been led to classify his information and improve his memory. The great danger in works of this kind is, lest students should substitute them for text books, and so obtain a superficial knowledge only.

The tables are divided into inorganic and organic, and an index is furnished at the end. Without the latter it would be somewhat difficult to find an article in the inorganic portion, for the tables begin with oxygen and pass on through carbon, sulphur and iodine, etc., to the acids, so that the arrangement as a whole in this portion is difficult to be understood. In the organic portion the drugs are arranged under their respective natural orders and are in consequence found with comparative ease without the use of the index. An alphabetical arrangement of the drugs in each family would, however, have been an improvement.

Great difference in type is observable throughout the list of names of the substances and appears to have been intended to give prominence to some articles and not to others, but this prominence does not appear to have anything definite about it, and we have searched in vain for any clue to its meaning. Under each substance its source, preparation, properties, reactions, impurities, source of impurity, tests, action, uses and doses are given in as few words as possible, and we congratulate the author upon the success with which he has been able to convey a vast amount of information in so succinct and clear a manner.

It is scarcely possible in this age of books to find one which is entirely perfect and this one is no exception. Although the author has consulted most of our recent standard works on materia medica, including 'Pharmacographia,' he has failed to apprehend in some cases the real meaning of the writers; thus *Empleurum serrulatum* is stated to have leaves which differ from those of *Barosma serratifolia* in not having an oil gland. Pareira brava is ascribed to *Cissampelos Pareira.*

In the organic portion the name of the substance is followed by its source, botanical and geographical; the name of the part used, mode of preparation; its distinctive characters; names of substances resembling it, how they may be distinguished; the composition of the substance, its action, use and dose.

The list of substances which may be mistaken for each other will probably prove very useful to medical students, though we venture to believe that no pharmaceutical student would confound colocynth fruit with Indian bael, or veratrum viride and valerian with arnica or senega, nor sarsaparilla with arnica. The book is of a very convenient size although a little too large for a breast pocket, and the type is very clear; and if the work be conscientiously used, as directed by the author, we feel sure it will not only be acceptable, but very useful to students of medicine preparing for examination. We cannot, however, recommend it to students of pharmacy who wish to pass the examinations of the Pharmaceutical Society.

Correspondence.

**** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Medicine Measures.

Sir,—Before proceding further in the discussion about the mode of measuring medicines, it might be as well to consult and ascertain the opinion of those first interested, namely, the prescribers.

I would like to know why the dispenser should take upon himself the responsibility of reforming the present system. Surely it is known to the physician and to most people, that table, dessert, and teaspoons vary in size, and knowing it, I believe as a rule the smaller size is adopted.

It is not unusual for a physician to prescribe a measured tablespoonful and so on, and sometimes he will distinctly order that a measure glass be provided, showing that he prefers to impress accuracy on the patient himself; besides it is not wise to exercise too great eagerness or anxiety that your customer should take an accurate dose of medicine; the motive is not always disinterested, and in many cases, where arsenic, strychnine and other potent ingredients form part of a prescription, it is quite opposed to the wish of the physician that any uneasiness or curiosity should be raised in the mind of his patient by the officious act of pointing out that the medicine must be accurately taken.

Referring to exceptional cases, where the patient is too poor or unwilling to invest in an ordinary measure glass, and the bottle cannot be accurately graduated, it is a very simple and inexpensive fact, as Mr. Long suggests, to present your customer with a phial the exact size of the dose required.

With due deference to the opinions of those gentleman who have interested themselves in this matter, I look upon the proposed alterations and suggestions as an unnecessary interference between the physician and the patient, and adding one more link to the chain of responsibilities which already encircles the business of a chemist and druggist.

THOMAS W. HORSLEY.

Notting Hill, April 17, 1877.

Sir,—After reading Mr. Proctor's paper and the discussion which ensued on the subject, "Medicine Measures," in your impression of last week, I feel impelled once more to offer a suggestion, made me by last year, which at the time met with a little ridicule at the hands of one of your correspondents, but which, notwithstanding, I continue to think would be a means of surmounting the present difficulty if adopted.

I would propose that the spoon shall continue to be recognized as hitherto, with the modification detailed below until, at least, the public become better acquainted with the more correct graduated measures. In the next place, makers should be required to produce spoons of the exact capacities of f℥ss, fʒij, fʒj, etc., stamped with some distinctive mark, which may easily be determined upon; for instance, the words:—"Official," "Medicinal," or "Imperial," might be prefixed, the inscription reading somewhat thus:—

Official Tablespoon
(Capacity—Half a fluid ounce).

This would enable the physician to designate, in familiar terms, the exact quantities he wished to be administered; and the dispenser would feel safe in translating the signs f℥ss, fʒj, etc., into such words as "Official Tablespoonful," "Official Teaspoonful," knowing that such stamped spoons would have the capacities so indicated.

If prescriber and dispenser concurred in insisting upon the use of the stamped articles, and those only, I do not think the public would be long in adopting the system also. Meanwhile, however, such "Medicine Measures" as those Mr. Proctor has been at so much pains to bring to perfection might be dispensed or sold wherever practicable; but in those neighbourhoods where the medical man does all his own dispensing I am afraid a long time would elapse ere such desirable accessories to the sick-room could be found in general use.

J. N. B.

April 10, 1877.

Ignorance, and the Cost of Teaching.

Sir,—On reading the report of the appeal on the Runcorn milk of sulphur case one is struck with the very different amount of consideration shown by the Bench to the two contending parties. To the analyst who frankly confessed his entire ignorance of medicine, pharmacy, and the sale of drugs, every indulgence was shown, whilst to the druggists credit was barely given for knowing anything, even their trade; indeed, but for the evidence of Mr. Pemberton the defence would have failed. All honour to him for nobly daring to come forward in defence of an oppressed trade, and for his vindication of the utility of a medicine hitherto despised by most of the medical profession. No one can doubt after reading his evidence that the preference shown by the public for the old fashioned article has been founded on practical experience of its superiority. Yet this medical evidence, to which alone the partial victory is due, should not have been necessary, the point in dispute being a matter of fact not of therapeutics. It should have been limited to the single question, "Is the article complained of, the substance usually known by the name employed in purchasing it?" and if there had been much anxiety to do justice no difficulty would have been found in establishing that such was the fact. The question of the presence or absence of certain ingredients is quite irrelevant, and as to the injurious nature of either one or other, there is not a single medicine which is not injurious, according to the opinion of some author.

But what concerns the trade most of all in this case is the attitude of the magistrates toward the analyst, and this really ought to have our most serious attention. It reminds us of an old story, told in all times and in all languages, of the clown who picked up a snail thinking it was some fruit and who, finding his mistake on biting it, endeavoured to conceal his ignorance and disappointment by exclaiming with an air of judicial severity, "Take that, for being so like a plum." What the snail thought of the transaction we are not told; probably some dim idea crossed his gelid brain that he was the victim of injustice, and that the superior creature might have gained information at less cost of suffering to him, but reflecting that the strongest are always in the right, he slunk off silently to get his wounds healed. Now the world has up to this time considered that the gist of the story lay in the laugh excited by the clown's clumsy attempt at deception, but the Knutsford magistrates throw quite a new reading into the old text, as they are evidently of opinion that ignorance of a subject is a complete justification for inflicting suffering upon an innocent being. The scene in court after luncheon is worthy of remembrance. After conclusive proof had been given that the analyst by a little inquiry might have assured himself that over two centuries ago several substances were known by the name of milk of sulphur, and of these one secured popular favour and has been continuously used till now, and that one was the very article about which the action was brought, you might expect from the aristocratic guardians of public morality something like a homily upon the sin of taking up hastily an evil report against our neighbour. Nothing of the kind: the court evidently sympathized with the poor analyst in his defeat by a parcel of tradesmen who knew only their business. A fellow feeling for the official, who knew nearly as little about the matter as themselves, led them to feel deeply for him. *Le pauvre homme*, they don't expect him to have the knowledge of Mr. Pemberton! Certainly not; nor of any of the druggists either. It might have embarrassed him and prevented the action.

Whilst ignorance, invested with authority, has such privileges who would wish or labour for knowledge?

As for the reasons given for refusing costs, the absence of milk of sulphur from the Pharmacopœia, I have entirely failed to fathom its application to the case. The only thing known to me at all resembling it is:—

"At Kilve there was no weathercock
And that's the reason why."

Alas for us poor druggists! How much has it cost the trade to dispel the ignorance of some five or six public analysts! After all it is but a few who have made us suffer, for wherever the position is occupied by one of common sense and knowledge of the business of life, we have nothing to fear. Spirit of nitre, citrate of magnesia, milk of sulphur, and other substances, have in turn been the cause of heavy expenses, which knowledge, on the part of prosecutors, might have spared us.

But is it justice that we should be made to pay through the ignorance of others?

Shall we quietly sink into the position of a subject-race, having no right but the privilege of paying our "droits de seigneurie?"

There is a necessity for some general action on the part of all the trade, and the sooner this is begun the better the hope of success.

ALEX. KINNINMONT.

EMULSIONS.

Sir,—After reading the paper on "Emulsions," by Mr. E. Gregory, in the *Pharmaceutical Journal* of 14th inst., I proceeded to experiment for myself, adopting his last process, No. 9. When using castor oil and balsam copaiba, the results were most satisfactory, but when oil of turpentine was used, no result could be obtained that could be by any means termed an emulsion. After repeating the process two or three times I resolved to add more water, and I find that the best emulsion is formed with one part of acacia, two parts turpentine, and two of water; although a very excellent one can be produced by three-quarter parts of acacia, two parts turpentine, and two and a quarter parts water. Mixing first the acacia and turpentine, and adding at once the water, was the process I adopted, the result being an excellent emulsion in a few seconds. If any one is able to produce an emulsion on the plan No. 9, in Mr. Gregory's paper, I should be pleased to hear how it is to be done, for I confess it is beyond my powers.

STUDENT.

4, *Cornwall Terrace, Rye Lane, Peckham.*

EARLY CLOSING.

Sir,—In view of the meeting about to take place in London, for discussing the means of promoting the earlier closing of pharmacies in the metropolis, a few words of practical experience may not be out of place, as the initiation of these innovations is always more or less surrounded with difficulties, and but too often results in disappointment and failure.

Some ten years since, with the desire of bringing about a similar change in Belgravia, I invited all my neighbouring chemists to my house to discuss the subject in a friendly manner, the result being an unanimous agreement to close our shop doors and turn out the outside lamps punctually at 9 o'clock, on Saturdays at 10·30, and on Sundays to keep our door as well as window-shutters closed, to abstain from lighting outside lamps, and further, to sell no articles but such as were required for medical purposes.

Having secured the signatures of all our neighbours for a considerable radius, our next step was to print and to circulate a large number of small hand-bills among our customers and over the counter in daily business, giving notice of our united action, and asking their assistance and consideration in enabling us to carry out the arrangement.*

The result of the effort was, I may safely say, a very great success, a few, but very few, partially broke through the engagement, and adopted various devices whereby to evade it, but the mass most faithfully adhered to it, and up to my leaving London, through ill-health, in 1874, within a few minutes of Big Ben striking nine, every one of our shops would be found closed, and on Sundays, with the few exceptions mentioned, not one of us, by open door or coloured lamp, invited the public to enter, while at the same time a ring at the bell or a turn of the handle was always sufficient to obtain admission and the needed supply, whether on Sundays or other days. The closed door and the partially lighted shop had a moral and persuasive influence upon the public mind, and to a large extent reduced our Sunday and late work to a minimum.

The great secret of success is the cultivation of friendly feeling and sympathy, rather than a petty jealous supervision, and an honourable firm adherence to the engagement, notwithstanding the delinquencies of a few.

EDWIN B. VIZER.

Belgrave House, Cliftonville, Brighton.

* Vide *Pharm. Journ.*, s.s. vol. 8, p. 257.

Sir,—In reply to the letter of a West-end Assistant, respecting the lethargy of the Bayswater and Notting Hill chemists, I wish to draw his attention to the fact that so far back as the year 1856, in the month of February, the late Mr. J. Garle, Mr. G. Y. Sharpe and myself, canvassed the whole district from Shepherd's Bush to Great Western Railway, and obtained the consent of all save one to curtail the hours of business by closing finally at 9 o'clock, a step then far advanced compared with the very long hours, viz., till 11 and in some cases half-past, but finding the one dissentient in Westbourne Grove destroyed the harmony otherwise existing throughout the district, the then existing chemists of Notting Hill and Shepherd's Bush resolved to close their shops at 9 o'clock from the first week in April of that year. And although many competitors afterwards opened businesses they, the older and longer established, honourably kept to their agreement, notwithstanding their rivals kept and do keep open (some still to most unreasonable hours), although others have somewhat fallen into the example set them, and the successor of the late Mr. Garle has for several years past closed entirely at 8, thereby being the pioneer of what may be done throughout the district. My object in addressing you is to enlighten your correspondent that although possibly all has not been accomplished that is desirable, yet a long stride in the right direction was made in the year 1856 by the then existing chemists of the neighbourhood, and to remove the slur of apathy or lethargy from several now in business and who will gladly welcome, I feel certain, a further reduction of the hours of business if the whole brotherhood will unanimously join in such a much to be desired arrangement. It rests with themselves quite as much as with the public, the bulk of whom will soon be educated to the change, and then, as very graphically expressed a few years ago, the "white slaves" will be released from their thraldom. "White slaves" was a theme which led to several letters in Journal some years back.

ONE OF THE FIRST EARLIER CLOSERS.

"*Syrupus*, P.B."—(1) *Bartramia pomiformis*; (2) *Tortula subulata*; (3) *Bryum bimum*; (4) Send a larger specimen; (5) *Atrichum undulatum*; (6) *Pogonatum nanum*; (7) *Ceratodon purpureus*.

H. Bartlett.—We are unable to answer the question without knowing the nature of the formula. The Act of Parliament is explicit with respect to details.

"*Inquirens*."—It is beyond our comprehension.

"*Local Sec.*"—The muddiness probably arises from the presence of albuminous matter, due to imperfect clarification, and might be removed by filtration through cotton.

B. B.—(1) No, the presence of nitrites is not in itself an indication of the fitness or unfitness of water for drinking purposes. (2) Wanklyn's 'Water Analysis,' published by Trübner.

F. B. Langdon.—(1) Water Lane, Blackfriars. (2) We believe the lists are published in the weekly medical journals.

C. B.—We cannot answer the question, as much might depend upon the circumstances of each case.

T. Horton.—It is impossible to name the plant without the flowers.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Manning, Mr. Hallaway, Mr. Gostling, Omega, Fair Play, Juvenis, J.B., A.J.R.

"THE MONTH."

The bright green tint of spring is now prevalent everywhere, and many a wood is gay with the delicately tinted flowers of the wood anemone and the golden cups of the marsh marigold, while the pale yellow tufts of primroses are scattered like nosegays in many a sunny copse and hedgerow. Even in the smoky city, the flowers feel the genial warmth and moisture of the atmosphere, and the flower stalls are gay with deutzias, genistas, polyanthuses, cinerarias, wallflowers, and many another well known household favourite. In the Botanical Gardens so large a number of plants, having more or less medicinal interest are now coming into blossom, that it is difficult to decide which best deserve the fullest notice.

In the Apothecaries' Gardens, at Chelsea, the delicate lilac blossoms of the labdanum plant (*Cistus Creticus*, L.) may be seen in the hothouse. The flower is much like a rose in shape and general appearance, but the petals have a crumpled look like those of the red poppy, and are just as fugacious. The opposite entire leaves and the hypogynous stamens at once distinguish the plants of this order from those of the rose family, while the five persistent sepals and the opposite leaves distinguish them equally well from the poppy family. The leaves, although not furnished in this climate with much of the resin for which the plant is famed, yet still possess a certain amount of fragrance. The odour is particularly pleasant and very persistent, and it seems strange that while such a disagreeable drug as opopanax has been turned to account by the perfumers, labdanum should have fallen into undeserved neglect.

Several American medicinal plants are now in blossom in the same garden; most prominent among these are the pale purple flowers of the *Geranium maculatum*, L., the root of which is official in the United States Pharmacopœia under the name of Cranesbill, but which, equally with *Heuchera americana*, L., is sometimes known as alum root. Like most of the Geraniaceæ, it possesses powerfully astringent properties. It is occasionally to be found cultivated in gardens in this country, and bears some resemblance to our native species, *G. sylvaticum*, L., and *G. pratense*, L., from which it differs in its angular stem furnished with reflexed hairs and in the upper leaves being opposite.

Another less conspicuous plant is the yellow-root (*Xanthorrhiza apiifolia*, Willd.), official in the secondary list of the United States Pharmacopœia, which has small purple flowers, looking very like those of the *Aucuba japonica*; this is now also to be seen in blossom. *Asarum Canadense*, L., known in the United States as wild ginger, may now be seen in blossom in company with its European relative *A. europœum*. The flowers are small, solitary, dingy purple bells, bearing some resemblance in colour and shape to those of belladonna, and generally scarcely raised above the ground, so that it is only by carefully looking among the leaves that they are seen at all. These little plants belong to the order Aristolochiaceæ, which is remarkable for the singularity of its flowers. In the Canadian plant referred to, the leaves are somewhat kidney-shaped, and when young are folded in half (affording an instance of conduplicate vernation), shortly stalked and all radical. The flowers are remarkable for having the parts usually in multiples of three, the superior calyx being three-parted, and the stigma divided into six parts; the twelve stamens are very curious, all of them having the connective prolonged beyond the anther into an awl-shaped process, so that the anther appears as if it were sessile on the middle of the filament. Six of the stamens are longer than the others, and their anthers rest between the stigmas, the other six are shorter than the style, and are opposite to the stigmas; all of the anthers are extrorse, so that self-fertilization is scarcely possible. The English species is very similar in appearance, but the leaves remain throughout the winter, those of the Canadian plant withering away. The Canadian species is also a much more variable plant, the flowers being sometimes four-cleft, and having sixteen stamens and eight stigmas; the leaves also very variable in outline. The leaves of the English plant form an ingredient in cephalic snuff, and the root possesses emetic properties in doses of ½ to 1 drachm. Wild ginger is used to promote perspiration and expectoration.

Another lowly plant, *Gaultheria procumbens*, L., belonging to the heath family, and official in the United States Pharmacopœia under the name of wintergreen, is now bright with its red coral-like fruits, which are very conspicuous among the dark shining green leaves of the plant. The oil yielded by these berries and by the whole plant is the well known oil of wintergreen of commerce and is remarkable for being the heaviest known essential oil, its sp. gr. being 1·175.

The pretty little scurvy grass, *Cochlearia officinalis*, L., is the only representative of medicinal cruciferous plants as yet in blossom. Its small bluish white or white flowers may be found equally on the mountain and on the sea shore, and are a common feature in rocky districts. Formerly the plant had a high repute for the cure of scurvy; Gerard speaks of it in his Herball as an undoubted remedy for that disease, and states that it cures fetid breath, etc. A small form of the plant, *C. Danica*, L., with the stem-leaves stalked, often occurs some distance inland in maritime districts, decking the hedge-banks with its small white flowers.

In the economic house at Kew Gardens, the Barbadoes aloes, *Aloe vulgaris*, Lam., may now be seen in blossom. The leaves are much broader than those of the Socotrine aloe, and the flowers are of a pale yellow colour, the outer segments of the flowers having a green stripe down the middle; the flower spike is forked. The grass which yields citronelle oil, *Andropogon Nardus*, L., is just coming into flower. *Chloranthus inconspicuus*, Sw., and *Jasminum Sambac*, L., the flowers of which are used in China for flavouring tea, may also be seen in blossom here. *Pelargonium capitatum*, L., one of the species which yield oil of geranium, is noticeable on account of the rough appearance of its leaves, due to its hairs being furnished with bulbous bases. The leaves resemble in shape those of the common pelargoniums, but the flowers are small and are very similar in appearance to those of the "oak geranium." The castor oil plant, the cotton plant, and the coca are also still in blossom in the same conservatory, while the ipecacuanha will be in flower in about a week.

In the open ground the Berberidaceæ are well represented, particularly in the herbaceous ground, where the *Podophyllum peltatum*, L., is just sending up its leaves, looking like so many small, green, folded umbrellas, each leaf being bent backward on the leafstalk, and its lobes folded in a convolute or twisted manner; in another week it will be freely in flower. The *Jeffersonia diphylla*, Pers., or twin-leaf of the Americans, has a white flower, not unlike that of *Podophyllum*, but only about half the size; it is especially remarkable for the leaves being binate and somewhat reniform. The flowers arise directly from the ground, and not from the fork of a double leaf as in the *Podophyllum*. The capsule is very curious, looking somewhat like a poppy fruit, only the stigma is raised on a short stalk, and the ovary when ripe opens half-way round horizontally, the upper portion forming thus a hinged lid which when open exposes the seeds attached to one parietal placenta. The anthers, as in most other plants of this order, open by valves. The root is used by eclectic practitioners in the United States in syphilis, and as an expectorant instead of senega. Another flower belonging to this order, *Epimedium alpinum*, L., although not used in medicine, is well worth examining on account of its curious structure, the inner row of petals being formed into horn-shaped nectaries.

Among the umbelliferous plants, the caraway is just coming into flower, and is easily recognized by the stipules at the base of the leaf-sheath, stipules being very rare in this order. It is not a little singular that this plant, which is a northern species, produces in Morocco a variety of robust growth, which forms fruits nearly twice as long as the ordinary kind. The Alexanders (*Smyrnium Olusatrum*, L.), the root of which was formerly and in some districts is still used by herbalists, is now conspicuous with its shining green leaves and yellow flowers, which on account of their fæcal odour attract hundreds of blowflies. In the Chelsea Garden every umbel was dark with blowflies, while at Regent's Park the common yellow dung-fly was to be seen on every tuft of flowers. The leafstalks of this plant were formerly used as a pot-herb. Among the labiate plants the rosemary is now a very noticeable object, its pale greyish-blue flowers contrasting strongly with its dark green leaves. The latter, which are linear in shape, somewhat like those of lavender, but shorter and narrower, are strongly revolute and covered at the back with a white down, consisting of stellate hairs. The flowers terminate short axillary branches, and appear to unfold in a very irregular manner, each little tuft opening centripetally, and having the appearance of a corymb; this is probably due to the fact that it is made up of axillary cymes in which only one flower of each is developed. The calyx appears at first sight to have only three teeth, but upon slight pressure the upper tooth is seen to be divided into two, so that there are four in all. The style protrudes considerably beyond the ringent corolla, and becomes after a time bent downwards. The stamens are only two in number, and the anthers are very slightly attached to the tips of the filaments. Only one lobe of the anther appears to be developed, the other being represented by a short spur or subulate point on the other side of the filament, which, it has been suggested, may represent, in connection with the portion of the filament above it, an elongated connective similar to that occurring in *Salvia*, to which genus it also approaches in the form of the calyx.

The cherry-laurel (*Prunus Lauro-cerasus*, L.) may now be seen in bloom, not only at Kew, but in gardens and shrubberies generally, especially where sheltered by other trees. The shining green lanceolate leaves taper rather abruptly at the base, and are furnished with small teeth (serratures) at the margin, which being recurved partially conceals them. On the under surface of the leaf below the lowest pair of veins, and close to the midrib, may be seen from two to four shallow depressions; these are glands, which exude a saccharine matter in spring and soon assume a brownish colour. It is rather remarkable that the leaves, which, when punctured, give off an odour of prussic acid, may be dried and powdered without doing so, until moistened with water. It might almost be inferred from this, that the amygdalin, and the emulsin or other similar substance, must be contained in separate cells. The white, rather small flowers are arranged in erect axillary racemes, and in structure are similar to those of the plum and blackthorn. The cherry-laurel must not be confounded with the true or noble laurel (*Laurus nobilis*, L.), so called because the leaves were used by the ancients for making victors' crowns. This shrub is now also in flower, and is worth examination on account of its curious anthers. The leaves are of a darker green than those of the cherry-laurel, and taper more gradually towards the base; the margins of the leaves also are wavy but not serrulate. The flowers are small, yellowish-white, and are arranged in small, almost sessile, twin umbels in the axils of the leaves, each umbel being furnished with a small involucre of scaly bracts. The calyx is 4-parted. In the male flowers there are twelve stamens, each furnished near the base with two yellow sagittate glands. The anthers dehisce by valves. In the female flowers there are four sterile stamens, alternating with the lobes of the calyx, each furnished near their apex with a pair of glands. The fruit, commonly known under the name of bay berries, yields upon pressure a semi-solid fat, known as oil of bay, in lieu of which oleum viride is often wrongly supplied in retail shops. The bayberry powder used by herbalists is not, as might be supposed, the powdered berries of this plant, but is prepared from the root-bark of an American plant, *Myrica cerifera*, L., a catkin-bearing plant, nearly allied to our own bog myrtle (*Myrica Gale*, L.).

In the economic house at the Botanical Gardens, Regent's Park, the Barbadoes aloe (*Aloe vulgaris*, L.) is now coming into blossom, and the mango (*Mangifera Indica*, L.) is covered with pyramidal panicled cymes of small yellowish white flowers. The leaves are large and lanceolate in outline. The bark of this tree has been used for restraining mucous discharges, and the leaves for chest affections and disorders of the liver.

In the open ground *Carum Carui*, *Asarum Europæum*, and *Daphne Laureola* may be seen in blossom, as well as the little lungwort (*Pulmonaria officinalis*) with its spotted leaves and pink or blue flowers. This plant was formerly held in considerable reputation for pulmonary diseases, a reputation which it first obtained from a belief in the old doctrine of signatures, and retained for a considerable time by reason of its demulcent properties. The lungwort now sold by herbalists is not this plant, but a lichen, *Pulmonaria officinalis*, sometimes also called oaklungs.

On chalky pastures and banks, the little pasque flower, *Anemone Pulsatilla*, L., with its dull purple bell-shaped flower, may now be looked for. The root of this plant is used by homœopaths to form a tincture, which, under the name of "Pulsatilla," is used to restrain mucous discharges. The flower-stalk (scape) is furnished with a whorl of bracts which, like the leaves, are finely divided. When in bud, this involucre is immediately beneath the flower, and the flower-stalk is then only two or three inches high. By the time that the hairy purplish calyx has fallen, the flower-stalk has so elongated that the fruit has become removed 3 or 4 inches from the involucre, and the styles of the carpels have become developed into long feathery tails which render the head of fruit a conspicuous object. The plant is rather local, but where one plants occurs, there are generally hundred of others.

In the Edinburgh Botanical Gardens, Professor Balfour kindly informs us that the Asarabacca, *Helleborus viridis* and other species, and *Arctostaphylas Uva-ursi*, are all in blossom in the open ground. The latter plant we have not observed in flower, in either of the London Botanical Gardens. Another plant of the heath family, the trailing arbutus, or ground laurel (*Epigæa repens*, L.), has been in splendid blossom during the past month, and has formed one of the most noteworthy features on the rockwork. Its little white bells tinged with red, are as fragrant as they are pretty, and should render the plant a general favourite. The stem and leaves have been used in America for the same complaints as uva ursi, and are said to have succeeded where the latter has failed. Another plant, *Polygala oppositifolia*, L., which is also in flower in the London Botanical Gardens, although not used in medicine, is worthy of notice by those who are studying botany, on account of its flowers having a falsely papilionaceous appearance. This is due, partly to the two lateral sepals being large and petaloid, and partly to the lower large petal forming a kind of keel.

Through the kindness of Dr. Moore, Director of of the Botanical Gardens at Dublin, we are enabled to say that the following medicinal plants may now be seen in blossom there: *Erythroxylon Coca*, *Drimys Winteri* (growing in the open air); *Nicotiana Virginica*, *Arctostaphylos Uva-ursi*, *Cochlearia officinalis* and *Daphne Laureola*. *Polygala chamæbuxus*, a small procumbent plant with leaves shaped like those of the box tree, is now also in flower. It possesses properties similar to those of senega.

The chiretta in commerce at the present time is of very inferior quality. Specimens of the spurious kind described by Professor Bentley have come under our notice during the past week. This kind is easily distinguished by its less bitter taste, by the absence of pith, and by the woody portion of the stem being thicker than in the genuine kind. Some specimens of chiretta possessing the solid well-marked pith of the genuine kind, but having hardly a trace of bitterness, have been lately met with. Possibly this may be owing to damage during sea voyage. We advise our readers to taste their chiretta before preparing or dispensing an infusion made from it.

It is quite time that some steps were taken by Government to appoint an inspector of the drugs which come into the London and other markets. Only last week the public sale of eight bags of partly mouldy ergot was recorded in the *Public Ledger*. It would be instructive to ascertain how many human lives are likely to be endangered by the administration of ergot which has thus lost its activity and how many dispensing establishments are likely to have their reputation tarnished by the unwitting sale of bad ergot.

It was scarcely to be expected that the concession granted to an English firm of exporting mummy bones from Egypt should have brought anything into the drug market; nevertheless, during the past month, a quantity of mummy asphalte has been offered for sale and purchased by private contract, for use, it is believed, as a brown pigment. To what base uses may we come at last!

In the April number of the Chemical Society's Journal, there is a note by W. R. Hodgkinson and H. C. Sorby on *pigmentum nigrum*, the black colouring matter contained in hair and feathers. When these are treated with warm dilute sulphuric acid, red or brown solutions are obtained, which exhibit decisive absorption spectra, but the authors do not state clearly whether they regard this coloring matter thus dissolved or the insoluble black amorphous matter as the *pigmentum nigrum*. They give some analyses which are as follows:

Several species of—	C.	H.	N.
Corvus (mean of 10 analyses) . . .	55·4	4·25	8·5
Ciconia alba (mean of 2).	55·5	4·8	8·5
Corvus pica (mean of 2).	49·5	4·8	7·6

After this, the authors remark that the composition of egg albumin, which contains sulphur and 7 per cent. of hydrogen, is very similar. We do not quite perceive the similarity, nor do we well see that the above analyses support the formula the authors deduce from them, viz., $C_9H_8NO_4$, or $C_{18}H_{16}N_2O_8$. Of course, anything may be true, and there are few things without some show of reason; madness has at times method in it, but this appears to be more than some authors have.

R. Nietzki* has described a new glucoside existing in the flowers of *Cichorium Intybus*. It is said to crystallize in long white needles, soluble in hot water, alcohol, and ammonia, but insoluble in ether. It melts at 250-255°, and on boiling with dilute acids, splits up thus—

$$C_{32}H_{34}O_{19}+2H_2O=C_{20}H_{14}O_9+2C_6H_{12}O_6.$$

All these glucosides are extremely interesting compounds, but with each new addition to the list, it is to be regretted that we generally hear more of the glucose to be obtained from them severally than of any accompanying products; presumably, they are not so easy of detection, nor do they admit of such ready investigation as sugar.

M. Berthelot† has ascertained that ozone formed by the action of the electric discharge upon oxygen will not oxidize nitrogen in the presence of pure baryta water into nitrite or nitrate, but if the ozone be furnished by the slow oxidation of moist phosphorus it does so in a small degree; thus, in one experiment M. Berthelot obtained less than one-twentieth of a milligram of nitrate (of barium?). This is a very small amount, but that nitrate is formed at all would be an interesting fact if the author had in the first place established the proposition that phosphorus by its slow oxidation yields ozone. Some chemists are sceptical about this matter, and regard the product as peroxide of hydrogen; but this is of course of secondary importance.

Apropos of this subject, it is interesting to note a paper by M. Corne,‡ an abstract of which is fur-

* *Arch. Pharm.* (5), 4, 327-337.
† *Compt. Rend.*, lxxxiv., 61—64.
‡ *Journ. de Pharm.* (4), xxii., 425.

nished in the April number of the *Journal of the Chemical Society*. The author describes his paper as setting forth a "New Reaction for Iodates and Iodides," which consists in adding to such solutions a few drops of water in which phosphorus has been kept for some time; iodine is then immediately liberated. The reaction, however, does not take place in the presence of an excess of alkali, and this is not to be wondered at. As neither phosphorus nor phosphoric acid can give this reaction, the author illogically concludes that it must be the result of the presence of phosphorous acid; perhaps it may be, but more probably it is due to peroxide of hydrogen. Therefore, until this matter is settled, it is best to refrain from entering into the uses of this new reagent and the application of this new reaction as set forth in the author's paper.

Were it not for the consumption of space, many other instances of similar scientific advances which have come to light during the month might be adduced, but they can be found in the *Journal of the Chemical Society*, from which we now pass on to "fresh woods and pastures new."

Numberless as are the articles that have been written about our milk supplies, and the necessity of a pure milk supply, the medical press still continues to float new articles and to impress humanity with the stated necessity. Thus, in the *Medical Times and Gazette* of the 21st inst., there is an editorial article on pure milk, setting forth the dangers of impure milk in communicating typhoid fever, and we are assured that the Aylesbury Dairy Company do their best to give their customers the best and safest article they can command. Doubtless this is so, and it is equally true of many other companies and individuals, but what is the good of the best, if the best is not worth having? And where is the test? Surely no chemist can say, "This milk is impure, and will give you typhoid fever if you drink it, and this other sample is pure and will not do so"! It is quite true that a chemist might tell if a certain sample of milk contained a large quantity of sewage, but no chemist can certify, and no medical man can certify, to the absence or presence of disease germs in ordinary samples of milk; therefore, the meaning of the second article, in the above quoted journal, on "The Aylesbury Dairy Company," is somewhat hidden, notwithstanding the analyses by Mr. Wanklyn which are therein quoted. "A rose by any other name would smell as sweet," although it may have poison to its core; and in the same way the contaminating influence, if any there be, in milk is not to be exposed by chemical analysis.

The public analysts have had further cases of peas containing copper; and there has been another case of tea adulterated with iron, which could be detected by the magnet! It is almost sad to think how persistently the public will continue to demand poisonous articles in spite of the learning and skill exhibited by the analytical "back bone and sinew" of this country.

Beyond these cases, there have been several prosecutions for the sale of sweets coloured with plumbic chromate. In one instance it was found that the sweets contained one fifth of a grain to the ounce, while in the second the analysis revealed the presence of twice this quantity of plumbic chromate. Both the dealers who had sold the sweets were fined on the showing that chromate of lead is a cumulative poison. But, in a third case, concerning the sale of a sugar-cured American ham, which had been coated with a composition containing the same substance, the summons was dismissed, on the ground that the composition was only a coating, and was not an admixture.

All this is extremely interesting, although it is to be feared that there are some who will fail to recognize this distinction without a difference.

It is convenient to notice here some researches recently communicated to the Académie des Sciences of Paris, by M. Richet, respecting gastric juice. He finds that the mean acidity of this liquid, when pure or mixed with food, amounts to 1·7 grms. per 1000; that this is almost invariable, and not dependent upon the quantity of fluid in the stomach. The consumption of wine or other forms of alcoholic drinks, as well as sugar, decreases the acidity, which reaches its maximum during digestion. M. Richet seems also to have ascertained that the sensation of hunger is not dependent upon the acidity or the emptiness of the stomach, a conclusion which derives support from other considerations. The gastric juice is secreted by the rennet glands and from these the juice flows out during digestion; in fact, digestion cannot take place without it. The sensation of hunger is to a great extent a nervous phenomenon, and one which is alleviated by causes which exercise an action upon the stomachic nerves. Among such actions is that of alcohol, a fact which was fairly established by Sir Benjamin Brodie, and which explains the observation of M. Richet to the effect that alcohol decreases the acidity of the stomach. Tobacco-smoking exercises a like influence, although probably through a different channel.

Simultaneously with advances in science, occur attempts, in other more practical directions, based generally indeed upon a scientific groundwork, to perfect either the apparatus used by the investigator or the instrument used by the surgeon in his treatment of disease. Among these there may be fairly noticed a perfected form of "Throat Spray," introduced by Messrs. Corbyn, Stacey and Co. This particular form is constructed upon the principles observed in all such pieces of apparatus, but is particularly good in kind. It is intended for the application of remedies in the shape of fine spray to the throat, mouth, and eye, in such a manner as to avoid causing any pain by the impinging of the liquid particles against sensitive parts. With the instrument there is also supplied a ton gue depressor and an eye piece, both of which are int ended to localize the spray to the affected regions.

J. Hertz† has extracted from a Mexican species of shell-lac, termed "Soma de Sonora," which exuded from the *Mimosa coccifera*, a body which he has designated "sarcosinic acid." This name has been given to it by reason of its apparent relationship to sarcosine, which substance has the same empiric formula ($C_3H_7NO_2$), but is not of an acid character. Hertz has examined the silver salt ($C_3H_6AgNO_2$), also the salts of barium, sodium, and calcium.

Scarcely have chemists recovered from the excitement caused by the discovery of gallium, before further studies in similar directions bring to light yet another new metal, which has been christened

* *Bull. Soc. Chim.* [2], xxvi., 450.
† *Arch. Pharm.* [3], viii, 244—251.

"Lavœsium," in honour of Lavoisier. This alleged discovery is the work of M. Prat, who states that lavœsium exists in many minerals, but more especially in iron pyrites. It is described as a silvery white metal, of a malleable and fusible nature, and forms salts which are colourless and highly crystalline. One of the most characteristic reactions furnished by its salts is that with ammonia, which gives a precipitate very soluble in excess; the potash precipitate is insoluble in excess. The spectroscopic characters of the new metal are perfectly characteristic, and consist of two sets of lines in the indigo; two sets of simpler lines in the bright green; and some blue, violet, and secondary lines, making in all a total of twenty-three lines.

Notwithstanding the interest appertaining to this statement, there are many possible sources of error to be eliminated before it can be entitled to absolute acceptance. Chemists will await with anxiety further information from M. Prat, and it will afford M. Mendeleef* and Mr. Newlands, another opportunity of testing the correctness of their particular views regarding the nature of the chemical elements and the mathematical principles underlying the atomic weights of bodies. The name of Mr. Newlands deserves mention in connection with this subject, because he claims to have foretold the existence of gallium even before Mendeleef, by virtue of a theory similar to that more recently made public by him. The Chemical Society of London did not see their way to publish Mr. Newlands' theory at the time he brought it before their notice.

Dr. W. von Knieriem† has for some time past been engaged upon a study conducted with the view of determining the origin of uric acid and urea. He finds that in the fowl the digestion of protein compounds gives rise to asparaginic acid, leucin, and glycocoll, just as these substances are formed by the digestion of proteids by mammals, and Dr. Knieriem concludes that these bodies constitute the antecedent stages of uric acid formation. The same antecedent stages, with the exception of salts of ammonia, he considers, relate to the production of urea in mammals. These ammonia salts are for the most part eliminated from the bodies of birds. It would be interesting to apply a similar process of investigation to serpents, whose dung is so largely composed of uric acid.

But what is far more important to bear in mind in connection with this subject, is the recent work by Schützenberger on the albuminous principles, by which it was tolerably well established that the urea group enters into the molecular constitution of albumin, and as proteids are modified forms of albuminous principles, it leaves little doubt that the urea excreted by mammals is derived from albuminous substances.

Dr. Richard Goddefroy has published‡ some analyses of the ashes of *Xanthium spinosum*, which was some time since recommended as a specific for hydrophobia, but which has since been proved to be useless for the purpose. He finds (1) that the ash of the leaves and spines of the plant contain most carbonate of potassium, while the ash of the stems is comparatively free from this substance; (2) that phosphate of lime exists most abundantly in the ash of the seeds, while the least amount occurs in the ash of the leaves and spines; (3) the ash of the stalks contains most silica; (4) that ferric oxide occurs in the greater amount (14 per cent.) in the ash of the stalks and the least in that of the leaves and spines.

* See *Pharm. Journ.* [3] vol. vi., p. 1027.

† *Zeitschrift für Biologie.* Band xiii., Heft 1, 1877.

‡ *Zeitschrift des allgemeinen österreichischen Apotheker-Vereines*, vol. xv., No. 11.

Ten years having elapsed since the publication of the last edition of the French Codex, there has naturally been a large accumulation of new medicaments for which there exist no authorized methods of preparation. The subject has been under the consideration of a commission appointed by the Société de Pharmacie de Paris, which has drawn up a report that has now been adopted by the Society. In this report, directions are given for preparing the various constituents used in the compounding of the new medicinal agents.

Dr. Cech * has recently called attention to viridic acid, which is a green colouring matter obtained from the coffee bean by atmospheric oxidation in the presence of moisture. According to a previous investigation of this substance, by Rochleder, it is non-nitrogenous in character. Dr. Cech recommends it as suitable for use in imparting a green colour to articles of food, and from its innocuous nature it is certainly to be recommended in preference to copper salts, which are highly poisonous. *En passant* it may be observed that on more than one occasion viridic acid has been mistaken for copper in coffee.

THE GENUS COPAIFERA.*

BY PROFESSOR H. BAILLON.

In the preparation of the botanical portion of an article to appear under the word "Copaiva" in the *Dictionnaire Encyclopédique des Sciences Médicale*, the author has had to undertake some researches upon the principal sources of that drug and these have given rise to the following article. For the general characters of the genus the reader is referred to the author's *Histoire des Plantes* (pp. 140, 162, 192, figs. 123-128).

It is not very long since it was believed that all the copaiva of commerce was produced by the *Copaifera officinalis*, a species of which the geographical distribution has been much too extended in classic works, and which grows spontaneously only in Trinidad, Venezuela, Columbia, and in the south-western part of North America, starting from San Salvador. It is cultivated in several tropical countries in both hemispheres, notably at Martinique, and it sometimes attains a rather fine development in our hot-houses, where it occasionally flowers. It is a tree of medium height, sometimes tall, with hard wood of good quality; it is therefore sought for industrial purposes, as are also *C. pubiflora* and *C. bracteata*, which are said to yield the "purple wood" of commerce. The *C. officinalis* is glabrous, and has alternate branches. Its leaves have three or four pairs of oval-lanceolate leaflets, 6 to 10 centimetres long, 3 to 5 centimetres wide, supported on a petiole about ½ centimetre long, jointed at the base. These leaflets are nearly opposite or alternate, furnished with slender pinnate veinlets, which ramify and anastomose, forming a delicate network. They are rounded or slightly attenuated at the base, almost regular, and more often unsymmetrical, the side of the leaflet nearest the rachis being always the narrowest. The summit is acute or shortly acuminate, the tapering usually obtuse at the extremity. The limb is covered with fine translucent points, which are reservoirs of essential oil. The flowers are arranged in compound axillary racemes, equal to or a little shorter than the leaves. Their secondary divisions are alternate and distichous, bearing alternate flowers, solitary in the axil of a caducous bract, sessile, or supported on a short

* *Journal de Pharmacie et de Chimie* (4), vol. xxv. p. 251.

pedicel. The calyx is globular in the bud, glabrous externally, covered internally with slightly crowded silky hairs, with four (rarely three) rather thick pointed concave, imbricate segments. The staminal filaments are inserted around a small receptacular cup, covered with glandular tissue; in the cultivated plant there are sometimes eleven or thirteen, and the alternate sepals are the shortest. The substipitate ovary is orbicular, compressed, glabrous or having fine silky hairs upon the edges. The slender arched style, nearly twice as long as the ovary, has a very slightly swollen stigmatiferous summit, and is entire or divided into two not very distinct papillar lips. The fruit, borne on a pedicel nearly ½ centimetre long, is elliptical, with convex valves externally, about 3 centimetres long, and 2 wide, which are finally subligneous, pale brown within, and terminate in a short apiculus. The seed, 1½ centimetre long and 1 wide, is ovoid, with smooth shining integuments, black, and has an exalbuminous embryo, the cotyledons of which are elliptical, planoconvex, and hide the very short radicle which does not appear on the surface. The fresh seeds give off a strong odour of tonka bean. This species is the *Copaiva* of Jacquin. Its juice is the *Tacamahaca* of Venezuela, the *Aceite de Canime* of New Granada, the *Capivi*, *Cupayba*, and *Copaiba* of the natives. In the old English pharmocopœias it is called *Balsamum Capivi.* Under the name of *Copaifera officinalis* it is believed that Linnæus confounded several species. Desfontaines also has reserved the name *C. Jacquini* for the plant of the Antilles, Columbia and Venezuela, the one to which Kunth and Humboldt have preserved the name *C. officinalis* (*Nov. Gen. et Sp. Pl. Æquin*, vii. t. 659).

Copaifera pubiflora, Benth. (in Hook *Lond. Journ. Bot.* ii. 101) is a species found first in British Guiana, notably by Schomburgck, and distinguished, as its name indicates, by the pubescence of all the parts of its flowers, especially the calyx. It is used for the extraction of the oleo-resin of copaiba, and appears to the author to be very near to *C. officinalis* in all its characters, especially in its flowers. But Bentham, in his more recent works, considers it to be only a form or variety, with pubescent flowers and more acute leaves, of *C. Martii*, Hayne.

Bentham has given (*Mart. Fl. Bras.* 243) the name *Copaifera rigida* to a Brazilian species from the provinces of Piauhy and Goyaz, which is used for the extraction of the oleo-resin, and has thick coriaceous leaves. It is a small tree, of which all the parts, except the rust-coloured tomentose inflorescence, are glabrous in the adult plant. The leaves have three, more rarely two, pairs of leaflets, supported on a very short articulated petiole, elliptical, oval, oboval, or elliptical-oblong, obtuse at the two extremities, sometimes emarginate at the summit, or shortly attenuated at the base. They are 2 to 4 inches long, and 2 inches broad, and are rigid, coriaceous, entire, with the margin recurved, glabrous and glossy above, duller underneath, finely penniveined with parallel veinlets and not dotted. The flowers are numerous, small, united in handsome compound racemes as long or nearly as long as the leaves, loosely ramified, and covered with a fine brown down. The flowers are distichous, nearly sessile, articulated upon the divisions of the inflorescence. The segments of the calyx, which are unequal, thick, two lines or more long, are nearly glabrous outside, and silky and covered with stiff hairs within. The ovary is covered with down, at least on the edges. The style and stamens are exserted.

The *Copaifera Martii* is a species from northern Brazil: it has been found at Cujuba, in the province of Mato Grosso, at Pará, near the Amazon, and at Maraca de Santarem. It grows also in British Guiana, where it is worked for the extraction of copaiba (Hayne, *Arzn.* x. t. 16; Nees, *Pl. Offic.*, *suppl.*, t. 44; Benth. *in Mart. Fl. Bras.*, *Legum-Cœsalp.*, 244). It is a moderately tall tree, the young organs of which are often finely pubescent, but very soon become quite glabrous. The leaves, although thinner, recall rather those of *C. rigida.* They have two to four pairs of leaflets, which are nearly opposite, have a very short petiolule, and are oval, elliptic or oval-oblong, obtuse at the summit, more rarely emarginate or shortly and obtusely acuminate, rounded at the symmetrical or scarcely symmetrical base, 2 to 4 inches long, 2 to 3 inches broad, almost coriaceous, without dots, glabrous and slightly shining above, paler and duller underneath, with numerous slightly prominent parallel veinlets, recalling much those of *C. rigida.* The inflorescence, in compound ramified racemes, is at first covered with a ferruginous silky tomentum. The ramifications bear distichous imbricated bracts, which finally become glabrous, and are rather thick, concave, acute, and ciliate at the edges, and fall off early, even before the flowering, together with the bracteoles, which are analogous to them. The flowers are sessile. The segments of the calyx touch or slightly overlap each other at the thick edges; they are glabrous externally, and covered within by a silky down. The stamens and style are exserted. The ovary is supported on a short stalk, and is hispid at the margins; its slightly flattened faces are generally glabrous. The fruit is nearly an inch long, and slightly compressed. The ovoid, nearly globular, seed is said to be devoid of an arillus. There is a variety of this species (*pubiflora*), having the calyx covered within and without with silky down, and the leaflet more clearly acuminate than in the type, and often more unsymmetrical. This species has, as before remarked, many characters that approach *C. officinalis*, and if the specimens of *C. pubiflora* examined by the author were authentic, he sees nothing to oppose their being considered a variety of *C. officinalis*, which would in this way become closely associated with *C. Martii.*

Copaifera Langsdorffii, Desf. (*Mem. Mus.*, vii. 377) is the species best known of those that yield the copaiva of Brazil (DC., *Prod.* ii. 969; Hayne, *Arzneig.* x. t. 19; Berg. et Schm., *Darst. Offic. Gew.* i. t. 6; Benth. in *Mart. Fl. Bras.*, *Legum-Cœsalp.*, 242, t. 63, 1). It is the *C. nitida* of Hayne (*op. cit.*, t.27), and the *C. Sellowii* (t. 22). Bentham believes that it is also the *C. Jussieui* of Hayne; but that plant had not been examined by him, neither is it to be found in Jussieu's herbarium. It is usually a rather small tree, or a shrub, and much branched. It is said, however, sometimes to be a large tree, sixty feet high. The branches and petioles are covered with loose hairs or finally glabrous. The inflorescence is covered with a rusty coloured down. The leaves consist of three to five pair of leaflets, which are shortly petiolate, opposite or alternate, oval or oblong, obtuse at the summit, more rarely slightly acute or shortly and obtusely acuminate; at the base they are rounded, nearly equal, or more or less unsymmetrical. They are sometimes at least an inch long, or even attain 1½ or 2 inches, and are about an inch broad; very different dimensions are met with in a single specimen. They are slightly coriaceous, sprinkled with translucent dots, glabrous, rather smooth, sometimes shining, and have numerous parallel and finely anastomosing veins. The flowers are sessile or nearly so, and are united into compound branched racemes, but the branches are usually rather few. The segments of the calyx are unequal, white, or, it is said, spotted with rose colour, more than two lines long, glabrous or scarcely pubescent without; and bearing silky rust coloured hairs within. The style is curved and twisted at the summit, the stigma being capitate. The stamens have long exserted filaments, and oval anthers, surmounted by a small apiculus. The fruit is shortly elliptical or suborbicular, compressed, 1 to 1½ inch long, surmounted by a curved apiculus; base of the style rugose, and dotted externally; the seed has rather a large arillus.

Numerous varieties of this species have been distinguished, under such names as *grandiflora*, *laxa*, and *glabra*. The last two are made species by some authors: the one is the *C. laxa*, of Hayne (*Arzn.*, x. t. 18), and the other the *C. glabra* of Vogel (in 'Linnæa,' x. 410). The first has branches and petioles which are villous and the leaflets usually pubescent underneath. The second has smaller leaflets, and the calyx glabrous or slightly hairy within. The leaves of *C. grandiflora* attain a length of 2 or 3 inches, and are very obtuse at the two extremities. It has been collected near Bahia, in the province of Goyaz, and perhaps near Rio de Janeiro. *C. laxa* grows at Minas Geraes and Goyaz. The typical plant is said to be common at St. Paul, Goyaz and Minas Geraes. It is found also in the Serra d'Araripe, province of Ceara, in the dry woods of the province of Bahia, and at Cujaba, in the province of Mato Grosso.

Copaifera Guianensis, Desf. ('Mem. Mus.,' vii. 376, t. 9), has long been considered as furnishing all the copaiba which comes to Europe by Cayenne. It grows in all the Guianas, and also in the north of Brazil, where Spruce met with it between Manaos and Barcellos. The species is rather near to *C. officinalis*; but it has shorter and more obtusely acuminate leaflets (DC. Prod., ii. 508; Hayne, Arzn. x. t. 13). It is a tree, 30 or 40 feet high, glabrous in all its part, except the inflorescence. The leaves have three or four pairs of leaflets, which are petiolulate, oval-elliptical or oblong, rather long and narrowly acuminate, slightly unsymmetrical or symmetrical at the base, rounded or subcordate (3 to 5 inches long), slightly coriaceous, smooth and shining above, covered on both sides with numerous slender veinlets, and with translucent dots. The common petiole is about 6 inches long. The flowers are united into compound branched racemes, which are axillary shorter than the leaves, and covered with a very fine whitish tomentum. The flowers are small, inserted upon the divaricate ramifications of the inflorescence, nearly distichous and sessile. The bracts are orbicular, ciliate, scarcely half a line long, and caducous. The lateral bracteoles are smaller than the bracts, but resemble them. The divisions of the calyx are 2 lines long, covered with silky hairs within, and externally with a very fine down. The stamens are slightly exserted. The more or less hispid ovary is biovulate, and the fruit stipitate, glabrous, about 1 inch long, and ¾ inch broad. Bentham considers that the *C. bijuga* of Hayne (Arzn., x. t. 16) should be referred to this species.

Copaifera oblongifolia, Mart. (Hayne, Arzn., x. t. 23), is a Brazilian species, met with in the provinces of Goyaz and Minas Geraes, especially in the plain near Chapado do Parana and towards the banks of the Rio Claro. It is a medium sized or rather tall shrub, much branched, with the branches and petioles nearly glabrous, or covered with loose hairs. The inflorescence is covered with a ferruginous down. There are six or eight pairs of leaflets, which are nearly sessile, opposite, oblong, obtuse, unsymmetrical at the base (½ inch long), coriaceous, covered with translucent dots and numerous veinlets, reticulated, shining above and pale beneath. Most of the inflorescence is shorter than the leaves. Bentham remarks (Mart. 'Fl. Bras.' 242), that the flowers and fruit are the same as in *C. Langsdorffii*, Desf., from which *C. oblongifolia* scarcely differs, except by the more numerous and often smaller leaflets. The author (M. Baillon) considers it at least doubtful whether this species yields copaiba, if it be remembered that it is most frequently represented by individuals with slender trunks which could hardly be worked profitably.

Copaifera multijuga, Hayne (Arzn., x. 17), is but doubtfully referred to this genus by Bentham. Baillon believes that he saw the plant some years since in the Imperial Herbarium at Vienna; and that it seemed to approach by its foliage more nearly to the genus *Dialium* than *Copaifera*. The tree is found in Para and the neighbouring regions, and the branches and petioles are covered with a rusty down. The leaves (which are rather similar to those of *Crudya amazonica*) have five to six pairs of leaflets, mostly alternate, with long petiolules, oblong or oblong-lanceolate, acuminate, unsymmetrical, rounded at the base, 1½ to 2 inches long, slightly coriaceous, scarcely shinning, glabrous, covered with pellucid dots, the nerves, with the exception of the principal one, scarcely visible. Is it certain that this plant yields copaiva? In any case it does not appear to be referable to the genus *Copaifera*.

Probably the oleo-resin of copaiva was not originally extracted from the *Copaiferæ* of Central America, but from Brazilian species, and from *C. Langsdorffii*. It is, therefore, very possible that this was the principal one to which Linnæus attributed the name *C. officinalis*. In fact, one of the earliest documents known in Europe on this question, as noticed by Hanbury, was a treatise by a Portuguese priest, who lived in Brazil from 1570 to 1600. His manuscript was translated into English, and published in 1625, by Purchas ('Pilgrims and Pilgrimages,' iv. 1308). Among many other natural products of the country, the author notices the *Cupayba* as a large tree, from the trunk of which when deeply incised there ran in abundance a clear oil, much esteemed as a medicine. [M. Baillon then quotes Hanbury's description of the collection of copaiva ('Pharmacographia,' 201).]

The name of copaiva is wrongly given to an oleaginous liquid, extracted by incising the trunk of the *Dipterocarpus* and other trees of the same family, in the Indian Archipelago. Its properties are nearly the same, but from a botanical point of view there is no relation between the plants of the two groups. In India, also, the juice of a plant very near to the *Copaiferæ* in its organization, the *Hardwickia pinnata*, Roxb., is used like the true copaiva.

There are some *Copaiferæ* in Africa, where they are called "Gorskia," but the author is not aware whether they are used medicinally. Their fruit is flattened, and their leaves have two multinerved leaflets (Boble, in Peters., Mozamb., Bot., i. 15, f. 3). In the seed of *C. mopane*, Kirk, of tropical Africa, the cotyledons are much developed, corrugated, and dotted with reservoirs of resinous juice. *Guibourtia copallina*, which is thought to yield, partially at least, the substances known in England as "African red gum," and "yellow gum," has been referred by Bentham to the genus *Copaiferæ*. In the "Histoire des Plantes," the author has named it *C. copallina*. At the Gaboon, there is a doubtful *Copaifera*, which he has named *C.* (?) *Mannii*.

The author is unable to say anything *de visu* of *Copaifera Beyrichii*, Hayne; *C. Sellowii*, Hayne; or *C. Blancheti*, Benth., as they do not exist in the Paris Herbarium. They also are said to be used in the extraction of the oleo-resin.

SILICOTUNGSTIC ACID AS A REAGENT FOR ALKALOIDS.*

Dr. Richard Godeffroy has ascertained the fact that silicotungstic acid is probably the most delicate reagent for alkaloids, nearly all of which, even in highly dilute, neutral, or faintly acid solutions, yield a precipitate with an aqueous solution of this acid. The sensitiveness of the reaction was tested by experimenting with the hydrochlorates of quinia, cinchonia, and atropia, with the following results:—

An aqueous solution of quinia hydrochlorate gave, with a few drops of an aqueous solution of silicotungstic acid, a distinct precipitate, even in dilutions containing only 0·004 per cent. of the alkaloidal salt. Opalescence could be still observed in presence of only 0·002 per cent., corresponding to $\frac{1}{50000}$ of quinia hydrochlorate.

A solution of cinchonia hydrochlorate was rendered cloudy in presence of only 0·0005 per cent., or $\frac{1}{200000}$ of the alkaloidal salt.

A solution of morphia hydrochlorate was made opalescent in presence of 0·0065 per cent., or $\frac{1}{15385}$ of the salt.

None of the known alkaloidal precipitants, such as platinic chloride, potassium iodohydrargyrate, iodized potassium iodide, etc., show any reaction in such high dilutions.

The precipitates produced by silicotungstic acid are

* *Arch. d. Pharm.*, Nov., reprinted from *New Remedies*.

soluble with more or less difficulty in concentrated hydrochloric acid; they are decomposed by solution of caustic potassa, which causes the separation of the alkaloids and the formation of an easily soluble potassium silicotungstate. On shaking the precipitates with caustic ammonia, they are at first dissolved to a clear solution, which, however, soon becomes cloudy from separation of silica. Ignition of the precipitates leaves behind an insoluble mixture of silica and tungstic anhydride (anhydrous tungstic acid).

Silicotungstic acid is best prepared by boiling sodium tungstate with freshly precipitated gelatinous silica. To the resulting solution is added solution of mercurous nitrate, which causes a precipitate of yellow mercurous silicotungstate, which is well washed with water upon a filter, and decomposed by an equivalent quantity of hydrochloric acid. Silicotungstic acid goes into solution, and mercurous chloride (calomel) remains behind. The clear filtrate is evaporated, to drive off the excess of hydrochloric acid, and furnishes, on spontaneous evaporation, large, shining, colourless octahedra of silicotungstic acid, which effloresce in the air, melt at 36° C., and are easily soluble in water or alcohol. We are therefore enabled to precipitate the alkaloids even in alcoholic solution, by using a similar solution of the acid. Marignac has found that this acid does not produce insoluble or difficultly soluble precipitates with any metallic salt, and Godeffroy adds that only cæsium and rubidium salts—but both even in very dilute solutions—are precipitated by it, and that it produces in a neutral solution of ammonium chloride a white precipitate, which is very difficultly soluble in large quantities of water.

PREPARATION OF LITHIUM CARBONATE AND SOME NEW COMPOUNDS OF LITHIUM FROM LEPIDOLITE.*

BY E. FILSINGER.

The lepidolite, reduced to fine powder, was treated with strong sulphuric acid containing some nitric acid, in a large brick trough, at a gentle heat. It was heated with constant stirring till it gained consistency enough to be made into balls, which could be easily introduced into a reverberatory furnace. The slight excess of sulphuric acid was driven off at a gentle heat, the temperature was then raised, and the pieces while still hot were treated with water in vessels lined with lead. The residue consisted of almost pure silica, for which a market is easily found. As lithium does not replace potassium in alum, a sufficient quantity of potash is added to transform all the sulphate of aluminium present into alum. On evaporation the alum separates in powder. It is removed, dried in a centrifugal machine, and on recrystallization is obtained in fine crystals. The excess of alumina is then precipitated from the mother-liquor by milk of lime, and the excess of sulphuric acid by barium chloride. The barium sulphate obtained is a marketable article. The liquid is then evaporated, and the mixed chlorides of lithium, potassium, sodium, calcium, and sometimes barium, exhausted with absolute alcohol. The lithium and calcium chlorides are dissolved. The calcium is separated as oxalate, and the lithium chloride evaporates and crystallized. It is precipitated with ammonium carbonate and ammonia, and brought into the market in the form of carbonate. The advantages of this process are complete consumption of the crude material; cheap reagents; common plant; precipitates which are easily washed, and a number of marketable chemicals, *e.g.*, silica, alumina, potash alum, and lithium carbonate.

Borates of Lithium.—Of these the author has prepared three. The first was prepared by boiling equivalents of boracic acid and lithium carbonate till carbonic anhydride was no longer evolved. On treatment with alcohol it was obtained as a granular precipitate. Its formula is $Li_2B_4O_7 + 5H_2O$. Even with excess of lithium carbonate no less acid salt was obtained. It lost two equivalents of water at 200°. The second salt was prepared by saturating one equivalent of boracic acid with lithium carbonate, and adding another equivalent of acid. It was precipitated with alcohol. Its formula is $LiB_3O_5 + 3H_2O$. Under the microscope it has a crystalline appearance. The third salt was prepared by boiling lithium acetate with boracic acid till all acetic acid was expelled, and evaporating over sulphuric acid. Crystalline crusts deposited, of the formula $Li_2B_8O + 10H_2O$. The author was not successful in preparing a more acid salt than the last described; such salts might, however, be probably formed by use of lithium hydrate. The flame reaction of $Li_2B_4O_7$ shows only that of the base; and second gives a flame with a green border; while the third exhibits the colours both of base and acid. Sulphuric acid separates boracic acid from dilute solutions of the second and third, but not from the first.

* *Arch. Pharm.* [3], viii., 198—219. From the *Journal of the Chemical Society*, April, 1877.

CYCLAMIN, OR ARTHANATIN.*

Professor De Luca, of Naples, has ascertained that cyclamin may be used as a substitute for curare, and recommends it as a remedy against tetanus. *Cyclamen Europæum*, L., "sowbread" or "hogs' bread," nat. fam. Primulaceæ, is a native of southern, eastern, and central Europe, and contains a poisonous glucoside in the fresh tubers. Drying, boiling or roasting the latter entirely destroys the substance. These tubers are used in Sicily, after proper treatment, as food for hogs, and are even eaten, roasted, by the common people in some parts of Russia. When eaten in the fresh state, the roots produce vomiting and diarrhœa, often with inflammation of the intestinal canal and sometimes with fatal effects. They were used already by the ancients, and Dioscorides as well as Pliny recommends them as remedies against jaundice, constipation, cutaneous eruptions, enlargement of spleen, freckles and lymphatic swellings; besides, in form of decoction, against the bite of poisonous serpents and as an external application to wounds. While the juice of the fresh tubers, when absorbed by the blood from wounds, is apt to have fatal effects, the application of a decoction, in which the poisonous substance must have been destroyed, to wounds is unobjectionable. *Radix cyclaminis* or *R. Arthanitæ* was yet officinal about one hundred years ago in Germany.

Saladin, Buchner, Herberger, De Luca, and Martius have prepared cyclamin and studied its effects. The two last-named investigators prepared it from air-dry, Saladin from fresh tubers. These are gathered in autumn, pounded to a pulp, extracted with a small quantity of water, the extract is evaporated at a temperature not exceeding 60° C., the syrupy residue exhausted with absolute alcohol, the alcoholic solution treated with animal charcoal and then allowed to evaporate spontaneously in a warm place.

According to Saladin, cyclamin forms small white crystals; according to Martius and De Luca, however, a white amorphous mass, possessing no odour, but a very acrid taste. It belongs to the chemically indifferent or neutral principles and has the composition: $C_{20}H_{34}O_{10}$. It is easily soluble in alcohol and water, insoluble in ether, chloroform and carbon disulphide. The aqueous solution, according to De Luca, foams like soap-suds, and when heated to between 60° and 70° C. separates the cyclamin in a coagulated form. Concentrated sulphuric acid dissolves it with a yellow colour gradually passing into violet. By boiling with dilute mineral acids it is separated into glucose and cyclamiretin, which latter is insoluble in ether and water, but soluble in alcohol. Emulsin produces the same decomposition at 30–35° C.

Pelikan's experiments with this substance upon frogs show that it belongs to the irritant poisons. Schroff administered it in quantities of 0·2 gm. (3 grs.), and the toxic effects disappeared after the lapse of about one hour.

* From *Pharm. Centralh.*, 1877, 17, reprinted from *New Remedies*. March, 1877.

The Pharmaceutical Journal.

SATURDAY, APRIL 28, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PRICE OF QUININE.

THE bark sale held last Tuesday was remarkable for the large quantity of East Indian bark put up, and still more for the high prices which it commanded. Even the red bark, which is the produce of *Cinchona succirubra,* and is generally characterized by containing a very large proportion of cinchonidine, together with a comparatively small amount of quinine, was sold at prices as high as those which were paid some months ago for bark suitable for the manufacture of quinine. Some of the crown bark from the plantations in the Madras Presidency realized from twelve to fifteen shillings a pound, in consequence of the large amount of quinine that it contains, and the great demand that there is now for bark.

The prices given for these parcels of bark were not in all instances proportionate to the amount of quinine contained in them. This may be partly due to the circumstance that particular lots were bought for making pharmaceutical preparations, more on account of the appearance of the bark than from any better reason, since it often happens that bark of good external character fetches a price altogether out of proportion to the amount of alkaloid it contains. The contrary is also true sometimes, and at the last sale some bark containing a high percentage of quinine was not bid for to the extent of its relative value, but was bought in at a merely nominal price. It is at the same time deserving of notice, that several parcels of bark containing chiefly cinchonidine realized a very high price.

The fact that such unusual prices have been paid for bark seems to indicate that there is little prospect of a reduction in the price of quinine, which is now upwards of three times the price it was some six or eight months ago, and consequently the present seems a favourable opportunity for some effort to be made to introduce into legitimate use cinchonidine and the other alkaloids associated with quinine.

The results that have been obtained by the medical commissioners entrusted with the inquiry into the relative febrifuge value of these alkaloids have sufficiently shown that they are not much inferior to quinine in their efficacy, but as yet little has been done in this country towards the practical application of the experience gained by the trials made in India. None of these alkaloids are official in any of the existing Pharmacopœias, although the much less satisfactory preparation called quinoidine or amorphous quinine is contained in the German Pharmacopœia; and though salts of cinchonidine are abundantly manufactured in a state of purity and of a crystalline character equal to the best qualities of quinine salts there is not any recognized use to which these preparations are applied in this country.

It would therefore seem that by the introduction of cinchonidine into use very considerable service might be rendered, and the influence of the high price of quinine in restricting its use might be to a very great extent made up for, with great advantage to certain classes of the community. Moreover the adoption of this course would probably contribute somewhat to prevent the substitution of cinchonidine for quinine and its admixture with that alkaloid in the manner that we have recently pointed out to be frequent.

THE ROYAL SOCIETY.

THE following fifteen gentlemen have been selected by the Council of the Royal Society to be recommended for the election as Fellows, at the annual meeting on the 7th of June: Professor JAMES DEWAR, M.A.; Sir JOSEPH FAYRER, M.D., K.C.S.I.; Rev. NORMAN MACLEOD FERRERS, M.A.; THOMAS RICHARD FRASER, M.D.; BRIAN HAUGHTON HODGSON, F.L.S.; JOHN W. JUDD, F.G.S.; WILLIAM CARMICHAEL M'INTOSH, M.D.; ROBERT M'LACHLAN, F.L.S.; Professor JOHN WILLIAM MALLET, Ph.D.; HENRY B. MEDLICOTT, M.A.; HENRY NOTTIDGE MOSELEY, M.A.; Professor OSBORNE REYNOLDS, M.A.; WILLIAM ROBERTS, M.D.; Professor JAMES THOMSON, LL.D.; Professor WILLIAM TURNER, M.B. There were fifty-three candidates.

THE NEW YORK DRUG TRADE.

IN an annual review of the drug trade of New York for the year 1876, presented by Mr. D. C. ROBBINS to the Chamber of Commerce in that city, it is stated that imports of drugs and chemicals for the year ending June 30, had declined in value, as compared with those of the previous year, nearly six millions of dollars. This falling off is considered to be indicative that the manufacturing interests are suffering under the economy that has been forced upon the people by the stringency of the times. It is estimated to be distributed as follow: chemicals, 3,000,000 dollars; drugs, including seed, 2,000,000 dollars; spices, 500,000 dollars; and crude drugs, mainly used in the arts, 500,000 dollars.

A few chemicals, however, showed an excess over previous yearly importations; as for instance, crude argols, used in the home manufacture of cream of tartar and tartaric acid, the importation of which has almost ceased on account of the extreme protective duties. The importation of soda ash has also considerably increased, whilst that of carbonate and bicarbonate of soda has decreased for similar reasons.

The importation of crude medicinal drugs has been the least affected, their consumption having been very steady. The consumption of opium increases yearly, and in a greater ratio apparently than the increase of population of the country, the quantity being 228,742 lbs. in 1876, against 188,238 lbs. in 1875. A large quantity of this drug is imported in a prepared form for smoking, and is received at San Francisco for the use of the Chinese population. There was also a considerable increase in the quantity of cinchona bark imported.

MASSACHUSETTS LIQUORS.

From the Second Annual Report of Professor James F. Babcock, Inspector and Assayer of Liquors to the Commonwealth of Massachusetts, we gather that according to his experience, the malt liquors met with in this district, are absolutely free from coculus indicus, picric acid, strychnia, or any other bitter except that of hops and malt. Some of the wines examined contained added spirit, but no fuchsine or artificial colouring matter was detected in the ports or clarets, though the quality of most of the samples was poor. "Raw" whiskies were rather plentiful, but the chief admixtures met with in the different kinds of spirit were caramel and water, the latter of which, unlike an authority nearer home, Professor Babcock looks upon as an adulterant.

PITURY, AN AUSTRALIAN RIVAL TO COCA.

Baron von Mueller, of Melbourne, has at length determined the botanical source of the "Pitury," a stimulant long known to be in use by the aborigines of Central Australia and said to be of marvellous power. After some years of efforts to obtain a specimen of the plant he has now received some leaves, and has with certainty determined them to belong to *Duboisia Hopwoodii*, F. Muell., a bush referred to the order *Solanaceæ*, or *Scrophulariaceæ*, which grows sparingly in the desert scrubs, from the Darling river and Barcoo to West Australia. In a recent communication to the *Australian Medical Journal*, Baron von Mueller states that the natives chew the leaves to invigorate them during their long foot journeys through the deserts, just as coca leaves are used in South America. Those living near the Barcoo travel many days' journey to obtain the precious foliage, which is broken into small fragments and carried about by them in little bags. It is also employed to excite courage in warfare.

THE NORTH BRITISH BRANCH.

Amongst the official notices will be found the particulars of four courses of lectures for the Summer Session, for which tickets on special terms may be had on application to the Honorary Secretary of the North British Branch. The lectures are on Botany, by Professor Balfour; Materia Medica, by Dr. W. Craig and Dr. F. W. Moinet; and Practical and Analytical Chemistry, by Dr. S. Macadam.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

April 18th, 1877.

Present—Messrs. Ainslie, Borland, Gilmour, Kemp, Kinninmont, Stephenson and Young.

Professor Maclagan was also present on behalf of the Privy Council.

MINOR EXAMINATION.

Fourteen Candidates were examined. *Five* failed. The following *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Carter, William Robinson ......Rusholme.
Cowie, John ....Glasgow.
Dodd, Thomas Hunter ....Sunderland.
Donaldson, David.................Edinburgh.
Dott, David Brown ....Edinburgh.
Ellis, George.......................Banff.
Hall, Robert ....Hartlepool.
Jepson, Joseph Morley ....Grimsby.
Robertson, Alexander ....Broughty Ferry.

April 19th, 1877.

Present—Messrs. Ainslie, Borland, Gilmour, Kemp, Kinninmont, Stephenson and Young.

Professor Maclagan was also present.

MINOR EXAMINATION.

Eight Candidates were examined. *Three* failed. The following *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

McNicol, John ....Glasgow.
Richardson, George ....Quatre Bras.
Rogers, James Isaac...............North Shields.
Tweedie, Alexander ....Edinburgh.
Whyte, James Samson...............Montrose.

MODIFIED EXAMINATION.

Two Candidates were examined. *One* failed. The following passed and was declared to be qualified to be registered as a Chemist and Druggist:—

Rae, William.........................Aberdeen.

EXAMINATIONS IN LONDON.

April 18th, 1877.

Present—Mr. Savage, Vice-President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Hanbury, Haselden, Linford, Martindale, Moss, Southall, Taylor and Umney.

Dr. Greenhow was present on behalf of the Privy Council.

MAJOR EXAMINATION.

Six Candidates were examined. *One* failed. The following *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Baldwin, Arthur Henry ....Clifton.
Cook, Robert, jun. ....Great Grimsby.
Peacock, William Henry.........Durham.
Sandwith, William Henry ......Scarborough.
Strongitharm, William George .Birmingham.

MINOR EXAMINATION.

Twenty-two Candidates were examined. *Eight* failed. The following *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bristed, John..........................Margate.
Burden, John Britten ....London.

Fell, John James ....Lancaster.
Gooch, William Hobbs............Norwich.
Hardwick, Stewart ....Sleaford.
Hart, James ....Sunbury.
Longman, John Ham ....Exeter.
Palmer, Charles Edward ....Ely.
Pickup, John Arthur ....Bacup.
Shepherd, John William ... .Settle.
Smith, William Ross ....Chester.
Story, George Arthur .... Bourne.
Tuck, Walter Barber ....Eastbourne.
Worfolk, George William ......Leeds.

April 19th, 1877.

Present—Mr. Williams, President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Hanbury, Haselden, Linford, Martindale, Moss, Southall, Taylor and Umney.

Dr. Greenhow was also present.

MAJOR EXAMINATION.

Five Candidates were examined. *Four* failed. The following passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Duffus, Alexander ....London.

MINOR EXAMINATION.

Sixteen candidates were examined. *Six* failed. The following *ten* passed and were declared qualified to be registered as Chemists and Druggists:—

Barnes, James William ....Spalding.
Beacock, Joseph Henry ....Barton-on-Humber.
Griffin, Joseph Thomas ....Oldbury.
Hoult, Joseph Emanuel ....West Bromwich.
Jones, Thomas ....Tenby.
Marris, Wm. James Graburn ...London.
Moses, Joseph ....Bishop Auckland.
Paull, John ....London.
Pheasant, William ....Clapham.
Wright, John Charles ....Wolverhampton.

MODIFIED EXAMINATION.

Eight candidates were examined. *Four* failed. The following *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Garrett, Thomas Philip ....London.
Howard, Samuel Bird ....Hadleigh.
Hussey, Robert ....London.
Wrighton, Alfred ....Birmingham.

April 25th, 1877.

Present—Mr. Williams, President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Hanbury, Haselden, Linford, Martindale, Moss, Southall, Taylor and Umney.

MINOR EXAMINATION.

Twenty-eight Candidates were examined. *Twelve* failed. The following *sixteen* passed and were declared qualified to be registered as Chemists and Druggists:—

Broadbent, John ....Manchester.
Furness, Thomas ....Chesterfield.
Gant, Joseph ....Spilsby.
Greenhill, Samuel Osborne ......Colchester.
Griffiths, John Moore ....Birkenhead.
Harris, Walter Thomas ....London.
Lund, William John ....Lancaster.
Mortlock, William John ....Peckham.
Parker, John Wortley ....Barnstaple.
Portway, John Bernard ....Bury St. Edmunds.
Pottinger, Thomas ....Dartford.
Roberts, William ....Swansea.
Simpkins, George Starr ....Minchinhampton.
Temple, Frederick Staveley ..Hull.
Williams, William ....Carmarthen.
Wilson, William Alexander ...Birmingham.

April 26th, 1877.

Present—Mr. Savage, Vice-President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Hanbury, Haselden, Linford, Martindale, Moss, Southall, Taylor and Umney.

Dr. Greenhow was present on behalf of the Privy Council.

MINOR EXAMINATION.

Twenty-nine Candidates were examined. *Twelve* failed. The following *seventeen* passed and were declared qualified to be registered as Chemists and Druggists:—

Bennison, Richard ....Stokesley.
Capes, Howard Hawksley ......Epworth.
Clark, Frank........ ....Liverpool.
Edwards, James ....Halesworth.
Giles, William Egbert ....Penydarran.
Greenough, Hugh Fairhurst ...Manchester.
Hadwen, Walter Robert ....Woolwich.
Hendy, Albert ....Bristol.
Hetherington, Thomas............Penrith.
Hinks, John ....London.
Jones, Thomas Pryce ....Wrexham.
Lewin, Arthur Clayton ....Plymouth.
Pyefinch, John ....Shrewsbury.
Redford, George Alfred ....Liverpool.
Robinson, William Prior.........Waterloo.
Wills, Vincent Andover ....Blaenavon.
Yates, Ebenezer ....Manchester.

PRELIMINARY EXAMINATION.

The undermentioned Certificates were received in lieu of the Society's examination:—

Certificates of the College of Preceptors.

Hubbard, Daniel L...............Eastbourne.
Levett, Herbert ....Maidstone.

Certificate of the Royal College of Surgeons of England.

Odhams, George Frederick ......Faversham.

Certificate of the University of Cambridge.

Prentice, Hector Vaughan ......London.

Certificate of the University of Oxford.

Blunt, Thomas P...................Shrewsbury.
Latham, Walter Joseph ....Spalding.
Lewitt, Frederick William ......Leicester.
Pars, Charles Frederick R.......Lincoln.

The Report of the College of Preceptors on the examination held on April 9th, was received.

Three hundred and twenty-three candidates had presented themselves for examination, of whom *one hundred and forty-five* had failed. The following *one hundred and seventy-eight* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

(Arranged alphabetically).

Alexander, John ....Glasgow.
Allison, John ....Coldstream.
Andrew, Edward Oliver ....Welshpool.
Armstrong, F ....Workington.
Atkins, Ernest ....Woolwich.
Axford, Sidney Bertram ....London.
Ball, James ....Mevagissey.
Baxter, William ....Bromley.
Bence, Frederick Herbert ......London.
Benson, Matthew..................Wigan.
Bolton, John ....Maidenhead.
Bowen, Ivor ....Brecon.
Bowes, John William ....Pocklington.
Bowman, Edmund ....Leith.
Bradbeer, John.....................Windsor.
Broad, Benjamin William ......Monmouth.
Brogden, Charles Henry ....Hyde.
Brough, Frank Thomson ....Northampton.

Browne, Thomas Ellis ....Exeter.
Bulmer, John ....Pocklington.
Butchart, William Henry ......Leeds.
Byrd, Edward John..............Leeds.
Cadge, John ....Kingham.
Cappell, Robert......................Crieff.
Careless, John .. ..Birmingham.
Cartwright, Arthur ....Alford.
Charge, Arthur William ......Chichester.
Charlesworth, Moorehouse ......Saltaire.
Chipchace, Charles Herschel ...London.
Claridge, Charles ....London.
Clarkson, Richard Bell ....Newark.
Clayton, John Henry ....Thirsk.
Clayton, William Hatch.........Newcastle-on-Tyne.
Close, Thomas ....Middlesborough.
Collins, Charles Edmund.........Saltley.
Crawford, Thomas ....Leith.
Crofts, John Ernest...............Leicester.
Crossley, Frederick ....Guernsey.
Crow, William Edward ....Louth.
Davies, Sylvanus Howell.........Carmarthen.
Davies, William ....Newcastle Emlyn.
Davis, George Albert ....Cheltenham.
Dawson, James.......................Bridge of Allan.
Dee, Arthur Henry ....Tewkesbury.
Drummond, George ....Edinburgh.
Dunstan, John Frederic ....Truro.
Eaton, Charles Arthur............Hull.
Edgar, Frederick George.........Southsea.
Evans, David.........................Lampeter.
Evans, William......... ....Pontypridd.
Everingham, Fredk. Adolphus...Market Weighton.
Frise, Jesse Symons ....Chesterfield.
Gaskin, John Henry...............Wolverhampton.
Gaylard, James Ratcliff ....Uxbridge.
Gibson, John.........................Barnard Castle.
Goldby, Frank ....Abingdon.
Gough, Arthur ....Keynsham.
Graham, Henry.......................London.
Greenway, John Wells............Ottery St. Mary.
Haines, William Edward.........Hereford.
Hall, Charles..........................Leighton Buzzard.
Hanson, Christopher ....Buckhurst Hill.
Harrison, Oliver Herbert.........Totteridge Park.
Harvey, James.......................Edinburgh.
Haward, Edgar ....Darlington.
Heath, Walter Edwin............Coleshill.
Heaton, John ....Burnley.
Hinnell, James ....Bury St. Edmunds.
Hobbs, John Kingdon ....London.
Hodges, Thomas Walter.........Fueford.
Horton, James Edward ....Wolverhampton.
How, Thomas McKay............Kirriemuir.
Howell, William ....London.
Hubbard, A. E. L. F. W. A....Downham Market.
Hughes, Evan Cromwell.........Birmingham.
Hughes, William...................Llandyssil.
Humphreys, Charles Evan......Llanfair.
Hunter, John ....Gosport.
Hurndall, Frank ....Rickmansworth.
Ivatt, Albert..........................Cottenham.
Jacks, David Russell ....London.
Jackson, William Edward ......Newark.
James, Charles Frederick ......Highworth.
Jenner, Harry Albion ....St. Leonards.
Johns, John ....Llandilo.
Jowett, Henry ....Leeds.
Kay, Thomas Wilkinson ....Manchester.
Keir, John..... ....Glasgow.
Kirby, Herbert Edward ....London.
Kirk, John Henry..................Belgrave.
Lakeman, Jasper James ....London.
Langford, Wm. Henry Herbert Lynn.
Langwade, Horace Merrikin ...Lynn.
Laughlin, Edwin Drewery ......Ramsey, Isle of Man.
Law, John William ....Leeds.
Lawson, James ....Glasgow.
Lord, William Carey ....Tottington.
Lowther, Thomas William ......Cardigan.
McGregor, Adolph Saphir ......South Shields.
McHale, Thomas ....Bolton.
Mackay, David M'Naughton ...Dundee.
Madge, Thomas William.........Shaldon.
Mallet, Thomas Charles ....Nottingham.
Marpole, John ....Aberystwith.
Mayo, Harry.........................Towcester.
Meadows, John Martin ....Swindon.
Milne, Alexander ....Banff.
Morgan, George ....Market Drayton.
Mould, John Salmon ....Louth.
Norfolk, Henry......... ....Stockton-on-Tees.
Norris, James Owen ....Preston.
Ogilvie, Thomas ....Duthil-by-Carrbridge.
Owen, John Hart...... ....Bala.
Parker, Henry George.............Kettering.
Pearson, Tom ....Chesterfield.
Perry, John ....London.
Pickering, James Skelton ......York.
Pinney, Joseph Crow ....London.
Plant, James Robert ....Leicester.
Porter, Henry Edward U. ......Gravesend.
Pottage, Edwin ....Beverley.
Priestley, William Jepson ......Kingston-on-Thames.
Procter, George Woodyatt ......Sunderland.
Prothero, George Rees............Pontypridd.
Rawlinson, James ....Tyldesley.
Reast, Francis ....Sleaford.
Rhodes, Alfred Barrett ....Manchester.
Richards, Arthur ....Swansea.
Richards, John Wesley ....Saltburn-by-the-Sea.
Richardson, Edward James ...Hingham.
Ridsdale, Herbert Allan ....Birmingham.
Robertson, Charles ....Keith Station.
Robinson, John James............Carlisle.
Robinson, John William ....Sunderland.
Ross, Andrew Leighton ....London.
Ryley, Edward ....Louth.
Sales, John William...............Doncaster.
Scott, Joseph.........................Dumfries.
Shannon, Robert James ....Birmingham.
Shields, Robert Henry...........London.
Simpson, Charles ....Aberdeen.
Slater, William......................Romsey.
Smith, Thackwell Gillett.........Lexden.
Snowball, Joseph ....Hexham.
Sommerville, William Barrie ...London.
Spoor, William Joseph ....Milford Haven.
Stableford, John William ......Leicester.
Stanford, Frederick William ...London.
Stephenson, Stephen ....Congleton.
Stevenson, William Dymes......London.
Stewart, William ....Helensburgh.
Sugden, William Allen ....Waterfoot.
Summerland, Wm. Randle ......Dudley.
Swaby, John'........................Sheffield.
Taylor, Stephen.....................Liverpool.
Temple, Arthur William.........Thrapston.
Thomas, John Evan...............St. Clears.
Thomas, William Walter ......Aberystwith.
Tredwell, Samuel Nehemiah ...Leeds.
Venables, Samuel Henry.........Wellington, Salop.
Walker, George John ....Revesby.
Wallace, James Frazer ....Glasgow.
Warrick, Frederick Walmsley London.
Waterworth, Eli ....Preston.
Watts, Harry.........................Henley-on-Thames.
Weller, Arthur William ....Bridgenorth.
Wells, Richard John ....Chesterfield.
West, Frederick ....London.
Weston, Henry.......................Devizes.
Wheeler, Wilfred Nevill ....London.

White, Thomas....................Jedburgh.
Wickham, Onslow Andrews ...Wye.
Williams, George Rowland ...Hitchin.
Williams, John Llewellyn ... ..Llantrissant.
Woodhead, Charles ....Ashton-under-Lyne.
Woollings, Frank....................London.
Wright, Charles Franklin ......Great Yarmouth.
Youngs, John Thomas...........Lynn.

The following is a list of the Centres at which the examination was held, showing the number of candidates examined at each Centre, and the result:—

	Candidates. Examined.	Passed.	Failed.		Candidates. Examined.	Passed.	Failed.
Aberdeen	7	4	3	Leicester	7	4	3
Aberystwith	4	3	1	Lincoln	5	4	1
Berwick-on-Tweed	2	1	1	Liverpool	13	3	10
Birmingham	22	8	14	London	45	31	14
Boston	3	3	0	Lynn	7	4	3
Brighton	1	1	0	Macclesfield	1	1	0
Bristol	4	2	2	Manchester	21	9	12
Cambridge	5	2	3	Newcastle-on-T.	6	4	2
Canterbury	2	1	1	Northampton	6	4	2
Cardiff	6	4	2	Norwich	4	3	1
Cardigan	4	2	2	Nottingham	8	3	5
Carlisle	6	3	3	Oxford	4	3	1
Carmarthen	3	3	0	Perth	1	1	0
Cheltenham	2	2	0	Peterborough	2	1	1
Chester	3	0	3	Plymouth	1	0	1
Colchester	1	1	0	Portsmouth	4	3	1
Darlington	11	6	5	Preston	4	2	2
Doncaster	2	1	1	Reading	4	2	2
Dumfries	3	1	2	Salisbury	3	0	3
Dundee	3	2	1	Sheffield	6	4	2
Edinburgh	14	6	8	Shrewsbury	7	5	2
Exeter	4	3	1	Southampton	1	1	0
Glasgow	10	5	5	Stafford	3	0	3
Guernsey	1	1	0	Swansea	5	4	1
Hereford	2	1	1	Taunton	1	0	1
Hull	4	3	1	Truro	3	2	1
Jersey	1	0	1	Worcester	1	0	1
Leeds	14	6	8	York	6	5	1

The Questions for Examination were as follows:—

First or Preliminary Examination.

April 9th, 1877.

(*Time allowed: three hours for the three subjects.*)

I. LATIN.

1. Translate into English:—Ita ancipiti proelio diu atque acriter pugnatum est. Diutius quum sustinere nostrorum impetus non possent, alteri se, ut coeperant, in montem receperunt, alteri ad impedimenta et carros suos se contulerunt; nam hoc toto proelio, quum ab hora septima ad vesperum pugnatum sit, aversum hostem videre nemo potuit. Ad multam noctem etiam ad impedimenta pugnatum est, propterea quod pro vallo carros objecerant et e loco superiore in nostros venientes tela conjiciebant, et nonnulli inter carros rotasque mataras ac tragulas subjiciebant, nostrosque vulnerabant.

2. Parse the words *nostrorum, impetus, receperunt*, and *venientes*.

3. Give all three degrees of comparison of the adjectives *superior* and *brevis*, and of the adverbs *acriter* and *diu*.

4. Decline together *hoc proelium* ('this battle'), *acer impetus* ('a fierce attack'), and *atra nox* ('black night').

5. State the chief uses (*a*) of the accusative case; (*b*) of the ablative case.

II. ARITHMETIC.

[The working of these questions, as well as the answers, must be written out in full.]

6 Subtract Five hundred and four thousand and seventy-six from Fifteen millions eighty-four thousand and nine.

7. How many yards of cloth worth 3*s*. 7½*d*. a yard must be given in exchange for 144 yards of cloth worth 18*s*. 1½*d*. a yard?

8. Find, by Practice, the value of 84 cwt. 3 qrs. 14 lbs. at £12 11*s*. 8*d*. per cwt.

9. From $\frac{2}{5}$ of $8\frac{2}{3}$ subtract $\frac{2}{7}$ of $2\frac{1}{5}$.

10. Reduce $\frac{7}{16}$ and $9\frac{4}{5}$ to decimals; and multiply the one decimal by the other.

11. A wheel makes 400 revolutions in rolling over $2\frac{1}{2}$ miles. Find its circumference in metres, centimetres, etc.

III. ENGLISH.

12. State clearly the functions of adjectives, adverbs, and prepositions.

13. Explain the difference between transitive verbs and intransitive verbs, and between verbs in the active voice and verbs in the passive voice. Arrange the following verbs in two classes, according as they are transitive or intransitive:—[*I*] *ran*; [*he*] *heard*; [*the letter*] *was sent*; [*they*] *are gone*; [*we*] *shall arrive*; [*he*] *had lost*.

14. Parse each word in the following sentence:—"Full many a flower is born to blush unseen."

15. Write a short account of Sir Walter Raleigh, or of King Henry II., or of the Duke of Wellington (*only one*); or a short essay on one of the following subjects:—(*a*) Self Control; (*b*) Vivisection; (*c*) Railways.

MEETING OF THE NORTH BRITISH BRANCH.

The Scientific Meetings of this Session closed with the eighth of the series, which took place on the evening of Monday, 23rd April, in the Society's Rooms, 119A, George Street, Edinburgh. Mr. Wm. Gilmour, President of the Branch, presided. The programme of the evening consisted of a description of the Medicinal Plants of Scotland, illustrated by diagrams and specimens, by Dr. Wm. Craig, Lecturer on Materia Medica, Edinburgh School of Medicine. This lecture will appear in a future number of the Journal.

Dr. Andrews P. Aitken, Chemist to the Highland and Agricutural Society, then delivered a short address on the subject of Fermentation. It was a process, he said, that had been known from the earliest times, but until recently it had been very little understood. Passing in review the various theories of fermentation, he dwelt especially on the two which a few years ago were so hotly debated between Liebig and Pasteur. Liebig maintained that fermentation was due to an instable chemical compound called a ferment, which, in the act of splitting up or undergoing a chemical change, was able to communicate that molecular change to some other bodies capable of receiving it. These were called fermentescible bodies, and that the free action of the oxygen of the air was necessary to the process. Pasteur, on the other hand, declared fermentation to be the result of living germs, which multiplied in a saccharine liquid at the expense of the oxygen dissolved in it, but when that was used up they took oxygen from the saccharine liquid, and in so doing caused it to be decomposed into alcohol, carbonic acid, etc. When fungi, such as blue mould, grew on the surface of a liquid containing sugar, albumenoid matter, etc., it used the atmospheric air, and no sugar was decomposed; but if the fungi were then plunged beneath the liquid, it still continued, though with difficulty, to live, and in doing so decomposed the sugar into alcohol and carbonic acid. Fermentation was therefore due to the prolonged vital activity of a fungus, which was cut off from a supply of free oxygen. This was an exhausting process, and the vitality of the ferment required to be restored by occasional admission of air, which enabled it to multiply rapidly, and thereafter produce a more vigorous fermentation.

The lecturer then described a few of the more common ferments, and explained the condition of their vitality, and the methods employed to study their character and history.

In the course of his address he referred specially to the fermentation of beer, and as it contains some points of considerable interest to brewers, we quote it in full.

When barley has been steeped in water for some time, and then spread, damp, on a floor at ordinary temperature, it germinates. From three to seven little rootlets appear, and the embryo within the seed begins to grow. During this time the starchy matter in the seed is being converted into sugar. The barley is then dried in kilns, and is called malt.

The malt, when crushed and dissolved in water, yields the sweet wort or malt liquor of the brewers.

It has long been known that if this wort is exposed for some time to the air it begins to ferment, *i.e.*, it puts on an appearance of boiling; bubbles of carbonic acid gas continually rise in it, and the sugar of the wort is converted into alchohol. This process of fermentation immediately stops if the liquid is boiled. If wort is boiled in a tube or flask, and if the vessel is hermetically sealed, or even plugged with cotton wool, while boiling, the wort may be allowed to cool, and will never ferment, but remain quite unaltered for any length of time. In the latter case there is free access of air to the wort through the cotton wool, so that it cannot be the air alone which causes the wort to ferment.

A little examination of a fermenting liquid will show a sediment, or scum, which, when examined through the microscope, will be found to consist of cellular bodies, having a definite shape and in an active state of growth. The most familiar substance of that kind is the yeast plant (*Torula cerevisiæ*), composed of small, roundish, nucleated cells, which when put into fresh wort immediately bud and grow with great rapidity, the wort in the mean time entering into brisk fermentation.

A minute germ of *Torula* is sufficient to begin the process, and as these germs are floating abundantly in the air, they cannot fail to alight on wort when exposed to the open air. This is the cause of spontaneous fermentation.

When the yeast plant alone is added to wort, either spontaneously or otherwise, the products of the decompositions of sugar are alcohol and carbonic acid, along with notable quantities of succinic acid and glycerine.

In all commercial beer there are found, however, lactic acid and a little acetic acid. These are impurities, and Pasteur, in his beautiful research on the maladies of beer, has traced their origin.

They are caused by the action of other germs than that of the yeast plant. The lactic and acetic ferments, which floating in the air have sown themselves in the sweet liquid along with the yeast plant, and have set up fermentations different from that of the yeast plant. Sour beer, turned beer, ropy beer, putrid beer, etc., have all been found to be associated with the growth of special germs. Each malady has its germs, and if care be taken to exclude the germ, the malady does not appear.

Cold weather kills or benumbs, and prevents the multiplication of these minute germs, hence in cold weather beers are much less subject to disease, and the colder months of the year are best suited for brewing purposes. In this country it is possible to brew in warm weather, from one great cause among others, that our brewers make use of the high fermentation, *i.e.* fermentation by means of a species of yeast that tends to float on the top of the wort.

The bubbles of carbonic acid on rising to the surface are entangled in the yeast, and form a thick layer of froth, termed "the head," which, covering over the fermenting wort, protects it to a considerable extent from contamination by germs of disease falling on it from the air. The practice which prevails in most breweries of beating back "the head" into the wort, so as to oxygenate it, and hasten the fermentation, by bringing the yeast into better contact with the wort, contaminates the wort with the germs of disease that had been intercepted by "the head." The mischief thus brought about would be greatly lessened if brewers would skim off the upper surface of the head before beating it back. On the Continent, where the lower fermentation is employed, it is impossible to brew good beer in summer.

The lecturer remarked that for practical brewers one of the most valuable results of Pasteur's research was the method he proposes for obtaining a pure yeast. He found that by the growth of yeast alternately in pure wort and pure solution of sugar, the germs of disease were killed off, and the germs of yeast, which were hardier and immensely more numerous, survived.

This simple experiment was one that could easily be carried out by brewers on a large scale, and with careful attention to the purity of yeast (and the microscope presented a means of testing its purity), it seemed probable that good sound beer might be brewed as easily in warm as in cold weather.

There were no doubt many other precautions which required to be taken, but it was quite certain that the researches of Pasteur had thrown a flood of light upon the *rationale* of the process of fermentation, and brewers would do well to make themselves acquainted with his works, that they might be able to escape much of the loss incident to their trade.

The lectures were warmly received by the meeting, which was the largest of the session, and at the conclusion, the audience heartily responded to a vote of thanks to the Lecturers. The vote was proposed by Mr. J. R. Young, and seconded by Mr. Ainslie.

Mr. Mackay intimated the donation of a number of botanical specimens for the Herbarium, from Mr. Wm. Gilmour, and took occasion in moving a vote of thanks to Mr. Gilmour for the donation, to refer to the very able manner in which he had so long presided at the meetings of the Branch, and the many original and instructive communications he had been at the trouble to prepare for them. This vote required no seconding, and the manner in which it was responded to must have been very gratifying to Mr. Gilmour.

Provincial Transactions.

SOCIETY OF CHEMISTS AND DRUGGISTS, ABERDEEN.

The annual meeting of this Society was held in the rooms, St. Nicholas Lane, on March 20th, Mr. Coutts, President, in the chair. The Treasurer presented his annual report, from which it appeared that £10 6*s.* 0½*d.* stood to the credit of this Society. The meeting then proceeded to the election of office-bearers, when Mr. Cruickshank was proposed President, Mr. Ritchie, Vice-President, Mr. Mackay, Treasurer, and Mr. Strachan, Secretary. On the proposal of Mr. Mackay, the Price List Committee was reappointed to revise and report.

Mr. Strachan brought under the notice of the meeting the desirability of the chemists of the neighbourhood being represented on the Council of the Pharmaceutical Society or on that of the North British Branch in Edinburgh. It was finally resolved that Mr. Reid, be requested to allow himself to be nominated for election, but he declined the honour.

The membership of the Society for the present year numbers thirty-two.

An adjourned meeting was held on April, 19th, Mr. Cruickshank, President, in the chair.

A memorial from the assistants and apprentices was read, respectfully requesting that the hourss of business be reduced from eight p.m. to seven p.m. After a considerable amount of discussion, in which most of the members present took part, it was agreed that at present, while they were always willing to accede to the requests of their memorialists as far as lay in their power, they could not unanimously recommend the desired reduction The feeling of the meeting was that they would arrange to allow those of their assistants or apprentices who desired to attend existing classes or lectures.

The Secretary laid on the table a letter from Mr. Fairlie requesting a deputation to attend the special meeting of the Trade Association to be held in Edinburgh on the 25th inst. After some discussion the subject was allowed to drop, no deputation being appointed.

The Secretary proposed that the best thanks of the Society were due to the Pharmaceutical Society for their kindness in sending them a copy of the Register as well as a copy of the Journal as published, which was seconded by Mr. Mackay and unanimously agreed to.

Mr. Paterson moved that assistants and apprentices be admitted as associates of this Society on payment by assistants of 5*s*. and apprentices of 2*s*. 6*d*. yearly, and that monthly meetings of this Society be held. This proposition created a considerable amount of discussion. Ultimately it was seconded by Mr. Ritchie and unanimously agreed to. A few years ago classes were started; but, owing to the small amount of interest displayed on the part of the apprentices, they were abandoned. It now appears that this motion or something akin has been sought after by the younger members, so as to atone for their predecessors' neglect. It is hoped that at some not very distant date the object of the above motion will be attained, viz., that classes will be again started with a sort of co-interest, when larger attendances will be expected. The present high price of quinine seemed to be the all-absorbing subject; it was finally agreed that the price for the present should be 1*d*. per grain and 4*s*. per drachm.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, April 19, Dr. Gladstone, President, in the chair. After the announcement of visitors, confirmation of the minutes of the previous meeting, etc., the following certificates were read for the first time:—Messrs. W. H. Ellis, W. Lapraik, J. L. Notters, T. Scarf, H. G. Stacey. The following papers were read:

1. *On the Estimation of Manganese in Spiegeleisen, and of Manganese and Iron in Manganiferous Iron Ores.* By E. Riley.

Estimation of Manganese in Spiegeleisen.—There are two methods now in use: (*a*) *the direct method.* The pulverized spiegeleisen (about one gramme) is dissolved in dilute nitric acid sp. g. 1·2, a little chlorate of potash and hydrochloric acid added to destroy the soluble organic matter from the combined carbon; the solution diluted to about a litre is neutralized with carbonate of soda or ammonia, acetate of soda or ammonia added, the solution boiled, the basic peracetate of iron allowed to settle and filtered off. This precipitate is redissolved in hydrochloric acid, and the process repeated to ensure complete separation of the manganese. The filtrates are evaporated to one litre and a half, allowed to cool, two to four c.c. bromine added, the solution well shaken, ·880 ammonia added in excess, the solution heated gradually for an hour, boiled for a few minutes, the precipitate allowed to settle, filtered (the filtrate should be evaporated and tested for manganese), dried, and ignited in a muffle or over a gas blowpipe for half an hour: (*b*) *the indirect method.* The finely powdered spiegeleisen (about one gramme) is dissolved in dilute sulphuric or in hydrochloric acid, the liquid diluted with recently boiled, cooled distilled water, and the iron estimated volumetrically; to the percentage of iron thus obtained five per cent. is added for carbon and impurities; the difference is assumed to be manganese. The results obtained by this method are usually too low, from the formation of soluble organic matter during the process of solution. This error can be obviated by using nitric acid for a solvent, evaporating to dryness and heating. The oxides of iron and manganese are then dissolved in hydrochloric acid, the solution largely diluted and reduced with sodium sulphite. Results obtained thus agree very closely with the direct method. The author gives fourteen analyses, showing that the addition of five per cent., for impurities, to the percentage of iron is a fair one. Thus, for all practical purposes, the indirect method is sufficiently accurate and can be accomplished in one hour, the direct requiring five or six hours. The author strongly recommends the use of acetate and carbonate of ammonia instead of the corresponding soda salts in the direct method, and proves by check experiments with pure sulphate of manganese, etc., the statements of Fresenius and others, that the presence of ammoniacal salts prevents the complete precipitation of manganese by bromine and ammonia, to be erroneous. On the other hand, if soda salts be used the ignited precipitate will contain soda. The author considers that sulphur cannot exist in spiegeleisen. He determines the carbon by dissolving the iron in neutral chloride of copper, and after complete solution of the iron and precipitated copper, the carbon is filtered on asbestos and burnt with oxide of copper in a current of oxygen. The carbon determinations by the colour test are unsatisfactory for high percentages of carbon. According to the author, the percentage of carbon varies with the percentage of manganese. The methods of Mr. Parry (*Chemical News*, vol. 29, p. 86), and of Mr. Galbraith (*Chemical News*, vol. 33, p. 49,) were considered, and stated to be undesirable methods.

Estimation of Manganese in Manganiferous Iron Ores.—These ores contain baryta, many contain oxide of zinc and some potash or soda in appreciable quantities. The use of ammoniacal salts, as mentioned in the previous part of the paper prevents any large error from the presence of the oxide of zinc, but it is difficult to get rid of the baryta; even in the presence of sulphuric acid it remains in combination with the manganese, and is precipitated with it unless special precautions be taken. Lime, if present, may also be precipitated with the manganese. After insisting on the importance of taking fair samples, and of determining all the constituents directly, the author gave the following process as the one which yielded the best results:—One gramme of the ore dried at 100° C. is dissolved in hydrochloric acid, the silicious matter separated by filtration, and the larger portion of the free acid driven off. The liquid is made up to about one-third of a litre, and allowed to stand four hours after adding a few drops of sulphuric acid to separate any baryta. The solution is now diluted to about one litre, neutralized with ammonia and after the addition of acetate of ammonia boiled, allowed to settle and filtered; the unwashed precipitate is redissolved in hydrochloric acid, and again precipitated with ammonia and acetate of ammonia. The basic peracetate of iron, after settling, is filtered off and washed three or four times with boiling distilled water containing a few drops of acetate of ammonia. The filtrate is evaporated to one litre and a half, when cold, two to four c.c. of bromine added, and the process completed as described above. After ignition the precipitate should be dissolved in a small quantity of hydrochloric acid, the residue, if any, filtered off, a drop of sulphuric acid added, and the precipitate (if any occurs) separated. It is most important to test the ignited Mn_3O_4 for impurities, baryta, zinc, lime, etc. Chlorine can be substituted for bromine, but without advantage.

The sulphide of ammonium process the author considers to be most objectionable.

Estimation of Iron.—The author recommends a standard solution of bichromate of potash, the results being usually a little high. As a reducing agent, sulphite of soda prepared in the laboratory is used, the purchased samples being always impure; bisulphite of soda should not be used. The percentages of iron in sixty samples of steel rails are given, determined by weighing as Fe_2O_3, and by standard solution of bichromate of potash; the mean difference between the two methods is ·073 per cent.

Dr. Gladstone said that the Society must feel greatly indebted to Mr. Riley for giving them the benefit of his experience in so elaborate a manner, especially as the determination of manganese had now become a matter of such great importance.

Mr. Field asked if Mr. Riley had tried hydrated oxide of lead in suspension for effecting the separation of barium, manganese and iron. Cobalt and nickel were entirely separated from iron by its use.

Mr. Riley said that the acetate of ammonia process was so beautiful that he should prefer it; and besides, there would be the additional trouble of getting rid of the lead. In answer to Mr. Heathfield, the barium, in the case of a sample of ore containing 14·87 per cent. Ba. was combined with the manganese.

2. *On a Method of Detecting small Quantities of Bismuth.* By M. M. Pattison Muir, F.R.S.E.—The author finds that the following test liquid (see "Researches on Bismuth," *Pogg. Ann.*, lxxxviii., p. 45, by R. Schneider) is a very delicate qualitative test for bismuth; twelve grm. crystallized tartaric acid and four grm. stannous chloride are dissolved in caustic potash so as to produce a clear liquid having a distinctly alkaline reaction. This liquid must remain clear at 60—70° C. To the liquid to be tested is added a considerable quantity of tartaric acid; it is warmed and made alkaline with caustic potash; a few c.c. of the stannous chloride solution (which the author proposes to call Schneider's reagent) are now added and the mixture warmed to 60—70° for a few minutes. If bismuth is present a brownish black colour is produced, from the formation of hypobismuthous oxide (Bi_2O_2). One part of bismuth in 210,000 parts of liquid may be thus detected. The absence of mercury must be secured before applying the test. Copper and manganese interfere slightly. Lead, arsenic, antimony, iron, cobalt, nickel, and chromium not at all. The author hoped to have perfected a volumetric method from the above reaction but has not succeeded.

Mr. Field mentioned that the precipitation of iodide of lead was an exceedingly delicate test for the presence of bismuth. If no bismuth was present, the iodide of lead was precipitated of the usual yellow colour: if one thousandth part of bismuth was present, the precipitated iodide was of a distinctly darker colour.

3. *On Certain Bismuth Compounds. Part V.* By M. M. Pattison Muir, F.R.S.E.—By precipitating a nearly neutral solution of bismuth nitrate with potassium ferricyanide, washing by decantation, and drying *in vacuo* over sulphuric acid, pure bismuth ferricyanide is prepared as a tawny yellow amorphous powder, with a shade of green; its formula is Bi_35FeCy_6. It is unaltered in moist or dry air; suspended in boiling water hydrocyanic acid is evolved; it is partially decomposed by drying at 100° C. By the action of chlorine, bromine and nitric acid, bismuth ferrocyanide is converted into bismuth ferricyanide. The ferricyanide is decomposed by the action of chlorine, when suspended in water or in the presence of cold or hot solutions of caustic soda. A method for analysing bismuth ferrocyanide and bismuth ferricyanide is given. Bismuth ferricyanide is converted by sodium amalgam into the ferrocyanide. When heated in closed crucibles both salts yield a black-brown mass, containing iron, bismuth, carbon and small quantities of cyanogen.

4. *Notes on Madder Colouring Matters.* By E. Schunck, Ph.D., F.R.S., and H. Roemer, Ph.D. *Continuation.* Munjistin, purpurin, and purpuroxanthic acid.

Munjistin.—The authors found this substance to resemble purpuroxanthic acid, softening at 125°, fusing at 130°; when further heated it evolved carbonic anhydride, and was converted into purpuroxanthin. After criticizing the conclusions of M. Rosenstiehl (*Compt. Rend.*, lxxxiii., 827), who states that his purpurin is identical with purpuroxanthic acid, and that the latter is formed from pseudopurpurin, the authors claim, having been the first to discover among this series of bodies one containing a carboxyl group, to be left for the present in undisturbed possession of the field they have opened up, *i.e.*, the preparation and examination of such members of the series as are formed from alizarin and its isomerides, as well as from the isomerides of purpurin by the substitution of n H by n CO OH.

Purpurin.—The specimen examined had a melting-point which remained constant after it had been converted into the acetyl compound and again liberated; its formula was $C_{14}H_8O_5$; it was easily soluble in boiling spirits of wine, yielding a yellow solution, from which it crystallizes on cooling in thin flattened prisms of a deep orange colour; the crystals lose water at 100° C., and contain one molecule of water. Purpurin melts at 253° but begins to sublime at 150° in red plumose or acicular crystals. It is slightly soluble in boling water and dissolves in ether, readily in carbon disulphide, benzol and glacial acetic acid. It dissolves in concentrated sulphuric acid, in caustic potash, soda lye, sodium carbonate solution, and ammonia. These solutions give absorption spectra. In alcoholic potash and soda purpurin is almost insoluble. It forms with baryta and lime water purple lakes. A solution of purpurin in caustic alkali loses its colour on exposure to the air, the purpurin disappearing entirely; this is due to oxidation. Purpurin dissolves in boiling alum liquor, forming a pink fluorescent solution containing purpurin in a loose combination with alumina. This solution is precipitated by the addition of a little sodium carbonate or ammonia, though the liquid may still retain an acid reaction. An alcoholic solution of purpurin gives with lead acetate a crimson precipitate, soluble in excess of alcoholic lead acetate. The precipitate obtained with alizarin is insoluble in excess; with copper acetate purpurin in alcohol gives a dark reddish yellow precipitate; a solution of alizarin becomes purple, but gives no precipitate.

Triacetylpurpurin softens at 193° and melts at 198° to 200° C. It is decomposed by dilute caustic potash yielding purpurin. Analysis gave the formula, $C_{14}H_5(C_2H_3O)_3O_5$.

Brompurpurin is obtained by digesting purpurin with carbon disulphide containing bromine at 150—200° C. It crystallizes from glacial acetic acid in dark red needles, melting at 270°. Its properties resemble those of purpurin. Its formula is $C_{14}H_7BrO_5$. By heating pure purpurin for six to seven hours in sealed tubes to 300° C a small quantity of quinizarin is formed and a quantity of byproducts. No alizarin is formed. Quinizarin crystallizes in bright red needles, melting at 193—194° C. Its ethereal solution is strongly fluorescent; it is soluble in alum liquor, giving a red solution with two absorption bands.

The Society then adjourned to May 3, when the following papers will be read:—

1. "On Some Points in Gas Analysis," by J. W. Thomas.
2. "On Nitroso-β-naphthol," by Dr. Stenhouse and Mr. Groves.
3. "On the Action of Pyrogallate of Potash on Nitric Oxide," by W. J. Russell and W. Lapraik.
4. "Asbestos Cardboard and its Uses in the Laboratory," by W. N. Hartley.

Parliamentary and Law Proceedings.

EXPLOSION OF NITRO-HYDROCHLORIC ACID.

At Bow Street, on Saturday, April 21, Messrs. Rouch and Co., who were represented by their manager, Mr. G. H. Turner, were summoned for having sent out a dangerous explosive liquid, and causing damage to a tablecloth and other property in chambers occupied by Captain Hawley Smart, at St. Martin's Chambers, Trafalgar Square.

Mr. Montagu Williams, in support of the summons, said that the matter had been taken up on public grounds by Captain Smart, a gentleman in the military service, but also well known as an author and novelist. If he had been pursuing his literary occupations at the time of the explosion he might have been deprived of his eyesight or otherwise injured for life. It appeared that on the morning of the 9th April a boy delivered at the chambers a small packet, resembling a medicine bottle. There was no address written on the bottle, and the boy was unable to say for whom it was intended. The landlady, Mrs. Billingham, thinking that it must be for Captain Smart, desired the servant to place it on that gentleman's table, and it was left there till the return of the captain between 10 and 11 at night.

Captain Smart deposed that he saw the packet lying on his table. He looked at it for a moment, and then sat down in front of the fire with his back towards the table. Suddenly he was startled by a loud explosion, like the bursting of a soda-water bottle, and he saw that the packet on the table had disappeared. The room was filled with smoke and a suffocating vapour, causing him to open the door and windows, and as both the tablecloth and table appeared to be burning, he procured a wet cloth and took other means to prevent the spreading of fire. He found that the bottle had been splintered to atoms, and the neck of it, with a cork still in it, was found upon the floor. Stains caused by the contents of the bottle were to be seen on the carpet, the furniture, and a portion of his own wearing apparel, and he burnt one of his fingers through taking up a fragment of the bottle. The label of Messrs. Rouch was still adhering to the bottle. He sent to them for an explanation of the matter, but they treated the inquiry with such nonchalence, not to say rudeness, that he resolved to place the matter in the hands of his solicitors.

Mr. G. H. Ogston, analytical chemist, of Mincing Lane, described the mixture as a most dangerous one, stronger than nitric acid, and more destructive than vitriol. It was known as *aqua regia*, and was a combination of nitric and hydrochloric acids, and he was surprised that any chemist could have sent out such a preparation without a proper description of it, and a caution as to its dangerous character written outside.

The defence was that the mixture had been made up from the prescription of a medical man, and, when sent out by the boy, was accompanied by proper instructions, the prescription, and the address of the gentleman for whom it was prepared, viz, Major Furlong, who resided in another set of chambers under the same roof as Captain Smart. It happened that the boy neglected to deliver the prescription, etc., and address. With respect to the statement that the clerk of Messrs. Frere, complainant's solicitors, was treated with insolence by Mr. Rouch—who said that it was an attempt to extort money, and that he was as "smart" as the complainant—it was alleged that the complainant and his solicitors had behaved in a very "bumptious manner," and that Mr. Rouch consequently lost his temper. It was urged that the occurrence was merely accidental, and that there being no wilful intention the complaint could not be sustained; but Mr. Flowers remarked that such an explosion would probably have happened in Major Furlong's chambers with similar or worse results. The defendant said if the instructions had been delivered with the bottle it would have been seen that the bottle was to be kept in an upright position, and the defendant's boy was called to prove that he lost the paper at the time, but, finding it afterwards, delivered it the next morning.

Mr. Flowers said there had been great carelessness, and fined the defendants 40*s.* and £2 12*s.* 6*d.*, the amount of damage done by the explosion.—*Times.*

Obituary.

Notice has been received of the death of the following:—

On the 29th of March, 1877, Mr. William Thomas Aylesbury, Pharmaceutical Chemist, Edwardes Terrace, Kensington. Aged 31 years.

On the 9th of April, 1877, Mr. Alfred Kent Laslett, Chemist and Druggist, Hadleigh. Aged 38 years. Mr. Laslett had been a Member of the Pharmaceutical Society since 1869.

On the 10th of April, 1877, Mr. Thomas Brand Steckles, Chemist and Druggist, Newcastle-on-Tyne. Aged 39 years.

On the 10th of April, 1877, Mr. John Clarkson Sutcliffe, Chemist and Druggist, Barnsley. Aged 33 years. Mr. Sutcliffe was an Associate of the Pharmaceutical Society.

On the 13th of April, 1877, Mr. Thomas Buckley Booth, Pharmaceutical Chemist, Eccles. Aged 59 years. Mr. Booth had been a Member of the Pharmaceutical Society since 1853.

On the 17th of April, 1877, Mr. John Jerrard Flower, Chemist and Druggist, Fulham Road. Aged 55 years.

On the 20th of April, 1877, at his residence, 25, Palace Gardens Terrace, Mr. John Sanger, senior partner in the firm of Sanger and Sons. Mr. Sanger had not been actively engaged in the business for several years past.

Notes and Queries.

[544.] GINGER ALE.—"T. A. H. would feel obliged by any reader furnishing a good recipe for Ginger Ale."

HAARLEM OIL (*The Pharm.*).—

Linseed Oil	2 pints.
Resin	1 pound.
Sulphur.	1 „
Oil of Turpentine	1 pint.
Strong Water of Ammonia . .	50 drops.

M.

PREPARATION OF MEDICINAL PEARLS.—The mass for forming the capsules consists of gelatin, gum arabic, sugar and honey. This is rolled out into sheets of suitable thickness. One of these sheets is placed on top of an iron plate having a thickness of 0·6 centimetre, into which holes of a diameter of 1 centimetre have been bored. The gelatinous mass, while still pliant, sinks into these holes by its own gravity, forming a hollow hemisphere in each concavity. The ether or other medical preparation is then introduced, and the orifices are closed by another sheet of the gelatinous compound.

A second iron plate, furnished with holes corresponding exactly to those of the first, is now applied and securely fastened by suitable screws. The whole apparatus is now reversed in such a manner that the superior plate assumes the inferior position. Concavities will thus be formed in the second sheet of gelatin in the same manner as they previously were in the first. In order finally to separate the pearls, the entire arrangement is subjected to strong compression between iron plates in a powerful press. A. W. M.—[*Translated from "Hager's Hand-book of Pharmaceutical Practice,"* 1876.]—*American Jour. Pharmacy.*

BOOKS, PAMPHLETS, ETC., RECEIVED.

Butter, its Analysis and Adulterations, Specially treating on the Detections and Determination of Foreign Fats. By Otto Hehner, F.C.S., and Arthur Ongell, F.R.M.S. Second Edition. London: J. and A. Churchill, 1877.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Santonin and Strychnine.

Sir,—In the Journal of February 17th was reported a case of poisoning by santonin mixed with strychnia. At the time of reading it, I remembered having seen a similar case reported some years ago, but could not bring to mind any of the circumstances; I was, however, so persuaded that my memory was not at fault, that I have been diligently searching through my books and have at last succeeded in finding the looked-for information. In the *Journal de Chimie Médicale* for January, 1860, at page 23, is an article entitled "Accidental Poisoning by Santonin mixed with Strychnia." As I do not remember having seen this French journal at the Square, and as the subject is an important one, I think that I may venture to intrude upon your space, giving you a complete translation of said article, which now follows.

"It will be remembered that there was recently a fatal case of poisoning which occurred in Brussels, by means of santonin administered as a vermifuge and which was afterwards found to contain four-fifths of strychnia. The *Espana Médica* recounts a series of similar accidents which happened in the Brazils, by the use of santonin bought from the same chemist. Fortunately only one of these poisonings was followed by death. A servant for whom 0·30 gram of santonin had been prescribed, mixed with 0·40 gram of calomel, to be taken in two doses, at two hours' interval, but the second dose was only to be administered in case the first had not had an aperient effect. A quarter of an hour after having taken the first dose, the patient was seized with tetanic convulsions, which passed away. At the time indicated, the second dose was administered, but she did not take it quite all, saying that it was too bitter. The convulsions reappeared and the poor girl died in a quarter of an hour's time. The *post-mortem* failed to discover any appreciable cause to account for the death and the report being spread of several other accidents due to the same substance, the Society of Pharmacy became alarmed and commissioned two of its members, Messrs. Janvret and Vieira to analyse the suspected medicament.

"Having obtained eight grams of santonin from the same shop, C——— Street, No. 113, they first of all remarked that it contained two kinds of crystals, some being in rhombic prisms, flattened, and with a slightly bitter taste, such as are usually those of santonin, the others in masses of square prisms and very bitter, as are those of strychnine. By means of a magnifying glass they were able to separate 0·30 gram of these last crystals. By submitting them to the action of sulphuric acid, which gave no colour, of nitric acid, which turned them yellow, of sulphuric and nitric acids and bi-oxide of lead, which produced a blue colour changing to violet and lastly to yellow, and by testing in various manners an alcoholic solution, the certitude was obtained that this was really strychnine. A complementary experiment was, however, indispensable; 0·05 gram of the strychnine extracted from this santonin were administered in a bolus to a dog of ordinary size. In five minutes' time it was seized with convulsions and died in ten minutes. A second dog took, in the same manner, 0·20 gram of the santonin submitted to the commission. The same symptoms appeared and killed it in fifteen minutes. As a counter proof, 0·20 gram of pure ordinary santonin were administered to a small dog, producing no effect whatever.

"From these facts, scrupulously observed, the commission decided that the santonin in question contained strychnine, and that that substance existed in it to the extent of 20 per cent. (*Espana Médica et Gazette Médicale de Lyons.*) A country doctor, living in Belgium, having bought some santonin from a druggist, administered this vermifuge to a young child, who shortly died poisoned. The so called santonin was examined and found to contain one-sixth part of strychnine. The doctor was condemned to pay a small fine for having, without previous examination, made use of a substance proceeding from a druggist's."

"The cases becoming numerous, we ask, how is it that sometimes santonin contains strychnia?"

With this question of the editor the article concluded, and so far as I can make out the subject rested here. This was seventeen years ago, and such a length of time having elapsed it is useless trying to trace the supply of Mr. Sherrat's santonin to the same source from which the other poisoned samples were obtained.

There is here a mystery which it would be important to discover; these cannot be mere ordinary accidental mixings of strychnine, for why should santonin be more liable to this accidental mixing? These two products are obtained by very different processes; it cannot therefore be especially convenient to prepare them at the same time, they being thereby more likely to become mixed through carelessness. The last operation of recrystallization is alike in both cases, but as I have no knowledge of how these operations are practically carried out by manufacturing chemists, I do not know how far this would render an error possible. Does a plant exist containing strychnia, and yet at all similar in appearance to the *Artemisia Santonica* or any other plant from which santonin is usually extracted? If so, is the Pharmacopœia process for the preparation of santonin capable of producing strychnia at the same time? Do manufacturing chemists usually follow Pharmacopœia process for the preparation of santonin; if not, is their process more likely to extract any strychnia present? I put these questions for competent persons to answer, for although I may have my own opinion upon the subject it can be of no value in a matter of so much moment.

There is one more possible source of error existing in the slight similaritude of names; would not a careless and absent-minded warehouseman be liable to mistake strychnine for santonin, or in the event of a verbal order being given at some distance off and spoken quickly, would it not be possible to misunderstand one for the other? Then comes the question of the labelling; a man must be very absent minded indeed, to put up one thing and label it another, although if two warehousemen are working together, one will very likely put up and the other finish off, in which case it is possible for the finisher off to verbally order his companion to put up santonin; he puts up strychnine through misunderstanding the word, and it is finished off in the usual way and labelled santonin. This theory supposes that the retail chemist has a certain quantity of pure santonin remaining in his stock bottle which mixes with the strychnia received in mistake. Strychnine and santonin being two words very much alike in most languages favours this supposition; and I will also give you following translation of an extract from Darvault's 'Officine,' last edition, where under the head of strychnine will be found at page 888:—"The initial of its name, some physical resemblance, have been the cause of terrible mistakes between this energetic poison and a simple vermifuge, *Santonin.* Attention!"

Having had no experience in the wholesale trade, I merely wish to suggest this and ask whether it could happen. Wilful adulteration is not to be thought of, for besides the danger of the admixture, strychnia is more costly than santonin.

In the three cases mentioned in the French paper, the proportion of strychnia varies from four fifths to one sixth, and the quantity present in the Manchester santonin must have been considerable, Dr. Walker having suffered the symptoms of poisoning through merely tasting it. The difference of percentage of strychnia present only proves that these were not all one and the same sample of poisoned santonin.

In addition to these four cases, we now have the alarming contents of Mr. Willson's letter in your issue of Feb. 24th, which shows that the poisoned santonin is probably more general than we suppose, and if there have not been more fatal cases, it is only due to the small doses usually employed. Mr. Willson takes it for granted that in the German case the poisonous symptoms were due to the santonin, but as it is not mentioned whether the santonin was examined for strychnia, and considering the facts now on record, I think that we may conclude that in Germany there also exists santonin mixed with strychnia, for in all likelihood the physician in charge of the case used the very same sample of santonin for his experiments on the lower animals.

Bearing in mind that convulsions often accompany worms in young children, it would not be surprising to find that in many cases of slight convulsions caused by the strychnia in santonin, the medical man has attributed the symptoms to the worms; one might almost go further and ask whether death caused by strychnia could not be mistaken for convulsions.

I have spoken on the subject to a Spanish chemist, who informs me that he has often remarked that santonin is more bitter at times, but he had not noticed the existence of two different crystals. Of course the difference of bitterness may be due to a larger or smaller quantity of photosantonic acid present, just the same as it may be to strychnia.

Chance has thrown these facts in my path, and it has been my duty to lay them before you, so that steps may be taken to discover the cause of this fatal admixture and to prevent its recurrence.

LOUIS E. DOTESIO.

10, *Calle de la Cruz, Bilbao, Spain,*
April 19, 1877.

THE BURNING OF CARBON BISULPHIDE FOR DISINFECTING PURPOSES.

Sir,—My attention has been drawn to a letter sent some months ago, by Mr. T. W. Keates, to the *Lancet*, on the subject of disinfection,—"A Mode of Generating Sulphurous Acid." He recommends strongly the burning of bisulphide of carbon, using for the purpose an ordinary spirit lamp, with precautions, which he details.

For some eight or nine years I have been employing this method, but instead of using a glass lamp, have preferred the ordinary sponge lamps, which are to be bought at any ironmonger's for 6*d*. each. They possess two advantages—they are not breakable, and do not spill when overturned; on the other hand they are not easy to extinguish, and the flame is unprotected.

Would it not be worth someone's while to devise and produce a special lamp for the combustion of the bisulphide? It should be made, I think, of lead, and have a cup dipping into a joint moistened with glycerine. The addition of a perforated dome of earthenware would be an improvement.

The glycerine joint might not strike one as necessary, but I fancy it would be difficult, seeing the extremely low ignition temperature of the bisulphide, to apply a screw cap to the lamp when hot.

THOS. B. GROVES.

MEDICINE MEASURES.

Sir,—I take the opportunity of this discussion on "Medicine Measures" of suggesting (I don't know whether it has been done before or not) what I think will be the best method of writing the directions for mixtures, viz., to use the words "Medical" or "Medicine" as a prefix to the words "tablespoonful," "dessertspoonful," and "teaspoonful." It has the advantage over such words as "accurate," "measured," etc., as it brings before the patient, in a plain and unmistakable manner, the information that there is a particular sized spoonful to be taken—a "medical spoonful"—and it then becomes his duty to provide himself with one, and whether he obtains a glass graduated to tablespoonfuls, etc., a china spoon, or a Proctor's medicine measure, and whether he buys it, or gets it given, it does not matter, the chief thing being done, informing him he has to take a medical tablespoonful, dessertspoonful, or teaspoonful, as the case may be. Also, prescribers would not in any way have to alter, either their calculations, which they would have to do should the sizes of the spoons be increased, or their form of directions, as ʒj, ʒij, ℥ss, would mean as before a tea, dessert, and tablespoonful, only they would be medical spoonfuls. It would in all probability not be long before every household was educated to the knowledge that there was a difference between a "medical" and an ordinary spoon, and had one, in the shape, either of a spoon, graduated glass, or an accurate measure of some kind, set apart for taking medicine.

With hospitals, perhaps, it is a more difficult matter, but it might be got over by having a plain and easily understood notice hanging in the rooms in which the patients are waiting for their medicine, informing them that a "proper medicine spoon or measure" may be had when receiving the medicine, for the sum of, say, one penny.

In conclusion, I may remark our duties and responsibilities are already onerous enough, without our unnecessarily increasing them, and that when we have prepared the medicine, and labelled it in accordance with the "intention" of the prescriber "we have done our duty."

JOHN HALLAWAY.

52, *Castle St., Carlisle.*
April 18, 1877.

COUNTER PRESCRIBING.

Sir,—As the legitimacy of counter prescribing is now being called in question, it may be interesting to your readers to know the interpretation which was given by the judge in the case, *Apothecaries' Company* v. *Greenough*, of the word "dispense" in the 28th section of the Apothecaries' Act, 1815. (See 'The Law Journal Reports,' 1842.') The word "dispense," in that section, must mean either by selling in their shops, or by administering for a specific disease, provided that they only charge for medicines, and not in any other capacity. Formerly it was considered that no one could prescribe but a physician (*College of Surgeons* v. *Rose*, 6 Mod. 44), which was overruled by the House of Lords (1 Bro. P. C., 78, 1st Edition.) If your readers will take the trouble to refer to this case, they will see that the defendant, Greenough, who was declared to have practised as an apothecary, had "attended sick persons, administered medicines to them and made charges." It now remains to be seen what interpretation will be given on this said 28th section by the Court of Queen's Bench, and we await this decision with considerable anxiety, not that we want to practise as apothecaries, but it is of serious moment to chemists and druggists, and also to the public, to know, whether the prescribing of a few lozenges for a sore throat, or a draught for a headache, is an infringement of the Apothecaries Act.

Cannot the Council of the Pharmaceutical Society take up the question with a view to its amicable settlement? If not, and should a decision be arrived at adverse to chemists, apothecaries' shops must take the place of many of our pharmacies. But surely, then, legislation must be obtained to require all future apothecaries to possess a qualification for dispensing which shall be equal to the "Minor" of the Pharmaceutical Society.

F. P. GOSTLING.

Diss, Norfolk,
April 17, 1877.

SUNDAY CLOSING.

Sir,—I for one strongly uphold the keeping of the Sabbath as it should be kept, and I think chemists, as a rule, might set a better example in that respect than they do at the present time. I often go out for a walk on a Sunday, and in the evening especially, greatly to my abhorrence, do I see seven tenths of my brethren with the door-shutter down, the gas flaring, and pomades, perfumes, etc., displayed for sale on the counter, just as though it were an ordinary week day. I maintain that such a proceeding is anything but creditable to the honourable profession to which we belong; it brings our calling down to a level with lollipop and cigar shops.

This is my plan with regard to the management of Sunday. The shop-door is not open at all the whole day, and the needful amount of medicine is supplied at the private door. The following notice is affixed to a brass plate on the door-shutter (not forgetting there are some places without a private entrance, then the shop-door has to be resorted to): "Attendance on Sundays, before 10 A.M. and after 7·30 P.M. Please to ring the bell. Orders placed in the letter box at other times shall receive early attention."

I find this scheme works remarkably well, and I would strongly advise my "brother chips" to have a similar notice affixed in a conspicuous place on the door. When I first took to business, about a year ago, I instantly closed on Sunday, and I have lost nothing by so doing, consequently I shall always adhere strictly to that principle. Before my time here, the shop-door was always on the swing in the evening, and a light shining brightly within, but I very soon altered matters.

I do not pledge myself to stay at home all day long, and if people come at other times, and I am not in, they must call again, which in nine cases out of ten they do. I really do think that employers are cruel to expect an assistant to stay in the whole day; I have been served so myself in different places, and oftentimes not five shillings were taken all through those dreary hours, which seemed more like days, and I was glad when Monday made its appearance. Therefore, I can deeply sympathize with any assistant who has to go through that trying ordeal. The fact is we make ourselves too cheap by half, but I sincerely hope that, as time wears on, there will be an improvement in this respect, and that we shall see every chemist closed on the Sabbath day.

With regard to the early closing movement, I shall be most happy to fall in with any reasonable proposition. I think closing windows at 8, and door at 8·30 a very good one, and will gladly work it in my district, should my neighbours do likewise.

A BEGINNER.

Highbury Park,
April 23, 1877.

Sir,—In reply to "Student's" remarks, in the *Pharmaceutical Journal* of 21st inst., on the process No. 9, in Mr. E. Gregory's paper on "Emulsions," I wish to say, that after reading of his difficulty in obtaining a good result by following "plan No. 9" given by Mr. Gregory, I first prepared an emulsion according to ingredients and process given by "Student," with a most satisfactory result.

Next, I followed Mr. Gregory's "No. 9," and having "Student's" remarks in my mind, was rather astonished on, almost at once, obtaining a result by every means entitled to be "termed an emulsion."

In both cases, I first added, gradually, the turpentine to the acacia, mixing them well together, then added at once, in the one case two, in the other, one and a half parts of water, both "came" quickly and beautifully, and if any difference at all, that by the process of "Student" came easiest.

Having marked both, I set them aside, on the 21st, and to-day, the 23rd, both emulsions are "as like as two peas," each having a "cream" on the surface, the under portion remaining like milk.

I repeated process No. 9 to day, with the very same result. Perhaps "Student" may try again, after reading how "plan No. 9" behaved in the hands of

ANOTHER STUDENT.

Glasgow,
23rd April, 1877.

EMULSIONS.

Sir,—Replying to the letter of "Student" in your last issue of the Journal, I beg to inform him that it is quite possible to produce a perfect emulsion according to the form No. 9 in Mr. Gregory's paper (vide *Pharm. Journ.* April 14th).

The *modus operandi* which has yielded in my hands the greatest satisfaction is as follows:—One part acacia was put into a mortar and well triturated with two parts oil of turpentine: one and a half parts of water were then added at once and well rubbed, when a beautiful emulsion was obtained in one minute. This has remained perfectly unchanged for eight hours, and is miscible with any quantity of water.

Continuing the experiment, the same proportions were used, first rubbing the water with the acacia, then adding the oil *guttatim* This also yielded a good emulsion but occupied half an hour to complete the trituration. I therefore consider the process No. 9, above referred to, to be by far the preferable one, and hope "Student" will preserve in his attempt to produce it.

A. E. C.

145, *Meadow Lane, Leeds.*

GLYCERINE OF PEPSINE.

Sir,—Some years back I made a solution of pepsine in glycerine, which has come into extensive use, owing chiefly to the recommendation of Dr. W. B. Richardson, F.R.S. This compound is known as "Acid Glycerine of Pepsine;" and I am induced to call the attention of your readers to this title, lest otherwise they might confound my preparation with those of other makers having somewhat similiar names. I may state that I have found my acid glycerine of pepsine to possess very much greater digestive power than any liquid form of pepsine with which I am acquainted. This can easily be tested by any one who will make the following experiment:—Take fifty grains of hard boiled white of egg, sliced thin, place it in a wide mouthed bottle with half a fluid drachm of acid glycerine of pepsine, and six drachms of dilute hydrochloric acid (two fluid drachms of hydrochloric acid B.P. in one pint of water). The mixture to be stirred occasionally with a glass rod, and allowed to stand at the ordinary temperature, when the albumen will gradually but slowly dissolve. To make a series of comparative experiments, let the operator take two, four, or more times the quantity of any other fluid preparation of pepsine, and observe the results. Those who are not accustomed to test pepsine will find the employment of hard boiled white of egg preferable to fibrine.

J. LLOYD BULLOCK.

3 *Hanover Street.*

"*Kamala.*"—(1) The preparation is a proprietary one, and we cannot infom you as to its composition. (2) We do not think the ointment would be a safe remedy.

S. N.—See paper by Mr. H. Williams Jones, on Syrup of Ferrous Phosphate prepared from Metallic Iron, *Pharm. Journ.* [3], vol. v., p. 541.

"*Jersey.*"—The density of water at 99·8° (taking its density at 4° as =1) is, according to Mendelejoff, 0·95903, and at 156·8° is 0·90770. See Watt's 'Dictionary,' vol. iii., p. 59.

W. T. W.—The subscription is 7*s.* 6*d.* annually. Apply to the Honorary Secretary, Professor Attfield, 17, Bloomsbury Square.

"*Juvenis.*"—He is not so entitled.

R. W. Broomfield.—We believe the preparation to be exempt, but recommend you to ask the question of the Inland Revenue authorities.

"*Scapel.*"—We know of no method more effectual than judicious advertising.

"*Hamilton.*"—Apply at Apothecaries' Hall.

"*Carex.*"—*Carex riparia.* Carices should always be sent in the fruiting state.

"*Rusticus.*"—(1) *Sinapis arvensis*; (2) *Sanicula Europæa*; (3) *Veronica Chavmædrys*; (4) *Cardamine hirsuta*; (5) *Scandix Pecten-Veneris*; (6) *Lamium purpureum*; (7) Looks like *Nepeta glechoma.*—Specimen too imperfect to identify.

"*Syrupus.*" — (1) *Tortula intermedia*; (2) *Bryum cernuum*; (3) *Tortula unguiculata*; (4) *Tortula lævipila*; (5) *Bryum capillare.*

ERRATUM.—In some copies, on p. 861, col. 1, line 6 from top, *for* "2000 pounds" *read* "92,000 pounds."

SPECTRUM ANALYSIS.*

BY PROFESSOR REDWOOD.

Among natural phenomena there are none more calculated to excite our admiration and wonder than those presented by the rising or the setting sun, by a rainbow, and by the sky on a clear starlight night. An intelligent observer of these phenomena cannot fail, at some period of his life, to have indulged in speculation as to what the objects presented to his observation are, and how they have been brought to his perception. He has been told that for all his ideas of things that are beyond his sense of touch he is indebted to an agent, itself invisible, which is the medium of communication between his organs of vision and objects which may be separated from him by distances either small or immensely great, extending even into the abyss of fathomless space. He has learnt that the chief source of this wonderful agent, which we call light, as far as we are concerned is that glorious orb which shines upon us by day and leaves us in comparative darkness by night. He may have been told that the sun is distant from us about 92,000,000 of miles, a distance which, Sir John Herschel says, a cannon ball would occupy seventeen years in travelling, yet that such is the velocity with which light travels, that it performs the same journey in eight minutes, its rate of travelling being about 190,000 miles in a second of time. He knows, for it is a matter of common knowledge which is sown broadcast in these days of extended education, that philosophers have constructed theories to explain the phenomena referred to, and to account for the way in which they are brought within our perception;—that by some philosophers light has been supposed to consist of particles of a particular kind of matter, infinitely small, emitted from luminous bodies, darting through space in straight lines, striking against, rebounding from, or penetrating and sometimes passing through those bodies which lie in its way,—this being the theory of Sir Isaac Newton, which has been known as the corpuscular theory or theory of emission; while other more modern philosophers, with what is now considered to be stronger evidences in their favour, assume that light is not a sort of matter but a condition of matter, that it is caused by a tremulous or vibratory condition which bodies assume when they become luminous, and that this vibratory condition is communicated to and propagated through an ethereal medium which fills all space, has a high degree of elasticity, and is so greatly attenuated that we have no evidence of its being affected by gravitation,—this being known as the wave theory of light.

Now, there exists a very close relationship between light and heat and chemical action which necessarily brings the study of all these subjects into the department of chemistry.

Chemical action developes heat, and heat developes light. So also both heat and light induce chemical action.

We have a good illustration of the development of light from heat in observing what occurs when we send a current of electricity through this wire. The wire first becomes hot, and then it becomes luminous, the light increasing with the increase of temperature.

And we have a good illustration of the development of heat by chemical action in this little jet of flame produced by the chemical combination of hydrogen and oxygen gases. But here at present we have no evidence that the heat produces light, for although the heat of this flame is as great as the heat of that wire, the light emitted from them is very different. The one is brilliantly luminous, while the other is practically invisible. This difference is due to the fact that light can only emanate from the solid particles of matter, and the denser the matter,—that is, the greater the number of particles in a given space,—the greater will be the amount of light produced by the heating of such matter. There are very few solid particles in this gas flame and therefore it gives very little light, but if I introduce solid particles by putting a platinum wire into it, the heat which is already in the flame when communicated to the wire renders it as luminous as the other wire.

Having thus associated heat with chemical action and light with heat, we may say, in accordance with accepted theories of modern science, that not only is heat a mode of motion but that light and chemical action are so also.

Now, as we shall be chiefly engaged this evening in examining and studying some of the phenomena of light, it will be well to commence by considering what the mode of motion is by which we may account, and by which physicists are accustomed to account, for light in some of its various conditions.

In doing this, it is essential for our purpose to assume that no such thing exists in the universe as a perfect vacuum. We may also assume that no such thing exists as absolute solidity or continuity of parts in any form of matter except those particles or atoms of which bodies are composed. Masses are made up of atoms, but there are spaces between the atoms which, in common with all other space, are filled with the ethereal medium which we call the luminiferous ether. This ether is so infinitely attenuated that, as I have already said, we have no evidence of its being affected by gravitation, yet it possesses a very great degree of elasticity.

It is necessary to assume that the ether that fills the spaces between the atoms of bodies acquires increased density there, but that it does not acquire proportionately increased elasticity. In consequence of this change of density in the ethereal medium which fills the spaces between the atoms of transparent bodies, light travels through such bodies with velocities which are diminished in proportion as the densities of the bodies are increased.

This result accords with what is known to occur in the case of sound, the velocity of which increases with the elasticity, but diminishes with the density of the medium through which it is propagated. Now, if the luminiferous ether in transparent bodies had its density and elasticity increased so as to maintain their proportions unaltered, the one would exactly neutralize the other, and there should in that case be no alteration of velocity; but by assuming that its density is increased to a much greater extent than its elasticity, the observed effects of the transmission of light through different transparent bodies is easily accounted for.

It is to the alteration in the velocity of light when it passes from one medium into another of different density that we ascribe the refraction or bending of the rays; and it is by means of refraction that we shall be enabled presently to effect the analysis of light.

* Lecture delivered before the Pharmaceutical Society of Great Britain, on Wednesday, May 2, 1877.

Light, then, is a state of motion of the luminiferous ether, originating in a condition of motion of bodies which, when they are in that condition, are said to be luminous.

The grosser forms of matter, which are distinguished from the luminiferous ether by their being affected by gravitation, are capable, under the influence of heat, or electricity, or chemical action, of exciting the luminiferous ether, and throwing it into a tremulous or vibratory condition.

This vibratory condition of the ether is itself imperceptible to us, except when a continuous line of such vibrations reaches the retina of the eye from either a luminous or an illuminated body, the latter being a body which instead of originating light by exciting the luminiferous ether, merely changes the direction in which a line of vibrations or ray of light is travelling; and when any of these rays impinge upon the retina of the eye they render the object from which they proceed visible, that is to say, they excite motion in the optic nerve which communicates with the brain, and produces a sensation or image.

Now, we have to deal with the luminiferous ether, and to consider what kind of motion the ether undergoes in the propagation of light. In doing this we must first assume that the ether itself is composed of parts or particles, infinitely minute, which are held in their normal state by a force which gives to it great elasticity, but admits of the particles moving to and fro through infinitely short distances, with almost inconceivable rapidity.

If we compare the transmission of light with that of sound, taking for granted the conclusions arrived at by physicists, we shall find that there is a marked difference between them. In both cases the effect is due to vibrations. In the case of sound, it is due to vibrations that are propagated through a material medium, usually through air. In the case of light it is due to vibrations through a medium which is independent of the recognized forms of material matter.

The vibrations to which sound is due consist in the movement to and fro of particles or little volumes of air in the direction in which the sound travels. The vibrations are *longitudinal*, in a line coinciding with the direction of the sound.

On the other hand, the vibrations to which light is due consist in the movement to and fro of particles of the luminiferous ether in a direction *transverse* or at right angles to that in which the light is travelling.

If we assume the existence of a line of particles of the ethereal medium in a quiescent state, and conceive a luminous body, such as a candle, to be the source from which light is to be propagated through such particles by throwing them into a state of vibration, we may readily suppose that the particles would begin to move, not all at once, but progresively one after another, commencing with the particles nearest to the luminous body. The first particle would begin to move before the second, and the second before the third; and as they would all move to the same extent, to and fro, across the line of light, the position of the particles when in motion would necessarily represent a series of waves.

But the idea thus formed is that of motion or vibration of the particles in one plane only, and it is necessary to assume a more complex mode of motion than this in a ray of common light. It is assumed that the plane of vibration is constantly shifting, that there are a few vibrations in one plane then a few in another plane, and so on as the ray travels along, this shifting of the plane of vibration occurring very irregularly, but occurring in all conceivable planes around and through the line originally formed by the particles in their normal state of rest.

A round ruler, or this model, may be taken to represent or afford a rude idea of a ray of common light.

But it is now necessary for us to endeavour to dissect this ray of light, and we are enabled to effect this dissection or analysation of the ray by taking advantage of the effect produced upon it on causing it to pass through transparent bodies of different densities.

At the moment of its passing from one medium into another of different density, if it enters the new medium in a direction oblique to the surface at which it enters, it is bent or *refracted*, and when it is refracted at two surfaces which are not parallel to each other, as, for instance, in passing through a prism of glass or other transparent substance, the different parts of which the white light is composed are to some extent separated from each other, and we thus find that the separate parts possess colour.

This, which is prismatic analysis of light, is the first step we take in the direction of analysation. We are here pulling the elements of light asunder, so that we may examine and study the separate parts of which it is composed. The result of this *dispersion*, as it is called, of a ray of light is the production of the *spectrum*, in which we have the colours of the rainbow painted on the screen with a brilliancy far surpassing anything we can produce by the use of artificial colours or pigments.

Now, the question is, what do these colours signify, and what is the difference between one colour and another?

The answer to this question is, that these are effects resulting from the greater or less rapidity with which the vibrations occur, and the conclusion arrived at is, that a ray of common white light is composed of several sets of vibrations travelling together with equal velocity, but each set consisting of vibrations differing in frequency or rapidity from the others. The vibrations of least frequency are those at the red, and those of greatest frequency are those at the violet end of the spectrum.

Each of these sets of vibrations forms a separate series of waves, and these waves differ in length just as the vibrations from which they result differ in frequency; the least frequent vibrations produce the longest waves, while the most frequent vibrations produce the shortest waves.

Prismatic analysis was first studied by Sir Isaac Newton, who, admitting a beam of sunlight through a round hole into a darkened chamber, obtained by means of a prism an oblong image of coloured light on a screen, and the image thus produced presents seven distinct colours, which are known as Newton's prismatic colours. But the spectrum produced in that way is not now recognized as a pure spectrum, because the colours overlap each other, and thus produce intermediate colours.

Dr. Wollaston, at a later period, obtained a much nearer approach to a pure spectrum, by admitting the light through a narrow slit. In this case the spectrum is a long band or ribbon of light, the colours of which may, by narrowing the slit, be reduced to four, namely, red, green, blue and violet.

Several suggestions have been made with the view of simplifying the mode of representing the composition of white light. It is now generally assumed to consist of three elementary colours, and these have very generally been supposed to be red, yellow, and blue. Sir David Brewster adopted this view, and the observation of the results of mixing artificial colours or pigments appears to justify the opinion that Newton's prismatic colours may be all produced with red, yellow and blue. But the study of coloured lights produced by the prismatic analysis of white light leads to a different conclusion.

Wollaston reduced his spectrum to four colours, namely, red, green, blue and violet, and he found these to bear the quantitative relation to each other of 16 parts of red, 23 of green, 36 of blue, and 25 of violet, in 100 parts.

Dr. Thomas Young, one of the highest authorities on the subject, recognizes three simple sensations as those produced by a ray of white light, these sensations when separated being those of *red*, *green*, and *violet*, and it has been shown that not only can white light be produced by the union of those three colours, but that orange and yellow can be produced by the union of green and red, and that blue and indigo can be produced by the union of green and violet.

We therefore take red, green, and violet, as the three elementary colours from which all others may be produced.

I must refer you to the diagram which represents what are assumed to be the number of waves that are formed within the space of an inch, and the number of vibrations that occur in a second of time, in each of the elementary colours.

Waves of Light.

	Waves in 1 inch.	Vibrations in 1 second of time.
Red..............	34,000	482 millions of millions.
Green...........	45,000	550 „ „
Violet...........	60,000	707 „ „

Now, we have produced our spectrum by Dr. Wollaston's method of passing the light through a narrow slit, but we have not the advantage here that he possessed of employing the light of the sun. We are using the best representative of sunlight that we can command, namely, the light of incandescent charcoal brought to an intense heat by a current of electricity. The luminous body from which this light emanates consists of solid carbon which forms the terminals of the conducting wires of a Groves' battery of 40 cells. These carbon terminals when brought together touch each other only at a few points and thus offer obstruction to the free passage of the electric current; heat is therefore developed; the carbons become hot, and if they be now gradually separated to a small distance from each other, the current is maintained, an arc of light fills the space betweeen the two points, through which small particles of incandescent carbon are constantly flying from one terminal to the other, while the points themselves being intensely heated are the source from whence our light emanates. The magnified image of this is thrown on to the screen, so that you there see the whole mechanism of the production of the light.

I will now shut off the light which has been passing from the lantern in a direct line to the screen, and, sending it in another direction through two prisms, filled with bisulphide of carbon, will cause it to travel round a corner and so reach the screen by a different route. In passing through the prisms the light is turned from its original course, and it is largely dispersed in consequence of one part of it being refracted more than another, the bisulphide of carbon contributing to the dispersion.

We thus produce our spectrum, which you will observe is a continuous band of light, of different colours, but without any interruption of light from one end to the other.

This is the result always obtained when the luminous body from which the light is derived is either solid or liquid. But it is not the result obtained with the light of the sun.

It was Dr. Wollaston who first, in 1802, discovered, on closely examining the nearly pure spectrum of sunlight, which he obtained by adopting his method of prismatic analysis, that there were several dark lines running across the spectrum and interrupting its continuity. These lines are not seen in Newton's spectrum, the effect being there obscured by the overlapping of the colours.

Afterwards, Fraunhofer of Munich, in 1814, by increasing the length of the spectrum and using a telescope, was enabled to trace about 600 of these dark lines, which are now called Fraunhofer's lines.

I must refer you to the drawings, for a representation of these dark lines. There is no difficulty in detecting the more prominent of them in the solar spectrum, but it long remained an enigma as to what was their cause.

We have reason to believe that this enigma has now been solved; but before attempting to explain the manner in which the phenomena of Fraunhofer's dark lines are accounted for, I purpose bringing under your notice the spectra produced by some other lights besides that I have hitherto employed.

I have already alluded to the fact that the light emitted from luminous bodies, when in the solid or liquid state, yields spectra which are continuous throughout the illuminated band, the light consisting of rays of all degrees of refrangibility within the range of the two extremes.

To this must now be added the statement that if the luminous body be in the condition of a gas or vapour, the light emitted by it may consist of rays of several limited degrees of refrangibility, which will produce a spectrum consisting of one or more bright bands of coloured light with intervals more or less completely dark.

Any substance that can be converted into a luminous vapour may in this way produce a spectrum peculiar to itself, and we thus have a means of identifying substances and of detecting their presence when existing in a state of admixture with other substances, which in many cases is of great value to the chemist.

It will be perceived that we are here entering upon the practical part of the subject of spectrum analysis.

With a little modification of our lamp we shall be able to make the intense heat produced by the electric current a means of converting some of the metals into vapours of sufficient luminosity to yield spectra that may be projected on to the screen.

In doing this we shall work with the carbons a little wider apart than we have hitherto had them, so that the arc of flame between the points, rather than the points themselves, should be the source of light.

We use a large carbon now for the lower terminal, and the end of this is hollowed out so that it may support the bit of metal which is to be heated by the electric current until it melts and is converted into vapour, which will give colour to the flame and also a characteristic spectrum.

My son who has taken charge of the lamp, which requires rapid and skilful manipulation in the experiments we are going to perform, will make the necessary adjustments for producing the required effects, while I endeavour to explain the results.

The first metal I propose using is thallium, which the President has had a good deal to do with, especially in the production of its compounds. This metal owes its discovery to spectrum analysis, and it yields a very distinct and beautiful spectrum. On heating some of it in the electric lamp, it is converted into a beautiful green vapour, which fills the space between the carbon terminals. By allowing the light to pass directly from the lamp to the screen you are enabled to see the carbon points which are now less heated and less luminous than they were in previous experiments, the electric current being more freely transmitted by the metallic vapour than it was by the incandescent carbon alone. The green vapour of the thallium, so beautifully painted on the screen, forms an arc of light, some rays of which, by stopping their direct passage to the screen, and allowing them to pass through the slit and the prisms, are gathered up into a single band of green light, which forms the spectrum of this metal.

We now remove the carbon cup in which the thallium has been heated, and introducing a fresh carbon cup, subject a bit of silver to the same treatment. It melts and boils, emitting a vapour which, as you will perceive, is not distinguishable in colour from that of the thallium vapour. But if we now stop the direct passage to the screen, and send the light through the prisms, we obtain a spectrum which differs from that of thallium, inasmuch as it consists of two green bands instead of one, and these do not occupy exactly the same position as the thallium band did in the space that would be occupied by a continuous spectrum of white light.

Removing the silver with its carbon support, we will now introduce copper, which, treated in the same way as the other metals, yields again a green vapour, the spectrum of which, however, is distinctly different from either of those previously obtained. We have now three or four bands of red, several of green, and also of blue.

Changing now again the carbon support on which we have had the copper, we will next introduce a bit of zinc. The colour of the bright vapour of this metal as it is thrown directly on to the screen, you will observe, is a beautiful violet. Remark the splendour of the luminous arc of violet light, which we can increase to some length by separating the carbons, as the metal freely volatilizes and carries the current of electricity from one pole to the other forming a bridge of coloured light. But we must now close that passage from the lantern, and send the rays by another route to be analysed by the prisms, and to have the component parts of the light gathered together and displayed on the screen as the spectrum of zinc. You will see that it consists of a red band, and three very beautiful blue bands, wholly distinct and different from anything we have had before.

Following copper and zinc we will now introduce a bit of brass, and here we shall see that the spectrum of this metal at once reveals the elements of which it is composed. We have the characteristic bands both of the copper and the zinc, showing the power of this method of analysis for indicating the component parts of compound bodies.

I have now only one more metal to bring under your notice, namely sodium. This metal gives a very characteristic yellow band, which is easily produced, but I fear we shall not be able now to produce it in a state of purity on account of the atmosphere of our lantern having so much volatilized matter from the metals we have been already operating upon. I am anxious, however, to show the bright yellow sodium band, and will ask you to disregard some of the other bands, which will appear with it, and which are caused in the way I have stated.

It is this yellow sodium band that we are going to endeavour to convert into a dark band, and failing the accomplishment of that result I should have failed to demonstrate one of the principal objects I have had in view, namely, that of showing that the bright bands which characterize the several metals, and which you have seen, may be converted into dark bands.

It has been found, by very careful and accurate admeasurement of the positions occupied by the bright bands in the spectra of many of the metals as compared with the solar spectrum, that the bright bands in the one correspond with the dark bands in the other. It has also been shown that when light of a high degree of luminosity passes through a luminous atmosphere of lower illuminating power, the one light may absorb out of the other that portion of light which corresponds in refrangibility with its own. This result has been proved experimentally and explained theoretically, but time will not admit of my entering minutely into this part of the subject on the present occasion.

I must, however, endeavour to show you that if we introduce the vapour of sodium into the flame of a Bunsen's lamp, in front of the slit from which the light of the carbon points is issuing, and then allow the light to pass through the prisms, the spectrum so produced will have a dark band in the place of the usual bright sodium band.

This reversal of the bright bands of the spectra of the metals, and the establishment of the coincidence of such bands with dark bands in the solar spectrum, was the great discovery of Kirchhoff, which not only affords an explanation of the cause of the dark lines in the solar spectrum, by assuming that the sun consists of a solid or liquid nucleus in a highly heated state with a luminous atmosphere surrounding it, but it indicates that we have the means of detecting, and that Fraunhofer's dark lines prove, the presence in the sun's atmosphere of certain metals, including those, with perhaps one or two exceptions, which we have been using this evening.

By spectrum analysis, therefore, we are enabled to reveal the composition of substances within our reach and to detect the presence in them of elements which may be there in such minute quantities that they cannot be discovered by other means, and we are also enabled in the same way to investigate the composition of bodies so far distant from us as the sun and even some of the fixed stars, the distance of which is vastly greater than that of the sun, for it has been calculated by astronomers that a ray of light cannot reach the earth from the nearest of the fixed stars in less than five years.

Nor does the power and application of spectrum analysis terminate here, for, as I will now show you, when a ray of white light is made to pass through substances in solution such as chlorophyll, the colouring matter of cantharides, lobelia, etc., part of the light is often absorbed so as to yield spectra with dark bands which are sometimes characteristic. A large number of results of this description have been obtained which are interesting and may prove to be of value in analytical researches.

But I must reserve much of what I have latterly alluded to for future communication, and if I may judge of the interest you take in the subject by the evidences you have afforded this evening, it will be a pleasure to me to extend the number of these evening meetings, at which I may be enabled again to use the electric lamp with other instruments we possess for the illustration of these and other phenomena of light.

CALIFORNIA MANNA.*

The *Druggists' Circular* has received from a California correspondent some cuttings of cedar and pine, covered with saccharine matter which old Californians call "honey dew," and which is only found in quantities in extremely dry seasons, when the trees are said to be literally covered with it. The specimens were submitted to Prof. George Thurber, who furnished the following notes:

"The specimens consist of terminal twigs of two conifers: a pine of the section with ternate leaves (three in a cluster or sheath), but which cannot be accurately identified without the cone; and the California white cedar, *Libocedrus decurrens*. Specimens of both are freely incrusted in a stalactitic manner with a nearly pure white substance. A friend who stood by as I opened the box at once declared them to be fragments of a Christmas tree; you made a similar comparison in your note accompanying them, which shows that the resemblance of the incrustation to candle drippings at once suggests itself. The taste recalls that of manna, and if a fragment is carefully separated, that is not in direct contact with the stem or leaf, it is free from any terebinthinate flavour. It is one of the numerous saccharine exudations classed under the head of *manna*, to indicate a common method of production, rather than identity of chemical characters.

"While the manna of commerce is furnished by a species of ash (*Fraxinus Ornus*), similar exudations, more or less valued in the countries where they occur, are produced by trees of widely different families. The *Leguminosæ* and *Rosaceæ* contain manna-bearing plants; a tamarisk, a cistus, a willow, and one or more oaks, afford similar products; even the genus Eucalyptus, of which so much is now expected, has a manna-yielding species; with all these very dissimilar plants producing sugary exudations, it is not so surprising that we should find them in a family where they would be least expected, judging from its ordinary 'naval store' products—the *Coniferæ* or Pine Family.

"Manna from the conifers is, however, no recent thing. The Briançon manna, employed in France early in the last century, is from a conifer, the European larch (*Larix Europæa*), and received its name from being collected in the mountains about Briançon, where it is still gathered by the peasants for their own use, though no longer in commerce. It is found in midsummer adhering to the leaves of the larch, and is collected early in the day, as it disappears with the heat of the sun. The old writers mention the Manna of Lebanon, which some authors say was afforded by the Cedar of Lebanon (*Cedrus Libani*), but others assert that it was only a synonym for gum mastic.

"One of the finest pines of that country of magnificent trees, our Pacific coast, is known to cultivators as Lambert's Pine (*Pinus Lambertiana*); this reaches the height of 200, and even 300 feet, and is useful as well as grand, its wood serving there for all the purposes that the white pine does with us. Ordinarily, this tree exudes only turpentine, and but little of that; but when the tree is injured by being partially burned, it yields a saccharine substance, formerly used by the settlers for sweetening their food, on which account the tree is known all along the coast as the 'Sugar Pine.' According to Professor J. S. Newberry, 'Pacific R. R. Reports,' vol. vi., 'Botany,' p. 44, the laxative properties of this pine-sugar are known to the frontiersmen, who make use of it as a medicine. He says: 'Its resemblance in taste, appearance, and properties to *manna* strikes one instantly, and but for a slight terebinthine flavour it might be substituted for that drug without the knowledge of the druggist or physician, its physical and medical properties are so very like.'

"The pine, however, among the specimens in question, is not the sugar pine (*P. Lambertiana*), as that species belongs to the section having five leaves in a sheath, and shows that there are at least two species of our far Western pines which produce a manna. The observation as to its production by *Libocedrus* is, so far as I am aware, quite new, and adds one more to the manna-yielding genera.

"As to the cause of this exudation, so long as the phenomenon in the manna ash, where there has been abundant opportunity for study and observation, remains unexplained, it is hardly worth while to conjecture in the present case, in which we have only the results.

"Manna is exuded from this ash spontaneously, the tree being wounded merely to increase the product. It only occurs in warm and dry countries, and is greatly affected by the character of the season. We have in the specimens, and also in the sugar produced by the sugar pine, not only an exudation, but one very unlike that usually yielded by the tree. The ordinary exudation from these trees, in common with others of the pine family, is turpentine, an oleo-resin. In these cases the character of the exudation is entirely changed, and we have a form of sugar, belonging to an entirely different class of principles. In the sugar pine this appears to be effected by destroying the vitality of the tree by partial burning; in the specimens before us it is ascribed to extreme drought.

"As some of the products resembling manna are due to the punctures of insects, I examined a portion of this by dissolving the sugar from a stem; a few fragments of what appear to be remains of *aphides* were found in the solution, but none attached to the twig. I have not been able to make any examination of the optical or other properties of the sugar."

TAXINE, A POISONOUS ALKALOID PRESENT IN THE LEAVES AND SEEDS OF TAXUS BACCATA, L.*

BY W. MAVINÉ.

Although cases of poisoning by yew berries have been confirmed in former times and also recently, the poisonous effects of the fruits and seeds of the yew tree are disputed from many sides, while the strongly toxic action of the other portions of the tree are known generally.

Lucas isolated from the leaves of this tree three grains of a body which he calls taxine, and gave a few reactions regarding it. For its preparation Stass's method for detecting alkaloids was followed out, without giving satis-

* *Chem. Centr.*, 1876, 166—167. From the *Journal of the Chemical Society*, April, 1877.

factory results. The following process was more successful:—The leaves or seeds are powdered, and repeatedly exhausted with ether; the extracts are mixed, and the ether is distilled off. The residue which when obtained from the leaves forms a green resinous mass, having a peculiar aromatic smell and sharp taste, while that from the seeds is a large quantity of a fatty oil, was repeatedly shaken up with water, acidulated, and slightly warm. The water separated from the residue was filtered, and in the clear and colourless filtrate the taxine was precipitated by ammonia or fixed alkali, in snow-white bulky flakes. When washed and dried over sulphuric acid, it forms a white crystalline powder, which is scarcely soluble in distilled water, readily soluble in acidulated water, alcohol, ether, chloroform, benzine, and carbon disulphide, insoluble in petroleum and ether. It has no smell, but a very bitter taste. Pure concentrated sulphuric acid reddens it; nitric, hydrochloric, and phosphoric acids dissolve it without change of colour. With most of the reagents characteristic of alkaloids—tannic acid, phosphomolybdic acid, potassio-mercuric iodide, potassio-cadmic iodide, potassio-bismuthic iodide, iodo-potassic iodide, potassio-argentic cyanide, potassic bichromate, picric acid—it yields, in an acid solution, amorphous precipitates. Platinic chloride, auric chloride, mercuric chloride, potassio-platinous cyanide are not precipitated. It does not form crystallized salts with the ordinary acids. It is nitrogenous (evolves ammonia when heated with freshly ignited soda-lime), melts at 80°, and burns without residue when heated more strongly. Taxine is present in the leaves in larger quantities than in the seeds of the yew tree.

THE FERMENTS CONTAINED IN PLANTS.*

BY C. KOSMANN.

There appears to exist in the buds of trees and young leaves of many plants a natural ferment which is capable (1) of transforming cane-sugar into glucose, (2) of converting starch into dextrin and glucose, and (3) of resolving a glucoside, such as digitalin, into glucose and digitaliretin. The method adopted to show the presence of the ferment was as follows:—The buds or young leaves were chopped and macerated in cold water; after twelve hours the liquor was strained off, filtered, and a portion warmed with Fehling's solution to see if any precontained glucose was present. 1·5 to 4·0 grams of sugar were then added and the solution allowed to remain for some hours at a temperature of 18° to 30°. Generally at the end of twenty-four hours the whole of the sugar was inverted, and a syrup of glucose could be obtained by evaporation, which had a powerfully reducing action upon the copper solution. Instead of sugar, starch-paste was sometimes used, which, when acted upon, was converted as above mentioned. No gas was evolved in these experiments, on the contrary oxygen was absorbed: a microscopic examination of the deposits which occurred also revealed the presence of much organic life.

The ferment was proved to exist in the following plants:—Buds of *Ulmus campestris*, *Populus nigra*, *Quercus pedunculata*, and *Corylus avellana*; in the flowers of *Cornus sanguinea* and *Prunus spinosa*; in the young leaves of *Chelidonium majus* and *Digitalis purpurea*.

An infusion of digitalis leaves reduced a considerable quantity of digitalin on exposure to sunlight, resolving it into glucose and digitaliretin. The latter substance was collected as a precipitate, dissolved in alcohol, and submitted to suitable tests whereby it was recognized.

Extraction and Purification of the Ferment contained in Digitalis.—To a concentrated infusion of the young and fresh leaves, its own volume of strong alcohol was added. After twelve hours the greyish-white precipitate which had fallen was collected, washed and dried. It was then redissolved in water, the solution filtered from a little insoluble matter, and again precipitated by the addition of alcohol. The white precipitate was washed with alcohol, and then dried on glass. The dry substance was greyish-white, granular, soluble in water, and was not rendered blue by iodine. Under the microscope it presented the appearance of granules adhering to one another. It possessed eminently the power of decomposing cane-sugar, starch-paste, and soluble digitalin, acting thus quite as energetically as a strong infusion of the leaves of the fresh plant.

THE ALKALOIDS OF CELANDINE (CHELIDONIUM MAJUS).*

BY E. MASING.

Celandine contains two alkaloids, chelidonine and chelerythrine (sanguinarine), which form with Mayer's iodide of mercury and potassium, insoluble salts having, in the case of chelidonine, the formula $C_{19}H_{18}N_3O_3I.HgI_2$. These alkaloids were estimated at given intervals in the growth of the plant by extracting with alcohol of 75 per cent. containing a little acid, and titrating with Mayer's solution. The chelerythrine, $C_{19}H_{17}NO_4$, is calculated as chelidonine. A long table of results is given, including determinations of the amount of alkaloids every few days from May to September. The general results are: a diminution in the total amount of alkaloids before flowering, and a marked increase after a few days. The young plant gathered in autumn shows a regular increase of alkaloids. This may be explained by assuming the alkaloids to be the immediate precursors of the albumin, and that they are gradually transformed into albuminous substances. The weather is also an important factor in the amount of alkaloids. In rainy weather the consumption is greater than the production, and the percentage is decreased; while in fine sunny weather consumption and production are nearly in equilibrium, the production having a slight advantage. These changes are more noticeable in the root than in the leaf. A good soil influences the formation of alkaloids, for plants grown in a garden were found to contain double the amount of alkaloids found in wild plants. The largest amount of alkaloid is 1·09 per cent., and the smallest 0·27 per cent. The average appears to be about 0·6 per cent.

THE MILKY JUICE OF THE FRUIT CAPSULES OF PAPAVER RHŒAS.†

BY O. HESSE.

A statement by Selmi, according to which the unripe fruit capsules of the wild poppy contain an alkaloid similar to morphia, induced the author again to examine the milky juice that flows from such capsules upon being scratched. This juice, collected in the morning under a clouded sky, gave 35 per cent. of dried residue at 100°; some obtained after half an hour's violent storm gave only 34 per cent.

The milky juice is at first mostly white; sometimes, however, it is of a beautiful citron yellow colour, and then quickly changes in the air to a dark brown. Ferric chloride produces with it an intense red colour, probably indicating the presence of meconic acid.

4·4 grams of dry residue examined by trustworthy methods gave no trace of morphia or an alkaloid similar to it; whereas 0·090 gram gave equal to 2·1 per cent. of rhœadine and traces of another partially crystallizable alkaloid, to which the author promises to return on a future occasion.

As rhœadine is the principal alkaloïdal constituent of these fruit capsules, the author considers it would have been present in the "new substance" that Selmi prepared from this *Papaver*. Rhœadine is not coloured by ferric chloride, but agrees somewhat with morphia in being almost insoluble in ether.

* *Journ. Pharm.* [4], xxii., 335—340 and 420—423. From the *Journal of the Chemical Society*, April, 1877.

* *Arch. Pharm.* [3], viii., 224—228. From the *Journal of the Chemical Society*, April, 1877.

† Liebig's 'Annalen d. Chemie,' vol. clxxxv. p. 329.

The Pharmaceutical Journal.

SATURDAY, MAY 5, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, *17, Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ANNUAL REPORTS.

ONCE more an opportunity is afforded the Members and Associates of the Pharmaceutical Society of estimating the work performed for them by their Executive, and of considering the position in which the Society stands as compared with that of former years. For not only will they find on another page the Report adopted by the North British Branch at its Annual Meeting last week, but, in accordance with a resolution passed by the London Council on Wednesday, almost simultaneously, they will receive an early copy of the Report to be presented at the Annual General Meeting of the Society on the 16th inst.

In referring first to the North British Report it is satisfactory to note that it shows a marked advance, at once the justification and the reward of the increased expenditure in connection with the Society's establishment in Edinburgh. Whether reference be made to the number of students using the new rooms, the issue of books from the Library, or the result of the educational arrangements, it will be found that there has been considerable progress made. The only expression of regret relates to an increase in the percentage of failures at the different examinations in Edinburgh, but we agree in thinking that the new regulations as to the examination fees will probably affect these figures favourably also. Certainly, Messrs. GILMOUR and KINNINMONT, after three years' valued services as President and Vice-President, are to be congratulated upon being able to hand the affairs over to their successors in so prosperous a condition. Fortunately for the Branch, too, it still retains its indefatigable Honorary Secretary, Mr. MACKAY.

Turning to the Report of the Council to be presented to the Annual General Meeting of the Society, we may, without presuming to anticipate its discussion at the proper time and place, venture to remark that there are many points in it which are subjects for congratulation. So far as the Financial Statement is to be taken as indicating the present and prospective strength of the Society, the advance of education as tested by examination, and the growth of the class of which the Society is the acknowledged representative, we think the indications are to be considered satisfactory. A larger number of persons have paid a larger total amount in subscriptions than in any previous year in the history of the Society. As compared with the previous year, also, there has been a considerably larger number of candidates for each of the examinations, but with a much reduced percentage of failures. It would be difficult to say in which case this relative increase has the most important significance, but it will be reassuring to those gentlemen who have feared that the stringency of the examinations would prevent a sufficient number of youths entering the trade to find that the increase of Preliminary candidates on the previous year has been at least 25 per cent., whilst the rejections have fallen from 50 to 42·4 per cent.

Another matter for congratulation is that no measure specially affecting the interests of chemists and druggists has been proposed in Parliament since the last meeting of the Society. With the fact that many prosecutions for infringements of the Pharmacy Act have been successfully carried through, our readers will have already become acquainted through the reports in our columns, but it is not so well known, or at any rate it is often lost sight of, that in a still greater number of cases the Registrar succeeds in compelling offenders to discontinue their illegal practices without going into a law court.

There have been some special causes of expenditure during the year that are referred to in the report, and which require no explanation here. But naturally we are gratified to find that the expenditure in respect to this Journal has been now reduced to an amount that represents little beyond the cost of postage.

THE ADULTERATION OF FOOD AND DRUGS IN CANADA.

THE reports recently presented to the Canadian Inland Revenue Department by the analysts appointed under an Act passed in 1875, shows that a considerable amount of sophistication occurs in some articles of food and drugs in the Dominion. Milk, of course, has been found adulterated. Hardly any of the mustard, pepper, ginger, cloves, or cinnamon examined has been pure. Six samples of mustard each contained two-thirds of wheat flour and turmeric. Five out of six samples of ginger contained 10 to 15 per cent. of wheat and rice flour. All the ground cloves contained clove bark, and from all the so-called "cinnamon" cinnamon was entirely absent, its place being taken by cassia, mustard and pea meal. Dr. J. BAKER EDWARDS, the analyst for Montreal, reports of five samples of quinine wine submitted to him, that only one was in accordance with the official formula, the others being in fact potable stimulants, containing as much alcohol as is present in most ports and sherries, and but little quinine. One sample deserves special remark. According to Dr. EDWARDS it consisted of inferior red wine, coloured with logwood, citric acid, sugar, tincture of gentian and orange, and traces of strychnia and brucia from a small quantity of tincture of nux vomica. Its alcoholic strength was 68 U.P., and it contained one grain of sulphate of quinine in three fluid ounces.

BOTANICAL LECTURES AND DEMONSTRATIONS AT THE GARDENS OF THE ROYAL BOTANIC SOCIETY.

It will be seen by reference to the advertisement of the School of Pharmacy of the Pharmaceutical Society of Great Britain, that Professor Bentley will commence his course of lectures and demonstrations on Systematic and Practical Botany, at the Gardens of the Royal Botanic Society, in the Regent's Park, on Saturday morning, May 12th, at eight o'clock. These lectures will be continued on the succeeding Friday and Saturday mornings, till the end of July. On p. 901 will also be found the announcement respecting the Botanical Prize for 1878.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of the above Association will be held at 17, Bloomsbury Square, W.C., on Thursday Evening next, May 10th, at eight o'clock, when the following papers will be read;—"The Luminosity of Flame," with experimental illustrations, by Mr. Harold Senier, and "The Qualitative Analysis of the more commonly occurring Scale Preparations, Alkaloids, etc.," by Dr. A. Senier, F.C.S.

THE CINCHONA ALKALOIDS.

Our statement last week that none of the cinchona alkaloids except quinine are official in any of the existing Pharmacopœias requires a slight modification. Mr. Fritz, of Vienna, has kindly reminded us that sulphate of quinidine is included in the Austrian Pharmacopœia of 1869 and the Hungarian Pharmacopœia of 1871.

Mr. E. W. Giles of Melbourne, South Australia, has been recently elected a Fellow of the Royal Geographical Society, a distinction which he has well earned by a series of gallant and laborious explorations in the great island continent. In his latest expedition (which our readers may remember to have seen chronicled some months ago in the *Illustrated London News*), he succeeded in attaining the goal of the Australian explorer's ambition, by crossing an unknown region from the central telegraph line to Perth on the Western Coast and returning by a new and more northerly route in the latitude of the Murchison River, the time occupied by the double journey extending over thirteen months.

The country traversed was desolate to the last degree, with few water places at long intervals, and the exploration has not therefore been rich in practical results, but this circumstance added infinitely to the perils and privations of the journey.

We may claim Mr. Giles as at least collaterally associated with pharmacy, being the cousin of Mr. Giles of Clifton. He has been a diligent collector of the flora of the regions traversed by him, and has catalogued a large number of plants at the end of his published journals.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, May 2, 1877.

MR. JOHN WILLIAMS, PRESIDENT.

MR. WILLIAM DAWSON SAVAGE, VICE-PRESIDENT.

Present—Messrs. Atherton, Betty, Bottle, Cracknell, Frazer, Greenish, Hampson, Hanbury, Hills, Mackay, Owen, Rimmington, Robbins, Sandford, Shaw, and Stacey.

The minutes of the previous meeting were read and confirmed.

The following being duly registered as Pharmaceutical Chemists were respectively granted a Diploma stamped with the Seal of the Society:—

Baldwin, Arthur Henry.
Cook, Robert, jun.
Duffus, Alexander.
Peacock, William Henry.
Sandwith, William Henry.
Strongitharm, William George.

Elections.

MEMBERS.

Pharmaceutical Chemists.

Babb, James	Upper Sydenham.
Baldwin, Arthur Henry	Clapham.
Cook, Robert, jun.	Great Grimsby.
Ferguson, William Harry	London.
Kidd, William Champley	Upper Norwood.
Peacock, William Henry	West Hartlepool.
Sandwith, William Henry	Scarborough.
Squire, Alfred Herbert	London.
Strongitharm, William George	Walsall.
Thomas, Harry Alma	London.
Wilkinson-Newsholme, G. T.	Hellifield.

Chemists and Druggists.

Knowles, Thomas, jun.	London.
Netten, Henry John Thomas	East Stonehouse.
Pownall, Thomas Robinson	Bolton.
Wheeler, John Buchan	London.

ASSOCIATES IN BUSINESS.

The following having passed their respective examinations, being in business on their own account and having tendered the subscription for the current year were elected "Associates in Business" of the Society:—

Minor.

Ashwell, Lawrence Thomas	London.
Atwell, Benjamin Arthur	Castle Cary.
Broomfield, Robert William	Liverpool.
Cowgill, Brian Horatio	Burnley.
Donald, David	Perth.
Dyson, Alfred	Bacup.
Fawthrop, Thomas	Portslade-by-Sea.
Fuller, Thomas	Manchester.
Gregson, James Kenyon	Blackburn.
Harriman, Edwin	Liverpool.
Heyland, Charles Philip	Redcar.
Hunter, Frederick William	Newbottle.
Hunter, John Carswell	Glasgow.
Key, George Brown	Kirkcaldy.
Langbeck, Hugo Waldemar	London.
Marris, Wm. James Graburn	London.
Morris, Thos. Henry Vaughan	Hereford.
Myott, Frederick	Halifax.
Oliver, Frederick Bailey	Folkingham.
Pechey, Thomas Pollard	Leicester.
Perry, Horatio Nelson	Gravesend.
Pitts, Thomas Cruso	Norwich.
Read, John Henry	London.

Roberts, William ....Pontlottyn.
Stephens, George Thomas ......Hereford.
Stoddart, Joseph ....Sunderland.
Storie, Robert ....Dalkeith.
Sweetman, Robert ....Ludlow.
Verity, William ....Liverpool.
Weedon, Joseph ....Bexhill.
Wellington, James ....Oakham.
West, Arthur Henry ....South Norwood.
Wilks, Maurice....................Burnley.
Worfolk, George William ......Leeds.
Wylie, David Neil ....Edinburgh.

Modified.

Boutall, George Squire ....Kingsland.
Brooks, Owen ....Llandudno.
Clarke, Richard Thomas ....Gravesend.
Goucher, Levi Tom ....Sheffield.
Harrison, William Dale ....Sheffield.
Harvey, Henry....................Newark-on-Trent.
Knight, John Edward............Hampton.
Norman, Henry ....Canterbury.
Phillips, Benjamin ....Poona, India.
Powers, Thomas ....Birmingham.
Richardson, Thomas James......Carlisle.
Sutton, William Denny ....Thame.
Thompson, Alfonso de Lamartine...Haydon Bridge.
Thorburn, Henry William ......Bishop Auckland.
Watson, William ....London.

ASSOCIATES.

The following having passed their respective examinations and tendered (or paid as Apprentices or Students) their subscriptions for the current year were elected Associates of the Society:—

Minor.

Arblaster, Charles ....Birmingham.
Barnes, James William ....Spalding.
Beacock, Joseph Henry ....Barton-on-Humber.
Bennison, Richard ....Stokesley.
Bristed, John ....Margate.
Burden, John Britten ....London.
Carter, William Robinson ......Rusholme.
Clark, Frank ....Liverpool.
Cowie, John ....Glasgow.
Dodd, Thomas Hunter............Sunderland.
Dott, David Brown ....Edinburgh.
Edwards, James ....Halesworth.
Fell, John James ....Lancaster.
Forrest, John Kerr ....Edinburgh.
Gant, Joseph....................Spilsby.
Gooch, William Hobbs ....Norwich.
Greenhill, Samuel Osborne......Colchester.
Greenough, Hugh Fairhurst ...Manchester.
Greenwood, Dennis ....Cambridge.
Griffin, Joseph Thomas ....Oldbury.
Griffiths, John Moore ....Birkenhead.
Hadwen, Walter Robert ....Woolwich.
Hardwick, Stewart ....Sleaford.
Harris, Walter Thomas ....London.
Hart, James ....Sunbury.
Hoult, Joseph Emanuel ....West Bromwich.
Jones, Thomas ....Tenby.
Kent, James Stephen ....London.
Longman, John Ham ....Exeter.
Lund, William John ....Lancaster.
McNicol, John ....Glasgow.
Marshall, Charles William ......Devonport.
Moses, Joseph ....Bishop Auckland.
Palmer, Charles Edward.........Ely.
Parker, John Wortley ....Barnstaple.
Parkinson, Frederic William ...Peterborough.
Pheasant, William ....Clapham.
Pickup, John Arthur ....Bacup.
Portway, John Bernard ....Bury St. Edmunds.

Pottinger, Thomas ....Dartford.
Redford, George Alfred ....Liverpool.
Richardson, George ....Quatre Bras.
Robertson, Alexander ....Broughty Ferry.
Robertson, William ....Peebles.
Robinson, William Prior.........Waterloo.
Rogers, James Isaac ....North Shields.
Shepherd, John William.........Settle.
Temple, Frederick Staveley ...Hull.
Thompson, Harry....................Norwich.
Tuck, Walter Barber ....Eastbourne.
Turner, George Thomas ... .London.
Wells, Albert Charles ....Leamington.
Whyte, James Samson ... .Montrose.
Williams, William ....Carmarthen.
Wright, John Charles ....Wolverhampton.
Yates, Ebenezer ....Manchester.

Modified.

Ham, William ....Oxford.
Howard, Samuel Bird ....Hadleigh.
Taylor, Isaac....................Doncaster.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary Examination and tendered their subscription for the current year were elected Apprentices or Students of the Society:—

Allison, John....................Coldstream.
Ball, James ....Mevagissey.
Benson, Matthew ....Wigan.
Bower, Henry ....Norwich.
Crossley, Frederick ....Guernsey.
Curry, Nicholas ....Spennymoor.
Dawson, James....................Bridge of Allan.
Dee, Arthur Henry ....Tewkesbury.
Edgar, Frederick George.........Southsea.
Goldby, Frank ....Abingdon.
Greenway, John Wells............Ottery St. Mary.
Hall, Thomas Wright ....Bristol.
Hildyard, William ....Woodbridge.
Hobbs, John Kingdon ....London.
Howell, William ....London.
Humphreys, Charles E. ....Llanfair.
Jacks, David Russell ....London.
Jackson, George ....Hartlepool.
Kirk, John Henry ....Belgrave.
Lakeman, Jasper J. ....London.
Miller, John William .... Preston.
Norburn, Albert Edward ......London.
Parish, Henry ....Birmingham.
Plant, James Robert ....Leicester.
Pottage, Edwin....................Beverley.
Rhodes, Alfred Barrett ....Manchester.
Rook, Barnard ....Sittingbourne.
Smith, Alexander C. T. ....Horselydown.
Todd, Joseph....................Carlisle.
Warrick, Frederick Walmsley .London.
Wheeler, Wilfred Nevill.........London.
Whitlock, Draycott Kelly ......Southampton.
Williams, Robert Edwin.........Cheltenham.
Woollings, Frank ....London.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

The following names were restored to the Register of Chemists and Druggists:—

Edwin Constable, 223 Green Lanes, Small Heath, Birmingham.

Thomas Nash Williams, 13 High Street, Aberdare.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was read and adopted and sundry accounts ordered to be paid.

Library, Museum, and Laboratory.

The Librarian's report stated that the average attendance for the preceding month had been, day, 19; evening, 11. Circulation of books in town, 143; in the country (to 17 places), 138. Also that 'Bloxam's Laboratory Teaching,' and 'Thorpe and Muir's Qualitative Chemical Analysis,' which had been missing from the library, had been returned. The number of books now in the library is about 4830, 60 having been added since the beginning of the present year, and nearly 300 in 1876.

The purchase of the following books was recommended by the Committee:—

Fownes' 'Chemistry,' by Watts, 12th ed.; 'British Manufacturing Industries,' edited by Bevan; 'Industrial Classes and Industrial Statistics,' by Bevan; Arnott's 'Physics,' by Bain and Taylor; Artus' 'Hand-Atlas sämmtlicher medicinisch-pharmaceutischer Gewächse,' 5e auflage; Three new copies of the British Pharmacopœia to make up the original number.

The Curator had reported the average attendance in the museum for the past month, which had been, day, 16; evening, 4. Also that most of the articles asked for by the Bristol Pharmaceutical Association could be supplied from the Society's museum without detriment. The Committee had instructed him to send as many of the articles asked for as possible.

Professor Attfield had reported 77 entries in the laboratory since the commencement of the session; 48 students being now at work.

Professor Bentley had reported that there were 40 students in his class at present.

Professor Redwood had reported that his class numbered 32.

The Committee had also drawn up the Annual Report, which was now submitted.

The report and recommendations were received and adopted, and a few verbal alterations having been introduced into the Annual Report it was ordered to be issued with the voting papers.

Benevolent Fund.

The report of this Committee included recommendation of the following grants:—

£20 to the widow of a late member, aged sixty-seven, in very delicate health, who is left destitute.

£10 to an associate in very bad health, who received a like grant last year.

£10 to the widow of a registered chemist and druggist. aged fifty-nine. Applicant's late husband had received two grants.

£10 to the orphan daughter of a late member, who has previously received nine grants on various occasions.

The report and recommendations were received and adopted.

Benevolent Fund Dinner.

The Sub-Committee appointed to make arrangements for the dinner reported the progress that had been made.

Mr. Hills suggested that a good effect would be produced on the subscriptions if a special appeal were made for the purpose of making provision for the education of orphans, more than hitherto it had been possible for them to do.

The President said that it could be fairly pointed out that if more money were forthcoming, a great deal more good might be done, and a very important point might be made of the education of orphan children. There was an unlimited field for benevolence in that direction.

Mr. Mackay was very glad to hear these remarks, and wished so know whether the idea was to endeavour to found an orphan asylum, affording both board and education, or to provide only for the education of the orphans.

Mr. Hills thought the effort should be limited to the provision of education.

Mr. Mackay inquired if that was not now done to some extent.

The President said the Council had hitherto generally limited the grant in each case to about £20, which was often not enough to secure the election of a child into an asylum, although that was generally the best way of providing for an orphan.

Mr. Mackay asked if it was proposed to get children into existing asylums.

The President thought that would be a better mode of procedure than spending money on bricks and mortar for their own glorification and the benefit of architects.

Mr. Shaw drew attention to the fact that the annual charge for annuitants was £720, of which only £480 was received from the investments, leaving £240 to be taken from the subscriptions. He thought it would be well to make an effort to raise the amount of the investments to £20,000.

The President observed that a great many people were not in favour of more money being funded, but would rather see it spent, relying on the generosity of the future to provide for its own necessities.

Mr. Robbins thought it would be very impolitic to appeal for increased support in order to invest the money.

Mr. Owen said there need be no lack of arguments for an appeal, since the amount of assistance was often limited for want of funds. He believed the largest amount ever voted to one case was £30; but if £100 or £120 could be given to secure the election of an orphan into an asylum, a substantial benefit would be conferred.

Mr. Sandford drew attention to the rule which had enabled the Council on one occasion to expend a hundred guineas in purchasing the admission of a child into an orphan asylum.

Mr. Robbins thought such a privilege should be confined to the orphan children of members of the Society, which would be an inducement to many persons to become members, who now say they can see no advantage in doing so.

The President pointed out that subscriptions were received from persons not members of the Society, and as it was wished to encourage that still more he did not think such a regulation as that suggested by Mr. Robbins would be wise. With regard to the approaching dinner he thought a special appeal should be made for annual subscriptions as much as for donations.

The report was received and adopted.

Royal Botanic Society.

A letter was read from the Secretary to the Royal Botanic Society, stating that the usual facilities would be afforded to students attending Professor Bentley's classes.

Chemists' Assistants' Association.

Mr. Betty presented a Memorial from some Members, Associates and Students of the Society, who were desirous of forming a Chemists' Assistants' Association, asking that the use of the Society's Lecture Theatre might be granted for the purpose of holding a meeting on June 6th. The objects of the proposed association were described to be the promotion of friendly feeling among assistants; the support of those principals who are desirous of shortening the hours of labour; the discussion of all matters affecting the welfare of assistants; and the reading and discussion of papers possessing scientific or trade interest.

Mr. Hampson moved that the prayer of petition be granted.

Mr. Greenish seconded the motion.

The President stated that the holding of such a meeting on a Wednesday evening seriously inconvenienced the professor in giving his lecture on the following morning.

Mr. Hampson then suggested that the use of the room be granted provided a convenient evening could be arranged.

Mr. Greenish said he understood that there would have been no necessity for this new association but for the fact that membership in the School of Pharmacy Students' Association was limited to those who had studied in Bloomsbury Square.

Mr. Sandford, Mr. Hills and other members took exception to a sentence in the petition which stated one of the objects of the proposed society to be the "support of those principals who adopted the early closing system," as tending to show a spirit of coercive trades unionism.

Mr. MACKAY thought the request ought to be refused, but there might be an intimation that if the objectionable phrases were withdrawn the room might be lent if a convenient time could be arranged.

Mr. STACEY remarked that at the recent meeting in favour of early closing, a resolution of thanks to the Council was passed for the use of the room, and for the moral support thereby given. If the Council granted this request, it would be giving its moral support to this new association.

Mr. HAMPSON said the use of the room had recently been granted for a meeting of employers, and he hoped the Council would grant a similar favour to the assistants, without scrutinizing too closely the wording of their memorial.

Mr. OWEN said the Council did not commit itself to anything except the loan of the room.

On being put to the vote the motion was lost.

HOUSE.

The report of this Committee referred to several matters of detail connected with the house arrangements, gas, water supply, etc. The octagon laboratory had been inspected by the Committee, and was considered to be now very excellently arranged for examination purposes.

Mr. GREENISH bore testimony to the great improvement in the octagon laboratory, and hoped that the dispensing department in the examination room would be improved, so as to make it more in accord with the arrangements generally found in a dispensing establishment.

The PRESIDENT said the matter had not escaped attention, and some improvements had been adopted, but he did not see how the desired result could be obtained, except by making structural alterations in the room. The examiners were always present, and if a young man did not readily lay his hand on what he wanted, he had only to ask for it, when it would be given him at once.

Mr. CRACKNELL and Mr. BOTTLE having stated the results of their experience in the examinations,

The report and recommendations were adopted.

LAW AND PARLIAMENTARY.

The report of this Committee contained particulars of several cases of alleged infringement of the Pharmacy Acts, into which inquiries had been made by the Solicitor or by the Secretary.

THE SALE OF CHLORAL HYDRATE.

The Committee also reported that a letter had been received from the coroner at Carlisle, calling attention to an inquest in a case of death from an overdose of chloral hydrate, where the jury had recommended that chloral hydrate should be added to the list of poisons in schedule A of the Pharmacy Act, 1868. He also called attention to the fact that a qualified chemist might keep any number of shops managed by unqualified assistants.

The PRESIDENT said the Council had previously received recommendations that chloral should be placed in one or other of the poison schedules. This substance was now in very general use, and was frequently employed simply as an intoxicant, especially by habitual drunkards. He thought, therefore, it was high time that some step should be taken by the Council to place this article on the list of poisons, without waiting for further pressure from outside.

Mr. SHAW thought chloral hydrate should be put into part 1 of the schedule, if anything were done. There had been several communications on the same subject, and he thought it was time something should be done.

The VICE-PRESIDENT said he had also received a communication from the coroner, showing the importance he attached to the subject.

Mr. HAMPSON suggested that the matter be referred to the Law and Parliamentary Committee, and that the coroner be informed that it was under consideration.

This was agreed to unanimously, and the report and recommendations of the Committee were received and adopted.

PROVINCIAL EDUCATION.

A letter from the Bristol Association was read, thanking the Council for the grant made last month.

The Oldham Association had also written to thank the Council for the grant made to it.

THE PRELIMINARY EXAMINATION.

A letter was read from a member of the Society in the Isle of Man, pointing out the hardship inflicted on young men in that island, in having to go to Liverpool to pass their Preliminary examination.

The PRESIDENT said it would be obviously desirable to make Douglas, Isle of Man, a local centre, and so get over the difficulty.

A resolution to this effect was carried unanimously, and Mr. William A. Brearey was appointed Superintendent.

REPORT OF EXAMINATIONS.

April, 1877.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major, 18th	6	5	1
„ 19th	5	1	4
	—11	— 6	— 5
Minor, 18th	22	14	8
„ 19th	16	10	6
„ 25th	28	16	12
„ 26th	29	17	12
	—95	—57	—38
Modified	8	4	4
Total .	114	67	47

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Minor 18th	14	9	5
„ 19th	8	5	3
	—22	—14	— 8
Modified	2	1	1
Total .	24	15	9

PRELIMINARY EXAMINATION.

Candidates.		
Examined.	Passed.	Failed.
323	178	145

Eight certificates were received in lieu of this examination:—

2 College of Preceptors.
1 Royal College of Surgeons of England.
1 University of Cambridge.
4 „ „ Oxford.

STATEMENT OF ATTENDANCE OF MEMBERS OF COUNCIL ON COMMITTEES FOR THE YEAR 1876-77.

	Committees held once a Month or oftener.		Committees held Occasionally.				Special Committees appointed to draw up Reports, etc.	Total Number of Attendances.
	Finance.	Library, Museum, and Laboratory.	House.	Benevolent Fund.	Law and Parliamentary.	General Purposes.		
Number of Committee Meetings held.	10	12	12	11	10	2		
Atherton (*Nottingham*)	*	*	*	7	8	1	0	16
Atkins (*Salisbury*)	*	*	*	0	0	0	0	0
Betty (*London*)	9	10	10	10	9	2	8	58
Bottle (*Dover*)	*	0	0	7	6	1	1	15
Brown (*Manchester*)	*	*	*	0	0	0	0	0
Cracknell (*London*)	10	*	*	10	0	0	0	20
Frazer (*Glasgow*)	*	*	*	7	7	1	0	15
Greenish (*London*)	10	12	12	11	10	2	3	60
Hampson (*London*)	*	9	9	*	8	2	3	31
Hanbury (*London*)	*	7	7	*	2	0	2	18
Hills (*London*)	*	12	12	*	5	2	6	37
Mackay (*Edinburgh*)	*	*	*	5	4	1	0	10
Owen (*London*)	8	*	*	7	3	1	2	21
Rimmington (*Bradford*)	*	*	*	5	5	0	0	10
Robbins (*London*)	7	11	11	9	7	1	6	52
Sandford (*London*)	*	11	11	5	5	0	7	39
Savage (*Brighton*)	7	6	6	10	10	2	1	42
Schacht (*Clifton*)	*	*	*	0	4	1	0	5
Shaw (*Liverpool*)	*	*	*	9	9	2	0	20
Stacey (*London*)	*	4	4	*	5	1	0	14
Williams (*London*)	1	12	12	11	10	2	9	57

* Not appointed on this Committee.

NUMBER OF ATTENDANCES OF MEMBERS OF COUNCIL AT COUNCIL MEETINGS FOR THE YEAR 1876-77.

Atherton, John Henry	9
Atkins, Samuel Ralph	9
Betty, Samuel Chapman	11
Bottle, Alexander	10
Brown, William Scott	1
Cracknell, Charles	11
Frazer, Daniel	8
Greenish, Thomas	11
Hampson, Robert	10
Hanbury, Cornelius	11
Hills, Thomas Hyde	11
Mackay, John	6
Owen, John	11
Rimmington, Felix Marsh	7
Robbins, John	10
Sandford, George Webb	10
Savage, William Dawson	11
Schacht, George Frederick	8
Shaw, John	11
Stacey, Samuel Lloyd	7
Williams, John	11

Number of Council Meetings during the year, 11.

BOTANICAL PRIZE FOR 1878.

A Silver Council Medal is offered for the best Herbarium, collected in any part of the United Kingdom, between the first day of May, 1877, and the first day of June, 1878; and should there be more than one collection possessing such an amount of merit as to entitle the collector to reward, a second prize, consisting of a Bronze Medal, and also Certificates of Merit, will be given at the discretion of the Council. In the event of none of the collections possessing sufficient merit to justify the Council in awarding medals or certificates, none will be given.

Competitors must be Associates or Apprentices or Students of the Society, and under twenty-one years of age.

The collections must consist of phanerogamous plants and ferns, arranged according to the natural system of De Candolle, or any other natural method in common use, and be accompanied by lists, arranged according to the same method, with the species numbered.

The collector must follow some work on British botany (such as that of Babington or Hooker), and state the work he adopts. The name of each plant, its habitat, and the date of collection, must be stated on the paper on which it is preserved.

Each collection must be accompanied by a note, containing a declaration signed by the collector, and certified by his employer, or a pharmaceutical chemist to whom the collector is known, to the following effect:—The plants which accompany this note were collected by myself, between the first day of May, 1877, and the first day of June, 1878, and were named and arranged without any other assistance than that derived from books.

In estimating the merits of the collections, not only will the number of specimens be taken into account, but also their rarity or otherwise, and the manner in which they are preserved, and should a specimen be wrongly named, this will be erased from the list.

The collections must be forwarded to the Secretary of the Society, 17, Bloomsbury Square, on or before the first day of July, 1878, indorsed "Herbarium for Competition for the Botanical Prize." After the Prize Distribution in October, they will be retained one month, under the care of the Curator of the Museums, for the inspection of persons connected with the Society, and then returned to the collector, if required.

NORTH BRITISH BRANCH—EDINBURGH.

Annual Meeting.

The annual meeting of the North British Branch of the Society was held in the Society's Rooms, 119A, George Street, on Wednesday, April 25, at 12 o'clock. Mr. William Gilmour, President of the Branch, in the chair.

The Chairman opened the meeting by asking the Secretary to read the following annual report:—

Annual Report.

The Council have now to submit to the Annual Meeting a short account of the proceedings of the North British Branch during the past year of 1876.

The novelty of the new accommodation in connection with the operations of the Society in Edinburgh having now subsided, the Council have the pleasure to report that the arrangements made two years ago continue to work very fairly. Additional room could, however, be utilized, and the Council hope that ere long this may be obtained. Meanwhile the three rooms are used for the purposes indicated in former reports, and are open during the day as well as in the evening.

The following is the result of the attendance of young men during the year, from January 1 to December 30: 687 entered their names as having been present between 10 a.m. and 4 p.m., while 337 have used the rooms by being present from 8 to 10 p.m., making the total attendance during 1876 equal to 1024. The number who have used the rooms since this privilege was given amounts to 4203, which the Council consider in all respects very gratifying.

In connection with this matter the Council think it proper to state that acting upon a suggestion made to them, and with the concurrence of the London Council, the use of the rooms was granted to Dr. Craig and Mr. Sadler for the purpose of carrying on a short course of lectures in the evenings during the winter months, and which they undertook to do as an experiment to test the number likely to take advantage of such courses if they became fixed and regular. The former lectured on Materia Medica and the latter on Botany. Eighteen pupils connected with pharmacy took advantage of those classes, with which both lecturers appeared satisfied; but the Council much regret that in consequence of the want of lecture accommodation, no such means can be afforded for the future, as the use of the principal room for these meetings prevented many students from availing themselves of the evenings during which to carry on their studies in connection with the cabinet of specimens and museum. It may be remarked that this fact may be taken as an indication that the evening attendance would have been considerably greater but for the occupancy of the chief room during the evening by the respective lecturers.

The Honorary Secretary issued for Professor Balfour's full summer course on Botany, 7 tickets; for Dr. S. Macadam's full winter course on Chemistry, 14 tickets, 2 for his practical course—and 2 for Dr. Moinet's full summer course on Materia Medica. These complete the number of pharmaceutical students attending the various classes, making in all 43 who during last year had obtained special tickets in connection with the Society. This number contrasts very favourably with that named in the report of last year being 15 more, or 43 as compared with 27.

The Council have much pleasure in recording that the privilege of using the books in the library has been taken advantage of to a much larger extent than has ever been done before. During 1877 no fewer than 236 volumes were given out, while throughout the preceding year only 95 were in circulation; giving an aggregate of considerably more than double the number in use during a corresponding period. The Council are well pleased with this result.

The Board of Examiners have met in Edinburgh eight times during the year, and at these examinations 3 Major, 77 Minor, and 15 Modified candidates presented themselves Of these 1 Major, 41 Minor, and 5 Modified candidates were successful, the rejections being about 60 per cent. While the numbers have been fairly upheld, the Council regret to observe that the percentage of failure has been on the increase, instead of, as they had hoped, in the opposite direction. The number of Preliminary candidates who presented themselves for examination at the different centres in Scotland during the year was 115.

Under the new regulations now in force, the Council trust that for the future this state of matters will be much changed for the better. Some young men, it is believed, knowing that only one guinea was deducted from their fee in case of failure, felt that they might safely come up on the chance of passing, and therefore made their appearance before the Board, not with a fair prospect of success, but more to see the form of examination, and, if possible, pick up some information likely to be of service on their next appearance. Arrangements having now been made by which the whole fee is left in the hands of the Society, it is hoped, will exercise a salutary effect for the future, and the results prove more satisfactory to the candidates as well as to the Board of Examiners.

The scientific meetings during the Winter Session just closed have been eight in number. It must be noticed that not only have these meetings been more frequent than usual, but very valuable communications have been made. The original papers by our President and others have added much to the interest of the meetings, while the attendance with one or two exceptions has been very gratifying. A glance at our weekly Journal will at once show how valuable and important the communications have been. The Council takes this opportunity of tendering the best thanks of the Society to those gentlemen who have aided in keeping up the interest of these scientific meetings, and look forward with much confidence to the future in obtaining a repetition of what has given so much satisfaction throughout the session just closed.

The library and museum have been rendered more attractive than ever. Both have been overhauled and systematically arranged by Mr. Stenhouse, the Assistant Secretary, and contributions rare and useful are respectfully solicited from those who desire that those departments should be kept worthy of a branch of the parent Society. The want of an herbarium has been often expressed by students who have no opportunities for studying dried specimens of plants when preparing for the botanical part of their examination, and the Council have much pleasure in stating that Mr. Stenhouse has been instructed to begin the formation of one this summer.

It is right the Council think to notice two presentation portraits which have been made to the Society, and which are now hung in the museum. The one is that of the late William Tait and the other David Rennie Brown. Both the deceased gentlemen were so well known to all connected with the Society that the Council cannot help feeling that a look now and then at the portraits may assist many of our young friends to emulate as far as they can the successful labours as well as the high position in connection with pharmacy attained by both these gentlemen.

The same course has been again followed this year as to the nomination and election of the Council in Edinburgh, the result of which will as usual now be made known.

Pharmaceutical legislation up to the present time remains unaltered, but the Council have every confidence that when any movement takes place in connection with an addition to, or alteration of, the Pharmacy Act of 1868, full justice will be done alike to the public and the Society by the Law and Parliamentary Committee in London, aided as that Committee is by the full body of the Council there. It cannot be denied that the practical working of some of the clauses of the Act might be with some benefit amended; but it must at the same time not be forgotten how difficult revised legislation is to carry out. When, however, circumstances demand some change, and action be again taken to urge upon the government of the country the claims of pharmacists for a revision of certain provisions at present in practical operation, the Council here are glad to know that the same readiness and ability which have been available on previous occasions, and which have in the past been so successful still exist, and it is with confidence believed that the London Council will, when required, do their utmost to obtain in the interests of the Society such alterations as will prove satisfactory to all concerned

---

Mr. James Mackenzie made a few remarks with reference to the new regulations of the Board of Examiners, but he did so under an erroneous impression, and he recalled his expressions after the matter had been explained to him.

The adoption of the report was moved by Mr. H. C. Baildon, seconded by Mr. A. Napier, and carried.

The Chairman then laid before the meeting the result of the voting for the new Council. He stated that 196 forms for nominations had been issued, and of these 72 had been given effect to. One was rejected as informal. The Committee appointed to scrutinize and tabulate the votes had completed their work in such a way that the result might be attested by any of the audience. From the table it was found that the following gentlemen had been duly elected as Council for 1877-78 (the names are published alphabetically):—

Mr. William Ainslie ....Edinburgh.
„ H. C. Baildon .... „
„ George Blanshard........... „
„ James Buchanan .... „
„ Thomas Davison ....Glasgow.
„ William Duncanson........Stirling.
„ Daniel Frazer ....Glasgow.
„ Alexander Govan.............St. Andrews.
„ William Gilmour ....Edinburgh.
„ David Kemp..................Portobello.
„ Alexander Kinninmont ...Glasgow.
„ Alexander Napier ....Edinburgh.
„ A. Seath ....Dunfermline.
„ J. B. Stephenson ....Edinburgh.
„ James R. Young .... „

Messrs. Gilmour and Kinninmont having expressed a desire to retire from the President's and Vice-President's position, which they had held for three years, Mr. Gilmour proposed that Mr. J. B. Stephenson be elected President and Mr. Alexander Napier Vice-President. Mr. Kinninmont seconded the motion and it was carried. Both of these gentlemen accepted office and returned thanks for the honour conferred on them.

Mr. Baildon moved and Mr. Ainslie seconded the reappointment of Mr. Mackay as Honorary Secretary. The motion was carried and Mr. Mackay accepted and briefly replied.

Mr. Mackay moved a special vote of thanks to Mr. Gilmour for the very efficient manner in which he has so long discharged the duties of the chair. Mr. Stephenson seconded, and the motion was most cordially responded to.

This concluded the business of the meeting.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fourteenth and concluding general meeting of the twenty-eighth session was held at the Royal Institution, Colquitt Street, on Thursday evening, April 26. The President, Mr. Alfred H. Mason, F.C.S., in the chair. Donations of 'The Year-Book of Pharmacy, 1876,' the *Pharmaceutical Journal*, the *Canadian Pharmaceutical Journal*, and 'Proceedings of the Historic Society of Lancashire and Cheshire,' to the Library, were announced.

Before the general business the President read the following:—

Obituary Notice of the late Martin Murphy, F.C.S.

It was the mournful duty of Mr. Davies and myself as your representatives to follow to the last resting-place the remains of the late Mr. Martin Murphy, Fellow of the Chemical Society of London, and Principal of the Liverpool College of Chemistry, and I feel it is my duty this evening to say a few words to the memory of one whom we so much respected, and whose loss we, and the profession generally, have to deplore. Those who have known him from boyhood bear testimony that he was endowed with a great love of learning, and a determined will to pursue to successful issue, if possible, whatever he engaged in. At school he appears to have made mathematics his speciality, and was soon known as an advanced student. At an early age he had thoroughly mastered Euclid, and few dared challenge him in this field of knowledge, even after he ceased to give it the attention of his youth. He was originally intended for the priesthood by his parents, but circumstances occurred at the time when he should have gone to college to study theology, which prevented this being carried out. In 1845 his eldest brother induced him to leave Ireland and join him as a shop assistant in Liverpool, preparatory to entering into commercial business. Martin went, however, to Warrington and accepted a temporary engagement at Muspratt's works (then the only chemical works in this part of the country), there he met Dr. Sheridan Muspratt. The doctor had just come home from Germany flushed with high chemical honours, and was about starting a college of chemistry in Liverpool. Finding in Martin Murphy more than ordinary intelligence and a great desire for learning, Dr. Muspratt induced him to pursuade his parents to allow him to be bound for seven years, in return for which he was to receive a thorough knowledge of the science and art of chemistry. This was granted, and he soon became one of the doctor's favourite pupils, and it was prophesied that he would prove a chemist of no mean repute; we, gentlemen, can well testify how this prophecy has been fulfilled, and how in adopting this as his vocation, his parents hit upon the profession best suited to his tastes and character of mind. He had a deep love for the study, and whether he could make it answer his necessities in life as well as any other occupation or no, would not induce him to withdraw for one moment his attention from the study. From 1853 to the demise of Professor Muspratt, the responsibilities of the College of Chemistry devolved entirely upon Martin Murphy. Not only did he teach, but he performed all the analyses, and such was Muspratt's confidence in his accuracy and ability, that he ceased to examine any of his results, but adopted them as his own. In 1854-5, Muspratt's 'Dictionary of Arts and Science' was published, and I am told that three-fourths of the work was actually written by Martin Murphy, or revised and corrected by him. He told me that for two years he worked sixteen hours out of the twenty-four, and such was his interest in the work that he rarely felt exhausted; in fact, the large and varied field of scientific inquiry which the writing of that book brought before him so absorbed his mind, that he seemed almost to live in the region of chemistry for the time. Nothing else was thought of; hence in a great measure resulted the very general knowledge which he possessed in all branches of industry.

From 1864 to 1866, he was Honorary Secretary of this Association, and there are those present who can testify to the ability with which he fulfilled the duties connected with the office. In 1868, he was elected a Fellow of the Chemical Society.

After the demise of Dr. Muspratt, Murphy was strongly urged to leave the college and superintend one of the largest chemical works in the kingdom, at a very high salary. For a time the lucre seemed to influence him, but only for a time. He soon dismissed the thought, and resolved to keep to chemistry as a *profession*, even though it should prove less remunerative. The College of Chemistry he wished to make a place where students might obtain a thorough chemical knowledge in reality, and not only in name. One great characteristic he had was a thoroughness in his studies, and a fixed determination to adhere only to facts, and not to accept a statement on the *ipse dixit* of any person. He strongly advocated the necessity that in chemistry there should be no guessing, or taking things for granted; expediency had no toleration with him. He never felt so much annoyed as when a money-grubber attempted to prostrate the science to his own interest. Never did he attach his name to a certificate upon the correctness of which he was not prepared to stake his name and reputation. He had a great objection to being thought a sensationalist; wild theories he left (as he used to say) to those who had a glib tongue to propound them, and laughed at their own discomfiture rather than grieved. He always thought it was possible to reconcile the most profound scientific investigation with Holy Writ, and he did not admire those who, with only a little knowledge, professed to fathom what was, and always will be, beyond their conception.

Had he lived he purposed writing a work on chemistry, which he said would prove a handbook, not only to manufacturers, but also to consumers and others interested in the arts.

He had just completed the erection of extensive chemical works, at Old Swan, for the manufacture of oxide of cobalt, for potters' use, by a method he had devised, and he was sanguine as to very profitable results.

It has pleased Providence to take him away from us. May our loss be his gain! I had been so constantly brought in communication with him, in connection with the affairs of this Association, and learnt to appreciate his words of encouragement, that I was led to place a high estimate upon his opinion. I feel that we have lost one of the brightest ornaments of our Association, and I could not let this opportunity pass without bearing testimony to his abilities, the display of which we were so glad to avail ourselves of, and which he so willingly gave.

He died, at his residence, Old Swan, on the 23rd inst., after a painful illness, at the age of forty-eight years, and was buried yesterday, several of the leading chemists in the town and neighbourhood being present to pay a last tribute of respect to his memory. He leaves a widow and two daughters, and your Council has requested me to convey a vote of condolence with them in their bereavement.

On the motion of Mr. A. H. Samuel it was unanimously decided to embody the sympathy of the meeting in the vote of the Council.

Valedictory Address.

The President then delivered his valedictory address. He commenced by enumerating the papers read before the Association during the session, and gave details as to the attendance. Allusion was also made to the Conversazione, which was described as the most successful in the annals of the Association. The President then continued as follows:—

"Gentlemen,—You have heard a faithful report of our work this session, and I think we can only arrive at a candid conclusion that it has been most creditable and satisfactory. Each section of our members (if I may use the phrase) has been represented in the work done, the originality of the papers and practical discussion which followed. Our average attendance, though apparently small, from all I can gather bears very favourable comparison with any kindred society or association. I may add that your Committee have arranged that during the recess the museum shall be thoroughly renovated and, I think, we shall have some very handsome contributions to announce at our annual meeting. The library also will be renovated, periodicals bound, and those books requiring rebinding attended to; a thoroughly revised catalogue will be issued, and I can promise my successor that all things will be got into as smooth order as possible for him when he takes office.

"It will not be expected this evening that I trespass upon your patience with any matters not immediately associated with our proceedings, but there are one or two subjects of interest to which, with your permission, I should like to call attention.

"During the last few months considerable agitation has been raised in the chemical journals respecting the status of the Chemical Society of London, and a few of the Fellows thought it expedient to black-ball some candidates for fellowships who did not come up to their requirements. This action was strongly deprecated at the Annual Meeting of Fellows, held a few weeks ago. My own impression is that it has had a beneficial effect out of London. The ultimate result of the discussion is that the Chemical Society has now decided to elect as Associates (at a reduced fee) gentlemen who are interested in the science. It has considerably raised the fees and standard of qualification of Fellows, and also made more stringent the obligation which Fellows have to sign, and this is the full extent of its powers. But some of the leading scientific chemists have decided to form a new body, to be styled "The Institute of Professional

Chemists of Great Britain and Ireland." The objects of the organization are to be the general advancement of chemistry in its application to the arts, manufactures, agriculture, and public health. Secondly, to ensure that persons adopting the profession of consulting chemists, or acting as analytical chemists *for reward*, are qualified by study and training for the proper and competent discharge of the duties they undertake.

"The vexatious proceedings which have been taken under what, for the sake of brevity, I will call the 'Adulteration Act,' by incompetent analysts, will, I am sure, make such an announcement as the foregoing welcome, but it has occurred to me that most of our members who are not Fellows or do not think of applying for fellowships, may derive great benefit themselves, and help the Society, by becoming Associates, and I should rejoice to see all our members in the ranks, for not only would the funds which the Society gain thereby enable them to publish a far more satisfactory Journal, but the fund for original research (which has lately been so liberally endowed) would also be enriched. England is making very rapid strides in her chemical status, and the time will soon arrive when the opprobrium will be removed that the world must go to Germany and France for the best scientific chemists. One thing we shall be quite sure of, that what an Englishman does will be real, if he is tempted to get into any other man's shoes; he will find his toes trodden upon so sharply that he will be glad to extricate himself and know better for the future.

"Dr. Dupré has made a communication to a publication called 'The Analyst,' in which he says that 'during the last five years he carefully examined 165 samples of drugs and medicines purchased at the better class of chemist, shops in all parts of the metropolis, all with very few exceptions having been bought under the Latin name by which they are distinguished in the Pharmacopœia; out of the 165 samples examined no less than 71 were found to be adulterated, some to a very considerable extent. Thus, of six samples of liquor arsenicalis, not one came up to the standard of strength, one showing a dilution of 60 per cent.; of six samples of scammony, all were adulterated; and of seventeen samples of ferri et quiniæ citras tested, eleven were found deficient.' Dr. Dupré sums up his experience as follows: 'Drugs consisting of sugar, well defined chemical compounds, such as bromide and iodide of potassium, sulphate of quinine, etc., are nearly always found pure; on the other hand all such as should contain a certain proportion of active ingredients or should be the more or less altered natural products, are frequently adulterated. Out of 49 samples of the first class two only were found adulterated, whereas out of 116 samples of the second class 69 were found adulterated.'

"The editor of the *Lancet* comments upon this report as follows:—'The conviction is forced upon us that there is more adulteration in drugs than in articles of food.'

"If Dr. Dupré had reported convictions instead of the wholesale statement he has made, we might be more easily disposed to credit it, but we may fairly assume from the average results of prosecutions for the sale of impure drugs, that when the majority of cases are thoroughly investigated the analyst is at fault. When a druggist has painted upon his shop or printed on his labels 'pure drugs and chemicals' or 'genuine drugs and chemicals,' he admits that sophisticated articles are sold by some others, and he leads the public to infer the same thing, and there is not a doubt that in unfair competition dealers are tempted by the greed of gain to vend sophisticated goods; hence the value of the Adulteration Act. Any dealer zealous for his reputation does not now supply an article which does not exactly coincide with its label; but it is a matter for serious consideration whether the pharmacist may feel safe in trusting to what should be his very back bone and standard, the British Pharmacopœia. Some preparations may be made strictly in accordance with the Pharmacopœia and found deficient on analysis, and there are instances when sufficiency of description and methods for detecting sophistication are wanting. It is to be regretted that when necessary to print another Pharmacopœia these deficencies were not supplied.

"Take a recent prosecution as an example. If a druggist is to be prosecuted for selling balsam capivi as adulterated, when it answers the Pharmacopœia requirements, and at the instance of an analyst who admits in evidence that he has never studied pharmacy, when is he safe? If the value of capivi depends upon certain proportions of resin and oil (as natural capivi imported from different countries varies in these proportions) the Pharmacopœia should state what the proportions are to be, and provision could be made accordingly as in the case of scammony.

"The fraud practised by the natives of countries from whence crude drugs are imported is sometimes marvellous. Take opium for instance; it is not uncommon to find rather formidable traces of lead (without chemical analysis), in the form of bullets. Shot and leather are often found in musk pods. Some admixtures are attended with danger to life, as in the instance to which Professor Bentley called attention a short time ago, of valerian root being adulterated with white hellebore. Of course the educated pharmacist can easily detect this. And here we have evidence of the necessity for the dealer to show proof of such knowledge by being qualified at Bloomsbury Square.

"We have a public analyst in Liverpool, and we may congratulate ourselves that he is a gentleman of high scientific attainments and blessed with common sense, not disposed to institute such vexatious proceedings as milk of sulphur prosecutions. It is fair to assume that he does not neglect his duties, and that some of our members may have sold articles for his investigation; the absence of prosecution is evidence, therefore, that the chemists and druggists of this town are a most respectable body of men, fully alive to the responsibilities of their calling. I am not disposed entirely to agree with the recent decision in the milk of sulphur prosecution, the overwhelming evidence in defence brought to bear at the trial, might easily have been over-balanced by conflicting evidence from retailers, wholesale dealers, medical men, and scientific evidence even hailing from Bloomsbury Square. Either both preparations should be in the Pharmacopœia or one should be discarded. *Acid tartrate of potash* and *cream of tartar* are synonymous, why not *precipitated sulphur* and *milk of sulphur* be held also synonymous? At the same time it surely was never intended that the Adulteration Act should apply to such strained ideas, nor that the druggist should be made the bugbear in the majority of prosecutions for sale of the article.

"Since the failure of the Arctic expedition several newspaper correspondents and the editors of the medical journals have discussed the therapeutic value of lime juice. I am inclined to believe that any evidence from seafaring men disparaging the virtues of lime juice is entirely due to unsound quality, impurity, and sophistication. It is rather an important matter to us in a large seaport town that this should be investigated. A captain trading to the West Indies told me that the lime juice supplied to ships in Liverpool was obnoxious to the sailors and they refused to drink it, but when he got his lime juice where it was produced the result was contrariwise. Lime juice supplied to ships is provided under bond to save duty upon the alcohol employed to fortify it, and apparently under government control there is no doubt that large quantities of deteriorated lime juice mixed with lemon juice and fortified with very crude spirit is taken on board. If genuine racked lime juice fortified with pure spirit was always supplied, I think we should never hear complaints of its non-beneficial effects.

"The issue of the 'Year-Book of Pharmacy,' is an event of some importance, and we may congratulate our honorary member, Mr. Siebold, upon its value. The able article which prefaces the work shows that the editorial duties are in the hands of a learned man. The scientific publications which more immediately concern our interests are well worthy of our perusal. I would call attention to the reports in the *Chemical News*, of the 'Proceedings of the Berlin Chemical Society,' probably at the present time the most important chemical society in existence, and those who have noticed the articles in the *Pharmaceutical Journal*, headed, 'The Month,' will agree that they are valuable and welcome contributions.

"Before concluding, I have a little more to say about our Association. You are all aware that the only drawback we have in the successful working of our Association is the apathy which is shown towards the efforts of your council in providing classes for the education of students. Our chemistry classes have been conducted by our excellent teacher, Mr. Williams, but only seven have attended. I was present (by request) at the first lecture, and delivered a short address to the students—endeavouring to impress upon them the importance of diligent attendance and the value of the opportunities afforded to them.

"Our chief drawback is the difficulty students have to get leave of absence to attend these classes. Surely it is not too much to ask employers to grant liberty one evening each week, during the session, to enable us to obtain students. It appears to me a short-sighted policy, for there would be ample return for the self-denial exercised, in the greater ability with which students would manipulate the necessary operations in connection with their calling. Our botany classes commence on Wednesday, May 2nd.

"Although we have this drawback, it would be unfair to assume that the young men do not study. I can testify that some are early risers, and enthusiastic in their labours, and I take this opportunity to remind them of one of the most adjuncts to this Association—its library. From this they may obtain all that is necessary to stimulate them to work zealously in the profession to which we are attached. The example of another self-made man, Mr. Gossage, who has just been called away, will be my apology for reading to you the following interesting career:—

Obituary Notice of the late William Gossage, F.C.S.

"The late Mr. William Gossage, whose death was chronicled some days ago, performed services to the cause of science which merit special recognition. One of the most prominent manufacturing chemists of Lancashire, he was a self-made man; and his career was not one of uninterrupted scientific and business triumph. Disappointment as well as success, occasionally awaited him, while disaster attended ventures about which he was sanguine. The apprentice of the first quarter of the century was an extensive manufacturer at the beginning of the third quarter, and besides receiving recognition from the Chemical Society, which made him a Fellow, his name was enrolled on the commission of the peace for Lancashire. Mr. Gossage was born at Burgh-in-Marsh, Lincolnshire, in 1799, and as the youngest of thirteen children, received the merest elementary education, when he was apprenticed at twelve years of age to his uncle, a Chesterfield druggist. By rising at four o'clock in the morning he obtained time to read all the chemical works he could get hold of, while from a refugee he acquired a knowledge of French. Afterwards he started business on his own account at Leamington, where also he married. When thirty years of age he became chemist to some important works in Worcestershire, which post he held for twenty years. It was here that Mr. Gossage contrived his condensing towers of brick or stone, filled with coke or other material, to condense by contact with extensive wet surfaces, the hydrochloric acid resulting from the decomposition of salt. This was in 1836, and next year he patented a means of recovering sulphur from the residues of the black ash vats, of the utility of which he felt so certain that he subsequently contracted with Widnes alkali manufacturers to take all their waste for a certain period. These contracts nearly proved his ruin, especially as one manufacturer grimly adhered to his bond, though the others released the chemist. But Mr. Gossage's effort induced others to set about the utilization of sulphur in alkali waste with some degree of success. The deceased also did something to prevent the waste of manganese in the old process of producing chlorine in making bleaching powder. It was in 1850 Mr. Gossage established himself as an alkali manufacturer at Widnes, where he continued his labours in chemical research with profit to himself and others. The war with Russia made tallow dear, and Mr. Gossage showed how soap could be made without it. His life was active as well as long, but hard work did not harden his heart, and his death was much regretted by his employés, his fellow manufacturers, and his immediate friends. His death took place on the 9th instant, at his residence Earlsleigh, Bowdon, and he was buried in Toxteth Cemetery. The life of Mr. Gossage conveys a moral to young men of the period who feel that progress is hopeless.

"Gentlemen,—I do not say farewell this evening; if we are spared to meet in September I shall have to present our official report to you, but I cannot conclude without expressing my deep obligation to all of you for your kind assistance in enabling me to present this review of our proceedings and your ready forbearance with my shortcomings. I wish particularly to acknowledge the cheerful and invaluable assistance I have experienced from our Honorary Secretary, Mr. Williams, the minutes he has recorded and the published reports of our proceedings are quite sufficient evidence of the ability and zeal with which he has discharged the duties he has undertaken, and I desire to express my personal obligations."

A lengthy discussion followed in which several members took part, and on the motion of Mr. Shaw, seconded by Mr. Redford, an unanimous vote of thanks was accorded to the President for the address.

Mr. Woodcock (Vice-President), in eulogistic terms, nominated Mr. T. Fell Abraham as President elect for 1877-8, and the ballot being taken, the President declared Mr. T. Fell Abraham unanimously elected President for next session.

In the absence of his son Mr. Abraham thanked the meeting for the honour conferred and promised to convey the wishes of the Association to him.

The general business of the session terminated.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL ASSOCIATION.

The annual meeting of this Association was held at the rooms, Tudor Street, on March 7th, 1877. The following elections and arrangements were made:—President, Mr. W. V. Radley; Vice-Presidents, Mr. W. Ward, F.C.S., Mr. F. Hudson; Council, Mr. G. A. Cubley, Mr. H. E. Ibbitt, Mr. G. Ellinor, Mr. W. Jervis, Mr. H. W. Maleham, Mr. J. P. Hewitt, Mr. G. Carr; Treasurer, Mr. W. V. Radley; Hon. Sec. Mr. J. Turner.

Resolved that the annual subscription be five shillings per annum, and that Mr. Warner be employed to collect the same.

Resolved that the rooms at present occupied by the Association be given up, and that the President and Secretary hire rooms for the general meetings.

Resolved that the specimens, cabinet, books, microscope and maps, be placed under the care of Mr. H. W. Maleham, 7, West Bar, to which members may have access between the hours of nine in the morning and half-past seven in the evening, subject to rules being properly carried out.

The Treasurer gave his statement of accounts for the past year, which showed that although there had been a deficiency in the amount of subscriptions paid in, still there was a small sum in hand; whereupon it was carried that the treasurer's account as read be passed, which showed a balance in hand of £6 6*s.* 9½*d.*

The best thanks of the meeting were accorded to Mr. W. Jervis, for his services as president during the past year, to which he replied, expressing regret that so little had been done during his year of office, but it was mainly owing to the apathy of the members.

A general meeting of the above Association was held in the lower room of the Cutlers' Hall, on Friday evening last, April 27th, at nine o'clock, for the purpose of considering the position and prospects of the trade in reference to the past and present prosecutions, and on other business.

The following resolutions were passed by the meeting:—

"That this meeting heartily approves of the defensive action taken by the Chemists' Trade Association, in reference to the prosecutions for the sale of milk of sulphur, and trusts that this vexatious question will now be set at rest."

2nd. "That this meeting, believing in the time-immemorial right and privilege of chemists to prescribe across the counter, in simple ailments, not indeed pretending, or by their customers understood, to be medical men in a professional sense, but merely acting as private persons, —clergymen, and others are daily doing to the great advantage of the public, particularly the very poor—hereby pledges itself to support the Trade Association in the steps it is taking in the law courts in defence of this ancient right, and calls upon every member of the trade to contribute liberally immediate pecuniary aid to the Association at the crisis of affairs."

3rd. "That this meeting, impressed with the very important results and wide spread interests pending and involved in the question of counter-prescribing, respectfully, but earnestly, appeals to the Council of the Pharmaceutical Society to aid the trade in every possible manner in fighting this great battle."

4th. "That in order to secure a fair and satisfactory representation of the chemists and druggists of Great Britain at the Council Board of the Pharmaceutical Society, it is desirable that gentlemen should be selected from various parts of the country; this meeting therefore views with satisfaction the nomination of Mr. G. A. Cubley, in whose ability and usefulness it feels the greatest confidence, and whose election it feels most anxious to support."

5th. "That the Secretary forward a copy of the third resolution to Mr. E. Bremridge, asking him to lay it before the next meeting of Council."

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

Scottish Branch.

A special meeting of the Scotch members of this Association was held in the hall of the Bible Society, St. Andrew's Square, Edinburgh, on Wednesday, 25th April last. There was a fair attendance of members from different parts of the country, and a large number of apologies had been received from gentlemen interested in the association, but who were unable to be present.

Mr. George Blanshard, of Raimes, Blanshard and Co., was called to the chair, who in course of his opening remarks, said he had great pleasure in presiding over such a meeting of his fellow pharmacists, and thanked them for the honour they had done him in asking him to do so. He was deeply attached to the Pharmaceutical Society, which he believed had done, and was still doing a great deal for the trade at large; he believed, however, that there was work for the trade association, and he hoped that the two bodies would move in perfect harmony with each other.

Mr. James M. Fairlie, convenor of committee on the Scotch scheme was then called upon to make a statement regarding the position of the Association in Scotland. He stated that the membership was somewhat over 180, and the donations and subscriptions received since July last, amounted to about £85. As yet not much effort had been made in Scotland to obtain members, the engagements connected with the British Pharmaceutical Conference meeting in autumn last having prevented an energetic canvass being made in one of the principal districts, and the scheme which had been planned was only now being put into operation. There was no doubt but that the number of members might be easily doubled, if not tripled, within the next six months, if the scheme sketched out was faithfully wrought. During the last few weeks he had been in communication with a large number of the leading pharmacists throughout the country, and with the exception of a few of the older pharmaceutical chemists, who it might be expected would be somewhat cautious, the great majority were favourable to the Association as a defence body against the unjust attacks of analysts, excise officers, or unfriendly medical men, and he thought that a personal solicitation was all that was required to obtain the hearty support both financially and otherwise, of the great bulk of the trade. This might be done without much labour if one or two in each of the ten districts in Scotland would work out the plan of the executive of the Association. Mr. Fairlie then explained the scheme, a copy of which has appeared in the *Pharmaceutical Journal.* It was expected that once a year at least a meeting of the trade would be held in the principal town in such district, when a member would be chosen for the general committee, who would act as local representative of the Association, keeping up constant communication between the members in the district and head quarters. In some of the districts the trade was ripe for local associations being formed for educational and other objects, but the question arose, Who was to move in the matter? The elder men say the juniors should take it up, and the young men say the seniors should, with the result that nobody does anything, and the whole matter is left indefinitely in abeyance. The object of the meeting that day was the appointing of a moving spirit in such matters, and if the committee was in earnest, lasting good would result to the chemists in every town, for there were many who required to be protected as well as encouraged, by their brethren who were more fortunately situated. It required united and determined effort to accomplish all the good that might be done. He hoped the trade would do its duty to itself and join the Association, and if it was necessary for them to go to the Legislature for that protection which it would appear some of the laws and law operators do not give them, it would scarcely dare to withhold from them their just rights.

On the motion of Mr. Borthwick, Selkirk, seconded by Mr. Laird, Dundee, the report was received and adopted.

The appointment of the committee was next proceeded with, and after a list of names which had been submitted by members in the various districts had been gone carefully over, it was moved by Mr. Nisbet, Portobello, and seconded by Mr. Anderson, Musselburgh, that the following be the Scotch Committee:—For the counties of Kinross, Clackmannan, and Fife, Mr. D. Storrer, Kirkcaldy; Edinburgh, Haddington, and Linlithgow, Messrs. George Blanshard, James Mackenzie, and W. H. Laird, Edinburgh; Berwick, Peebles, Roxburgh, and Selkirk, Mr. J. G. Alexander, Galashiels; Dumfries, Kirkcudbright, and Wigton, Mr. William Allan, Dumfries; Lanark and Western Counties, Messrs. Thomas Davison, J. M. Fairlie, and H. Kinninmont, of Glasgow, Mr. A. Macnaught, Greenock, and David Murdoch, Falkirk; Perth, Mr. Peter Strang; Forfar, Messrs. Charles Kerr and William Laird, Dundee; Aberdeen and Kincardine, Messrs. D. M. Mackay and Alexander Strachan; Banff, Elgin, and Nairn, Mr. William Robertson, Elgin; Inverness and

Northern Counties, including Western and Northern Islands, Mr. David MacRitchie, Inverness.

The following office bearers were then nominated on the motion of Mr. Murdoch, Falkirk, seconded by Mr. Alexander, Galashiels, viz.: President, Mr. Thomas Davison; Vice-President, Mr. James Mackenzie; Hon. Secretary, Mr. James M. Fairlie.

After some discussion, it was moved by Mr. Mackenzie, and seconded by Mr. Fairlie, that "The arrangements for district trade meetings be remitted to the committee with powers," and agreed to.

Mr. Davison proposed, seconded by Mr. Kinninmont, that "Messrs Mackenzie, Laird, and Fairlie be appointed the deputation to attend the annual meeting of the Association, to be held in London on the 15th May."

After some remarks had been made by several of those present regarding different matters affecting the interests of the trade, a hearty vote of thanks to Mr. Blanshard for presiding brought the proceedings to a close.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The usual monthly meeting of this Association was held at Britannia Chambers, Pelham Street, on Wednesday evening, April 25th, the chair being occupied by the President, Mr. J. H. Atherton, F.C.S.

Mr. H. Major, B.A., B.Sc., F.R.G.S., delivered a most interesting lecture on "Changes which the Earth has seen." The lecturer showed, by numerous illustrations, how changes are constantly going on in the crust of the earth, and have always been going on since the beginning, through the action of volcanoes, earthquakes, the constant motion of the sea, etc., and said if it had not been for volcanic eruptions bringing them nearer the surface, many of the best metals would have been out of the reach of man. He briefly referred to the changes in animal and vegetable life, rather inclining in his views to the development theory, and said the only thing in nature which did not change was the "inconstant sea," and concluded an eloquent lecture amid applause.

The President, in proposing a vote of thanks to the lecturer, said although he was about to leave the town, he wished him every success in his new home, and hoped he would sometimes pay a visit to the Nottingham Chemists' Association. Mr. J. Rayner echoed the president's hope and seconded the vote of thanks, which was unanimously carried and duly acknowledged by the lecturer.

Parliamentary and Law Proceedings.

Prosecution for Sale of Syrup of Poppies without a Poison Label.

At the Ross Petty Sessions, John Stafford, chemist and druggist, of Ross, was summoned for selling a certain poison, called "Syrup of Poppies," without being labelled as poison, at Ross, on the 7th April.

Mr. Williams appeared for the defendant.

Supt. Smith deposed: On the 9th April I found in the house of William Powell, at Upton Bishop, the bottle I now produce; it was in the same state, and labelled as it is at present; I showed it to Dr. Fernandez at the time.—Cross-examined by Mr. Williams: The bottle had been concealed where I found it; no one casually passing through the room would have been able to discover it; I don't know what it is; I won't swear it is syrup of poppies; if the label were off, I should not know what it is; the label guides me in the opinion that it is syrup of poppies.

Elizabeth Powell, wife of John Powell, labourer, of Upton Bishop, deposed: I saw Supt. Smith find the bottle produced in my house; I got it at Mr. Stafford's, chemist, in Ross; I did not see Mr. Stafford; it was a young man in the shop; I asked for a pennyworth of syrup of poppies; I had used none out of the bottle; I had not used any before; I got it to make the child sleep; I got it on the Saturday, at 2 o'clock, and Supt. Smith found it on the Monday; I had never used any with my children; I heard what Dr. Fernandez said about the condition the child was in; the label was put on when I took it to Mr. Stafford's; it was not on it before.—Cross-examined by Mr. Williams: No one was in the shop besides the young man; I will swear it; I will swear Mr. Stafford did not caution me; he was not there; I did not tell my husband when I took it home; I put it up in the cupboard; it was not because no one should see it; there were things inside the cupboard, but the bottle was not covered up.

Dr. Fernandez deposed: I have examined the contents of the bottle produced; it is a preparation of poppies, and a poison; I have no doubt that the syrup had been administered, from the appearance of the child; the woman did not deny it when I taxed her with administering the syrup to the child; I have heard her statement just given, and do not believe her, because the appearance of the child was such as denoted that a narcotic had been administered.

Mr. Williams, in the course of an eloquent address to the Bench on behalf of his client, observed that the chemists of Ross appeared to have conducted their business upon very strict principles, for during the nine years that the Act had been in force, no case had ever been brought against either of them as to the way in which they dealt with the public. He know that Mr. Stafford in particular, conducted his business with great care, and would prove that when this person went to the shop and asked for this preparation of poppies, he (Mr. Stafford) was in the shop, and he would call a witness to state what transpired, for he was assured that he (Mr. Stafford) had cautioned the woman, and that a proper label had been placed upon the bottle, such labels being constantly at hand to place upon bottles containing these and similar preparations before they were taken from the shop. If the policy of the law had not prevented his putting Mr. Stafford in the witness box, he should have been most happy to do so, and then Mr. Stafford would have stated upon oath what had really taken place. But as he could not do so, he thought that from his character and position as a respectable tradesman, the Bench would attach as much importance to his simple assurance, coming as it did through him (Mr. Williams), as they would if he were able to appear in the witness box, and when they found Mr. Stafford's assistant telling them that before the preparation was handed to the woman she was cautioned in respect of it he felt certain they would hesitate before they accepted her testimony in a case of such grave importance as this. Besides, she did not come before them with such clean hands as a person should have who appeared in support of such a prosecution as this. From the beginning of the case to the last moment when she presented herself in that Court, she had been guilty of nothing less than a series of concealments. She had concealed the purchase of the syrup in the first place from her husband. There was no doubt of that. She had put the bottle in the place where it was found by the policeman. There was not the slightest doubt about that. She had told the Bench she had not given any of it to the children; but that was contradicted by Dr. Fernandez. Would they, therefore, believe the delusive evidence of such a woman in order to criminate a respectable trademan? It was a known fact that people were in the habit of removing the label printed "poison" as they left the chemist's shop, and he had not the slightest hesitation in saying that this woman, when she went away from Mr. Stafford's, must have pulled the word "poison" off the bottle. In order to show the uniform system on which Mr. Stafford conducted his busines, Mr. Williams produced a book, showing how everything was entered that was required by law to be entered, and said there had not been a single instance from the time Mr. Stafford had been in business in which any neglect of this kind could be imputed to him; and this was a reason why he urged all he possibly could in order to controvert the evidence of a woman upon which he asked the Bench not to rely, for they certainly ought not to do so. He also asked them if they could believe that Mr. Stafford would have imperilled his reputation by such an omission, when it could be clearly shown that he had always been most careful and considerate in the transaction of his business. He thought they could fairly assume that the proper label had been put on the bottle, and, after they had heard the shopman's evidence, he hoped they would say that, although it was a case which required their consideration, they did not believe that Mr. Stafford was guilty of the offence, and would accordingly dismiss the charge. After showing the Bench the various kinds of labels used by Mr. Stafford, and directing attention to a red one with the printed word, "Poison," which he contended was the kind used on this occasion, he called,

Albert Porter, qualified assistant to Mr. Stafford, who deposed: I have been with Mr. Stafford about five months; I remember a woman coming for syrup of poppies; Mr. Stafford was in the shop; she bought a pennyworth; I heard Mr. Stafford caution her about the preparation of poppies; when these preparations are sold, I am in the habit of putting one of the labels produced marked "poison" on the bottles; I cannot swear I did so on this occasion, but, according to my habit, I think I must have done so. I have been in other chemists' shops, and have seen people take off the label as they have left the shop, especially after buying laudanum. I do not remember the day when the woman came. I believe I placed a proper label on the bottle.—By the Bench: The reason I have for believing it is that it is my custom to do so.

The Chairman said the Magistrates were unanimously of opinion that it was their duty to convict. But it was not any great reflection upon Mr. Stafford in his business, because speaking from his own experience, Mr. Stafford's business was as well conducted as any shop of the kind that he had dealt at. This was one of those accidents that would occur even when the utmost caution and care were used; and the Bench believed that the omission was accidental. But as the label was not put on the bottle, in conformity with the Act, they had no alternative but to say the charge was proved. The defendant would be fined in the nominal penalty of 6*d*., the costs being £1. 7*s*. 0*d*.

Mr. Williams remarked that there was such a coin as a farthing.

The Chairman replied that the penalty was sufficiently nominal to show that they were clearly of opinion that it was an accidental omission. He was in the habit of dealing with Mr. Stafford, and his confidence in him was not in the least shaken by this case.

Methylated Spirit as a Beverage.

At the Thames Police Court, on Tuesday, Isaac Levi, of Trighton Court, Middlesex Street, Whitechapel, appeared to answer an adjourned summons, taken out by the Inland Revenue, charging him with, on the 12th of January, unlawfully having in his possession methylated spirit, capable of being partially used as a beverage and internally as a medicine, and not being sulphuric ether or chloroform, in the manufacture and preparation of which said methylated spirit had been used, whereby he had incurred a penalty of £100.

Francis Party, an officer of excise, said that on the 12th of January he went to the defendant's house, and on searching it, found in a cupboard in the front room downstairs a bottle containing half a pint of methylated spirit, and in a recess between two rooms, a bottle containing a pint of methylated spirit. On the following day he saw the defendant, who said that he purchased half a pint of the spirit, reduced it with water, sugar, and aniseed, and drank it himself, as he could not afford to buy spirits at a public-house.

Charles Birch, chemist to the Inland Revenue, said that on the 13th of January he received a sample of methylated spirit from the last witness, and on analysing it he found it to consist of methylated spirit 41 degrees underproof, flavoured with aniseed, and seven ounces of sugar to the gallon. The aniseed and sugar would give it a medicinal effect.

Mr. De Rutzen said there was no accounting for taste. It was plain that the defendant had brought himself within the meaning of the act, and had rendered himself, liable to a penalty of £100. He had no power to mitigate the penalty less than one-fourth, and he would be fined £25.—*Standard.*

Poisonous Green Peas.

At the Liverpool Police Court, on Wednesday, April 25, Messrs. Maughan and Thompson, Elliot Street, were summoned under the Adulteration of Food and Drugs Act for selling a tin of preserved green peas which had been coloured with an ingredient injurious to health.

The sale of the peas having been proved, the certificate of the analysis by Dr. Campbell Brown was put in, in which it was stated that the peas in the tin were discoloured with a salt of copper corresponding with from two to two and a half grains of crystallized sulphate of copper. Dr. Brown was called, and said that this amount was equal to half an emetic dose. Any person who partook of the peas regularly would certainly be injured; but, like many other poisons, the copper would affect some people more than others.

Mr. James, on behalf of the defendants, said they had done everything in their power so that they should sell nothing injurious to health. He produced a warranty from Messrs. Pelling, Stanley and Co., Victoria Street, from whom they purchased the peas in question, certifying them to be perfectly pure and unadulterated by any poisonous substance. This warranty having been proved,

Mr. Raffles said the defendants had taken the very course prescribed by the Act of Parliament, and dismissed the summons. On the application of Mr. Atkinson, the letter from Messrs. Pelling, Stanley and Co. was impounded.—*Liverpool Daily Post.*

Robbery by an Assistant.

At the Liverpool Assizes, last week, George Johnson Ashmore, twenty-seven years of age, chemist's assistant, pleaded guilty to having, at Garston, on March 22, stolen twenty packets of tea, eight bottles of champagne, two bottles of whisky, two cases of perfumery, and other articles, the property of Edgar Humphries, his employer. William Henry Ashmore, farmer, brother of the other prisoner, was charged with having received the goods, knowing them to have been stolen, and was acquitted. George J. Ashmore was sentenced to four months' imprisonment.—*Liverpool Weekly News.*

"Alpha."—Malcolmia maritima, R. Br., and *Stellaria media.*

Messrs. Canrick, Kidder and Co.—We are always glad when possible to insert reports of such cases when they are furnished in due time but opportunity in this case has lapsed.

H. Bartlett.—We recommend you to consult your solicitor.

"Nestor."—Stellaria Holostea.

"An Old L. S. A." (who should have sent his name and address.—(1) We are not aware that any "penalty attaches to a chemist who dispenses not only a poison but a non-pharmacopœial preparation." (2) We do not see the relevance of the question, as the person referred to is not a member of the Pharmaceutical Society.

L. Thompson.—Chrysoplenium oppositifolium.

We are compelled by want of room to defer the publication of several communications.

Communications, Letters, etc., have been received from Mr. Wright, Mr. Chipperfield, Mr. Brown, Mr. Cuttle, Mr. W. Clark, Mr. Williams, Mr. Abraham, Mr. Churchill, Mr. Piper, Mr. Bateman, Mr. Plomley, Mr. Fox, Mr. Elliott, Dr. Morel, Mr. Savage, Mr. Bartlett, Dr. Craig, Mr. Stoakes, Toxicology, Syrupus, Manu Forti, Buschius, Subscriber, Alpha, S. W. J., S. N., W. O. S., P. C. B.

OXALATE OF CERIUM.*

BY HENRY G. GREENISH.

In 1803, a substance, supposed to have been an element, was discovered simultaneously by Klaproth, and by Hisinger and Berzelius, in the mineral cerite, and named cerium. In 1839, Mosander discovered that the so-called element cerium was a compound, and contained a second element, which he named lanthanum (from the Greek λανθανω, I lie hid). In 1841 the same chemist determined the presence of a third element, didymium (from Greek διδυμοι, twins).

The earliest notice that I can find of any salt of cerium being used in medicine is in 1854, in a "Note on the Therapeutic Action of Salts of Cerium," by J. Y. Simpson, M.D.† The following is a quotation from an abstract of his note:

"He now proposed to read to the Society some very imperfect observations on the therapeutic action of some other metals, and first as to cerium, which, given in the form of nitrate, and in one grain doses, twice or thrice a day, appeared to act as a sedative tonic of considerable value, strongly resembling bismuth and the salts of silver. He had employed it, in the first instance, in cases of general chronic intestinal eruption, a peculiar and intractable form of disease, for which arsenic and nitrate of silver were generally prescribed, and where these remedies had failed, cerium had been tried with marked advantage. In irritable dyspepsia with gastrodynia and pyrosis, and in chronic vomiting, its exhibition was attended with satisfactory results, and in the vomiting which occurs during pregnancy prompt relief was afforded."

These remarks had reference to the nitrate of cerium only.

Five years later, Dr. Simpson, in one of a series of clinical lectures on the "Diseases of Women,"‡ spoke of the oxalate of cerium in these terms:

"I have not as yet said anything regarding the drug which I have found to be, of all individual remedies, the simplest and surest agent that can be administered for arresting the sympathetic vomiting of pregnancy. The drug I refer to is oxalate of cerium, which I have seen successful in curing vomiting in a larger proportion of cases than any other single remedy which I have used."

Further quotation from this lecture is not necessary for my purpose, as the remarks which follow have reference mainly to the special cases in which he found the oxalate valuable.

In 1865, Dr. Walsh, in a letter to the *Medical Times and Gazette*,§ recommended the oxalate of cerium combined with compound tincture of valerian for sea sickness, and stated that considerable relief had been derived from its use. This closes the history of oxalate of cerium till it became a Pharmacopœia preparation.

In 1867, oxalate of cerium was introduced into the British Pharmacopœia, with the following description:

"A salt, which may be obtained as a precipitate by adding a solution of oxalate of ammonia to a soluble salt of cerium."

If the soluble salt of cerium were pure this would be correct, but it would then be inconsistent with the "Characters and Tests" which are as follows:

"A white granular powder, insoluble in water, decomposed at a dull red heat into a reddish brown powder, which dissolves completely, and without effervescence, in boiling hydrochloric acid."

If the salt of cerium from which the oxalate is obtained be pure, the oxalate would be decomposed at a dull red heat into a pale yellow powder. The reddish brown colour is an indication of impurity. The salt of cerium of commerce, from which the oxalate is made, is not pure, and to the impurities contained in it this reddish brown colour on decomposition by heat is due.

Dr. Attfield* makes the following statement concerning oxalate of cerium:

"The oxalate of cerium may be obtained from cerite by boiling the powdered mineral in strong hydrochloric acid, evaporating, diluting, and filtering to separate silica, adding ammonia to precipitate the hydrates of all metals except calcium; filtering off, washing, redissolving in hydrochloric acid, and adding oxalic acid to precipitate oxalate of cerium. The preparation will still contain oxalates of lanthanum and didymium. It is therefore strongly calcined, the resulting oxides of lanthanum and didymium dissolved out by boiling in a concentrated solution of chloride of ammonium, the residual oxide of cerium dissolved in hydrochloric acid, and oxalate of ammonia added to precipitate pure oxalate of cerium."

I shall refer to this subsequently.

The following is the usual method adopted for the commercial manufacture of oxalate of cerium: †

The powdered mineral cerite is heated with a large excess of concentrated sulphuric acid for several hours and allowed to cool. The soluble sulphates formed are dissolved out by cold water. In this solution of sulphates a mass of sulphate of potassium is suspended, by which double sulphates of the cerium metals and potassium are precipitated. The precipitate is collected, decomposed by heating with carbonate of soda, and the resulting mass lixiviated with water, leaving the oxides of the metals; or the precipitated sulphates are strongly heated with charcoal, reducing them to sulphides, which may be dissolved in dilute nitric acid, and evaporated to dryness.

Another method‡ consists in the treatment of the mineral with *aqua regia*, dilution, and precipitation of the hydrates of the metals with ammonia. The precipitate is collected, washed, redissolved in hydrochloric acid, and precipitated with oxalic acid.

F. Mayer§ recommends heating the mineral with sulphuric acid, lixiviating, and passing sulphuretted hydrogen through the liquid; the sulphides are removed by filtration; hydrochloric acid is then added, and the oxalates of the cerium metals precipitated by oxalic acid. These are calcined with carbonate of magnesia, dissolved in nitric acid, and boiled in a large quantity of dilute sulphuric acid. By this means a subsulphate of cerium is precipitated. This is collected, dissolved in strong sulphuric acid, reduced by hyposulphite of soda to cerous sulphate, filtered, and oxalate of cerium precipitated with oxalic acid.

This process has the advantage of producing a pure, or nearly pure, cerium salt.

The minerals used in the manufacture are chiefly cerite from Westmanland, in Sweden; allanite and

* Read before the School of Pharmacy Students' Association.

† *London and Edinburgh Monthly Journal*, 1854, p. 564.

‡ *Medical Times and Gazette*, xix., p. 280.

§ *Pharm. Journ.* [2], vol. vii., p. 39.

* Attfield's 'Manual of Chemistry,' 1st ed., p. 252.

† Gmelin's 'Chemistry.'

‡ Watt's 'Dictionary of Chemistry.'

§ *Am. Journal Pharmacy*, Jan. 1860.

orthite from Norway, Russia, Germany, etc. The proportion of cerium to the lanthanum and didymium contained in them is by no means uniform, varying from 50 per cent. cerium with 8 per cent. of lanthanum and didymium, to 3 per cent. of cerium, with 9 per cent. of lanthanum and didymium. If, therefore, no attempt is made to separate the cerium from its allied metals, it is evident that the oxalate of cerium will contain a very variable amount of pure cerium, and from inquiries made of manufacturers of the drug, I find that no such separation is made, and that the oxalate of cerium of commerce is the mixed oxalate of cerium, lanthanum, and didymium in the proportion in which they happen to exist in the mineral used.

I will now quote the results of the qualitative analysis of six samples of oxalate of cerium obtained from different sources, showing the impurities contained in them. They may be taken as representative specimens of the oxalate of cerium of commerce:

No.	Basylous Radicles.				Acidulous Rad.
1	Pb	Fe Ce	Ca	Mg	SO_4; tr. Cl
2	Pb	Fe	*nil*	Mg	SO_4; tr. Cl
3	Pb	Fe	*nil*	Mg	Trace SO_4
4	Pb?	Fe	Ca traces	Mg	SO_4; Cl
5	Pb	Fe	*nil*	Mg	SO_4
6	Pb	Fe Ce Al	Ca	Mg	SO_4

The chief impurities were lead, iron, calcium, magnesium, and a soluble salt of cerium, present, however, usually in small quantity. In sample 4 the precipitate obtained with sulphuretted hydrogen was probably lead, but the quantity was very small. In sample 3 lead was rather more prominent than I should have expected. A weighed quantity, 1·911 gram of this sample yielded sulphide of lead corresponding to ·021 gram oxalate, or 1·1 per cent. In the acidulous radicals I found traces of chlorides in 1, 2, and 5, sulphates in small quantity in 1, 2, 3, 4, and 5, and in considerable quantity in 6.

Referring again to the Pharmacopœia, it will be found to be stated that "Ten grains of the oxalate when incinerated lose 5·2 grains in weight;" that is, 52 per cent. I give here the amount of loss sustained by the above six samples, and by a seventh which I know to be of German manufacture:

No.	Loss per cent.	No.	Loss per cent.
1	52·3	5	52·1
2	52·9	6	32·0
3	52·5	7	44·8
4	52·3		

It will be noticed that the loss sustained by samples 6 and 7 was much less than by the other five, or, in other words, the amount of ash was much greater. The ash was in each case tested, and the impurity found to be sulphate of cerium.

A weighed quantity of sample 6 was then taken, incinerated, the ash treated with water, by which the sulphate of cerium was dissolved out, the resulting insoluble oxide collected, dried, weighed, and calculated to oxalate. It was found to be 59·8 per cent. of the quantity taken, and would represent the amount of oxalate of cerium present in the sample.

Sample 7 similarly treated gave 81·3 per cent. of oxalate.

Next the oxalic radical was estimated. This was effected by a solution of permanganate of potassium of known strength. A weighed quantity of oxalate was introduced into a flask, water and sulphuric acid added, and the mixture heated till the oxalate was dissolved. The permanganate solution was then added from a burette as long as decolorization took place. When this ceased, the whole of the oxalic radical had been decomposed, and by this means could be easily and correctly estimated.

In the accompanying table is shown the amount of oxalic radical calculated to C_2O_4 in the seven samples before treated. Pure oxalate of cerium $CeC_2O_4 3H_2O$ would yield 37·6 per cent. C_2O_4.

No.	Per cent.	No.	Per cent.
1	36·8	5	37·7
2	36·7	6	22·5
3	36·9	7	30·6
4	37·1		

Samples 6 and 7, as might be anticipated, were remarkably deficient in the oxalic radical.

I will now direct attention to the separation of the pure cerium oxide from the oxides of lanthanum and didymium, with which it is always associated. The following are the principal methods which have been recommended for this purpose:—

1.* Pass chlorine through the hydrates suspended in potash; lanthanum and didymium dissolve, cerium is left as peroxide.

2.† Boil the mixed oxides in a strong solution of chloride of ammonium; lanthanum and didymium dissolve, cerium is not acted upon.

3.‡ Boil first with dilute nitric acid, then with stronger; lanthanum and didymium dissolve, cerium is not acted upon.

4.§ Dissolve the oxides in nitric acid, evaporate till most of the nitric acid is driven off, and boil in a large quantity of very dilute sulphuric acid. The cerium is precipitated as subsulphate—

$$(SO_6HCe_2 2H_2O).$$

5.|| Dissolve the oxides in nitric acid, nearly neutralize, add acetate of soda, then hypochlorite of soda, and boil, cerium is precipitated.

The first was the process employed by Mosander in separating lanthanum and didymium, and subsequently by Damour and Ste-Claire-Deville in the analysis of a mineral. The stream of chlorine must be continued for some hours till the liquid is completely saturated. The undissolved portion is then allowed to subside, the clear liquid poured off, fresh potash added, and the process repeated. The clear liquid is boiled to precipitate some oxide of cerium held in solution, and filtered. The filtrates will contain the lanthanum and didymium; the precipitates and that portion undissolved by the chlorine will be the cerium oxide. It may be collected, well washed, redissolved and reprecipitated to free it from salt of potash; collected, dried, incinerated, and weighed as sesquioxide, Ce_2O_3. Watts says of this process, "It is long and tedious, but the result is certain and separation complete."

·871 gram oxide from sample 2 gave ·252 cerium oxide, and ·594 oxides of lanthanum and didymium, or in percentage—

* Gmelin's 'Chemistry,' Art. Cerium. Damour and Ste-Claire-Deville, *Compt. Rend.*, 59—272.
† Watts, *Quarterly Journ. Chem. Soc.*, 2, 141.
‡ Gmelin's 'Chemistry.'
§ Erk, *Journ. Chem. Soc.*, 24, 494.
|| Popp. *Ann. de Chim. et Pharm.*, 131, 360.

Cerium	29·
Lanthanum and Didymium . . .	68·2
	97·2

leaving 2·8 per cent. not accounted for, probably due to the impurities contained in the sample, and to error in manipulation. The oxide of cerium obtained by this process is pale yellow in colour, the mixed oxides of lanthanum and didymium dark brown. Pure oxide of lanthanum is white. It is curious here to note that although the mixed oxides are easily soluble in hydrochloric acid, pure oxide of cerium is only slightly acted upon. It is difficult to reconcile this with the statement of Professor Attfield previously quoted, that "the residual oxide of cerium is dissolved in hydrochloric acid, and oxalate of ammonia added to precipitate oxalate of cerium."

Process 2. Solution of chloride of ammonium, as a solvent for oxides of lanthanum and didymium, was first brought forward by Watts.* He states that it is the easiest method, and that he has succeeded in completely separating the cerium; the boiling must be continued for some hours, the liquid occasionally renewed, and tested free from lanthanum and didymium, by oxalate of ammonia, before separation is complete.

·26 gram oxide from sample 2 was boiled in a 25 per cent. solution of chloride of ammonium for ten hours, water being added to replace that lost by evaporation, and the liquid occasionally renewed. At the end of that time the liquid still gave a precipitate with oxalate of ammonia. The undissolved oxide was collected, washed, dried, and incinerated; it weighed ·066 gram, or 21·7 per cent. of the quantity taken, and was not yet free from lanthanum and didymium. The liquids which should have contained the lanthanum and didymium were precipitated with oxalic acid, the precipitate collected, washed, dried, incinerated, and the resulting oxide boiled in dilute nitric acid. After an hour's boiling it was not entirely dissolved. This would indicate† the presence of cerium. From this circumstance I am inclined to doubt the process being reliable.

Process 3. Watts says of this process that the oxide becomes diffused through the liquid, will not separate for days, and if filtration be attempted, first passes through the filter, and then completely blocks it up.

Process 4. A weighed quantity of oxalate was incinerated, the ash dissolved in strong nitric acid, evaporated to a syrupy consistence, and introduced into boiling very dilute sulphuric acid. The precipitate was collected, washed, dried, and weighed. By this method, sample 2 yielded subsulphate of cerium, corresponding to 36 per cent. oxide of cerium. It was not, however, quite free from lanthanum and didymium. With careful manipulation and some practice, this would I think prove an easy and excellent process.

Process 5. No estimation was made by this process.

It will thus be seen that the composition of the oxalate of cerium of commerce is by no means uniform. The proportion of cerium it contains depends on the proportion of that metal to the lanthanum and didymium contained in the mineral used in its manufacture. This I have shown to be very variable. I am unable to give any satisfactory reason for the occurrence of so great a percentage of sulphate of cerium. The point in the manufacture to which we may refer it would be the imperfect decomposition of the sulphate of cerium by oxalic acid, and neglect of subsequent washing.

The presence of so large a proportion of the oxalates of lanthanum and didymium in the oxalate of cerium of commerce renders it doubtful whether the therapeutic action attributed to cerium is due to that metal alone, or whether it is shared equally by the lanthanum and didymium with which in commercial samples the cerium seems to be always combined.

* 'Dictionary of Chemistry.'

† Fresenius, 'Qual. Chem. Analysis.'

THE MEDICINAL PLANTS OF SCOTLAND.*

BY WILLIAM CRAIG, M.D., F.R.S.E.,

Lecturer on Materia Medica, Edinburgh School of Medicine.

In selecting a subject on which to address you this evening, it occurred to me, that it would be neither unprofitable nor uninteresting that I should direct your attention to the medicinal plants of Scotland. This is a subject which should possess a special interest, not only to members of the North British Branch of the Pharmaceutical Society, but also to the students under their care. My object to-night is to point out to you in as brief a manner as I can, what plants Scotland contributes to the materia medica. I shall confine my remarks to those plants which are officinal in the British Pharmacopœia. There are many plants in Scotland possessed of medicinal properties which are not officinal, and there are others which are very poisonous, but whose actions are to a great extent unknown, an account of which would be very interesting, and I may on some future occasion, direct your attention to such plants. To-night, however, my time is limited, and I will, in consequence, confine my attention to plants of the British Pharmacopœia.

I shall go over in regular order the various officinal plants found in Scotland, giving in very general terms their more prominent characteristics, with the twofold object in view, of telling you what plants are officinal, and at the same time helping you to recognize them.

There are about 63 natural orders officinal in the British Pharmacopœia, and of these about one-third are represented in Scotland.

Upwards of 360 plants are officinal in the British Pharmacopœia, and of these about 24 or 25 are indigenous to Scotland, or about 1 in 15 of all the medicinal plants is found in Scotland.

In describing the plants to you I shall follow the Natural Orders as given in the last edition of Professor Balfour's 'Manual of Botany.'

Ranunculaceæ.—Only two plants in this natural order are officinal in the British Pharmacopœia. One of these, although not an indigenous plant of Scotland, is nevertheless found naturalized in several parts. I refer to the *Aconitum Napellus*. This plant is easily recognized by its short tapering root, its deeply divided leaves with five pointed segments, and its raceme of blue flowers and its peculiar hooded sepals. This plant, which is known as the common monk's-hood or wolf's-bane of our gardens, is a true native of the mountainous districts of central and southern Europe. The best authorities consider it a doubtful native of Britain. It is, however, perfectly naturalized in Scotland, and in several places around Edinburgh it grows in considerable abundance, as in Arniston Woods. In Balfour's 'Flora of Edinburgh, eight stations are recorded for this plant, all within a

* Read before the North British Branch of the Pharmaceutical Society, April 18, 1877.

radius of twenty miles of this city. I have gathered it in several of these localities. The leaves and root are officinal. It is a very important medicinal plant. It is a sedative to the heart's action, and alleviates pain when applied locally.

Papaveraceæ.—Two plants of this natural order are officinal: *Papaver somniferum*, Linn., and *Papaver Rhœas*, Linn. The first though occasionally found in a wild state in England, and even in some parts of Scotland, is not a true native of Britain. At all events it is at best a doubtful native of England and is unquestionably an introduced plant in Scotland. Being, however, extensively cultivated in our gardens, it has established itself in sandy waste places, especially near the sea, and is mentioned in Balfour's 'Flora of Edinburgh' as an introduced plant. He gives seven stations for it around Edinburgh. It grows at Donibristle, Caroline Park, etc. It is a true native of the south of Europe. It is the most important of the medicinal plants, because from it we obtain opium. It is easily distinguished from the other species by its being glabrous and glaucous. The general appearance of the plant is very different from that of the other species.

The other officinal plant of this natural order is common around Edinburgh. It is *Papaver Rhœas*, Linn., commonly called field, or red, poppy. This plant is easily distinguished from the other British species. It is distinguished from *Papaver Argemone* by its capsule, which is smooth, whereas it is covered with bristles in *P. Argemone*. It is distinguished from *Papaver dubium* by the hairs of the peduncle, spreading in *P. Rhœas*, but adpressed in *P. dubium*. The capsule of *P. Rhœas* is more rounded than in *P. dubium*. The petals are officinal. From these we make a syrup, which is chiefly used for colouring mixtures. *Papaver Rhœas* is very abundant around Edinburgh. It is more abundant than any of the other species, many fields, especially cornfields, being quite red with it.

Cruciferæ.—Three plants of this natural order are officinal in the British Pharmacopœia, all of which are found in Scotland, one of them, however, only as an introduced plant, the *Cochlearia Armoracia*, Linn., *Armoracia rusticana* of other botanists,—the common horseradish. This is an introduced plant into Scotland, and probably also into England. It is said to have established itself at Dalkeith, Duddingston, and other places near Edinburgh. It is a plant of 2 or 3 feet in height, with white flowers, and very large oblong radical leaves. The root is the officinal part, and is interesting as being sometimes confounded with the root of aconite. The two roots do not resemble each other in many points. The aconite root is short, dark coloured and tapering quickly to a point, and produces numbness when chewed. The horseradish root is long, white, cylindrical, with a hot acrid taste. The two roots are very different in appearance, but from the fact that the aconite and horseradish are frequently planted together in gardens, in winter, when the roots are dug up, the one has sometimes been mistaken for the other with sad results. The plant is given in Hooker's 'Flora,' as a Scottish plant. Babington also mentions it as an introduced plant into the flora of Scotland.

The other two officinal cruciferous plants are both natives of Scotland: *Sinapis alba*, Linn., and *Sinapis nigra*, Linn., white and black mustard. These two plants are both to be found in the neighbourhood of Edinburgh. There are three native species of *Sinapis*. *S. arvensis*, common wild mustard, is very abundant in cultivated fields, and frequently cornfields are quite yellow with it. It is easily distinguished from the two officinal species, by having its pods spreading and glabrous. The *S. alba* has yellow flowers, and the pods spreading, but the lower part covered with stiff white hairs. It is more common in England than in Scotland. It is generally found in waste places, and occurs on the shore to the east of Burntisland and other places around Edinburgh.

Sinapis nigra is more rare in Scotland. It occurs, however, on Inchkeith, at Kirkcaldy, and on the banks of the Avon in Linlithgowshire It is distinguished by its adpressed pods. In both the seeds are officinal, yielding mustard. The oil of mustard is obtained only from the seeds of the *S. nigra*.

Linaceæ.—Only one plant in this natural order is officinal: *Linum usitatissimum*, Linn., common flax. This plant is easily distinguished from others of the same genus by its erect stem, lanceolate leaves, annular root, blue flowers, and petals 7 or 8 lines long. The origin of this plant is unknown, but it has long been cultivated in Britain, and at one time was extensively cultivated in Scotland, and in consequence has established itself in various localities. It occurs on Salisbury Crags, and in other places near Edinburgh. It is to be found in various places in Fife. The seeds are officinal:

Rhamnaceæ.—Only one plant belonging to this natural order is officinal, the *Rhamnus catharticus*, common buckthorn. There are two native species of this genus. They are both shrubs, and although both are possessed of medicinal properties, only *R. catharticus* is officinal. These two species, *R. catharticus*, and *F. Frangula*, are easily distinguished from each other by the former having the leaves minutely toothed, whereas they are entire in the *R. Frangula*. *R. catharticus* has thorny branches, diœcious flowers and 4 stamens, whereas *R. Frangula* has no thorns, hermaphrodite flowers and 5 stamens. The fruit is the officinal part of *R. catharticus*. It is used for making a syrup, which as the name of the plant implies is possessed of cathartic properties. The plant is said to occur in the south of Scotland. It is not mentioned in Balfour's 'Flora of Edinburgh,' but both Hooker and Babington mention it as Scottish plant.

Leguminosæ.—Only one officinal plant of this natural order is found in Scotland, *Sarothamnus scoparius*, Wimmer, common broom. This shrub is easily known by its angular stems, its large yellow flowers, and its flat dark hairy pods. It is a very common plant in Scotland. The "tops" are the parts used, and are powerfully diuretic:

Rosaceæ.—Of the three officinal species of this natural order, only one is a native of Scotland—*Rosa canina*, L., the common dog-rose. This is a common plant throughout Scotland, the fruit of which is the part used in medicine, and is probably familiar to you all as "hips." This is the commonest of our wild roses. It is not easy for the non-botanical student to make out the various species of the genus *Rosa*, but this matters little, since not only the fruit of *R. canina* is officinal, but also the fruit of "allied species." The fruit is deprived of the seeds and afterwards made into a confection with sugar, and is useful for making pills.

Umbelliferæ.—*Carum Carui*, L., common caraway (from whose fruit is distilled the officinal oil of caraway), is found in Scotland, where it is naturalized in several localities. In Balfour's 'Flora of Edinburgh' nine stations are given for this plant. I have gathered it on the railway bank between Burntisland and Kinghorn. It is, however, in all probability an introduced plant into Scotland.

The only other officinal umbelliferous plant found in Scotland is the *Conium maculatum*, common hemlock. This plant is generally distributed over Britain, and is very abundant in many localities around Edinburgh. It is very abundant on the Castle Rock, in the Queen's Park, and at one time was found in East Princes Street Gardens, near the site of Scott's monument. It is easily recognized from other umbelliferous plants by its much divided leaves, and especially by its smooth purple-spotted stem. The seeds and leaves are both officinal; it is a poisonous plant. Poisonous properties are generally associated in the popular mind with umbelliferous plants. This, however, is the exception, not the rule, in so far as our native species are concerned. Only four of our native plants are poisonous. *Œnanthe crocata*, a plant not unfrequent in ditches around Edinburgh; this, though undoubtedly a poisonous plant, is frequently when grown in the neighbourhood of Edinburgh possessed of no poisonous properties. The *Æthusa Cynapium*, common fool's-parsley, is also very poisonous. This is a common weed in cultivated and waste places around Edinburgh. It is easily known by its long beard-like involucre. The other poisonous plant is *Cicuta virosa*, the cowbane or water hemlock. This plant is found in several localities around Edinburgh, and is very abundant at the Black Loch, near Dunfermline. It attains a height of three or four feet, and has narrow leaves.

Caprifoliaceæ.—Only one plant in this natural order is officinal, *Sambucus nigra*, L., common elder. This is a small tree, with the stem and branches full of pith. This tree is abundant throughout Scotland, and in former times was extensively planted around farm houses, from its supposed efficacy in keeping away witches. The flowers are officinal; they are of a white or cream colour, and sweet scented. From them is made the Aqua Sambuci of the B. P. They are sometimes used for flavouring jellies, and also for making "elder-flower wine." This plant is regarded by many botanists as truly indigenous to Scotland, and is recorded as such in Balfour's 'Flora of Edinburgh.'

Valerianaceæ.—*Valeriana officinalis*, L., wild valerian. This is the only officinal plant in this natural order, and is common in ditches, moist woods, and on river banks throughout Scotland. It is easily distinguished from all the other British species, by having all its leaves divided, whereas in the other British species the lower leaves are undivided. The root is the officinal part, which is short, thick, with creeping runners, and a strong characteristic odour, an odour common even to *Valerianates*. It is chiefly used as a stimulant and antispasmodic.

Compositæ.—This order contains five officinal plants, three of which are natives of Scotland. I shall briefly refer to each of these.

Anthemis nobilis, L.—The flower-heads of this plant, known as chamomile flowers, are officinal, and are used as poultices to inflamed parts. Internally, they are tonic and aromatic. The plant is mentioned by Babington and Hooker as a Scottish plant, the latter mentioning the Isles of Bute and Cumbræ as stations in Scotland. The plant grows generally in sandy places near the sea. It is not mentioned in Balfour's 'Flora of Edinburgh,' but Groves in his 'Hortus Medicus,' says "I have found it in patches growing on the banks of the water of Leith from Juniper Green to Currie."

Taraxacum-Dens Leonis, D.C.; -*Leontodon Taraxacum*, L., common dandelion. This plant is very common in Scotland, in fact it is a troublesome weed in almost all cultivated parts of the world. The plant is easily known by its runcinate leaves, its radical hollow peduncles with single heads of yellow flowers, and its achenes having a pappus of numerous single hairs. The root is the part used, and is possessed of cholagogue properties.

Lactuca virosa, L., strong-scented lettuce. This is a beautiful plant, with a stem several feet in height. It is distinguished from the other Scottish species, *L. muralis*, by having the beak of the achenes elongated, and the keel of its leaves prickly. The whole plant abounds in a milky juice, which concretes and forms lactucarium, a substance resembling opium. The whole plant is used to make the officinal extract; which is possessed of narcotic properties. This plant is found in several places in Scotland. It occurs in the Queen's Park, on the rock of Stirling Castle, and is abundant on the banks of the Almond in Perthshire. These are the only officinal plants of this natural order found in Scotland. There are, however, several species of *Artemesia* found in Scotland, the genus from whose flower-heads santonin is obtained. Several species of *Artemesia* are common around Edinburgh, and I have no doubt but santonin could be obtained from their flower-heads. Santonin is anthelmintic.

Ericaceæ.—Only one plant of this order is officinal. *Arctostaphylos Uva-Ursi*, Spreng., common bear-berry. This plant is very abundant in the Highlands of Scotland. It grows in dry heathy rocky hills. It is plentiful in the mountains of Clova, Forfarshire, on Loch-na-gar, and on the Cairngorm range of mountains. It is a low trailing shrub, with leaves not unlike those of the cow-berry, or red whortle-berry of the Highlands (*Vaccinium Vitis-Idæa*), which plant it much resembles. It is at once distinguished, however, from the cow-berry, by having the sepals at the base of the fruit, whereas the sepals are at the apex of the fruit in cow-berry. The leaves are officinal; they are distinguished from those of the cow-berry by not being dotted beneath, and from those of *Arctostaphylos alpina* by not being serrated on the edges. The leaves are possessed of astringent and diuretic properties.

Solanaceæ.—This is a very important order to us, inasmuch as it contains some valuable medicinal plants. It contains six officinal plants, three of which are found in Scotland.

Solanum Dulcamara, L., bitter-sweet or woody nightshade. This plant is known by its shrubby zigzag stem, trailing in hedges and thickets to the height of several feet, and by its upper leaves having peculiar auricles at the base. Its flowers resemble somewhat those of the common potato, a plant of the same genus. Its fruit is a red berry. This plant is not common in Scotland, but it is found in considerable abundance in several localities around Edinburgh. I have gathered it frequently. It is plentiful on the Fife coast of the Firth of Forth. The dried young branches are used as an alterative. There is another species, *S. nigrum*, also found in Scotland, and which it somewhat resembles. The two plants are easily distinguished. *S. Dulcamara* has auricled leaves, purple flowers, and red fruit, whereas the *S. nigrum* has its leaves without auricles, white flowers, and black fruit.

Atropa Belladonna, L., deadly-nightshade. This plant is known by its herbaceous stem, often several feet in height, its entire ovate rather large leaves, its large purple bell-shaped flower, and its large globular, dark shining fruit. It is found growing in many places in Scotland apparently wild. It is given as a Scottish plant by Babington, and in Balfour's 'Flora of Edinburgh' five stations are recorded for it. It grows in considerable abundance on the shore between Donibristle and Aberdour. Its leaves and root are officinal. It is chiefly used for dilating the pupil, for alleviating pain and for correcting the griping of purgative medicines.

Hyoscyamus niger, L., common henbane. This is another important medicinal plant belonging to the same natural order, found in Scotland. Like belladonna it occurs in waste places and near old ruins. It is more plentiful in Scotland than the belladonna, being especially abundant about Elie, where it grows to a large size. In Balfour's 'Flora of Edinburgh,' eight stations are given for this plant, one of them being the "debris of Salisbury Crags." I have gathered it at Craigmillar Castle and on the shore in Dalmeny Park, two stations not recorded in Balfour's 'Flora.' The plant is easily recognized by its general appearance. It is a coarse plant, 1 to 2 feet high, hairy and viscid, with a nauseous smell. The flower is bell-shaped, of a pale dingy yellow streaked with purple veins. The capsule opens by an operculum. The parts used are the leaves and young branches. Its properties are similar to those of belladonna but weaker.

Scrophulariaceæ.—Only one plant in this natural order is officinal, *Digitalis purpurea*, L., purple foxglove. This is a common plant in the upland woods and rocky glens of Scotland, and is not uncommon in the flora of Edinburgh, being found as near as Craigleith. It is a beautiful plant, in fact it is one of the prettiest of our natives. It is easily recognized by its beautiful large purple bell-shaped flowers, spotted within, and arranged on a long spike 2 or 3 feet high. The leaves are officinal. They are large, ovate-lanceolate, crenate, downy beneath and narrowed into a foot stalk. It is used for its action on the heart and as a diuretic.

Labiatæ.—We have four medical plants in this order, two of which are to be found in Scotland: *Mentha piperita*, L., peppermint, and *Mentha viridis*, L., spearmint. These two plants are distinguished by the former having its leaves shortly stalked, whereas they are sessile in the latter. Both are found in Scotland, the former as an indigenous plant in several places. It is given in Balfour's 'Flora of Edinburgh' as found at Arniston, North Queensferry (a station also recorded by Hooker) and near Crookston. The *Mentha viridis* is found in Scotland only as an introduced plant. Eight stations for it are given in Balfour's 'Flora of Edinburgh,' one of these being Granton. Both plants are used for their oil, which is stimulant and carminative.

Thymelaceæ.—Two plants in this natural order are officinal, *Daphne Mezereon*, L., common mezereon, and *Daphne Laureola*, L., spurge laurel, both of which are found in Scotland, the first only sparingly and then only as an introduced plant; the second is found much more abundantly, and is probably, though by no means certainly, an indigenous plant of Scotland. The former is found at Dalhousie and Roslin, the latter at Roslin, Dalmeny, Arniston, and several other places around Edinburgh. They are both shrubs but differ very much in apperance. *D. Mezereon* has deciduous leaves which appear after the flowers. The flowers are purple and are very beautiful, especially as they appear before the leaves and very early in spring.

D. Laureola has evergreen leaves and green flowers, which appear in the axils of the leaves.

The bark of both is used in medicine as a stimulant and diaphoretic.

Cannabinaceæ.—This order contains only two genera and three species. Two plants are officinal, of these *Humulus Lupulus*, L., common hop, is occasionally found as an introduced plant near Edinburgh. In Balfour's 'Flora of Edinburgh' eight stations are given for this plant, at two of which I have gathered it, at Canonmills Bridge and on the banks of the Esk above Musselburgh. Bentham in his 'British Flora' says it "extends over England and Ireland, and here and there into Scotland, but probably, in the North at least, only as an introduced plant, having been long in cultivation." It is a twining plant, with opposite stalked leaves, diœcious flowers, and peculiar fruit, which is a kind of membranous cone, called by botanists a *Strobilus*. The dried strobiles of the female plant are used in medicine as a feeble narcotic and tonic.

Ulmaceæ.—Only one plant in this order is officinal, *Ulmus campestris*, L., *Ulmus montana* of other botanists, the broad-leaved wych elm. This is the common wild elm of Scotland, and is undoubtedly the officinal plant of the B.P. The tree is not uncommon in Scotland. It is easily known by its peculiar fruit, which is flat, thin and leaf-like, and occurs in clusters. The dried inner bark is used as a tonic and astringent.

Cupuliferæ or Corylaceæ.—*Quercus pedunculata*, Willd., which is a variety of *Quercus Robur*, L., is the common oak of Britain and is very abundant in Scotland. It is easily known by its stalked sinuate leaves with blunt lobes and glabrous, and its acorn placed in the cup-like involucre. This plant in some parts of the highlands of Scotland covers great tracts of country. Its bark is used as a powerful astringent.

Quercus infectoria, the species from which we obtain galls, is not a native of Britain, although galls are not unfrequently produced on British oaks.

Coniferæ.—The only officinal plant of this order found in Scotland is *Juniperus communis*, L., common juniper. This plant is not uncommon in hilly heathy places in Scotland. It occurs on the Pentland Hills, at Tynehead and other places near Edinburgh. It is an evergreen shrub, several feet high, with leaves in whorls of three, linear, spreading, and ending in a prickly point. The fruit is a berry of a dark purple colour, and about the size of a large pea. The fruit is officinal; from it we obtain an oil which is a powerful diuretic.

Monocotyledones. —About fifteen monocotyledonous plants are officinal in the B. P. and of these only one has been recorded from Scotland, the autumn crocus, *Colchicum autumnale*, L., a plant belonging to the natural order *Melanthaceæ*. This plant is abundant in some parts of England and Ireland, but is a very doubtful native of Scotland. The plant has this peculiarity that its flower comes up before the leaves. The seeds and corm are officinal. They are very poisonous and are used in gout and rheumatism.

Cryptogamous plants.—Only four cryptogamous plants are officinal in the B. P., all of which, however, are natives of Scotland. They belong to three different natural orders.

Filices.—*Aspidium Filix-mas*, Swartz, *Lastrea Filix-mas* of other botanists, commonly called male fern. This is a common fern in Scotland, growing in woods and banks. It is very abundant around Edinburgh. It is recognized by its handsome fronds, three or four feet in height and growing in a circle. The fronds are bipinnate, sori are large, near the base of the segments with a conspicuous peltate indusium. The fronds are very stiff and are easily distinguished from those of *L. Oreopteris*, which in some respects they resemble, by the latter having the sori arranged along the margin of the pinnas.

The rhizome is officinal, from which an ethereal extract is made. It is the best remedy for tapeworm.

Lichenes.—*Cetraria islandica*, the *Lichen islandica* of some botanists. Iceland moss is officinal in the B. P. It is a native of the north, and as its name implies is abundant in Iceland. It is by no means, however, uncommon in the Highlands of Scotland. It occurs in the Flora of Edinburgh, being found at Swanston, Dalmahoy, West Lomond Hill and other places. It has a foliaceous appearance, a brownish white colour, paler beneath. It is used as a decotion, and is possessed of tonic and mucilaginous properties.

Fungi.—Two fungi are officinal. *Claviceps purpurea*, the ergot fungus. The sclerotium (compact mycelium or spawn) of this fungus produced within the paleæ of the common rye, *Secale cereale*, L., forms the well-known medicine called ergot. It has a spurred appearance, of a dark brown colour, and is a medicine which can always be recognized by its smell. This fungus is a native of Scotland, and is not peculiar to rye. It is found on many other grasses, as *Lolium perenne*, common rye grass, and about thirty other species. It is used for its effect on the uterus, and as an astringent to the blood-vessels.

Torula Cerevesiæ, the yeast fungus, is officinal inasmuch as beer yeast is used in medicine as a tonic and antiseptic. The fungus is common in Scotland.

I have thus endeavoured to bring before you the various medicinal plants found in Scotland. You will see that many plants of considerable importance are indigenous to this part of the island, and I trust that what I have said to-night may lead all of you, and especially the young men, to study carefully, and in so far as practicable make a collection of the "Medicinal Plants of Scotland."

PRELIMINARY ACCOUNT OF SOME NEW REACTIONS IN ORGANIC CHEMISTRY, AND THEIR ULTIMATE BEARINGS.*

BY CHARLES T. KINGZETT, F.C.S., AND HENRY WILSON HAKE, PH.D., F.C.S.

1. *Pettenkofer's Notice of his Reaction*.—It has long been known that the cholic acid ($C_{24}H_{40}O_5$) of Demarçay, the cholalic acid of Strecker, furnishes with strong sulphuric acid and cane sugar a peculiar violet colour. Pettenkofer, to whom this discovery is due, founded upon it† a test for bile and for sugar, in organic fluids. He attempted to isolate the coloured body, but his efforts were unsu-

* Read before the Chemical Society of London, on Jan. 18, 1877.

† *Ann. Chem. Pharm.*, lii., p. 90 (1844).

tended with success nor was he able to suggest any explanation of the reaction. He showed, however, that the place of sugar might be taken by that of any body which by the action of strong sulphuric acid yields grape-sugar, and ascertained, that mannite cannot thus replace sugar.

2. *Further History relating to the Reaction.*—Since the publication of Pettenkofer's notice, while some few other bodies have been observed to behave like cholic acid with sulphuric acid and sugar, no explanation has been forthcoming. Thus *taurocholic acid* ($C_{26}H_{45}NSO_7$), and glycocholic acid ($C_{26}H_{43}NO_6$) give the reaction, not improbably through splitting up by means of the sulphuric acid into cholic acid.

Hyocholic ($C_{27}H_{43}NO_5$), oleic ($C_{18}H_{34}O_2$), and lithofellic ($C_{20}H_{36}O_4$) acids are also known to yield this colour test. According to some authors amylic alcohol ($C_5H_{12}O$) gives it, while cod-liver oil is known to give it without the aid of sugar. More recently, Thudichum* has found a like reaction to be true of cerebrine, phrenosine, kerasine, stearoconite, lecithine, myeline, psychosine, and cholesterin, bodies occurring in brain substance.

3. *New Substances giving a similar Reaction.*—In following out certain lines of thought directed to the explanation of the foregoing facts, we were led by the light of the researches on terpenes and allied hydrocarbons, which have been published by one of us, to study other bodies in connection with this reaction, hitherto apparently unconnected with bile compounds.

Before proceeding to describe our new reactions and their ultimate bearings, we here give a list of substances which we have discovered to behave in common with those above mentioned.

Benzene (C_6H_6), phenol (C_6H_5OH), turpentine ($C_{10}H_{16}$), camphor ($C_{10}H_{16}O$), salicylic acid ($C_7H_6O_3$), pyrogallic acid (C_7H_6O), tannic acid ($C_{27}H_{22}O_{17}$), piperine ($C_{17}H_{19}NO_3$), morphine ($C_{17}H_{19}NO_3, H_2O$), clove and other essential oils, rape, cotton seed, colza, and mineral oils; also various fats.

Side by side with these we note the following substances, which (among of course many others) will not yield the reaction, for reasons hereafter to be expressed: benzoic and camphoric acids.

4. *Modifications of the Reaction.*—Pettenkofer himself showed that strong hydrochloric acid could be used in his test in place of the sulphuric acid, but stated that the intensity of the reaction was by no means so strong. Since then, it has been shown that acetic acid may be used in certain cases in place of the sugar. Here again, however, the colour produced is not so deep. We have found that in this direction inulin ($C_6H_{10}O_5$) can be used in place of sugar, if at the same time a trace of water be present; so also with potato starch. Inosite ($C_6H_{12}O_6, 2H_2O$) gives but a feeble reaction. We shall presently offer an explanation of all these reactions, and their modifications; in the mean time we pass on to a consideration of those substances which give the reaction without the addition of sugar.

5. *Particular Studies of Bodies yielding the Reaction without the addition of Sugar.*—In the course of Thudichum's researches, it transpired that cerebrine ($C_{17}H_{33}NO_4$), and certain allied bodies, gave by a process of decomposition (effected by means of baryta water or dilute acids) among other products sugar, but this was not observed until after it had been shown that these principles give with sulphuric acid alone the colour reaction in question. Thudichum attempted a diagnosis between this colour and that produced by bile compounds, by observing the differences presented in their absorption spectra. From the facts above given, it would appear that in these particular brain substances is present a particular group in combination with a radical related to sugar, and that through the agency of the sulphuric acid this combination is split up and rearranged, perhaps, with the elements of the sulphuric acid, in such a way as to produce a coloured compound. A similar case is presented, apparently, by the so-called hederic acid found in ivy leaves. Messrs. Davis and Hutchinson* have stated that this substance gives with sulphuric acid a purple colour, and they also observed, that when hederic acid was heated with dilute acids, there was obtained a body which reduced Fehling's solution. At the time one of us suggested that these results seemed to indicate that hederic acid is a saccharide belonging to the series discovered and investigated by Berthelot, for, if so, it would yield by a process of hydration, sugar and any acids whose residues had been previously combined therewith.

Cod-liver oil is a third instance of a body giving the colour test without the addition of sugar, and it is remarkable that this oil is said to contain acetin, a compound known to be derived from glycerin and acetic acid; remarkable because, as already stated, acetic acid can be substituted for the sugar in certain cases. It is to be observed that this reaction of cod liver-oil has been interpreted by most writers as evidencing the presence of special biliary matters in the oil, but there is no evidence on record bearing out this statement, and our observations render it doubtful.

6. *Special Investigation of certain New Reactions and Theoretical Considerations with regard to their Meaning.*—When camphor ($C_{10}H_{16}O$) is placed in strong sulphuric acid it readily dissolves, forming a yellowish red solution; when saturated the solution is of a deep red colour, and it is only upon long standing that a slight odour of sulphurous anhydride is apparent, otherwise the solution has a weakened camphor odour. This product gives with cane-sugar a most beautiful reaction; the colour is, however, as in all cases, quickly destroyed by water. From the solution of camphor in sulphuric acid, water precipitates a substance free from sulphur, and having so far as observed all the properties of the original camphor. Nevertheless, from what is to be described hereafter, it appears that in the sulphuric acid solution it exists as a sulpho-acid. When such a solution is treated with sugar, and water added to the product there results a precipitate which is slightly yellow, and after washing exhibits a tendency to cake. It is free from sulphur, but is competent to furnish, with strong sulphuric acid alone, the original violet colour in an intense degree. This result seemed at first sight to indicate that the body produced as described was a saccharide or a glucoside, and to gain information on this point many experiments were conducted, as follows:—A saturated solution of camphor in sulphuric acid was exposed to a freezing mixture, and treated with its own volume of concentrated cane sugar solution, stirring meanwhile. By adding the sugar drop by drop the temperature was kept throughout below 15° C., and thus carbonization of the sugar was prevented. There was thus formed a solid pasty pink mass, which was then treated with much water; frothing ensued, and gradual destruction of the colour. It was then filtered and the precipitate well washed. On boiling it with a very dilute solution of sulphuric acid, during three hours, the purple colour to which we have already alluded formed upon the warm sides of the dish, but ultimately no sugar could be detected in the solution by means of the copper test. From this it follows that the substance cannot be a saccharide, as ordinarily understood by that term. Nevertheless it is probable that strong sulphuric acid has the power, possibly by the abstraction of water, of entering into combination conjointly with the camphor and sugar residues. Such a constitution seems at the first blush to express the nature of the coloured body. When treated with water sulphuric acid is re-formed, and there results a combination which only requires strong sulphuric acid again to restore primary conditions.

As regards the reactions yielded by turpentine, phenol,

* 'Rep. Med. Off. Privy Council, etc.' New Series. No. III., 1874.

* *Pharm Journ.*, Third Series, No. 327, p. 275.

and benzene, a certain relation is evident between these. All these substances give, with sulphuric acid and sugar, the colour test which was supposed by Pettenkofer to be peculiar to bile. The turpentine reaction is very striking, as is also that of phenol, while that of benzene, though distinct, is not so intense. The relation we allude to, comes out from the fact that salicylic acid yields the reaction but faintly, and benzoic and camphoric acids not at all, pointing to the probability that camphor and camphoric acid stand in somewhat similar relation to turpentine, as phenol and benzoic acid to benzene; that camphor indeed may possibly prove to be the phenol of turpentine, and not a ketone as is ordinarily supposed. The hydroxylic nature of camphor is further testified by its behaviour with zinc chloride and phosphorus pentasulphide, both of which reagents by the removal of water yield cymene ($C_{10}H_{14}$). On the other hand, it is to be admitted that some of the chlorinated derivates of camphor would seem to show that this substance differs in its constitution from ordinary alcohols. There is no strong reason why it should not be regarded in both lights, for the structure of compounds is not a fixed quantity, but only a relative one to others influencing their production and their reactions.

The formulæ of these substances and others are as follows:

Benzene, C_6H_6.
Phenol, C_6H_5, OH.
Benzoic acid, C_6H_5, COOH.
Salicylic acid, C_6H_4, OH, COOH.
Turpentine, CH_3, C_3H_7, C_6H_6.
Camphor, CH_3, C_3H_7, C_6H_5, OH. (?)
Camphoric acid, CH_3. C_3H_7, C_6H_4 (OOH)$_2$. (?)

In connection with these formulæ, those of pyrogallic and tannic acids are also instructive.

Pyrogallic acid, C_6H_3, 3HO.
Tannic acid, $C_{27}H_{22}O_{17}$.
Clove oil, $C_{15}H_{24}$.

The principal idea conveyed by a study of the foregoing facts, and the generally accepted formulæ for these substances, is that all bodies which give the colour reaction under study are, on our hypothesis, which however we refrain from giving in detail, benzene derivatives. And while, for instance, piperine gives there action without sugar and morphia with it, we may assume, *pro tem.*, that the first of these substances contains both benzene and sugar radicals, while the latter contains only a benzene radical. We abstain, however, from entering into the many speculations which arise in considering the connections of particular structure, with the reaction in question. Such speculations will come in better when we know more concerning the facts we are investigating. It may be that not only is the reaction referable to a particular structure, but perhaps to a particular carbon-atomic combination. Indeed such a result would seem to be rendered necessary, by the fact that oleic acid and other members of the fatty acid series likewise yield the reaction.

As above stated, acetic acid may take the place of sugar in many of these reactions, and it is not without difficulty to attempt anything like an explanation of this matter. It certainly never gives it so strongly, but this may be accounted for by the liability of the acetic acid employed to contain water, which, be it remembered, at once destroys the colour.

It is worthy of remark, however, that the empirical formula of acetic acid multiplied by three, gives that of grape-sugar.

A further difficulty is encountered since, as shown, hydrochloric acid may play the part of sulphuric acid, for from the results above detailed there is strong evidence to show that the acid radical forms an integral part of the coloured substance. For the time it may be assumed that the colour is dependent upon the constitution rather than the empirical composition of the body, in which case a general formula representing all modifications of the reaction is tenable.

The formula of a sugar may be taken as illustrative of our meaning, in which case the coloured substance may be supposed to be derived from it by the replacement of hydrogen or hydroxyl by a benzene residue, on the one hand, and the radical sulphuryl (or corresponding acid radical) on the other hand. And such a conception is as applicable to acetic acid as it is to starch and sugar.

In short, while the whole subject is fraught with interest, it covers an exceedingly wide field. It leads, for instance, to the question of the general constitution of sugars, which, admitted though they be as polyatomic alcohols, are but imperfectly described by such a denomination. Among such alcohols phenose or hexaphenol, apparently finds a place, notwithstanding its non-fermentable character.

We propose in the future, and indeed are at present occupied upon work directed to the elucidation of some of these points, and to a further study of the saccharides and bodies shown to be related to them, by the observations indicated in this paper.

Supplement.

As the above paper when read before the Chemical Society raised some discussion, and as the Society has since requested the authors to omit in its publication all theoretical considerations relative to and arising out of the investigations with which the paper is concerned, we think it well to supplement it here with some additional observations which lend farther weight to the views therein expressed. In the first place, however, it should be stated that the authors objected to withhold the theoretical considerations in question, and hence the paper has not appeared in the Society's Journal. It is desirable once more to state that the whole communication is preliminary in nature, and that it is attempted to illustrate the views which we advance rather by the subject matter than by direct enunciation. Since writing out the paper we have found that many other substances give, with sulphuric acid alone, the violet reaction in question, and the list of those bodies giving it with sugar and acid has also been extended.

Amongst the former class for instance we have *Salicin.* This crystalline substance occurs, as is well known, in the leaves of the poplar, willow and other trees, and its decomposition by acids or ferments is thus represented—

$$C_6H_4(OH)\cdot CH_2(OC_6H_{11}O_5) + H_2O = C_6H_{12}O_6 + C_6H_4(OH)\cdot CH_2(OH)$$

That is to say it yields glucose and saligenin or salicylic alcohol. Now this latter substance is related to salicylic acid, as is seen by the formula of this last-named body, which is C_6H_4(OH)CO(OH). In other words salicylic or orthoxybenzoic acid may be viewed as derived from the alcohol by the replacement of the H_2 in the CH_2 group by one oxygen, and, viewed under this light, the fact that salicylic acid gives with sugar and sulphuric acid the violet reaction we have above described becomes one of interest and importance. It is not proposed, however, to enter here into the exact meaning, as we apprehend it to be, of this reaction; that we reserve for a future communication.

Phloridizin, a glucoside occurring in the root bark of pear, apple, plum and cherry trees, also gives with sulphuric acid a violet coloured reaction, doubtless referable to a similar state of combination as that spoken of under salicin. Phloridizin is split up by dilute acids, etc., as follows:—

$$C_{21}H_{24}O_{10} + H_2O = C_6H_{12}O_6 + C_{15}H_{14}O_5.$$

As stated in the paper, morphia and piperine, two isomeric bodies, give different reactions; the former requires the presence of sugar whilst the latter gives with sulphuric acid alone the violet colour. This phenomenon would appear to indicate the existence in piperine of a sugar-like molecule, and although this has not been proved hitherto, yet the researches of Fittig and Mielck on piperic acid are not opposed to such a notion. It is our intention to carry on an investigation in this direction so soon as opportunity may permit.

Coniferin crystals contain $C_{16}H_{22}O_8+2H_2O$, and are known to strike with strong sulphuric acid a brilliant violet reaction, and this substance, like salicin gives on decomposition with dilute acids or ferments (as shown by Tiemann and Haarmann) glucose, and a crystalline substance containing $C_{10}H_{12}O_3$, which yields on oxidation vanillin—

$$C_8H_8O_3 \text{ or } C_6H_3\left\{\begin{array}{l}OCH_3\\OH\\COH\end{array}\right., \text{ a benzene derivative viewed}$$

by the authors quoted, as a methyl-ether of protocatechuic aldehyde.

To recapitulate thus far, it has been shown that certain substances which yield by hydration glucose and some derivative of benzene, give when treated with strong sulphuric acid a violet colour. From this it may be inferred, bearing in mind the above details of the camphor experiments, that the coloured body is a conjugated compound in union with the acid or its radical, no matter whether water be withdrawn or not. Certain other benzene derivatives yield with strong sulphuric acid no colour, but in certain instances sulpho-acids (for instance phenol), and these when treated with sugar (cane or glucose) give the violet reaction also. There can be no misgiving as to the inference to be justly drawn from these observations; at least it is reasonable to believe that the acid, either by removing the elements of water or otherwise, unites the radicals of sugar and the benzene derivatives employed by means of itself and thus performs a synthetical function.

It is found, however, that only benzene derivatives of a certain type behave in this way. What is that type? This is one of the questions we propose to solve, and its solution will probably throw much light upon the relations of the fatty acid series to the so-called aromatic compounds. For it is to be remembered that palmitic acid can be obtained from oleic acid, and the latter body gives with oil of vitriol and sugar the violet reaction we are studying.

This kind of research is attended with more than ordinary difficulty and is, from the nature of the products, to a large extent of a thankless character; it is made even more so by the discouragement it has received at the hands of a "distinguished member" of the council of the Chemical Society of London.

RESEARCHES ON MELEZITOSE.*

BY A. VILLIERS.

The plant, *Alhagi Maurorum*, which exudes this manna, grows in Persia, and is used there as a purgative, under the name *Turanjbin*. After being boiled with animal charcoal, and evaporated to a syrup, it crystallized after some months in small brilliant crystals, which on recrystallization from alcohol formed large white crystals of the formula $C_{12}H_{22}O_{11}+H_2O$. It is dextrorotatory, its power being $+94°\ 48'$, or for the sodium flame, $+88°\ 51'$. On boiling with an acid, it is converted into glucose, and its rotatory power is reduced to that of glucose, viz., $+53$. It then reduces Fehling's solution. Nitric acid oxidizes it to mucic and oxalic acids. Its melting point is 140°. It is thus seen to be identical with Berthelot's melezitose. It crystallizes in monoclinic (clinorhombic) prisms.

The mannite of alhagi also contains cane-sugar, which may be isolated by treating the mother-liquor of the melezitose with alcohol, and adding ether till a slight precipitate is formed. Crystals of cane-sugar are then deposited. The mother-liquor acts like a solution of cane-sugar containing dextrorotatory foreign substances, which are not fermentable with beer-yeast.

Commenting on the preceding paper, Berthelot says† the occurence of *melezitose* in the exudations of one of the Coniferæ and in a leguminous plant, one found in France, and the other in Affghanistan, is interesting. *Trehalose* exists in Echinops, and in cut rye, also in a number of mushrooms, and moulds. As cane-sugar is found together along with its isomeric melezitose, the mode of formation of the two sugars may be imagined. Cane-sugar, melitose, and milk-sugar, are formed by the union of two polyatomic alcohols, with elimination of water, and these two alcohols are different from each other. But melezitose and trehalose yield only one alcohol when decomposed, viz., grape-sugar (glucose). The two latter sugars may therefore be compared with ordinary ether; and if the glucose obtained from each of these two sugars is the same, it must be granted that two molecules of glucose may be united in two different ways, according to the molecule of water replaced. If glucose be viewed as at once a pentatomic alcohol and a monatomic aldehyde, three distinct isomeric types may theoretically result from the union of two molecules with elimination of water, viz.:—

1st. A *mixed ether*, the water being eliminated from two alcoholic groups, one in each of the two molecules of glucose. The product would thus be a diatomic aldehyde and an octatomic alcohol. A large number of isomerides is possible, depending on the primary, secondary, or tertiary nature of the alcohol groups affected.

2nd. A *mixed aldehyde*, a monatomic aldehyde like crotonic aldehyde, formed by the union of two molecules of a lower aldehyde, with elimination of water, and at the same time a decatomic alcohol.

3rd. An *ether-aldehyde*, the alcohol group of the one molecule of glucose combining with the aldehyde group of the other, water being eliminated. This body would be a monatomic aldehyde and a monatomic alcohol.

Of these three types, only the first and last can reproduce their constituents by assimilation of water.

This explanation would be sufficient were one of the constituent molecules of glucose transformable into ordinary glucose by the prolonged action of acids. But the author has not thought it necessary to theorize on the existence of isomeric saccharoses derived from the same glucose, and capable of reproducing them like trehalose and melezitose.

SHELLAC AND SARCOSINIC ACID.*

BY J. MERTZ.

This variety of shell-lac was obtained from Mexico, where it is known as "Soma de Sonora," and called by the Indians "Arré." It exudes from the *Mimosa coccifera*, the native name for which is Tzinacaia cuitlaquahuitl. It has an astringent, bitter taste, and a yellowish or brownish colour. It is used as a remedy for diarrhœa and uterine discharges.

East Indian shellacs are treated with water, before they are delivered to the European market, to extract an acid substance and a red dye, which forms 10 per cent. of the weight of the crude gum.

The American specimen lost 6 per cent. of its weight on treatment with hot water. It was then treated with alcohol, which dissolved about half; the solution, on evaporation, left a transparent, brittle residue, which had all the appearance of good shellac. The portion which refused to dissolve in alcohol was soluble in boiling potash with a fine red colour; on addition of acid the solution became colourless, and a yellowish-white resin separated, which was partially soluble in alcohol. These reactions correspond with those of shellac.

The aqueous solution contained two substances,—a colouring matter and an acid body. The colouring matter was removed by lead acetate, and the filtrate evaporated after removal of the lead. The colouring matter was soluble in water with a fine red colour and insoluble in alcohol and in ether. It could not be obtained in a crystalline state. Its solution had a strong acid reaction and showed a strongly acid reaction. The filtrate from

* *Compt. Rend.*, lxxxiv., 35. *From the Journal of the Chemical Society*, April, 1877. † *Compt. Rend.*, lxxxiv., 38.

* *Arch. Pharm.* [3], viii., 234—251. From the *Journal of the Chemical Society*. April, 1877.

the colouring matter deposited crystals, easily soluble in water and insoluble in alcohol and in ether. They were purified by solution in boiling aqueous alcohol, from which they deposited as a powder on cooling. The formula of the acid was found to be $C_3H_7NO_2$, and it was named sarcosinic acid.

The *barium salt* is an amorphous powder, soluble in water but not in alcohol. The *silver salt*, $C_3H_6NO_2Aq$, forms yellowish-white nodules, and is reduced on exposure to light. The *sodium salt* crystallizes with 6 molecules of water, and forms colourless hexagonal tables. The *calcium salt* crystallizes with one molecule of water, and is an amorphous powder.

The acid does not evolve ammonia when boiled with caustic soda, but on heating with soda-lime it does. It melts at 195°, and chars at a higher temperature without subliming. The acid is isomeric with alanine, sarcosine, lactamide, and urethane. The two latter, however, are indifferent bodies; lactamide when heated with soda decomposes into lactic acid and ammonia; urethane into carbonic anhydride, ammonia, and ethyl alcohol. Sarcosine unites only with acids, and it is doubtful whether it is an amido-acid; it evolves methylamine on ignition with soda-lime. Alanine, when treated with nitrous anhydride, yields lactic acid. These bodies are assumed therefore to have the following constitution:—

$$\begin{array}{cccc} \begin{array}{l} CO.NH_2 \\ | \\ CO.OC_2H_5 \end{array} & CH_2\left\langle\begin{array}{l} CH_2OH \\ CO.NH_2 \end{array}\right. & \begin{array}{l} CH_2.NH(CH_3) \\ | \\ CO.OH \end{array} & CH_2\left\langle\begin{array}{l} CH_2.NH_2 \\ CO.OH \end{array}\right. . \\ \text{Urethane.} & \text{Lactamide.} & \text{Sarcosine.} & \text{Alanine.} \end{array}$$

Sarcosinic acid appears to be more nearly related to sarcosine and alanine than to lactamide or urethane; yet sarcosine is a base, while sarcosinic acid is a true acid. The acid, however, was found to form a hydrochloride and nitrate. With nitrous anhydride nitrogen was evolved and lactic acid was formed. The acid therefore has great analogy to lactic acid, from which it differs only in taste, crystalline form, and marked acid properties. The author attributes to it the same constitutional formula as to alanine, but intends to attempt to prepare it synthetically to decide wherein the difference lies. E. Reichart attributes to it the formula $CH_2.NH_2.CH_2.COOH$.

THE ALTERATION OF CANTHARIDIN IN CANTHARIDES.*

BY R. WOLFF.

The experience that cantharides kept dry remain active for a long time, whilst when damp they rapidly lose their activity, and further the property of cantharidin not to be broken up under the action of strong sulphuric acid whilst in the cantharides it loses almost directly its vesicatory action upon the skin, led the author, who is an apothecary in Buenos Ayres, to the conclusion that there must be present in cantharides some substance which, assisted by moisture, effected a change in the cantharidin. As it is known that there is an evolution of ammonia when an aqueous solution of old cantharides is heated with caustic potash the opinion appeared to be justified that ammonia might play an important part in the decomposition of the cantharidin.

To clear up this point the author extracted the cantharidin from 100 grams of *Lytta aspersa*. This species is used in Buenos Ayres, and is said to excel the ordinary *Lytta vesicatoria* in its greater activity, which, when carefully dried, the insects retain during many years. From the 100 grams he obtained 0·815 gram of pure cantharidin, and also from the green-brown oily substance from which the cantharidin had separated, upon treating it with ether and chloroform, 0·46 gram of a new body in tabular crystals, which, although it also had a vesicatory action, differed from cantharidin in its chemical properties as well as its form of crystallization.

The crystals of this new body are difficultly soluble in cold water (about 1 in 6600); they are rather more soluble in boiling water, but separate upon cooling. In alcohol they dissolve in the proportion of 1 in 680; in ether, 1 in 390; in chloroform, 1 in 60. Hydrochloric acid is without action upon them; on the other hand, they are readily dissolved by nitric and sulphuric acids, especially when hot. In the latter case, however, decomposition appears to take place, since upon the addition of water cantharidin is precipitated, ammonium nitrate or sulphate being formed at the same time.

When pulverized the new body dissolves at the ordinary temperature in solution of potash or ammonia, and upon the addition of an acid is again precipitated unaltered. If the ammoniacal solution be allowed to stand for some time in a moderately warm place, after the excess of ammonia has been given off the solution readily reddens blue litmus paper. If the ammoniacal solution be concentrated crystals of the compound with ammonia are formed, which decompose upon drying, with formation of ammonia, and are then difficultly soluble in cold water.

Upon evaporating the ammoniacal solution to dryness a white crystalline residue is obtained that appears to be insoluble in cold water, but in boiling water it dissolves without difficulty. From the solution, which reddens litmus paper, acicular crystals separate upon cooling, which are not altered upon cooling. This is a second nitrogenous compound of cantharidin. The author made no closer investigation as to the composition of these two compounds. In the remainder of the paper he simply distinguishes them as No. 1 and No. 2.

Compound No. 2, placed on the skin, acts a vesicant. It dissolves with difficulty in cold water, but readily in boiling water. In alcohol, ether, and chloroform it is very difficultly soluble, even when warmed. In acetic ether it is easily soluble and upon evaporation cantharidin is left as a residue. The crystals dissolve readily in strong sulphuric acid, and no precipitation takes place upon the addition of water. Strong nitric and hydrochloric acids behave similarly. It appears as if the acids enter into combination without causing decomposition. In ammonia this compound No. 2 dissolves rather freely, but separates in acicular crystals upon the addition of acids. If the ammoniacal solution be allowed to evaporate slowly, crystals are formed which consist of compound No. 2 and ammonia; upon drying and warming these crystals are decomposed with evolution of ammonia. It is also dissolved by potash solution, but it then separates unaltered upon the addition of acids. Upon evaporating the solution in alkali to dryness, ammonia is evolved and part of the compound No. 2 passes into compound No. 1.

No. 2 appears to undergo no change upon fusion or sublimation; No. 1 also appears to melt and sublime without loss of weight.

If solution of a zinc salt be added to solution of cantharidin in caustic potash as long as any precipitate is formed, then a sufficiency of ammonia solution to dissolve the precipitate produced, and finally an acid in excess, the compound No. 1 separates as a white granular crystalline precipitate. Salts of copper and magnesia act like the salts of zinc, as probably do others that behave similarly towards ammonia. As magnesia salts are present in considerable quantity in cantharides, the author is of opinion that these, after the death of the insect, in presence of ammonia, quickly induce an alteration of the cantharidin into compound No. 1, and that this change is more rapid and complete in proportion as the conditions are favourable, which appears to be the case in the European cantharides that so soon lose their activity. If by moisture a progressive formation of ammonia is favoured the compound No. 1 is formed, and this after a time is in turn converted into compound No. 2, which then probably enters into combination with acids contained in the cantharides. The author has no doubt that a more exact investigation of the nitrogenous compounds would afford a method of recovering the cantharidin that has undergone alteration in cantharides, the details of which would vary according to the degree of change that has taken place.

* *Zeitschrift Oester. Apotheker-Vereines*, xv., 102.

The Pharmaceutical Journal.

SATURDAY, MAY 12, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BENEVOLENT FUND DINNER.

WHEN recapitulating last week the other subjects mentioned in the Report of the Council we purposely abstained from making any reference to the Benevolent Fund, not because we under-estimated its importance, but in order to leave ourselves at liberty to allude to it more prominently on the eve of the festival by which we hope it will be much benefitted. So now, at the risk of being thought wearisome in telling an oft-repeated story, we shall venture once more to make an appeal on behalf of the Fund, based on the facts disclosed in the Balance Sheet, and if in doing so we err by iteration, we must plead the goodness of the cause, for "Charity suffereth long, and—is kind."

The Balance Sheet shows that in 1876 the sum of £620 was paid in annuities to twenty-four persons, at the rate of £30 each yearly. Besides this a sum of £470 was distributed in grants of from £10 to £20 each to thirty-eight persons, who were themselves registered chemists and druggists or their widows or orphans. On the other hand, the sum received in donations and annual subscriptions was nearly £1360 and the interest on invested capital amounted to £457 10*s.* making the total income a little over £1800. From this has been disbursed, as above described, a total sum of £1090, and the entire expenses charged to the Fund for administration were only £100.

It will be noted that the excess of receipts over expenditure has allowed of the investment of a further sums in consols, and this might lead a superficial observer to the conclusion that the receipts have been ample as compared with the expenditure. But such a conclusion would not be a correct one, for it must not be lost sight of that this investment does not nearly equal the responsibility incurred by the increase of four in the number of annuitants, by which step a draft for £120 annually has been drawn on the future. Whilst it may be right to rely on the generosity of the future to some extent, it is well to remember that it will too surely bring its own claimants for relief, in whom naturally the subscribers of that time will feel a greater interest than in those of to-day.

One of the most regrettable things connected with the subject is the truth of the statement made in the circular recently sent out, that of the nearly 14,000 persons registered as chemists and druggists only 2300, or about one in six, subscribe to the Fund, leaving upwards of 11,000 who are not subscribers. To speak plainly this is not as it should be; the reasons which are thought sufficient by some persons for abstaining from joining the Pharmaceutical Society have no force here. The Fund is free for the relief of all registered chemists, their widows and orphans, and the published list shows that it is so administered, and we cannot imagine that any person, because he disapproved of the aims or quarrelled with the policy of the Pharmaceutical Society, would be deterred from recommending a worthy applicant for relief, or from seeking it himself if he needed it.

Unfortunately, although the sums expended annually in carrying out the object for which the Fund was established have been as much as warranted by the income, only the fringe of the work has been touched as yet. True, we have twenty-one annuitants at £30 each, but these might be increased to fifty at £50 each without extravagance, whilst the temporary grants might be multiplied manifold. The education of orphans, which in many other callings has been already provided for, has only just been tentatively mooted. As for almshouses for the old! Well, we hope that these, too, will be provided in the good time that's coming. Meanwhile we respectfully urge all our readers to do what lies in their power towards strengthening the hands of the administrators of the Fund, by making the sum realized in connection with the Dinner next Tuesday a large one. Those who will not be present on that occasion will be able to show their sympathy with this special effort, by sending their own subscriptions and donations, and those they may obtain from their friends, to the Secretary, Mr. ELIAS BREMRIDGE, 17, Bloomsbury Square, on or before the 15th.

THE CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

BY the courtesy of the Secretary we have been favoured with an early copy of the Report to be presented to the Members and Donors of the Chemists and Druggists' Trade Association at the First Annual Meeting, to be held at the Freemasons' Tavern, on Tuesday next. The Report commences by recounting the steps that have been taken to make the objects of the Association known since its formation at Birmingham in July last. The result of these has been that the annual subscriptions from 2880 persons have amounted to £720, besides which £1028 has been promised in donations. The total income up to the 30th of April was £1661 5*s.* 6*d.*, and the expenditure £1037 16*s.* 9*d.*, leaving a balance in hand at that date of £623 8*s.* 9*d.* The law business that has been under the notice of the committee consists of the "milk of sulphur" cases at Runcorn, where the appeal was successful, the balsam of copaiba cases at Salford, and the "counter prescribing" case at Nottingham. The appeal in the last case will be heard in the Queen's Bench Division of the High Court of Justice, but the date is not yet fixed. Two leading counsel and a junior are to be engaged to undertake the argument on appeal. The interview of a Deputation with the Law and Parliamentary Committee of the Pharmaceutical Society with respect to Co-operative Stores is referred to, and it is stated that the Committee of the Association having decided to take Counsel's opinion on the subject, a Sub-Committee is engaged in instructing the Solicitor to draft a case. The formation of a Scotch branch of the Association is also recorded. No elections of the General Committee have yet taken place, it being thought desirable, in order to secure a thoroughly representative body, that the elections should be postponed until the districts have been more thoroughly canvassed. The Committee, therefore, recommend that the General Committee for the ensuing year should be appointed at the Annual Meeting. In conclusion, it is pointed out that heavy liabilities will be incurred by the Association in connection with the appeal to the High Court of Justice, and that the Association will need continued support and wider extension, as its present financial position is largely owing to special donors.

THE MEETINGS OF NEXT WEEK.

THE meetings next week in connection with the Pharmaceutical Society will commence on Tuesday, at 6.30 p.m., with the Dinner in aid of the Benevolent Fund, which will take place at the Freemasons' Tavern. On Wednesday morning, at noon, the Annual General Meeting of Members of the Society will be held at 17, Bloomsbury Square. Lastly, on Wednesday evening, the Annual Conversazione will be held at the South Kensington Museum. Full details as to tickets for the Dinner or the Conversazione will be found in the official notices, but it may be useful here to remind intending visitors to the Conversazione that the officials at the Museum decline in all cases to take charge of hats. A programme of the music will be provided as usual for each visitor.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of the above Association will be held at 17, Bloomsbury Square, on Thursday evening next, May 17, at eight o'clock, when a paper will be read by Mr. CHARLES SHAPLEY, on "Practical Dispensing."

THE EBERT PRIZE.

WE learn from *New Remedies* that the Committee entrusted with the awarding of the Ebert Prize is again compelled to report that none of the essays sent in come fully within the terms of the stipulation of the donor, that they should contain an original investigation of a medicinal substance or improved methods of merit for the preparation of chemical or pharmaceutical products. The prize has only been in existence three years, and this is the second time that it has failed to be awarded.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

ASSISTANTS' SECTION.

The final meeting of the session was held in the Managers' Library, Anderson's University, on April 25th 1877. Mr Boa, President, in the chair. There was a good attendance of members. The minutes of last meeting were read and confirmed.

The chairman then called upon Mr. John E. Fairlie to deliver a lecture on "The Sun and its Rays;" it was attentively listened to throughout, and the striking and very successful experiments were much applauded. At the conclusion Mr. Fairlie was awarded a hearty vote of thanks for his instructive lecture.

The secretary then read the committee's annual report, which was unanimously adopted.

The election of office-bearers was next proceeded with, when the president, vice-president, and secretary were re-elected; the members of committee and the assistant librarian were also re-elected.

Mr. Simpson moved "That the assistants' section appoint a committee to try to obtain a reduction of the hours of labour on Sunday."

Mr. Phillips seconded the motion and it was unanimously agreed to.

A committee was then appointed, with Mr. Simpson, convenor.

At a meeting of the committee held on the 2nd of May, it was resolved to petition the masters to reduce the time of keeping open their places of business to four hours. From 10 till 11 a.m., 1 till 2 p.m., and 5 till 7 p.m. are the hours recommended by the committee.

HULL CHEMISTS' ASSOCIATION.

A special general meeting of the chemists and druggists of Hull and the district was held at the Church Institute, Albion Street, Hull, on Wednesday evening, April 25.

The meeting was called to receive Mr. Jones, President of the Chemists and Druggists' Trade Association. Mr. C. B. Bell, President of the Hull Chemists' Association, occupied the chair, and there was a good attendance.

The President, in a few brief remarks, introduced Mr. Jones to the meeting.

Mr. Jones commenced his remarks by referring to the course taken by the Association in respect to the balsam of copaiba prosecutions and the successful appeal at Runcorn against the conviction for selling milk of sulphur, as before reported in this Journal. He then alluded to the much more serious case of Mr. Shepperley, at Nottingham. This case had caused the Association great anxiety, because they felt that if chemists were to be prohibited from prescribing over the counter it would mean ruin to many. He meant prescribing for simple cases: toothache, sore throat, or cases of that description. If prescribing for simple cases like these was to be stopped half of the chemists in the kingdom would soon have to shut up their shops. The Association did not think that was the meaning of the Act, and they had instructed counsel to look into the matter. They would have to pay heavy fees, but they did not care; they meant to argue the case in the Court of Queen's Bench. There had been a similar case at Birmingham, in which the defendant was fined £20 for prescribing. Mr. Reeves, solicitor, Birmingham, appeared for the prosecution, who had put a detective on to watch, the same as had been done at Nottingham. The Association complained that officers paid by the public should be sent round the town to get up prosecutions of this character. If any one wanted cases of this kind getting up they should employ their own officers and not men who were paid by the ratepayers. The case was reported by the Birmingham *Daily Post*, and that journal had a very sharp article on the subject, complaining of police officers being employed in work of this kind. Mr. Reeves, the solicitor, was rather stung by this article and wrote a letter to the paper with reference to it. Mr. Jones here read the letter in question, and remarked that this gentleman rather contradicted what had been said in the case of Mr. Shepperley. He might say that some astonishment had been felt at the Pharmaceutical Society not taking up this case. He understood that that Society did at first contemplate moving in the matter, but they appeared to have changed their minds. He thought the Society had been misguided by certain remarks relating to Mr. Shepperley having used a stethoscope. The Association had made strict inquiries as to the truth of this, and as to whether Mr. Shepperley when visited by patients took them out of the shop into a back room. They found that he did not use a stethoscope, for the simple reason that he had not one in his possession. The case was one of simple prescribing over the counter and therefore the Association had taken this matter up. He explained how they stood in the case of Mr. Shepperley, but if the counsel on each side, (who had all the facts before them,) would argue the case between themselves it would save a great deal of expense to both parties. They should, however, push the matter on, in the hope that they would get the appeal heard this term. Another person in Birmingham had been threatened, but the judge had allowed the case to stand over until July. Another person in a different part of the country had been also summoned, and had been convicted for visiting. The Association would do nothing in a case like that, but, when one of their members was found merely prescribing over the counter they considered it their duty to support him. One thing he would like his hearers to observe was that if ever they were threatened with prosecution for adulteration, they should always take care to have a sealed sample of the article in question. He also wished to impress upon them the necessity of only prescribing behind the counter for simple cases and on no account to go out visiting. He thought he had now stated what the Association had done and what it had in hand. They did not, however, know what course the Fates might take if this appeal went against them, but if it did, they did not intend to let the matter rest. They would ask the Local Association to help them because they meant to go to Parliament and see if they could not get an alteration of the law, in order that chemists may be able to prescribe for simple cases. He was pleased to say that at the present time the Association numbered about 2500 members, and they hoped to get a considerable increase, and in fact had done since this case had been on. He wished to impress upon those present the desirability of being united together on these matters of protection. They did not wish to attack any one, but merely to be allowed to conduct their business in a proper manner. They should put aside all petty differences and be strong and compact for the defence of their own interests and of the interests of the chemists and druggists of the whole country, and in conclusion he hoped that a large number of the chemists of Hull would join the Association which had been formed.

Mr. Baynes moved the first resolution, "That this meeting having heard the aims and objects of the Chemists and Druggists' Trade Association, as explained by the president, heartily approves of the same and pledges itself to support the Association by every means in its power." Mr. Baynes remarked that he would be the last man to encroach upon the rights of the medical profession, but for many years he, and many who were now around him, had done the same as Mr. Shepperley had done, and had done it without let or hindrance or any doubt as to its perfect legality. It so happened that in the case of Mr. Shepperley, the man prescribed for really ailed nothing at all. The Nottingham judge appeared to be very much struck with the fact that Mr. Shepperley looked down the man's throat, but that was the only way in which the chemist could tell whether anything was the matter with the man. He could not understand why the Pharmaceutical Society had not taken action in the matter. The Parliamentary committee of which, for four years, he was a member, always discussed every subject most thoroughly, and it was a very rare thing for their decision to be reversed. They knew that the Parliamentary committee did recommend this case to be defended, but the matter was shelved at the council next day. The Pharmaceutical Society had given the chemists the best possible reason for supporting this Association which he thought at one time to be unnecessary. The work which was being done by this Association was what should be done by the Pharmaceutical Society. That society had many thousands of pounds in hand as a Defence Association, and he remembered that the Pharmacutical Society was established in 1841, not only for the promotion of education but for the protection of those who carry on the trade of chemists and druggists. But for the fact of the trade being then harassed and threatened as it was now, the Pharmaceutical Society would have had no existence for a long period. He was extremely disappointed and was afraid that by the action of the society, strong moral support had been given to the Apothecaries' Company. He was afraid the cost of the case would be very heavy, but it would be nothing compared to the privileges which the trade now enjoyed and which it was sought to take away. He had done a certain amount of prescribing for many years although he did not like it, and never did. But he considered chemists were not amenable to the laws for that, and only were so when they undertook to do what they were not allowed. He would certainly join with Mr. Jones in urging upon those present never to go out visiting and that their counter prescribing be as much limited as possible. He advised them only to deal with simple cases, although what simple cases were was better understood than expressed. In conclusion, Mr. Baynes expressed his hearty approval of the resolution.

Mr. Anthony Smith in seconding the resolution dwelt upon the necessity of unity in the trade. He was sure the steps taken in Birmingham to form this Association would be the means of greatly strengthening the trade throughout the whole land and the chemists would be blind to their own interests if they did not support it. They had every reason to be grateful to Mr. Jones for coming down and giving impetus to the movement and throwing a little spirit into the trade in Hull. He had no doubt, after the explanations which they had heard, they would all join heartily in the Association which promised such beneficial results to them. If the appeal which had been spoken of terminated successfully the members of the trade would have every reason to bless the efforts of their friends in Birmingham. The resolution was then adopted unanimously.

Mr. F. Earle moved the second resolution, which was as follows: "That this meeting, recognizing the usefulness of the Trade Association, respectfully urges upon every chemist in this town and district the advisability and necessity of joining and subscribing to its funds." Mr. Earle thought this resolution must appeal to every chemist in the town with success. It was a comfort to think that for the sake of the 5*s.* subscription to this Association every chemist could rest satisfied that he would have his battles fought for him. He thought if the trade was to be attacked in the way in which it was being attacked there was enough spirit amongst the chemists to rouse them to defend themselves. The chemists were not seeking to do anything but what had been done from all time in the trade, and surely they would not submit to the indignities which it was sought to put upon them.

Mr. Councillor Chapman seconded the resolution, remarking that he believed no chemist in Hull would object to paying 5s. or even more to secure the advantages of this Association. He might say that he had visited it many times, although not recently. He had never experienced any ill feeling from the doctor, although he knew nearly every doctor in Hull. If he was the first to be attacked he should look to the Association for help, if others were attacked he should be glad to subscribe to their help.

Mr. Kirby James, from Beverley, here apologized for the absence of the Beverley chemists, but pledged those gentlemen to raise £5 or £6 yearly towards the support of the Association.

Mr. G. Myers supported the resolution, remarking that he was present at the formation of the Association, and from the enthusiastic character of the meeting he was certain the matter had been warmly taken up by the chemists in that part of the country. He thought every one in this town and neighbourhood should join this Association. He thought if the appeal case were lost many prominent chemists would be immediately summoned for prescribing over the counter, and he thought it was as well to be prepared beforehand and not be found unprepared when the enemy was at the gates. He trusted the chairman would have a goodly list of subscribers at the close of the meeting, and that some gentlemen would not only pay their subscriptions but give a donation to the funds.

Mr. Goldsmith, one of the oldest chemists in Hull, remarked that he remembered a chemist being fined £20 and costs thirty years ago for out-door visiting (he afterwards graduated as a surgeon), and he believed the law stood the same now as then and the efforts of the trade should be directed towards having it altered. He thought it was the duty of every chemist to subscribe to this Association and to make every effort to defend their right.

The resolution was then carried *nem. dis.*

Mr. G. Myers moved, "That the best thanks of this meeting be and the same are hereby given to the Executive Committee of the Chemists' Trade Association for having taken up the recent milk of sulphur case and having carried the appeal to a successful issue." Mr. Myers remarked that he did not think the chemists in this town had any fear of being unfairly treated with regard to adulteration, seeing that a prominent member of our trade was the public analyst; although the chemists did not court any favour in the matter they were not likely to be harassed by any such frivolous case as that of the milk of sulphur prosecution. He did not think the members of the trade were guilty of adulteration, but he did not mean to say that none of the drugs were adulterated. They were not, however, adulterated by those who sold them. It was very difficult to ascertain what was the standard of many drugs. These were imported in an impure state, and it was very unfair that the chemist should be prosecuted when he had no knowledge of the adulteration. The chemists courted a fair inquiry into matters of this kind, and he trusted that when any of them were attacked, as they might be, they would take the hint given them by the President of the Association with regard to sealed samples.

Mr. J. F. Smith seconded the resolution, observing that the trade was in a very unfair position with regard to prosecutions for adulteration. Nearly all the drugs for which they were most liable contained some ingredient which had been gathered with them in some manner or other in the collection. Unless there was some defined standard for drugs he did not see how it was possible to keep clear of prosecutions for adulteration of some kind or other. They might be prosecuted for nearly everything they sold, because even the dry roots contained a certain amount of dust which had clung to them in transmission to the seller.

The motion was then carried unanimously.

The Chairman said he had a very pleasing duty to perform; he begged to move, "That the best thanks of the chemists of Hull and the district be accorded to Mr. Jones for having come down from the Chemists and Druggists' Trade Association, and hopes that success will attend the efforts of the executive on behalf of the trade." He thought all present would agree with him that the services of the executive were most acceptable and that a sense of gratification was felt at the visit Mr. Jones had paid to Hull. The duties of the executive were of a very arduous character and the thanks of the chemists of the entire country were due to them.

Mr. Councillor Chapman briefly seconded the motion, which was carried unanimously.

Mr. Jones, in acknowledging the compliment, expressed his high sense of the courteous manner in which he had been treated in Hull.

A vote of thanks to Mr. C. B. Bell for presiding brought the proceedings to a close.

A large number of chemists joined the Trade Association at the close of the meeting.

On Thursday evening, April 26, Mr. S. U. Jones, President of the Chemists and Druggists' Trade Association, was entertained at a supper, given by the members of the Hull Chemists' Association, at the Cross Keys Hotel, Hull, when about twenty gentlemen sat down.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

An ordinary meeting of this Society was held on Thursday, May 3; Dr. Gladstone, President, in the chair. After the announcement of visitors, the minutes of the previous meeting were read and confirmed. A list of presents made to the library was then read by the Secretary. The following certificates were read for the first time:—J. Gardner, J. Napier, C. G. Neison, Beeby Thompson, and W. Webster, junior. Notice was given by the President that he had received a requisition, duly signed, to call an extraordinary general meeting, and it accordingly gave him great pleasure to do so. The date of the meeting was however, not stated.

The Treasurer, Dr. Russell, then announced that he had received £1000, free of legacy duty, from the son of their late Fellow, Mr. Lambert, which he had placed to the general credit of the Society.

The following papers were then read:—

(1). *On Some Points in Gas Analysis.* By J. W. THOMAS.—The author during the examination of the gases occluded in bovey lignite, found after removing the carbonic acid, an absorption of 1·3 to 3·8 per cent. by pyrogallic acid and potash. As no oxygen was present he proceeded to investigate the cause of this absorption. He found that pyrogallic acid does not liberate carbonic acid from the alkaline carbonates; moreover, oxygen is completely absorbed, though slowly, by a solution of pyrogallic acid and potassic carbonate, provided an excess of the acid is not present. Oxygen is absorbed completely and rapidly by caustic potash and pyrogallic acid in the presence of potassic carbonate, if an excess of caustic potash be present. The author next investigates the formation of carbonic oxide during the process of absorption, and finds that the error caused thereby can be reduced to less than 0·5 per cent. by using at least twice as much caustic potash as pyrogallic acid, and agitating the tube so as to hasten the absorption. Nitric oxide is absorbed by a solution of pyrogallic acid and caustic potash; the absorption is, however, not complete, owing to the formation of some nitrous oxide, the reaction being probably $N_2O_2 = ON_2 + O$. Nitric oxide is slowly absorbed by pyrogallic acid and potassic carbonate. Of course, nitric oxide and oxygen could not coexist in a gaseous mixture, but if only a small quantity, say 3 per cent., of nitric oxide be present, it is difficult to determine whether the gas is oxygen or nitric oxide, as both would be absorbed by pyrogallic acid and potash. The author, therefore, always adopts the method of adding a known volume of oxygen to the mixture to be analysed, after absorbing the carbonic acid with potash, any decrease of volume will be due to the presence of nitric oxide. In conclusion, he gives the following precautions. An excess of caustic potash should always be present, and the absorption accelerated by agitation. The alkaline solution of pyrogallate should be used in moderate excess, so as to increase the rapidity of absorption and prevent the formation of carbonic oxide. The absorption should be complete in five to ten minutes. The best liquid is a saturated solution of caustic potash and one part of pyrogallic acid to five parts of water.

(2). *Experiments on the Decomposition of Nitric Oxide by Pyrogallate of Potash.* By Dr. Russell and Mr. W. Lapraik.—The nitric oxide was prepared by the action of sulphuric acid on nitrate of potash and ferrous sulphate. Its purity was always tested by its total absorption in a solution of ferrous sulphate. Different volumes of gas were exposed to the action of pyrogallate of potash: it was found that 58 to 59 per cent. of the gas was absorbed. The authors then tried the action of pyrogallate of potash fully saturated with oxygen; in this case 76 per cent. of the nitric oxide was absorbed. The action of potash alone was now investigated; 75 to 77 per cent. of gas was slowly absorbed. The action was substantially the same in the cold, and when heated, either at the ordinary pressure or in sealed tubes. The residual gas consisted, roughly, of 90 per cent. nitrous oxide, 2 per cent. nitric oxide, 8 per cent. nitrogen. The action of water alone, in sealed tubes heated in a water-bath for a fortnight, and remaining unopened four months, set up the same decomposition, but it was not complete, and more nitrogen was formed. Pyrogallic acid alone has no action on either nitric or nitrous oxide, and alkaline pyrogallate has no action on nitrous oxide. The authors conclude by stating that the probable action of the alkaline pyrogallate is to convert the nitric oxide into half its volume of nitrous oxide, but that simultaneously another more obscure action occurs, either from the excess of potash or from certain compounds formed by the action of the oxygen on the pyrogallate. Practically, in the gases obtained by burning a water residue, a contraction of volume, on introducing alkaline pyrogallate, does not prove the presence of oxygen.

Mr. Thomas remarked that by using caustic potash, absolutely free from carbonate, he had succeeded in obtaining the theoretical quantity, 50 per cent., of nitrous oxide, but if old pyrogallate was used a larger quantity of gas was absorbed.

Dr. Russell, in reply to Mr. Neison, said the nitric oxide used was always tested to see whether it was completely absorbed by a solution of ferrous sulphate.

Dr. Armstrong was inclined to think that the reaction was not a case of simple deoxidation, but that the potassic hydrate played some part in the decomposition.

The thanks of the Society were returned to the authors of the above papers.

(3) *Contributions to the History of the Naphthalene Series. No. 1. Nitroso-β-Naphthol.* By Dr. Stenhouse and Mr. Groves.—After attempting to prepare this substance by Fuch's process (*Deut. Chem. Ges. Ber.*, viii., 625 and 1026) with results far from satisfactory, the authors devised the following process, which yielded good results. One part of pure β-naphthol was dissolved in ten parts of boiling water by means of one part by measure of caustic soda, sp. gr. 1·323; cooled and poured into 100 parts of water. This solution was mixed intimately with a liquid containing two parts by weight of 15 per cent. nitrosyl sulphate solution in 200 of water. After standing twelve to twenty hours, the precipitate of crude nitroso-β-naphthol was collected on a linen filter and washed with cold water. This was purified, in the first instance, by solution in 200 times its weight of light petroleum at 40°, filtering, and precipitating with an alcoholic solution of ammonia. This method of purification was unsatisfactory. No evidence could be obtained of the existence of a second isomeric nitrous compound. Other solvents were equally useless for purifying the crude product. The author finally obtained the body pure by precipitation as a barium compound from a solution in dilute alkali. This compound after decomposition with an excess of hydrochloric acid and washing was redissolved, reprecipitated, etc., a second and third time; finally, the nitroso-β-naphthol was obtained pure. The yield of pure substance is about half the weight of the naphthol originally taken. Full details (attention to which is necessary to secure success) of the preparation and purification are given by the authors. Analysis indicated the formula $C_{10}H_6(NO)$, OH, the hydrated substance crystallizes in minute brilliant yellow needles, which lose water at a gentle heat and become brown. The anhydrous compound obtained by crystallization from alcohol, etc., forms thin orange-brown plates or short thick prisms, melting at 109·5°. Nitroso-β-naphthol is slightly soluble in water, easily in carbon disulphide, benzene, ether, acetic acid, and hot alcohol; sparingly soluble in light petroleum. It dissolves in cold concentrated sulphuric acid without alteration, but is decomposed by heating with concentrated nitric acid; it forms green compounds with the alkalies and alkaline earths. By treating nitroso-β-naphthol carefully with dilute nitric acid, mononitro-β-naphthol is prepared as a pale yellow crystalline powder or in orange-brown anhydrous plates; it melts at 96°. Other compounds are formed by the action of nitric acid on nitroso-β-naphthol, which the authors have not yet completely investigated. By treating the barium compound of nitroso-β-naphthol suspended in dilute ammonia with hydrogen sulphide for an hour, an amido compound was formed. On dissolving this body in dilute sulphuric acid and pouring the liquid into a 10 per cent. solution of potassium dichromate, β-naphthaquinone separated in bright orange needles, melting at 96° C. Analysis gave the formula $C_{10}H_6O_2$. By treating this new substance with hydriodic acid, a hydroquinone was prepared. On boiling with nitric acid it is oxidized into phthalic acid. The authors point out that this is the first instance of two isomeric quinones (α-naphthaquinone, which is readily volatile, having already been prepared by Groves) derived from the same hydrocarbon.

(4). *Asbestos Cardboard, and its Uses in the Laboratory.* By W. N. Hartley.—This substance, specimens of which were exhibited about three-sixteenths to one-eighth inch thick, can be used for making crucible supports, sand-baths, muffles, retorts, supports, etc. It can be cut with corkborers or scissors; by moistening with water it can be moulded to any shape. After moistening it should be gradually dried and ignited, to get rid of organic matter. It stands the ordinary wear and tear of the laboratory well. It is formed principally of asbestos fibres.

Mr. Hartley, in reply to various questions, stated it could be obtained from the manufactory, 31, St. Vincent Place, Glasgow, at 4*s*. a pound.

After a vote of thanks to Mr. Hartley for bringing this substance to the notice of the Fellows, the Society adjourned to 17th May, when the following papers will be read:—

1. M. M. P. Muir and S. Suguira, "On a Slight Modification of Hofmann's Vapour-Density Apparatus." 2. J. W. Mallet, "Note on the Fluid contained in a Cavity in Fluorspar." 3. J. B. Hannay, "Examination of Substances by the Time Method." 4. W. Ramsay, "On the Dehydration of Hydrates." 5. M. M. P. Muir, "On Certain Bismuth Compounds, Part VI." 6. J. Philippson, "Theory of the Luminous and Non-Luminous Flame."

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, April 26, at 17 Bloomsbury Square, Mr. H. Senier in the chair.

The first paper read was by Mr. R. H. Parker, on the "Occurrence of Cinchonidine in Quinine". After referring to the species of the genus cinchona yielding barks of commerce and the alkaloids contained in them, the author gave the official process for the preparation of quiniæ sulphas, noting that at its termination where the hot concentrated liquid is set aside to crystallize it is stated by some that "if other alkaloids are present they remain in the mother liquor," which is far from correct. The official test for the detection of other alkaloids in quiniæ sulphas was quoted, also the test official in the German Pharmacopœia. He then proceeded to remark that Dr. Paul at the Evening Meeting, Feb. 7,* had shown that the indications of both these tests (especially of the former) were very defective, and gave his own method of examining and estimating samples of quiniæ sulphas; also giving the reasons, theoretical and practical, why the other tests failed. These, together with Dr Paul's process were enumerated. With reference to the pharmacopœial test, Dr. Paul had stated that "any one exercising his judgment would never use so much ether as is there directed." The author thought that certainly an official test should not be open to such a statement as this, but a little reflection showed it to be correct. Quinine being soluble in its own weight of ether, quinidine 1 in 30, cinchonidine 1 in 150, and cinchonine almost insoluble, it is plain that half an ounce of ether would dissolve 1 or 1½ grain of cinchonidine, this quantity occurring in 10 grains of quinine is equivalent to 10 or 15 per cent. at least, which could not possibly be detected; moreover if quinine were present (the remainder of the 10 grains taken), 2 or 2½ grains remain dissolved, equivalent to 20 or 25 per cent.

The author said that having tried Dr. Paul's process, he had found it simple, easily applied and highly satisfactory. He laid before the meeting specimens of the test compared with the official test applied to the same samples of quiniæ sulph.; also to quiniæ sulph. with 20 per cent. cinchonidine which the B.P. test passed as pure; also B.P. test to quiniæ sulph. with 30 per cent. of cinchonidine sulphate—this gave crystals after few hours.

No. 1 sample B.P. test gave no indication of impurity. Dr. Paul's test in the first two crystallizations gave a crop of crystals, the characteristic thick shortened prisms at the juncture of the two layers of liquid—also some crystals (needle shaped) at the bottom of the aqueous layer. What these latter were deserved consideration; cinchonine being insoluble in ether should appear amorphous; the iodide of potassium test gave no indication of quinidine in the original alkaloid; the only alternative left was that both sets of crystals were cinchonidine. The physical difference the author thought might depend upon the one being formed in an ethereal solution saturated with water, and the other in an aqueous solution saturated with ether.

Sample No. 2 B.P. test passed as pure; 5·0 grams with Dr. Paul's method gave 0·358 gram of crystals, equivalent to about 10 per cent. of crystallized cinchonidine sulphate. The first crop of crystals of this sample was very bulky; one tenth of the amount or less might easily have been detected.

The author had found that the delicacy of Dr. Paul's test might be increased by evaporating the filtered solutions, and again allowing to crystallize before applying the ether test. 5·0 grams were boiled with 150 c.c. of water, cooled, filtered, crystals again boiled with 150 c.c. of water, cooled, filtered, the filtered liquids mixed, evaporated by water-bath to 80 or 100 c.c., cooled and filtered (very little quinine came out here from its very slight solubility so that it could not bring cinchonidine with it), and treated as usual. In this way a much smaller quantity of ether could be used.

* *Vide Pharm. Journ.*

Another important point in favour of Dr. Paul's method was economy (especially with quinine at present price) as nearly the whole could be recovered. If pure, 5·0 grams would only lose by the above treatment 0·4 gram or about 6 or 7 grains. If impure this amount would be lost *plus* the impurity.

A discussion followed the reading of the paper, at the close of which a vote of thanks to the author was passed unanimously.

Mr. Henry Greenish then read a paper on "Oxalate of Cerium," which will be found on p. 909. A vote of thanks to Mr. Greenish also was passed.

Parliamentary and Law Proceedings.

WHAT IS THE DEFINITION OF A MINERAL WATER? THE ATTORNEY-GENERAL *v.* LAMPLOUGH.

In the Exchequer Division of the High Court of Justice, on Monday last, before Mr. Justice Cleasby and a special jury, an information was laid at the instance of the Commissioners of Inland Revenue, against the defendant, to recover a penalty of £10, for selling a bottle of "Lamplough's Pyretic Saline" without a stamp label affixed, as provided by the Commissioners pursuant to the statute.

The Attorney-General and Mr. A. V. Dicey, appeared for the Crown, Mr. Herschell, Q.C., Mr. Ince, Q.C., and Mr. E. B. Cooper for the defendant.

The Attorney-General, in opening the case, said the object of the Crown in bringing this suit was not to inflict penalties, but to settle a dispute that had existed for a long time between the Revenue Department and Mr. Lamplough, who was a tradesman residing in Holborn, and manufacturing and selling a compound or powder under the above title. Although it had been necessary to have a jury to try any dispute as to facts that might arise, the decision would probably turn upon the construction of the Acts relating to the subject, and it would be for his Lordship to decide what was the law. According to his contention it was as follows. The Act 52 Geo. III. cap. 150, amending portions of a former Act, and repealing the schedule attached to it, was passed for granting stamp duties in Great Britain so far as regards the duties granted on medicines and on licences for vending the same. Section 2 of this Act provided that if any person, whether licensed or not, sold or exposed for sale, or bought or kept "any packet, box, bottle, pot, phial, or other inclosure, containing any of the drugs, herbs, oils, waters, essences, tinctures, pills, powders, preparations or compositions mentioned and set forth in the schedule annexed to this Act, without a paper cover, wrapper, or label provided and supplied by the Commissioners of Stamps," he should for every such offence forfeit the sum of ten pounds. Section 4 provided that it should not be necessary for any person selling any of the artificial waters mentioned in the schedule to be drunk on his premises, to take out a licence, provided that such waters were duly stamped. The schedule referred to contained a large number of articles, and amongst them this item.—"Waters, *videlicet*—All artificial mineral waters, and all waters impregnated with soda or mineral alkali, or with carbonic acid gas, and all compositions in a liquid or solid state, to be used for the purpose of compounding or making any of the said waters." At the end was an addendum, which he would call a "postscript," and considered of great importance, which included also all other pills, powders, waters, etc., prepared for use externally or internally as medicines for the prevention, cure, or relief of any disorder incident to or affecting the human body, when the person preparing or selling them claims to have an occult secret or art for preparing them, or claims to have any exclusive right or title to preparing them, or when the article is prepared and sold under the authority of letters patent, or if it has at any time been recommended in any public notice or advertisement, or printed papers, handbills or labels as beneficial to the prevention, cure or relief of any ailment incident to or affecting the human body. In a subsequent Act, 3 and 4 Will. IV. cap. 97, s. 20, so much of the schedule as is contained in the words above quoted relating to artificial mineral waters was repealed. This in his (the Attorney-General's) opinion, left the law in just the condition it would have been had these words never appeared in the schedule of the previous Act. But he submitted that what he had called the postscript still applied, and as Mr. Lamplough had recommended his preparation as valuable in the relief of many diseases, and asserted in his prospectuses that on one occasion in the Court of Queen's Bench he had succeeded in establishing his sole right to make this preparation, it was submitted that it would come within the provisions of the postscript as a patent medicine, and be subject to the payment of duty. But should it be decided that this was not the case, he would also contend that the preparation was not correctly described as merely a compound for the production of an artificial mineral water, but that its value as a medicine depended upon the presence of chlorate of potash, which was not a mineral alkali but a neutral salt, and never found in a natural mineral water.

Mr. Bannister, Deputy Principal of the Laboratory, Somerset House, deposed that he had analysed a sample of "Pyretic Saline," and found it to contain 45·7 per cent. of tartaric acid, 52·4 per cent. of bicarbonate of soda, and 1·9 per cent. of chlorate of potash. Upon solution of this compound in water, tartrate of sodium was formed, carbonic acid was set free, and 1·4 per cent. of the bicarbonate of soda and the whole of the chlorate of potash remained undecomposed. Chlorate of potash was not found in any natural mineral water, although chloride of potassium was. It was supposed that the medicinal activity of chlorate of potash depended upon the readiness with which it gave up its oxygen. He thought that the other constituents would also have a remedial effect in some of the diseases referred to.

Mr. Lewin, of Somerset House, was also called and confirmed the above evidence.

For the plaintiff, the facts deposed to were not disputed. It was contended however that the preparation was strictly a composition for the production of an artificial mineral water and as such had been taken out of the schedule by the repealing clause. It was urged that many artificial mineral waters differed in composition from any natural waters, and that a decision adverse to the defendant would render potash and other waters that had been recommended as beneficial in the treatment of disease also subject to payment of duty.

Ultimately the question resolving itself entirely into one of law, the learned Judge directed the Jury to return a verdict for the Crown, for a penalty of £10, leave being reserved to the defendant to move that the verdict be entered for him, the Court to be at liberty to draw inferences from the facts.

Accidental Poisoning by Chloral Hydrate.

Mr. Carter, coroner for East Surrey, held an inquiry at Balham, on Friday the 4th inst., touching the death of Mr. Frederick Macfarlane Levison, a medical gentleman, aged 37, who died suddenly from poison, it was alleged, at Balham Hill House on the previous Saturday morning.

Dr. Holthouse, senior consulting surgeon to the Westminster Hospital, who was called, was warned that he need not answer any question which he thought might induce a criminal charge against himself. He said deceased first came to him at his private consulting rooms, 15, George Street, Hanover Square, and said he was suffering from intemperance, which he could not control at home. He wished to place himself under witness's care. He was then suffering from the chronic effects of alcohol, and an arrangement was come to by which, on the evening of the 11th April, he was taken to witness's establishment at Balham Hill House, which some time ago was opened for the cure of dipsomania. He slept in a room with an attendant named Louis Chevallez and witness prescribed for him.—The Coroner: What did you prescribe? Witness: I prescribed 50 grains of chloral for him per dose; to be given to him at eleven each night, to quiet him and put him to sleep, and if he did not get quiet and sleep under that then the attendant was to give him a second dose. There was enough for two doses made up each night in a bottle with five ounces of water; the chloral was in solution.—Coroner: Now do be particular, for this may amount to a criminal charge. Do you mean to say that you ordered this man 50 grains of chloral? Witness: Yes.—Coroner: Are we to understand that this second dose was to be given him that night by your special agency? Witness: Well, not that night, but I had given previously general orders for a second dose. I had first satisfied myself that he had no organic disease.—Coroner: Did you allow him any stimulant spirit? Witness: No; I consider it perfectly safe to cut it off all at once, and do not allow any on the establishment on principle, under any pretence whatever. There is a notice up to that effect, and any servant giving it would be dismissed.—Coroner: What in your opinion did he die of? Witness: Of chloral. But I wish to explain that what would be a large dose sometimes, to the same person would, under altered circumstances of body, be a very small one. There is no accounting for these changes in the system. An individual might with safety take 80 grains at one time, when perhaps at another time 20 grains would kill him.—Coroner: This is a very important question. This is the third death I have had lately from taking chloral. In a case I had about three weeks ago it was stated in the medical evidence that the average dose of chloral was 10 grains, and here we have 50 grains given. Witness: He told me he had been in the habit of taking 40 grains per dose himself at home.—Do you think anything would be given to him intentionally for any purpose? No, not to my knowledge.

Mrs. Ophelia Johnson said she was in the service of Dr. Holthouse, and was the matron of the dipsomania establishment. On Friday night last she made up a mixture in the bottle produced by Dr. Holthouse's orders. There would be about 100 minim drops. If anything, there would be rather less than more than the quantity ordered. The deceased was rather noisy at nights, and occasionally disturbed the house, and the medicine was given to him for producing quiet and sleep.

Louis Chevallez said, I am in the employment of Dr. Holthouse at his dipsomania establishment, Balham, and was the regular attendant on the deceased. I used to sleep in another bed in the same room with him, and it was my duty to attend him day and night. He had his supper as usual on the night of his death, and ten minutes later I gave him what I understood was a mixture of chloral, as he went to bed. When he took it he said "How very nasty or strong this is; how very irregular or clumsy (I don't know which) Dr. Holthouse is; he never seems to give it to me in the same amount of water. Give me a little milk to take the taste out of my mouth." After he had drunk it he said he felt sick. He then asked me if I would read to him the text for the day, and not to leave him till he went to sleep, but to keep on reading. About half-past twelve the deceased asked me to give him half the remaining dose, which the doctor had ordered to be given two hours after the other. Deceased then took it in his own hand, and after he had drunk half of the second dose, he said "Give me some more milk to take the taste away." He then said "I don't think I shall be able to take the other chloral—give me a little whisky in a little milk." About a quarter of an hour after he had taken the portion of the second dose, he suddenly began to breathe very hard and stertorously. I had previouly just given him a little whisky and milk. Shortly after he began to breathe so hard he had a rattling in his throat, and then he threw up a little milk, and in another moment he was quite quiet. I then felt his pulse and found him quite pulseless. I then ran out of the room and called the matron. She came, and in about ten minutes after that we called the doctor. He never complained of chloral being nauseous before. The matron told me that she had given him 100 drops of chloral, and a drop over, and that it was the strongest dose she had ever given, and that afterwards she had poured a little more in besides the 100 drops.

The Coroner: There is no doubt that the deceased has died of an over-dose of poison. The question to decide is whether there is any culpable negligence on the part of any one?

A Juror: It seems very strange that such a poison as this should be left in the hands of such people as these.

Mrs. Johnson was recalled, and subjected to a very rigid examination as to whether she had poured a little over. She admitted having said that she had poured a drop over, but what she meant was that she had drained the minim glass of the last drop, which was not usually the case, but she was certain she had not poured one drop over the 100 minims. She also gave the attendant the whisky to give the deceased.

The jury returned a verdict, "That the deceased's death was accidental through the administration of a sedative medicine in water incautiously, but not recklessly or intentionally given to cause death."—*Standard.*

On Tuesday the following note appeared in reference to this case:—

Dr. Holthouse, of the Westminster Hospital, who gave evidence in this case, writes to us (*Standard*) protesting against the manner in which the coroner conducted the inquiry, and stating that the gentleman on whose body the inquest was held had been given to intemperance since he was eighteen years of age, and that latterly he had been a regular chloral drinker. He had told Dr. Holthouse that his usual dose was 40 grains, with 20 grains of bromide of potassium. Dr. Holthouse explains that his object was to cut off both the alcohol and chloral, the former at once and the latter by degrees; that the choral, of which he never ordered any stated dose to any one, had, on all but two occasions, previously been given by himself, the largest dose having been sixty grains, taken by the patient on the night of his admission; and that on the night of the death of his patient he had not prescribed any, having expostulated strongly with him on the subject the day before, and told him it must be absolutely cut off. Dr. Holthouse had not, however, forbidden it to be given, because on no previous occasion had that been done without his direct sanction; but his attendants, relying on precedent, and with disastrous faith in the patient's own medical knowledge, administered that last dose which subsequent analysis had found to contain less than fifty grains. The invariable order given to the attendant was to allow two hours to elapse before a second dose was given. From investigations made since the inquest it would appear that the first dose could not have been taken before half-past eleven, so that the portion of the second which was used must have been taken about an hour after it, death having ensued some time before one o'clock. It is further stated by Dr. Holthouse that notwithstanding the mistaken kindness of his attendants in giving the patient a little alcohol in doses to prevent his going out and having much, the deceased did go out, and procured both drink and chloral.—*Standard.*

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Sale of Chloral Hydrate.

Sir,—This subject seems to have received considerable attention at the last Council meeting, in consequence of a recommendation from a Carlisle jury that it should be added to the list of poisons in schedule A of the Pharmacy Act. I would not for a moment throw an obstacle in the way of the passing of any precautionary measures which would prevent accident or loss of life, but there is such a thing as erring on the side of caution. If this were the first time that a jury had made an unreasonable recommendation from their very partial knowledge of such matters, I could better understand the powerful influence it seemed to exercise over our esteemed President and Mr. Shaw, both of whom came quickly to the conclusion that "something ought to be done," the latter even arguing in favour of placing it in part 1 of the schedule.

A courteous reply to the coroner would certainly be in good taste, but to place chloral hydrate in the same category as morphia, strychnia, etc,, would simply be to outrage common sense and to nullify the value of the poison schedule altogether. Any serious results from the use or abuse of chloral hydrate have been very rare, and, when such cases have occurred, there has been much talk about "the growing evil," the "extensive abuse," etc, etc., with scarcely a trace of supporting evidence. We are told that it is used as an intoxicant. Well, there is no accounting for taste; but it might be safely asserted that more illness and deaths arise in any single day from the use of beer, wines and spirits than from the use of chloral hydrate since its first introduction as a medicine; yet, neither juries, coroners or judges ever suggest putting these intoxicating beverages into schedule A.

Charles Symes.

Liverpool, May 7, 1877.

The Benevolent Fund and Non-subscribers.

Sir,—The fact of having just received circulars with refence to the Benevolent Fund, and a Dinner which is shortly to take place in aid of this Fund, prompts me to write you a few lines on the subject. Having a dinner is no doubt an excellent way of raising "more supply," but then it falls to but a few who are able to take part in such a proceeding. Then, what else can be done? Why will not more subscribe annually? Is it because they can't afford, or they will not, and are heedless about the good which might be done by even a little annual help from each of those who do not yet subscribe? I scarcely think the former is their reason, but I do think it is more the want of proper thought than otherwise. Who can say he will never want help from this fund. Happy is he who really can, and happier still would he be if he put out a helping hand to those who did want. The figures are startling,—only think for one moment, out of 14,000 registered chemists only about 2300 are subscribers. Now supposing 5000 more names were added to the present list of subscribers (which number is less than half who do not yet give anything) at 5s. each, and this small amount could surely never be missed, it would mean an extra annual income of £1250. This fact ought to stimulate all non-subscribers to be charitable and send at once their "mite" to the Secretary, feeling and knowing then they would at least be helping to be a "blessing to many a poor infirm fellow chemist." With the sanction of the Council I think a deal might be done in canvassing (though some of course object to it), if some in each district of every town would undertake to go a round in his own neighbourhood; I, for one, would be willing to take my own neighbourhood, if some other brother chemist would volunteer to go with me; unity being strength, two would get on much better than one.

G. W. Pratt.

Manchester.

The Spoonful Question.

Sir,—Some dispensing chemists seem determined to make mountains of molehills,—nothing will prevent them.

(1). We all know what is intended by the respective terms "tea," "dessert," and "tablespoons."

(2). We all have graduated glasses with which those several quantities can be accurately measured, and those of us who are business-like will not omit to sell one if the customer can afford and is willing to pay for it.

(3). When the customer cannot afford to pay for one, we all have ʒj, ʒij, and ʒiv phials, which will equally well answer the purpose of a measure, one of which we can sell the customer for 1*d.* or make him a present of one if we prefer it.

Cannot the spoonful question henceforth be "quietly inurned." I feel aggrieved at its continuance. But for it I am inclined to think you would have found room for a letter that I wrote you on the subject of "cutting down prices,"—a discussion of which subject I think might have been much more useful and interesting to the trade generally than this *réchauffé* of the "spoonful," which I humbly submit has been presented to us *ad nauseam*.

Southampton. Robert Chipperfield.

Sir,—If you have a small space at disposal for discussing the above, I beg to bring forward a proposal for a new form of medicine glass.

My idea is to have a glass the size and shape of a 1 ounce conical measure, without the lip, graduated 1 T., 2 T., 1 Tab., 2 Tab., and to have plenty of room above the marks to add water when required.

A glass of this description would not be readily capsized in use, or broken in washing, and would be different in shape from ordinary wine glasses; and having few marks it would be easily understood.

It would only necessitate a dessertspoonful direction being rendered two teaspoonfuls, which is done at present when a measure glass is supplied.

Messrs. Maw and Thompson's registered spoons are very useful, but I think a glass is of more service, especially if the dose is two tablespoonfuls, or if water is to be added.

My experience of graduated bottles is that they are very inaccurate; and even supposing they were to be depended upon, many patients make mistakes in using them, taking two doses instead of one.

I think it will be generally admitted, that it is very much easier to pour liquid into a bottle up to a certain mark, than to pour it out down to a fixed point, as in the one case the bottle is upright, and shows at once, in the other we are obliged to judge first, from the quantity poured out, until we can try by the bottle standing up to hit the mark. This method of measuring the dose is very uncertain, as bottles containing a few doses returned to the chemist testify.

George Brown.

Sandown, I.W., April 24, 1877.

Sir,—I have been sorry to see so many objections raised to the introduction of the above articles by those who took part in the discussion at the "Square," following the reading of the paper on the subject; and so little said in favour of them by other pharmacists. But after the able replies of Mr. Proctor to all these objections the appearance of another unfavourable criticism in a subsequent number of your Journal induces me to write a word or two regarding the merits of these ingenious little cups designed by Messrs. Proctor.

I think they are well adapted to the purposes they were introduced for, and I believe are giving general satisfaction to those physic-takers who have seen and tried them. If not perfectly suited to all requirements, they have many good points, which ought to ensure their extensive use. Admitting they are capable of improvement, it is not too late to adopt the various suggestions tendered, and modify the terms of the label in future.

1. Their cheapness brings them within the reach of all. It is not necessary to give them away with all mixtures, but only when first dispensed; moreover, when the public get to learn the respective sizes they will not desire new ones.

2. They are more accurate than many of the usual graduated glass measures, and still more than the numerous forms of spoons vended for similar use.

3. They can be used in the capacity of drinking cup, simultaneously with its intended object, thus proving a boon to travellers, and affording a striking contrast to a practice which commonly prevails, viz., swallowing the medicine directly from the bottle—guessing the quantity.

4. By the aid of the lip spilling is avoided—a superiority over the usual household or china medicine spoons.

5. They are more easily cleaned than phials (as some propose), and not so friable; besides that viscous fluids can be more readily removed from the wide opening in the cup than through the small orifice of a narrow-necked phial.

6. There is less danger of fracture than in the case of glass measures.

7. Obviously, one of the main features has been overlooked,—the chance of mistaking graduations as in medicinal wine-glasses (not infrequent amongst the uninitiated) is entirely obviated.

8. They are very portable, occupy a small space, and fit nicely over the cork of the bottle.

Independent of all these features which recommend the vessels, they have the additional advantage, that whereas domestic spoons will rust or tarnish, these will not even become stained, and there is no fear of metallic contamination by the action of acid or alkaline mixtures. I think this important point has not been spoken of by the originator.

I see no difficulty in transferring the contents of the cup to a tumbler, etc., containing the dilnent. If the labels affixed are liable to be washed off, there is still left indelibly imprinted on the bottom the mark indicating the correct size. Again, if there is a possibility of confusing sizes, there is certainly much more of mistaking the phials which Mr. Long furnishes his customers with.

Even with accurate spoons, some patients scarcely fill them, lest the liquid overflows, while others pour in more than sufficient, the surface of the fluid being curved, owing to the attraction of the edges of the spoon.

Mythology tells us of a vulture which consumed the liver of immortal Prometheus as fast as that organ grew; and so, in a later era, there are always persons ready to condemn any new invention as an unnecessary innovation.

In conclusion, this much may be said on their behalf, they may appropriately be sold (or given away at discretion), in cases when concentrated medicines are prescribed, or a full dose ordered. I trust many, who, as yet, have remained *in silentiô*, will appreciate them more than has been done by those who have expressed their opinion.

Manu Forti.

Sunday Closing.

Sir,—I have read with general approval the remarks of "A Beginner," on the subject of "Sunday Closing," in this week's Journal.

Your correspondent affirms, "I have lost nothing by so doing, consequently I shall always adhere strictly to that principle." This, however, seems a low standard to take; in fact, it is not the correct standpoint. The command is, "Remember the Sabbath day, to keep it holy."

No worldly policy, of any kind whatsoever, can overrule that obligation. And what does "to keep it holy" mean, but to separate it from the other days, in its transactions. That medicine should be dispensed on the Sunday cannot be objected to: only, should there not be some provision for meeting really needful requirements without necessitating the opening of the shop, with the consequent exhibition of accessories, to attract and invite the purchaser?

It is clearly our duty, and should be our delight, to observe the Sabbath from religious principle, having due and preferent regard to the Divine Lawgiver, without making a proportion sum or an algebraic equation of the cash returns as the practical result of such obedience.

"Godliness is profitable unto all things, having promise of the life that now is, and of that which is to come. Faithful is the saying, and worthy of all acceptation."

Let us, then, in simple obedience of faith, comply with the condition, and assuredly the Lord will fulfil His promise.

Eusebius.

Carbon Bisulphide Lamp.

Sir,—Eighteen or nineteen years ago, in prosecuting an investigation of the effect of burning spirit solutions of several essential oils in the ordinary perfume lamp, with spongy platinum ball, I extended my experiment to solutions of chloroform, iodoform, bromoform, and bisulphide of carbon, with results which encouraged the expectation of a practical application of the method for disinfection. From a commercial point of view the cost and limited use of so elegant and convenient a method induced the making of more experiments, and resulted in realizing the burning of solutions of chloroform, iodoform, and sulphide of carbon in the ordinary methylated spirit of commerce in an ordinary spirit lamp, for which I afterwards substituted a lamp made specially for me by the York Glass Company, entirely of glass, and glass wick-holder with cup.

I have employed this mode of generating disinfecting gases on my own premises, and also for disinfecting rooms where contagious diseases had occurred, and can recommend what is comparatively a cheap plan, as well as easy of application.

The suggestion of Mr. Groves is a very good one, as insuring safety from breakage, and I have no doubt that a special lamp would find a ready sale if produced at a moderate cost. JOSEPH COUPLAND.

To the Benevolent.

Sir,—By your kindness we have been enabled from time to time to report the result of our appeal on behalf of Mrs. Fowler, and, as the subjoined statement shows, nearly £50 has been received. A little more effort will yield the £70 necessary for taking legal proceedings.

	£	s.	d.
Already Announced	37	15	6
Sandford, Mr. G. W.	1	1	0
Hopkins, Mr. W. K....	1	1	0
Colk and Williams, Messrs.	1	1	0
Wigan, per Mr. Phillips	0	7	6
Harrogate, per Mr. Davis...	0	7	6
Kilmarnock, Mr. J. Borland	0	10	0
Reading, Mr. W. G. Hayward	0	10	0
Chiselhurst, Mr. Lewis Wing	0	5	0
Stoke Newington, Mr. T. W. J. Tipping..	0	10	6
Brighton; additional:—			
„ Messrs. Barton Brothers ...	0	5	0
„ Billings, T.	0	10	0
„ Brew, J.	0	5	0
„ Cargill, R....	0	5	0
„ Colby, J.	0	5	0
„ Cornish, W.	0	5	0
„ Dowsett, A.	0	5	0
„ Else, W.	0	5	0
„ Gibson, W. H.	0	5	0
„ Glaisyer, Thomas	0	10	0
„ Gwatkin, T. J....	0	5	0
„ Haffenden, T.	0	5	0
„ Harris, E. W.	0	5	0
„ Haddock, G. S.	0	5	0
„ Histed, E....	0	5	0
„ Jeeves, T.	0	5	0
„ Mount, J.	0	5	0
„ Muston, George	0	5	0
„ Padwick, J.	0	5	0
„ Pears, Kilby	0	5	0
„ Phillips, J.	0	5	0
„ Salmon, F. W....	0	5	0
„ Sprackett, W.	0	5	0
„ Stevens, W. G.	0	5	0
„ Vizer, E. B.	0	5	0
	£49	3	0

Any further subscriptions will be thankfully received by either Mr. E. Bremridge or

W. D. SAVAGE.

Glycerine of Pepsine.

Sir,—In the Journal of the 28th April, I notice a letter from Mr. J. L. Bullock, respecting a solution of pepsine in glycerine, in which he states that he has found it to possess very much greater digestive power than any other liquid form of pepsine, and informs us that half a fluid drachm will digest fifty grains of hard boiled white of egg. I may state that I have for some years prepared a solution of pepsine, which is known as "Elliott's Liquid Pepsine," and is in extensive use, owing to the recommendation of our local members of the profession as well as to its powerful digestive properties. Half a fluid drachm of my liquid pepsine will digest two hundred and fifty grains of hard boiled white of egg, or five times the quantity digested by Mr. Bullock's preparation. Evidently Mr. Bullock has not examined all the liquid forms of pepsine.

279, *High Street, Gateshead*. ROBERT ELLIOTT.

[*** It might have imparted some scientific value to this and the other letter referred to if the writers, instead of confining themselves to a statement of results, had described the method by which they might be obtained by other persons also. We would remind the original critic and the critic's critic that this was done by the author of the paper that gave rise to their criticisms.—ED. PH. J.].

"*Hants*."—There are so many good books on Grammar to be had that we cannot undertake to decide which is the best, neither can we say which is the best postal system. Depilatories are used for removing hair, but will not prevent its growth.

Messrs. Plomley and Watts.—The following formula for Tinct. Quiniæ Ammoniata has already appeared in this Journal ([3], iv., 993):—

℞ Quiniæ Disulphatis . . . . . gr. xxxij.
Spirit. Tenuioris . . . . ℥iijss.
Spirit. Ammoniæ . . . . . . ℥ss. M.

A. Wright.—It will be necessary to grow the seeds to determine them.

"*Alpha*."—The formula for glyconin has already been given more than once. It will be found on p. 714 of the present volume.

H. Churchill.—The formula for "Liquor de Clemens," or "Liqueur à l'arsenite de bromure de potassium," which is probably the preparation you require, is as follows (*New Remedies*):—

Arsenious Acid . . . . 1 part by weight.
Potassium Carbonate . . 1 „ „
Bromine . . . . 2 parts by weight.
Distilled Water, to make . 93 „ „

Boil the carbonate and the acid with most of the water, until they are dissolved; when cold, add the bromine and enough water to make the bulk to 93 parts. Age is supposed to improve this mixture, as the bromine gradually enters into combination. Dose, 1 to 4 drops in water once or twice daily. The solution should be kept sheltered from the light.

S. W. J.—It is impossible to make a satisfactory preparation with such proportions.

T. H. Bateman.—We cannot see how the sale of toilet soap or granular citrate of magnesia by grocers, oilmen or others can be prevented. Neither do we think that any attempt to limit the trade in patent medicines to chemists and druggists would have a chance of success.

W. O. S.—(1) *Tincture of Jaborandi* (Martindale).

Take of Powdered Jaborandi Leaves . . 10 ozs.
Rectified Spirit . . . . q. s.

Percolate until a pint of tincture is obtained. Dose, ♏x ad ʒj vel ʒij. (2) It is not starch but mucilaginous matter that separates on the addition of the spirit.

M. P. S.—We admit that the adoption of the plan you approve of would be very desirable, and have ourselves advocated it on many occasions, but at present there seems to be very little disposition to follow it by either party.

A Registered Student.—You had no alternative but to give what was asked for, so long as it was not a poisonous dose.

A. M. is recommended to make an analysis of the crystals.

M. P. S.—We believe any manufacturing chemist, or wholesale druggist would be able to supply the concentrated colours.

Fred. Rivers.—*Sanicula europœa*.

A. Mitchell.—*Cochlearia officinalis*.

C. Gorton.—Corms of some endogenous plant.

J. B.—We are strongly of opinion that the discussion of the subject to which your letter refers would not be productive of any good result.

"*An Associate*," "*Respice Finem*" and "*Honi soit qui mal y pense*."—Under the above signatures we have received letters calling in question the justice of the decision arrived at by the Council not to grant the use of the Lecture Theatre for a meeting of assistants with a view of forming a Chemists' Assistants' Association. We refrain from publishing these letters inasmuch as we think that by further direct communication with the Council any existing obstacles to the satisfactory arrangement of this matter might probably be removed.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Jackson, Mr. Brown, Mr. Mitchell, Mr. Fairlie Mr. Townsend, Mr. Garrett, S. N., A. T., F. D. B., G. B., Syrupus.

THE BENEVOLENT FUND DINNER.

A Dinner in aid of the Benevolent Fund of the Pharmaceutical Society was held on Tuesday last at the Freemasons' Tavern. About 240 gentlemen sat down. The chair was taken by Mr. John Williams, President of the Society, supported on his right and left by Dr. Risdon Bennett, President of the Royal College of Physicians, and by Dr. Buchanan, President of the Medical Society of London.

The President proposed the health of the Queen, and the health of the Prince and Princess of Wales, both of which toasts were received in the usual enthusiastic manner. The toast of the Army, Navy, and Reserve Forces, was responded to by Captain-Commandant Richardson, of Leicester (31st regiment), who referred to the great part played by chemistry in modern warfare. Captain Walker (13th Lancashire Rifles) also assured the meeting that the volunteer forces were by no means declining. He had been a member of the force since 1860, and he hoped that many others whom he saw around him would devote some part of their leisure time to the same object.

Mr. Cornelius Hanbury (Treasurer) proposed the next toast, viz: "The Medical Profession." He said the toast which he had the honour to propose could not fail to elicit a hearty response. The medical profession was a theme which suggested a flood of thoughts to his mind with associations and feelings of gratitude and veneration which he had no power to express. There was no branch of science which had not been adorned by its members and there was no class of the community who were not largely its debtors. But there were obvious reasons why this toast should command special sympathy on the present occasion; medicine and pharmacy had a common origin, and a common object, and were reciprocally dependent. The prescriber was indebted to pharmacy for the most appropriate and elegant methods of employing his remedies; whilst chemistry had supplied him with the most powerful and reliable instruments at his disposal. On the other hand pharmacy and pharmaceutical chemistry could only proceed on the lines and within the limits indicated by the observations in physiology and therapeutics of the scientific practitioner of medicine. Thus, though mutually dependent, the exalted function of the prescriber was broadly distinguished from the humble duty of the preparer and dispenser of medicines. And in their highest development the separation of the two branches became complete. But where the exigences of society or other circumstances impeded this full developement there was ever a tendency to revert to the primitive union of those now distinct functions. Something analogous was found in other professions. Thus the lawyer had his stationer; the architect his builder. Experience enabled the law-stationer to advise an ordinary customer as to the character of the stamp he might require for an agreement or other deed, and in many simple cases even to supply him with the form for a legal document. So the builder frequently acquired such a knowledge of the nature and strength of his materials and of the principles upon which they were put together as enabled him safely to erect buildings of minor importance—it might be a chicken-house, or a stable, or even a cottage,—without having recourse to an architect. Yet no one imagined that the friendly relations of these professions and their respective trades were thereby imperilled; and his own experience convinced him that there was no more reason to doubt the maintenance of the friendly relations which had happily subsisted between the members of the medical profession and those of the Pharmaceutical Society. So long as the healing art was practised the services of both would be required, and the welfare of each would be promoted by due consideration for the rights of the other. But he would not pursue this subject further. They were there that evening to promote a work of pure benevolence, and they cordially thanked those members of the medical profession who had kindly honoured them with their presence. Theirs was a profession pre-eminently distinguished by benevolence. How unostentatious and self-denying their labours often were, many of them had witnessed, and all of them had had for themselves or those dear to them to thank members of the profession for the mitigation of suffering and the relief of anxiety. Thus, both on professional and personal grounds, he asked all heartily to join in this toast, coupling with it the name of Dr. Risdon Bennett, President of the Royal College of Physicians.

Dr. Risdon Bennett, in responding, said it was quite true that the professors of medicine and of pharmacy had been from the earliest times very closely associated, but in proportion as the science advanced it was found to be essential to the progress of medicine that pharmacy should also proceed, that it should not be what it was at the beginning of the commerce between the two. But although the medical profession boasted of having made very great advances in medical education during the last fifty years, and the entrance into the profession was no longer so easy as it had been, he could not but fear, in consequence of the very peculiar relations in which pharmacy had stood to the medical profession in this country up to the present day, that tradesmen had suffered somewhat from the imperfect study of pharmacy by those who were still constrained to practise it; and he was quite sure it would be to the advantage of all parties when the severance between the two was complete. At the same time it was fair to acknowledge that that severance they did not see their way at present to complete. He trusted, however, that as the Pharmaceutical Society proceeded in its laudable efforts to educate a large class of men competent to make up prescriptions and to undertake the thorough governance of pharmacy, the medical profession would be not unwilling to give up the small portion of it which it still retained. He rejoiced to see that there had been such a manifest advance in the state of pharmaceutical science throughout this country. Even before 1815, when the Apothecaries Act was passed, there was more than one attempt to do virtually what was being now done more effectually. It might not be known to all present, that one of these associations called itself the Pharmaceutical Association of Great Britain, and that at the close of the last century it issued its missives from the Buffalo Tavern, Bloomsbury Square. He did not know how far it succeeded in its efforts, but he believed they were superseded by the Apothecaries Act of 1815. There was not a member of the medical profession who did not rejoice at the prosperity of the Society, but he rejoiced also to see that in its prosperity it was not forgetful of those in adversity, and he uttered a fervent wish that this benevolent society whose interests they were met to support might be an abundant success from year to year, and that the time would never come when those who were successful would be forgetful of those less fortunate.

The President next rose to propose the toast of the evening, "Success to the Benevolent Fund of the Pharmaceutical Society." He said it was perhaps a misfortune that it should be necessary in their body or any other for a benevolent fund to exist, but there were very few professions or callings in which it was not necessary to provide for the unfortunate or the poor. The majority in their business they knew, as a rule, were not rich men, the number of those who could so describe themselves would be very small compared with the whole of the trade, but for all that he trusted that they had not so great a proportion of poor as most other trades or even professions would show. Still it was necessary that a benevolent fund should exist, and that it should be supported by their earnest and constant endeavours. This Fund had now been established for thirty-five years, having been commenced soon after the foundation of the Society, and although in its early days it was restricted in its action to those only who were subscribers to the Fund, at which time he himself had refused to aid it in any way, he was happy to say that after a certain period a change took place, and its benefits were thrown open to the whole trade, whether they had ever subscribed to the

Society, or even to the Fund, or not. He had great pleasure in saying that since the foundation of this Fund there had been paid to annuitants no less than £3300, and in casual relief to meet immediate necessities, £2800. Upwards of £6000, therefore, had been expended, and this showed that they had been able to do much good with the money which had been subscribed. There had been altogether 30 annuitants, 15 male and 15 female, and of the more casual grants assistance had been given to 140 men and to 90 widows and orphans, but this proportion arose simply from circumstances and not from any particular arrangement. As time went on it was found that the proportion of widows and orphans asking for relief was increasing, and this was a point which the Council was watching with great interest, in fact, it was one of the most important points which had to be dealt with. The sum of money that had been expended was something like a guarantee that the Fund deserved the confidence of the subscribers, but, he need hardly say, that if the Fund were larger, or if it were subscribed to in a different form, it could do much more good, and its sphere of usefulness would be very largely increased. He, therefore, thought it his duty, especially on that occasion, to point out that it would be a very proper thing not only to increase the number of annuitants, but also to increase, if possible, the amounts granted. What was £30 a year to support a widow or a poor man, probably with a family, fallen into distress, who had once occupied a position of respectability and comfort? Again, there was one branch of usefulness in which it had been felt for some time they might extend their operations, if their funds were larger and more available—he alluded to the education of the children of the poorer members of the trade who had not the means themselves of providing a sufficient education for their children, but in whose case such a provision would be of the utmost importance to their future welfare. It had been suggested that they might make a great effort to do something in the way of bricks and mortar and provide a great school, and it had also been suggested by some that it would be still better to have an asylum for the aged, something architectural, which should show to the public what they were doing. His own feeling, however, was decidedly against the sinking of capital in such a manner, and he trusted they would still be content to do without the outward show of philanthropy, and to utilize all their money for the benefit of their recipients to the best of their means. They had two classes of income. First, the donations; such portion of which as was not expended during the year they were required by the bye-laws to invest in the funds, and it was only the interest of that money they could use in the future. All donations, therefore, must of necessity be invested, and he thought it a very proper thing that a larger amount should be so invested, because annuities should be as nearly as possible secured, and not be dependent on voluntary subscriptions. But they had tried the experiment of increasing the number of annuities beyond the amount of interest derived from their invested capital, and, he must say, that they had found most satisfactory results accrue. In fact, they had found that they could depend on subscriptions coming in to supplement what might at first sight appear a not very provident arrangement. He had no doubt that the result of that evening's gathering, and of the collection which was being made, would place them in a position of having sufficient property funded to meet the whole sum required for the annuities. But it was not only the annuities they had to meet; they could do much more good if they had a large clear annual income from subscribers, and he therefore wished to urge very strongly on his hearers that the most effective way of helping the Fund would be to increase the regular subscription list. It sounded very pleasant to hear announcements of large donations from firms and individuals, but he should like to be able to announce that every man on the Register had subscribed, or promised to subscribe, 2*s.* 6*d.* a year. They would then have abundance to meet all the claims which might come upon them. There were about 14,000 chemists and druggists on the Register, of whom it was calculated 8000 or 9000 were in business on their own account; and if he could not call on the whole 14,000 to subscribe 2*s.* 6*d.* per annum, he might fairly call on at least 5000 to subscribe on the average 5*s.* each. That would give them £1250 a year, besides the interest on their funded property, and they would thus have enough, not only to provide for all necessitous cases, but also to do a great deal of good for the children of their poorer brethren, at any rate to the extent of giving them such a good education as to be of essential service to them in after life. He might add that he had taken out the number of cases to which relief had been granted, and it appeared that 143 were connected with the Society, and 86 were not, thus showing that the Council did not, in judging of the cases before it, consider whether the applicant had been connected with the Society or not, but simply whether or not it was a proper case for relief. At present there were only about 2300 subscribers to the Fund throughout the whole trade, which he could not consider satisfactory, and he therefore appealed to all to do their best to increase the number of subscribers. But he believed the success of the Fund depended very much on the local secretaries in the various towns. He had in his mind one town where there was a local secretary who took an active interest in the Fund, and who had been able to send up a list of something like 74 subscribers; whilst he could mention another town, three times the size, in which there were only three subscribers. There were a great many local secretaries present, and he wished to impress upon them that it was not only a duty but a necessity for them that they should exert themselves in this matter, and that on their return home they would be doing the greatest benefit to their poorer brethren in the trade if they would exert themselves to place the matter fairly before their fellow tradesmen. He was quite sure that many would subscribe if they were asked, but would not take the trouble to send up subscriptions otherwise. One interesting point which had often struck those who had managed the Fund was the gratifying proofs of good they found they effected. Many cases came before them in which, after a little timely relief had been given, the recipient was restored to comparative prosperity. Not long ago a man whom they had relieved several times obtained an appointment which brought him in a fair income, and the first thing he did was to come and pay 10*s.* 6*d.* as his first subscription to the Benevolent Fund. Many such cases could be mentioned, and this showed that they were doing real good. In conclusion he would remind his hearers that he was not asking them to subscribe to the Pharmaceutical Society. It was not a question whether they liked everything done by that Society or not, but simply whether it was the best medium for distributing benevolence to the trade; whether it had done its duty hitherto in that matter, and whether it was likely to increase in doing that which it believed to be its duty. He trusted they would be able to realize from that meeting not only a considerable increase to the invested capital, but also a large increase to the regular subscriptions.

The list of donations was here read by the Assistant-Secretary.

"Success to the Pharmaceutical Society of Great Britain" was then proposed by Dr. Buchanan, President of the Medical Society. He said he was not one of those who desired to see any kind of divergence between pharmacy and medicine. He regarded medicine as having many parts,—indeed embracing almost all the sciences, physics, chemistry, botany, engineering and even law being included. Every year it was found that fresh applications of science were necessary to the success of medicine. If this were the case how could one do otherwise than look on the preparation of medicines, the business of the chemist and druggist, as an essential part of the medical art, and, having the honour to be president of the Medical Society, he had great pleasure in proposing the toast which had been entrusted to him, coupling with it the name of the President, Mr. John Williams.

The President having suitably responded,

Mr. Bottle proposed "The North British Branch." He said it was rather a long way to bring him from the lowest point of the chalk formation to speak about their friends in Scotland, but he was obliged to obey the command of the President. He was happy to say that he remembered the foundation of the Society and he must be allowed to correct the statement of the President that the Benevolent Fund was started soon afterwards, the fact being that it was founded *pari passu* with the Society in accordance with a resolution moved by Mr. Jacob Bell and seconded by Mr. Hanbury. He coupled with the toast the name of Mr. Mackay, but he could not forbear expressing his regret at parting with another of their friends from the north, Mr. Frazer.

Mr. John Mackay, in responding, said it was now many years since the birth of the little bantling in the north, which had no doubt given its parent a great deal of anxiety and some trouble; but it had safely got through all the trials of infancy, had long since cut its teeth, and required some stronger nourishment than Scotch porridge; but he was proud and happy to say that the needful nutriment was always freely afforded, and he believed the parent had no need to be ashamed of its offspring. He had no doubt that in the future the North British Branch would sustain the high reputation of the Pharmaceutical Society of Great Britain.

Mr. W. S. Brown proposed the health of the "The Visitors." He said it was very gratifying to see so many visitors belonging to the medical and other professions at this decennial dinner; and he might here say that he had never heard of such a term before, as applied to a dinner, and hoped that the festival would be either annual, biennial, triennial, or at least quinquennial. It would be invidious to mention particular names, but the presence of Dr. Nicholson, who was connected with Earlswood Asylum, led him to express the hope that at some time or other they might have an Orphan Asylum of their own, which would show the the interest taken by pharmaceutical chemists in the Fund which bore this title. He would not inflict a long speech on the meeting, because he remembered the old story of a man who, after making a long and tiresome disquisition on the question whether oysters had brains, turned to one of his hearers and asked if he thought they had. The reply was, "I should think they have, for they know when to shut up." He would endeavour to be as wise as one of those bivalves, and would only assure their visitors how heartily welcome they were, and couple with the toast the name of Dr. de Vrij, who was so well known to them from his researches on the cinchona barks.

Dr. de Vrij, in responding, said it was now thirty years since he first came to London, and he had therefore witnessed, not the birth, but the infancy and growth of the Society. As a pharmacist of forty-five years' standing he had taken great interest in the progress which they had made in that time, but he must say that they had yet a great deal to do to place pharmacy in the same status as it occupied on the Continent. One thing had particularly struck him in England, viz., the want of a pharmaceutical staff, both in hospitals and the army; and this he considered detrimental both to pharmacy and to patients. Medicine and pharmacy, he considered, should work together in the interests of humanity, each in its own domain without intruding on the other. He could say a great deal on this point, but he was an enemy to long speeches after dinner, and would therefore conclude by thanking the company in the name of his fellow visitors and himself for the kind reception they had met with.

During the evening a selection of vocal music was given by Miss Annie Sinclair, Miss Helen Heath, Mr. Lester, Mr. Mackway, Mr, Montem Smith, and Mr. Winn. Mr. Harradine officiated as toast-master.

The Pharmaceutical Journal.

SATURDAY, MAY 19, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PHARMACEUTICAL SOCIETY'S ANNIVERSARY.

THE past week has been an interesting one for those who care for pharmaceutical politics, for not only has it seen the customary annual gatherings in connection with the Pharmaceutical Society, but the Trade Association, taking advantage of the fact that many chemists and druggists visit the metropolis at this time, has also chosen London as the place for holding its first Annual Meeting.

On Tuesday evening the Dinner in aid of the Benevolent Fund was held at the Freemasons' Tavern, and was well attended by a large number of pharmacists and gentlemen more or less connected with the calling, whilst several leaders of the medical profession showed by their presence their sympathy with the benevolent object of the Fund. On the other hand the company generally evinced its appreciation of this and other proofs of good feeling by the way in which it received the toast of the "Medical Profession," which was proposed in a very able speech by the Treasurer of the Pharmaceutical Society. An eloquent appeal on behalf of the Fund was made by the President, and it was announced that nearly £1400 had been promised. As the list is to be kept open until Wednesday next we hope that considerable additions will be made to this sum on or before that day.

Although, perhaps, not quite so harmonious as the festive gathering of the previous evening, the Annual General Meeting on Wednesday passed off with considerable unanimity. On the motion that the Report of the Council should be adopted the absence of any allusion to certain questions which are just now seriously occupying the attention of the trade gave rise to considerable comment. However we may presume that none even of the speakers thought that these subjects—of vital interest to the members of the Council as well as to any other members of the trade—had altogether escaped attention, and that really the object of the discussion was to give utterance to the wishes of the members for the instruction of the new Council. The fact that a Bill for the amendment of the Medical Act, introduced into the House of Commons by Dr. LUSH on behalf of the Medical Defence Association, had been issued from HANSARD'S on the previous morning gave additional piquancy to the discussion, but eventually the Report was adopted unanimously. Subsequently the question of dispensing of Co-operative Stores came up again in the shape of a motion instructing the Council to proceed against one of these stores in order to try the point; but the undesirability of fettering the Council in its action was speedily exposed by Mr. SANDFORD and the motion was withdrawn.

On Friday the Adjourned Meeting was held, to receive the Report of the Scrutineers. The result of the election is that two gentlemen will take their seats at the Council for the first time next month.

Before leaving the subject of this meeting, we wish to allude to a matter in which we may be supposed to have a more immediate concern; we refer to some criticisms that were offered as to the manner in which this Journal is conducted. An instance was quoted in which we had thought it to be our duty to abstain from inserting a letter, although, as shown on p. 941, not without acknowledging its receipt, as was erroneously implied by the speaker. We would remark in reply that sometimes when we have reason to believe that a delicate and difficult subject is under the anxious consideration of the Council, we feel it would be injudicious to publish in the Society's Journal strongly expressed opinions that might possibly be embarrassing to the future action of the Society. On more than one occasion we have deemed it wisest so to act in respect to communications upon the questions of co-operative stores and counter practice, but we are bound to say that after the discussions of the present week we shall no longer feel such reticence necessary. But these cases have not been very numerous, and as to the publication of a much larger proportion of correspondence, which it s assumed we receive, we do not think that the interest which some of our readers appear to feel in the correspondence columns would be increased by an indiscriminate admission of all letters received. Another gentleman complained that the trade was not kept sufficiently informed as to novelties, and quoted guarana as an instance. Now the fact is, that it is many years since guarana ceased to be a novelty. When, in 1870, it began to attract increased attention in this country, an account of it appeared in this Journal, and that has been followed at intervals by other notices in which nearly every point of the history of this drug has been discussed. In fact, we think we may fairly claim that in respect to new articles of materia medica—not proprietary articles—we have at least been abreast of the time. Some of the notices —for instance, those on jaborandi and KOLBE's discoveries in respect to salicylic acid—having been the first, we believe, that appeared in the English language. But unfortunately the unfamiliar is often passed by as "too scientific," and with those who have a fixed idea that the Journal is ten years in advance of the trade we can only hope for posthumous recognition.

The Annual Conversazione was held on Wednesday evening, in the South Kensington Museum, which had again been placed at the disposal of the Society by the kindness of the Lords of the Committtee of Council on Education. The guests, who numbered 2446, were received by the President and Council in the Throne Room of AKBAR KHAN, in the Indian Division of the Architectural Courts. In the North Court a selection of music was performed by the Band of the Royal Horse Guards, under the direction of Mr. CHARLES GODFREY, and in the Lecture Theatre a glee party, under the direction of Mr. WINN, sang a number of glees and madrigals.

THE ANNUAL MEETING OF THE CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

THE Trade Association held its first annual meeting on Tuesday, at the Freemasons' Tavern, and this was supplemented by a public meeting in the same place. There was a very good muster at both meetings and a report of the proceedings will be found on another page.

At these meetings, as at the Annual Meeting of the Pharmaceutical Society, the principal topics were the counter practice of chemists and druggists and co-operative stores. Of course, the supposed inaction of the Council of the Pharmaceutical Society furnished food for criticism by some of the speakers, but we were glad to note, as being in accord with an opinion we have continually expressed, that there was a general deprecation of any antagonism on the part of the Association towards the Society. In fact, we doubt not that by this time, if not before, the members of the Executive of the Association have some perception that the difficulties the Council has had to contend with are not to be removed by simple declamation, and the presence of one-third of the members of the Council at the meetings was ample proof that there is no lack of sympathy with the objects of the Association.

We are the more satisfied that this tone of moderation pervaded the meeting, because it acted as a rebuke to that exaggeration which tends to injure any cause. After hearing a gentleman announce that he had long ceased to support the Society, because of its shortcomings, it is rather amusing to turn to the Calendar and find that his support was limited to one year's subscription paid eight years ago, shortly after passing his Minor examination. We venture to say that he would have occupied a more dignified position if, feeling so strongly as he says he does, he had remained in the Society and tried to make it what he thinks it ought to be, a work that can be done by the members and by them alone. Then, forsooth, this gentleman, although qualified to pass the Major, will not do so because he will not countenance the Society by the payment of the fee. Is he aware that a considerable part of the fee would be required to meet the expenses of his examination and that a man may be a pharmaceutical chemist without lending his name or his purse to the Society? As containing considerably sounder views than his own on this subject of passing the Major, we commend to this gentleman's attention the remarks of his fellow-member of the Association, Mr. SLIPPER, made at the Annual Meeting of the Pharmaceutical Society, and reported on another page.

The proceedings of the Executive of the Association from its institution received the hearty endorsement of both meetings, and the only dissentient that we noticed was a gentleman, who, wrapped in the contemplation of the MS. of a speech he had intended to deliver, did not notice that a vote of thanks to the Chairman was being passed, and that he was losing his chance of temporary fame.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of the above Association will be held at 17, Bloomsbury Square, on Thursday evening next, May 24, 1877, when a paper will be read on "The Different Methods of Flower Fertilization," by Mr. J. F. SAVORY.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, May 16, 1877.

MR. JOHN WILLIAMS, PRESIDENT, IN THE CHAIR.

MR. WILLIAM DAWSON SAVAGE, VICE-PRESIDENT.

Present—Messrs. Atherton, Atkins, Betty, Bottle, Brown, Cracknell, Frazer, Greenish, Hampson, Hanbury, Hills, Mackay, Rimmington, Robbins, Sandford, Schacht, and Shaw.

Several individuals were restored to their former status in the Society upon payment of the current year's subscription and a fine.

After discussing other formal business the Council adjourned to the General Annual Meeting.

THE THIRTY-SIXTH ANNUAL GENERAL MEETING OF THE PHARMACEUTICAL SOCIETY.

Wednesday, May 16, 1877.

MR. JOHN WILLIAMS, PRESIDENT, IN THE CHAIR.

The Thirty-sixth Annual General Meeting of the Members of the Pharmaceutical Society of Great Britain was held at 17, Bloomsbury Square, on Wednesday morning last, May 16, at twelve o'clock.

The Secretary having read the notice convening the meeting, the President delivered the following address:—

The President's Address.

At the close of my year of office as President of the Pharmaceutical Society of Great Britain I feel some diffidence on the occasion of taking the chair at the general meeting of my brother members. Conscious of shortcomings and deficiencies in the performance of my somewhat anxious duties, I can however claim that I have acted with zeal and to the best of my ability.

The Annual Report of the Council brings under your notice the more salient points of interest which have occurred during the past year as affecting the material interests of the Society and of the trade. I would now invite your attention to considerations of another order and well worthy of your earnest thought. I allude to matters connected more especially with the scientific or professional status which has always been regarded as destined to be a most important factor in the position of the pharmacist of the future.

The man who is content with simply passing through apprenticeship or studentship and then rests satisfied with barely scraping through his Minor examination, even he who, graduating as a pharmaceutical chemist, "rests and is thankful," should be aware that what he has now accomplished is properly only a first step and not the final one; and when actively engaged in business (as I trust he will be), he must remember that it is then that his real career as a pharmacist commences, that the trade is one thing, but the profession another, and that if he desires (as who would not?) to attain the highest position his station in life will permit, he must now, more than ever, use his powers of observation, reflection, and thought.

I have sometimes heard brother chemists complain of the business as dull, irksome, and disagreeable; doubtless it is so to many, and for this reason, that those points of interest, which, the intelligent eye sees on every side, in the daily practice of their business, they pass by without notice, they are content simply to work, and, working thus, literally labour.

I think I hear some of my brother members muttering, "It's all very well—how are we to do it? We've as much as we can do to attend to the mere ordinary details of business; we've no time for study or experiments, or thinking about what we can or could do; we have got to earn money, and have no time—no time!—for intellectual pursuits." This is a mistake, and one of a nature most injurious to those who make it. I am now appealing to the younger members of our body—men who have passed their examinations, who are no longer in dread of being plucked, and who are at length liberated from the tender mercies of the demon "cram." I am asking such men to pursue and not give up their studies with the mistaken notion that now knowledge is useless to them, and I am trying to impress upon them that, so far from such being the case, it is now they want all they have and much more if they had it. Now, in everyday routine of business they will find all their knowledge of money value, and that the public—the great ultimate arbitrators on their success or failure in life—will not fail to distinguish between the man who is possessed of scientific or professional knowledge and the mere tradesman.

He whose mind is directed to the science of his business, I venture to state, but seldom experiences this feeling of "labour;" he is led by circumstances to take an interest in what is going on around him, interest, not merely of the "pounds-shillings-and-pence-type," but of a far different kind; he in time becomes an "expert" in the proper sense of the term—perhaps an enthusiast! —although such a contingency would not be advisable in all cases, perhaps. After a while the tradesman becomes a "professional" man, acquires new powers with increased knowledge, and thus by a sure process not only elevates himself but the whole body to which he belongs. No man really succeeds in this life who is not thoroughly in earnest. Competent knowledge and skill must be your servants; these coupled with integrity and common sense will form the best guarantee of future success.

There are occasions when not to advance is virtually to recede, and I take it none of us would be content to be as our forefathers were, something between oilmen, grocers, perfumers, quack doctors, and pharmacists.

I speak with some experience when I say that many of the younger men who are now coming into the trade are quite aware of the force of this argument; still I wish it were more generally, even universally felt. Then we should have our meetings not only of the parent society in Bloomsbury Square or Edinburgh, but also of those various associations throughout the country, overflowing with matter and papers, the reflection of the everyday life of attentive observation bestowed by intelligence upon the business.

It is very gratifying to find from the reports appearing in our Journal that great activity of this kind does exist in many parts of the country. Still there are many ugly blanks—blanks which are to the looker-on rather unaccountable at times. Let us take the case of two large towns of equal population and apparent advantages; one is and has for years been the the centre of active pharmaceutical exertion; the other, on the contrary, has remained perfectly quiescent. It is not necessary I should mention names, unfortunately most members present will be able to supply the blanks from their own personal knowledge. Now I want to call attention to this state of things very earnestly, and to urge upon members of the trade at large, not only in the country, but in those still more desert centres of intellectual sterility—the "outskirts of London"—the desirability, nay, absolute necessity, of establishing "local associations" —where all members of the trade may unite for mutual support, sympathy, and instruction, even, I would add, for strictly trade purposes, when necessary. Such associations exist as I have stated in some places, much to the advantage of the local members, but in many what I am suggesting as desirable is only partially carried out. And here, I dare say, I shall offend some susceptibilities when

I say I am not advocating the formation of associations for the mere purpose of the education of students, however important that may be in my estimation; my earnest wish is to see associations organized for the advancement of "men in business," both in their intellectual and material interests, giving them an inducement for study and the interchange of ideas on the one hand and the legitimate ventilation of trade interests on the other.

I beg I may not be misunderstood; I am not advocating the establishment of purely scientific, or purely educational, or purely trade associations. I have rather in my mind's eye the example set by that noble band of men, who, under many difficulties and much discouragement, founded the Pharmaceutical Society itself. They looked to the scientific advancement of the chemist and druggist of the day as the basis on which to rest the future structure. Still they did not hesitate to devote their means and energies to the advancement of education and the protection of trade interests when threatened in Parliament or otherwise, although never for a single moment forgetting the honour and dignity of the Society, or allowing it to become even by inference a "trade union." All honour, I say, to men like William Allen, Jacob Bell, Morson, Deane, and to many others whose names I might add—names of men, now, alas, too often no more—but who have left their successors a legacy of noble ideas and good intentions well carried out—a legacy whose teachings we are bound to stoutly maintain, foster, and advance.

I am quite aware that to establish local associations in small towns and villages is out of the question, but there are many large towns, centres, I may call them, at present without any local society of any kind, at which the pharmacists and trade should bestir themselves, and, by earnestly setting to work, achieve the success which must follow good intentions well acted upon. In many cases—may I not say in all?—it is really one man, or at most two or three, who determine the fact whether there is a local association or not. Let those who profess to be leaders in those towns at present without associations take heed of this. I hope my words will have some effect, and I think the time of this meeting will not be wasted by my treating on this question. I am sanguine enough to hope the time will come when every large town will possess its own local society in strict association with the parent Society in Bloomsbury Square, thus both giving and receiving support, and advancing the common cause; that the smaller towns and villages will be aiders and supporters to those centres; and that the organization of the trade both for professional and business purposes will become complete.

We have lately witnessed the rise of an association, formed specially to protect the trade interests of chemists and druggists,—an association aspiring to embrace the whole fraternity in Great Britain. Some fear was felt that its action might be antagonistic to the Pharmaceutical Society. I know of no reason why it should be; its promoters emphatically disclaim any such antagonism, and although, as may be gathered from what I have said, this association only very partially meets what I believe to be a necessity of the time, I feel bound to take this opportunity of speaking favourably of what appears so useful a movement.

Thus by being true to ourselves, taking advantage of the opportunities for improvement which may or ought to be within our reach, by not being content to be merely traders, but striving to be something higher, the public will soon learn to appraise us at our true value, and thus, I believe, not only our own interests but the good of the community at large be best—secured and advanced.

The VICE-PRESIDENT moved, and Mr. GREENISH seconded, that the report which had been printed and circulated among the members should be taken as read, which was unanimously agreed to.

REPORT OF THE COUNCIL.

The month of May again brings the Council of the Pharmaceutical Society and their constituents together to review the proceedings of the past year, and take counsel on such matters as may present themselves for consideration.

The financial statement usually takes precedence of other matters in the Report of the Council, not exclusively as a question of income and expenditure, but also, and perhaps more especially, as indicating the present and prospective strength of the Society; the advance of education as tested by examination; and the growth of the class of which the Society is the acknowledged representative.

It will be seen that although the number of "Members" is slightly below the return of 1875, the total amount of subscriptions is in excess of that year's, owing to the greater accession of "Associates" and "Apprentices or Students."

The number of candidates for examination in 1876 considerably exceeded that of 1875, *i.e.*, Preliminary, 1054 against 824; Minor, 468 against 285; Major, 101 against 82. The transference of part of the practical work from the Major to the Minor examination has proved beneficial, and the fact of a reduction in the percentage of failures from 50 to 46·3, is evidence that the change has not been prejudicial to the candidates themselves.

It will be remembered that in the last Report the Council called attention to the fact that the Preliminary examination had been committed to the College of Preceptors. This arrangement has now been in operation long enough to enable the Council to judge and speak satisfactorily of its working. The percentage of failures has been even more reduced than in the Minor examination, the examiners' statistics showing only 42·4, against 50 in the previous year; thus clearly the alteration has had no deterring effect in diminishing the number of applicants. This fact is satisfactory alike to those who look anxiously for the time when only educated men will be found exercising the responsible duties of pharmacy, and to those also who have been gloomily foretelling the coming dearth of assistants.

It has frequently been said, and cannot be too often repeated, that chemists taking apprentices have in their hands a great opportunity of advancing the important interests of pharmacy in Great Britain, by insisting on a previous examination and registration of their pupils.

The amount of expenditure from year to year must necessarily vary. The increased number of applicants for examination; the better arrangement of the Museum; the publication of a catalogue; and the provision of a separate set of specimens for the use of the lecturers swell the amount of disbursements.

The North British Branch has been rendered more complete by the appointment of a paid assistant-secretary, entailing, of course, additional cost to the Society. This appointment was mentioned in 1876, but it has not hitherto formed an item in the expenditure.

On the other hand the expense of the Journal has been considerably reduced; and the Society did not expend as much for law charges as in 1875.

The new regulations announced last year for the distribution of prizes were acted on in October last, and it was gratifying to find, on the testimony of the Professors, that the recipients were well worthy of the distinctions awarded, and of the perpetuation of their names in the Calendar of the Society. An addition to these prizes will be made in several future years through the liberality of Mr. Thomas Hanbury, who has presented to the Society, as well as to the British Pharmaceutical Conference, thirty copies of 'Science Papers' by his late brother, Daniel Hanbury, and thirty copies of the 'Pharmacographia' by the same author in conjunction with Professor Flückiger.

Although it may be matter foreign to the business of the Society, the Council cannot resist the gratification of pointing out to their fellow members the gift, from the same donor, of the admirable portrait of that distinguished scholar and pharmacist, the late Daniel Hanbury.

The Library now contains about 5000 volumes, and it was found necessary to provide accommodation for additional books which had accumulated subsequently to the extensive alteration in 1873. The number of readers in the Library and the applications (both from London and the provinces) for books, furnish satisfactory evidence of the value of this part of the Society's operations. A list of books suggested by gentlemen using the Library comes monthly before the Committee, and great care is taken in the selection of those to be purchased. The legacy bequeathed by the late Daniel Hanbury continues to be applied in the purchase of standard works of exceptional value.

In the Museum considerable efforts have been made to augment the collection and to maintain it in perfect condition. Previously specimens were removed from the cases day by day for the use of the lecturers. Although such an application of them was of great value, certain disadvantages arose therefrom, and it was determined to provide as far as possible a separate collection to illustrate the lectures. Again reference must be made to the kindness of Mr. Thomas Hanbury, and the life-long work of his brother. The valuable collection of Materia Medica, and the herbarium, formed by Daniel Hanbury, both containing many historic specimens, have now become the permanent property of the Pharmaceutical Society, and a special apartment has been assigned to them.

At the Evening Meetings many interesting papers have been read and discussed. The Council cannot too urgently invite members and associates, especially the younger ones, to join in these pleasant gatherings. Besides affording opportunities for obtaining and diffusing valuable information, these periodical meetings tend to keep up that feeling of good fellowship and *esprit de corps* which is the very life blood of a society.

During the past year the School of Pharmacy has been well attended; the classes, although somewhat smaller than those of the previous session, have been marked by diligence and an evident desire on the part of the students to avail themselves of the means offered for improvement. It is gratifying also to see that many of the young men who attend the School in the day, with some others of former sessions, embrace the opportunities offered by the periodical evening meetings of the Students' Association, which are held, by permission of the Council, in the house of the Society.

No measure affecting the interests of chemists and druggists has been proposed in Parliament since the last meeting of the Society.

Many prosecutions for infringement of the Pharmacy Act have been instituted during the past year and successfully carried through. In still more cases the Registrar has compelled offenders to discontinue their illegal practices. A very daring attempt to obtain registration by fraud, which for the moment was successful, occurred at the end of last year. A candidate for the Preliminary employed another person to represent him before the Board of Examiners. The case was tried and the offenders convicted at the Central Criminal Court; a full report appeared in the *Pharmaceutical Journal*. It is mentioned here more particularly to put Superintendents of the Preliminary examinations on their guard, and to show the necessity of identifying the candidates.

It will be remembered that some difficulty arose last year respecting the preparation of belladonna and aconite liniments with methylated spirit. The Board of Inland Revenue issued an interdict against that practice, and it was felt to be the duty of the Council to memorialize them on the matter. The memorial being couched in terms to show that the Council would in no way encourage or connive at any infringement of the Methylated Spirit Act, or any substitution of methylated for rectified spirit in the composition of medicines for internal use, met with that courteous consideration which has always been accorded to the Council by the authorities at Somerset House, and the previous decision of the Board was reversed.

The operations of the Benevolent Fund during the past year have been satisfactory. Four fresh annuitants were elected in October last, making twenty-four annuitants up to Christmas, representing an annual charge on the fund of £720. The casual grants to applicants amounted to £470. It is gratifying to observe that the annual subscriptions have exceeded those of 1875, by about £200, and the number of subscribers has increased from 1706 to 2347, showing a more widely spread interest in this important fund.

Before the official publication of this report, although after its preparation, an important gathering in aid of the Benevolent Fund will have been held. The Council decided on announcing a dinner at the present time for various reasons.

It is now ten years since the last dinner, which proved eminently successful, was held for a similar purpose. Ten years is the period allotted to firms as the limit of their privilege of voting in consideration of their respective donations, and many will doubtless be glad to renew that privilege as well as to extend aid in so good a cause. Another very important point is that the annuities, *which must never be jeopardized*, now exceed considerably the interest on invested capital, and although the Council would not for a moment anticipate any diminution of the annual subscriptions, they cannot as prudent guardians of the fund omit putting this question prominently forward.

By a new regulation which will come into operation in 1878, a provision is made to give votes, in proportion to his previous subscriptions or donations, to any person who may at some future time be under the necessity of seeking aid from the Benevolent Fund and be placed on the list of Candidates for an annuity.

FINANCIAL STATEMENT FROM JANUARY 1ST TO DECEMBER 31ST, 1876.

Receipts.

	£	s.	d.	£	s.	d.
Balance in Treasurer's hands, January 1st, 1876				476	7	2
Balance in Secretary's hands, January 1st, 1876				84	13	10
Balance in Mr. Mackay's hands, January 1st, 1876				39	14	1
Life Members' Fund—Interest				89	1	3
Government Securities—Interest				445	19	2
Subscriptions :—						
1811 Members, Pharmaceutical Chemists	1901	11	0			
836 „ Chemists and Druggists	877	16	0			
706 Associates in Business	741	6	0			
814 Associates not in Business	427	7	0			
934 Apprentices	490	7	0			
36 Entrance Fees	75	12	0			
	4513	19	0			
Fines upon restoration to the Society	52	8	3			
				4566	7	3
Registration Fees :—						
62 Pharmaceutical Chemists, Major Examination	325	10	0			
232 Chemists and Druggists, Minor Examination	730	16	0			
27 Chemists and Druggists, Modified Examination	28	7	0			
612 Apprentices, Preliminary Examination	1348	4	0			
24 Registration Fees as Chemists and Druggists	126	0	0			
8 Fees for Restoration to the Register	8	8	0			
				2567	5	0
Examination Fees :—						
746 Preliminary, Modified, Minor and Major Examination Fees	783	6	0			
273 Preliminary Examination Fees	573	6	0			
				1356	12	0
Balance due to Mr. Mackay, December 31st, 1876				13	0	2
				£9638	19	11

Expenditure.

	£	s.	d.	£	s.	d.
Advertisements				1	8	0
Apparatus				3	16	0
Annuity—Dr. Redwood				100	0	0
Carriage of Books to or from Library, and other parcels				13	16	4
Certificates of Death				19	17	10
Conversazione	238	19	3			
Pharmaceutical Meetings	20	5	9			
				259	5	0

Examiners, Boards of—

	England and Wales. £	s.	d.	Scotland. £	s.	d.
Fees to Examiners	686	14	0	136	10	0
Fees to Superintendents — Prelim. Examination	216	6	0	25	4	0
Hire of rooms for Prelim. Examination	64	18	5	4	13	0
Travelling Expenses	74	8	0	6	18	4
Refreshments for Examiners	64	19	8	3	7	4
Apparatus, Drugs, Chemicals, etc., for Examinations & charges in connection therewith	38	4	3	12	0	9
				188	18	5
				1145	5	4

	£	s.	d.	£	s.	d.
Examiners, Boards of	1833	18	9			
Fees to the College of Preceptors	110	15	6			
Deputation from Scotland	24	19	0			
				1469	13	3
Fixtures and Fittings				159	15	7
Furniture				58	16	0
Gratuity :—Assistant Secretary				20	0	0
House Expenses				231	7	6
Journal				629	14	10
Laboratory :—						
Professor of Practical Chemistry—Endowment of Chair	100	0	0			
Prize Medals, etc.	6	18	6			
				106	18	6
Law and Professional Charges				185	7	3
Lectures :—						
Professor of Chemistry and Pharmacy—Endowment of Chair	100	0	0			
Professor of Botany and Materia Medica—Endowment of Chair	100	0	0			
Subscription to Royal Botanic Gardens	21	0	0			
Prize Medals, etc.	9	6	0			
				230	6	0
Local Secretaries' Expenses				3	4	9
Library :—Purchase of Books, etc.	63	3	1			
Librarian's Salary	190	0	0			
				253	3	1
Hanbury Fund—Purchase of Books				20	2	0
Museum :—						
Curator's Salary	150	0	0			
Temporary Assistant's Salary	41	16	8			
Specimens, Bottles and Sundries	102	6	10			
Catalogue of Materia Medica Specimens	106	12	8			
				400	16	2
Branch of the Society in Scotland :—						
Assistant Secretary in Scotland—Salary	120	0	0			
Fixtures and Fittings	29	11	0			
Furniture	16	17	2			
Rent, Taxes, and Insurance	92	2	1			
Printing and Stationery	18	17	6			
Stamps and Telegrams	8	9	10			
Sundry Items	53	12	5			
				334	10	0
Postage				254	0	5
Provincial Education—Grants to Provincial Associations				40	0	0
Register				30	17	3
Repairs and Alterations				373	12	2
Rent, Taxes, and Insurance				489	19	0
Returned Subscriptions to Associates				22	1	0
Stationery, Engraving, Printing, and Office Expenses				323	10	10
Salaries :—						
Secretary and Registrar	450	0	0			
Assistant Secretary	250	0	0			
Clerks and Servants	800	11	6			
				1500	11	6
Cost of Materials supplied to Bell Scholars—session 1876-7				10	0	0
Diploma Cases				8	8	0
Council Medal Dies				37	10	0
Sundries				11	3	9
Travelling Expenses—Country Members of Council				240	14	4
Refreshments for Council				24	1	3
Balance in Treasurer's hands, December 31st, 1876				1703	6	1
Balance in Secretary's hands, December 31st, 1876				57	6	[illegible]
				£9638	19	11

BENEVOLENT FUND, 1876.

Dr.

	£	s.	d.	£	s.	d.
Twenty Annuitants, each receiving £30	600	0	0			
Two months' annuity to Christmas to Four Annuitants elected in October	20	0	0			
				620	0	0
A former Member, Brighton (third grant)	10	0	0			
A former Member, Dulwich (third grant)	10	0	0			
A former Member, Liverpool	5	0	0			
A former Member, Guernsey (second grant)	10	0	0			
Widow of the above, who died during Candidature for an Annuity	10	0	0			
A former Associate, Islington, London	5	0	0			
Ditto Kirkgunzeon	5	0	0			
Ditto (second grant)	10	0	0			
Widow of a Member, Tasmania	20	0	0			
Widow of a Member, Upper Norwood, now an Annuitant (second grant)	15	0	0			
Widow of a Member and Annuitant, Tottenham (second grant)	15	0	0			
Widow of a Member, Devizes (second grant)	10	0	0			
Ditto (third grant)	10	0	0			
Widow of a Member, Brixton, London	20	0	0			
Widow of a Member, Islington, London (second grant)	10	0	0			
Widow of a Member, Manchester (second grant)	15	0	0			
Widow of a Member, Durham	10	0	0			
Widow of a former Member, St. Ives, Hunts.	15	0	0			
The five Orphan Children of a late Member, Portsea (second grant)	10	0	0			
Orphan Daughter of a late Member, Southampton (ninth grant)	10	0	0			
A Registered Chemist and Druggist, Leicester (fourth grant)	10	0	0			
A Registered Chemist and Druggist, Norwich	10	0	0			
A Registered Chemist and Druggist, Croydon (second grant)	15	0	0			
A Registered Chemist and Druggist, Tiddeswell, now a Candidate for an Annuity	20	0	0			
A Registered Chemist and Druggist, Liverpool, now an Annuitant (fourth grant)	10	0	0			
A Registered Chemist and Druggist, Wells, Norfolk (fourth grant)	10	0	0			
Ditto (fifth grant)	10	0	0			
A Registered Chemist and Druggist, Southgate (second grant)	10	0	0			
A Registered Chemist and Druggist, Old Ford Road, London	10	0	0			
A Registered Chemist and Druggist, Norwich (third grant)	10	0	0			
A Registered Chemist and Druggist, Ashbourne (second grant)	10	0	0			
A Registered Chemist and Druggist, Liverpool	10	0	0			
A Registered Chemist and Druggist, Huddersfield	10	0	0			
Widow of a Registered Chemist and Druggist, Kingston-on-Thames, now an Annuitant	10	0	0			
Widow of a Registered Chemist and Druggist, Bristol (second grant)	15	0	0			
Widow of a Registered Chemist and Druggist, Poplar, London	10	0	0			
Widow of a Registered Chemist and Druggist, Westminster, London (second grant)	10	0	0			
Widow of a Registered Chemist and Druggist, Notting Hill, London (third grant)	15	0	0			
Widow of a Registered Chemist and Druggist, Birmingham (third grant)	10	0	0			
Widow of a Registered Chemist and Druggist, Richmond, Surrey	15	0	0			
Wife of a Registered Chemist and Druggist, London, husband a lunatic	15	0	0			
				470	0	0
Purchase of £700 Consols				659	5	0
Printing and Stationery	55	7	2			
Postage	44	18	5			
				100	5	7
Balance in Treasurer's hands				154	6	7
				£2008	17	2

Cr.

	£	s.	d.	£	s.	d.
Balance in Treasurer's hands, Jan. 1st, 1876				183	15	6
Balance in Secretary's hands, Jan. 1st, 1876				0	7	9
Dividends on Invested Capital				457	10	0
Donations	191	11	0			
Subscriptions	1164	1	7			
				1359	8	7
Balance due to Secretary, Dec. 31st, 1876				2	1	4
				£2003	17	2

We, the undersigned Auditors, have examined the accounts of the Pharmaceutical Society, as presented in the Financial Statement and Benevolent Fund Account, and find them correct; and that there was standing to the account of the Society at the Bank of England, on the 31st December, 1876:—

		£	s.	d.	£	s.	d.
General Fund	New 3 per Cents.	15,000	0	0			
Life Members' Fund	New 3 per Cents.	3,000	0	0			
					18,000	0	0
Benevolent Fund	Consols	15,700	0	0			
Pereira Memorial Fund	Consols	100	0	0			
Bell Memorial Fund	Consols	2,050	0	0			
					17,850	0	0
Secretary's Casual Relief Fund do.					105	0	0
Hills Prize Fund—Russian Bonds					300	0	0

FREDERICK BARRON,
WILLIAM HODGKINSON,
EDWARD HORNER,
HENRY AYSCOUGH THOMPSON,
WILLIAM SQUIRE,
Auditors.

March 26, 1877.

Mr. Jones (Leamington) said he was pleased to meet so many old friends in the room, and especially pleased, as the President of the Trade Association, to hear the kind remarks which had fallen from the President. That gentleman had also given a practical proof of good feeling towards the Association by a handsome donation from his firm. That donation was received with great pleasure, and on the part of the members of the Association he could thoroughly reciprocate his kind feeling, and say that they had no antagonism whatever towards the Society, their object being to work hand in hand with the Council to promote the general interests of chemists throughout the country. They felt there were matters which might fairly be considered as strictly trade matters, which the Trade Association could take up, and if they were at any time at a loss he was sure the Council would assist them with its advice. He was pleased to see that the financial statement of the Council showed that the funds were in a flourishing state. As regarded the number of candidates for examination it was a matter for congratulation to see that for the Preliminary they had increased from 824 to 1054; Minor, from 285 to 468; and the Major from 82 to 101; and it was especially pleasing to see the increase in the number of Major examinations, particularly to the Council, which was anxious that the number of members of the Society should increase. As a local secretary he might be allowed to say a word or two on the Preliminary examination. He considered, from some experience, the examination to be a very fair one. It was just such a one as a young man who had been fairly educated ought to pass, and he had always contended that when any candidates were plucked it had arisen, not from the fault of the Council or those who undertook the examination, but from their own fault in not passing it immediately they left school. No doubt many of those present, if set to work a very difficult sum in arithmetic or decimals, or to construe a long page of Cæsar, might find a difficulty, and so with these young men after they had left school some time. But when any such case happened within his experience he always recommended the parties to apply to a competent schoolmaster for instruction, and on the next occasion he found they passed a very good examination. He should recommend all his friends who took apprentices to insist on their passing the Preliminary examination immediately they left school. The examination was not by any means too severe, especially if taken at that time. The next point in the report referred to employers giving facilities to their assistants for study, and he was pleased to say that he knew a great many who took apprentices were now in the habit of giving them time to improve their minds and increase their knowledge. Then the report referred to the satisfactory condition of the North British Branch and to the fact of their having engaged a paid secretary. Of course that was only what they might expect from their Scotch friends, they knew how extremely well they managed all business matters, and with Mr. Mackay and the other Scotch members at the head he doubted not that the North British Branch would continue to flourish. Then a reference was made to the donation from the late Mr. Hanbury, and he could not pass that over without saying a word or two, because he had had the pleasure of enjoying Mr. Hanbury's society and friendship, and it was indeed a great blow to him when he was removed. He was glad to find the evening meetings had been pretty well attended, and he hoped the numbers would increase. It was a very great advantage to young men living in London to be able to attend those lectures and obtain information which could not fail to be of advantage to them. Then the report stated that no measure had been introduced into Parliament affecting the interests of the trade since the last meeting. He was sorry to say that one was now introduced which would require their very careful consideration, and perhaps they might hear from the Solicitor later on what interpretation the judges would probably put upon the most important clause in it. Then the report referred to prosecutions for illegal trading, and the next point was one with respect to the Benevolent Fund. The great gathering on the previous evening must have been very gratifying to the Council, especially as there was such a considerable increase in the funds. He wished every member would give according to his means, and in fact that every chemist throughout the country would give a small amount and then it would in the aggregate realize a large sum. They knew that chemists were not wealthy men; they generally managed to live quietly and comfortably, but their pockets did not get very full, and they were not able to leave large sums to those whom they left behind them. Sometimes misfortunes overtook people, and if a man felt that he had £30 a year to live upon, although it was not much, still it would keep him from the workhouse, or from starvation. He, therefore, hoped that not only donations but subscriptions would continue to increase from year to year. They must all be of one opinion with regard to the efforts made by the Council to encourage education and business-like habits amongst young men, and he was pleased to see that one of the examinations had become more practical, because that was what they wanted. They required not only a young man who was well up in chemistry and atomic weights, but one who knew the practical parts of the business. He had great pleasure in moving—

"That the report of the Council as now read be received, adopted, and printed in the Society's Journal and Transactions."

Mr. Slipper seconded the resolution with great pleasure, and said he felt it a great privilege to do so, and to follow Mr. Jones, who was so active and useful a member of the trade, and altogether a man of whom any society might be proud. He agreed with him very much in his remarks about education, especially about the education of those coming into the Society. He had always felt considerable interest in that point, and he was glad to find that the handing over of the examination to the College of Preceptors had been successful. He also sympathized with Mr. Jones's remark about tradesmen in the country insisting on parents and guardians seeing that those who were about to be apprenticed in this business should pass the Preliminary examination before the premium was paid. Any one who took apprentices would feel it much more pleasant to undertake the training of a youth who was properly prepared for the business in which he was going to be employed; and, therefore, he thought their country friends, who were more accustomed than those in London to take apprentices, should almost insist, if they took an apprentice, that he should be able to read a passage in Cæsar if it were put before him, and do certain other things, which forty years ago he himself might have been able to manage, but which he did not know that he could do so well now. He was glad to see that the number of Minors had increased, and he should like much to see the Majors increase also, because he thought it was very desirable that those who had got their Minor creditably should pass on to the higher examination. If a man thought at all about the interest of his order, he should feel that he had not attained his proper position until he was able to make use of the title, "pharmaceutical chemist." He was surprised to see so many young men go into business as chemists and druggists and remain so when a very little time given for the work would enable them to get through the Major examination creditably. He agreed with Mr. Jones that theirs was not a money-making business; but there was a satisfaction in feeling that wherever they were placed, they held a reputable position. He knew some of their friends spoke of themselves as professional men; but he must say he ignored that altogether unless they went in for the higher branches. He called himself a tradesman, and he thought most of them were tradesmen who dealt with the kind of things that came in their way. For any one to call himself a professional man who dealt in patent medicines and so forth appeared to him a misnomer. But still they might consider themselves as members of one of the most reputable trades that could be followed, and into which no one could enter unless he had received a respectable and something like a classical education. If they did not get very rich they ought to endeavour to uphold their position, and that might be considered almost a recompense for not making much money. With regard to the sale of methylated spirit he was very glad to see the good results which had followed the action of the Council, because it did seem a most anomalous thing that the distinction should be made between one liniment and another. It was quite absurd that they should be allowed to make soap liniment with methylated spirit, and not belladonna, which was a preparation that it was specially desirable they should make as reasonable as possible; and it was, therefore, very gratifying to find that the attention of the Council had been called to the matter, and that the Board of Inland Revenue had acceded to its request. He had been much pleased to be at the Benevolent Fund dinner on the previous evening, and hoped the Fund would be still more helped in the following year. He had been much struck with the figures stated by the President, showing how much would be produced if every chemist in the country subscribed 2*s.* 6*d.* per annum; and it did seem marvellous that there should be a chemist or druggist who did not subscribe. No one could tell what might happen to him, and the amount required was so small that he was surprised to find that any one did not subscribe at least 2*s.* 6*d.*, if not 5*s.*, to the Fund. He therefore trusted the remarks made by the President would receive attention, and that the Fund would be better supported in future.

Mr. Vizer (Brighton) said he was sorry he was too late to hear the address of the President, and with regard to the report he was also sorry that he could not enter into it with so much gusto as the last speaker. He did not regard it as quite so satisfactory; on the contrary, he thought it one of the most unsatisfactory ones he had read for a long time. He would not touch on many points on which observation might be made, as, for instance, on the decline in the number of members, which was a question that he had often spoken upon before, but he did wish to say a few words upon some points in it. He opened this report with some feelings of anxiety, being particularly desirous to know what the Society was doing in reference to subjects which were occupying a very prominent place in the minds of all their brethren. He read it carefully through paragraph by paragraph, and was astounded to find that not one single word was said upon the points on which he wanted information, and which he knew were uppermost in the mind of the trade. A very important decision which had been lately arrived at, with reference to the *lac sulphuris* question, was entirely absent, and the question of co-operative stores had failed entirely to stir the equanimity of their worthy brethren the Council. Again, he was astounded to find that the Nottingham case was not even alluded to. Was it the fact that the Council could sit there quietly and see a chemist fined £20, with a knowledge that the same thing might happen to any of themselves any day of the week, and yet not be disturbed about it? It had not only not been alluded to, but he found it stated that no measure affecting the interests of chemists and druggists had been proposed in Parliament since the last meeting of the Society. Now, he did not want to say anything harsh, but yet, as one engaged in the business, he must say that if the Council could not see clouds casting their shadows before them, it would be a very peculiar thing to his mind. Who could not foresee, from what was found in the *Lancet* of only Saturday last, that some day or other steps would be taken to settle this all important question with reference to prescribing over the counter? The paragraph to which he referred was on the 12th page of the *Lancet*, where it said that a Bill promoted by the East London Medical Defence Association had been introduced and read a first time on the 2nd May, bearing the names of Dr. Lush and other persons in high position, the object of which was that "any person not already registered or not qualified at the time of the passing of this Act to be registered under the said recited Act, who shall make, fill up, or sign any medical certificate for the purpose of an Act of Parliament, or who shall practise medicine or surgery for gain, unless such person has a duly registered qualification or qualifications in both medicine and surgery, shall likewise on summary conviction for any such offence pay the sum of £20." He was perfectly aware that in touching on a subject of this kind they stood in a most delicate position. Far be it from him to say one syllable that would compromise their position as dispensing chemists. He felt that the medical profession was an honourable one, and one which would not desire to unduly harass them. And from the intercourse he had had on the subject with different medical men, he was satisfied that it was not against the legitimate chemist that the medical profession was embittered, but it was against a class which he was quite confident the majority of chemists would equally deprecate. He would not advocate indiscriminate unlimited prescribing, for such was not their vocation; but whilst he maintained that, he also maintained that it would be a perfect impossibility, if this Act were carried through the House, for them to carry on business from day to day without incurring the liability which he had mentioned. Under these circumstances he was sorry to see the subject was not referred to in the report. Whether the President had touched upon it in his address he could not say, but he would impress upon the meeting most earnestly that the Council ought to put their shoulders to the wheel and face the difficulty which met them. He rejoiced to know that another organization was in existence, from which he believed, material help might be obtained, and he sincerely hoped that the two associations might work harmoniously together. He saw no reason why the trade association should not become instead of a very powerful opponent, as it might easily be, a very valuable support to the Society, and as such he hoped the Society would countenance it. Co-operative trading action was a very important question which no doubt they were all tired of hearing about, but at the same time they were equally tired of experiencing it, and he did say on mature consideration that the trade had a right to demand of the Council an absolute settlement of that question. Whether it was right or wrong they ought to know the fact. He was quite aware of what would be said about it, but if it were right that the Pharmacy Act was to protect them, and that persons had been prosecuted for carrying on business with qualified assistants, he did maintain that what was good for an individual must hold good in the case of multitudes of individuals, and therefore he thought they had a right to demand of the Council that this question should not be delegated to other parties. He admitted that the Society had carried on a great work with reference to education, but he did not think that was all it had to do; whereas in looking through the report, what did he find? Out of twenty-two paragraphs, eight were devoted to educational subjects, four to the Benevolent Fund, one to the infringement of the Pharmacy Act, but not one to any subject really touching their trade interests. With regard to this medical question, he held in his hand a resolution which was moved by a gentleman highly respected by all the older members of the association, Jacob Bell, in 1841, with reference to a Bill then before Parliament,—"That the provisions of this Bill deeply injure the interests and lessen the usefulness of chemists and druggists as well as affect the comfort and resources of the poorer classes of society, whilst the immediate and pressing wants of individuals would create a liability to informations which would be a source of increasing vexation."

He thought that was a good example for the Council to look at and carry out. They knew that such an Act as he had referred to would be highly injurious and detrimental, not to themselves only but to the public, and he believed that if a memorial were got up the public, as well as the trade, would sign it in great numbers. He therefore commended this subject to the attention of the Council, as it seemed to have been forgotten, and hoped it would receive careful attention.

Mr. YOUNG said he also was astonished at the apparent apathy of the Council with regard to the impending action of the medical profession as it influenced the trade. They had certain rights, and they ought to look to the Council to maintain those rights, so that they might hand them down intact to their successors. But speaking for himself, he must say, that if such an Act became law, he might close his shop. No doubt the medical profession was a very honourable one, but he did not give the members of it credit for having quite such good intentions as some gentlemen did towards chemists. That profession was already in possession of the Apothecaries Act of 1815, which gave them abundant power to prosecute medical nonconformists, and it was hardly likely they would go to Parliament for powers to prosecute medical eclectics, botanists and the like; they might depend upon it that chemists and druggists were really aimed at. Now he believed that chemists and druggists were a very important wheel in the social fabric, and that they ought to be supported. On a similar occasion some years ago, when a Bill was being brought in for the special aggrandizement of the medical profession, Sir Francis Burdett remarked in the House of Commons that they ought to be cautious lest they fell into pernicious error; they had not the power in England of compelling people to submit to medical prescriptions and surgical operations as was the case in some foreign countries, but only to the laws of the land. But if they did not look out they would have to submit to physicians' prescriptions and the operations of surgeons, because it was clear that chemists would not be able to afford any relief to the poor. He therefore hoped that the Council would take up the matter and he felt sure that the public would willingly sign in thousands any petition which might be prepared.

The PRESIDENT remarked that this Bill had been only published on the previous day, and that the Parliamentary Committee which met in the afternoon had had it under serious consideration, but it was impossible it could have appeared in the report which was printed a week previously.

Mr. URWICK was sorry he could not quite follow what had been said by a previous speaker as to the great advantage and gain to the Society from the increase in the number of persons examined. It was quite true there was a slight increase over the numbers in 1875, but if they went back to 1874 there was a decrease in all the classes except the one in which he was most pleased to see an increase, namely the Major examinations. The principal suggestion he had to make was as to the Shepperley case. No doubt the Council thought it was acting rightly in having nothing to do with it, but he could not forget that when the Society was formed the charter set out as its main objects not only education, but the protection of chemists and druggists, not of pharmaceutical chemists alone; and in the Shepperley case there were many things which affected their interests. He had never given himself to prescribing, because he did not like it, but still they were bound sometimes to prescribe. He always liked to keep within the law, and he should like to know what the law really was, and no doubt many others were in the same position; and while appreciating what the Society had done for education, he thought it ought also to have done something in this case. The Council might have good reasons for not taking it up, because there were many things known to the Council which were not known outside, and therefore he was quite prepared to believe that it had acted conscientiously. But there was another course which he thought might have been taken with advantage to the trade at large. The case might have been watched by the Solicitor, because very often in those cases, if the circumstances did not come exactly within the Act, there were principles involved, which rendered it important to know what was done, and to render assistance to the magistrates, especially with a view to dealing with future cases. He therefore thought it would be a great advantage if the Society appeared to watch the case, and no doubt the judge would have sanctioned it. Another serious matter was the co-operative trading. That was a very difficult question, and he was afraid many of the trade did not know all the difficulties. He believed many of these associations really came under the Benefit Societies Act, and that where men were associated together in supplying themselves they came within that Act, and had a right to be supplied with any articles at whatever risk or prices they could supply themselves at.

Mr. BULLEN (Westrup) supported the resolution, and in doing so said he did not propose to offer any criticism on the action of the Council, because his voice had been so rarely heard on pharmaceutical politics that he should consider it impertinent to offer any comments of his own. He only wished to make a suggestion, and to raise, if possible, a discussion on a point which had been more than once mooted there, namely, the administration of the Benevolent Fund. The President in his excellent address on the previous evening had alluded to the desirability that all annuitants on the Fund should have their income dependent on money absolutely invested and not on current subscriptions; but while he bowed readily to any opinion of the President, he thought that such a policy, although eminently safe, was not a wise one, and that a bolder and more liberal course would be more desirable. The gentleman who seconded the adoption of the report had remarked on the comparatively few subscribers to the Fund. It appeared that there were about 8000 chemists in business, of whom only about 2300 subscribed to it, and although he could not easily account for this fact, he thought it might to some extent be explained by the fact that they did not feel that personal interest in the matter which they would if there were a larger number of annuitants, and if they felt a closer association with the Fund. He thought it would be much wiser to throw themselves on the liberality of pharmaceutical benevolence rather than to invest all the money. A country chemist looked at 5*s.*, and, taking the time and labour into consideration, there was probably no money earned more hardly than that earned by chemists and druggists in the country. He looked at this 5*s.*, and though he would be glad to give it towards an annuity to an old friend who had broken down in business or fallen into distress, he did not feel inclined to hand it over to the Pharmaceutical Council to be invested in the 3 per cents., which would produce only 1½*d.* per annum out of the 5*s.* If the governors of the various orphan asylums and other charitable institutions were all to determine that no child at school and no poor person in the asylum should receive any benefit except what was derived from the interest of invested money, it would be a great calamity and a great reflection on the benevolence of the British public. But it would be a libel to suppose that the benevolence of chemists was not equal to that of the ordinary British public, and if they were to throw a little greater strain on these current subscriptions, he believed they would still bear it, and that the pulse of this pharmaceutical benevolence, which was healthy if not very robust, would throb with much greater power than it had hitherto done. He would, therefore, suggest that ten more annuitants should be added so as to charge an additional £300 on the current subscriptions, and he believed that if this were done it would give local secretaries a much stronger interest in the matter, that they would readily respond to the call, that the Benevolent Fund would be made much more useful, and that they would be more than recouped the extra £300 required. It need not be feared that the money would not be forthcoming in all future years, because there was no reason why succeeding chemists and druggists should be any less benevolent than they were at present. The experience of last year was a strong warrant for being more liberal in the disposal of this Fund, since £1359 had been received against £1145 in the previous year. One other item he should like to allude to, namely, the action of the Pharmacy Act with regard to one particular class of persons connected with the trade, and it seemed to him it was in that direction it was likely to throw upon the Benevolent Fund more candidates than would otherwise make claims upon it, namely, the widows of deceased chemists. He believed the Act did not allow a widow to carry on business in her own name even with a qualified assistant. It struck him it was rather oppressive in that respect. He had always been anxious that the Act should be carried out fairly and that no unqualified person should carry on business whose name was not on the register; but if a poor woman whose husband was just dead, had a son of 17 or 18 likely to succeed to the business, or if she herself by the aid of a competent assistant could carry it on for the rest of her life, so as to obtain a living, he thought it extremely desirable, and it seemed somewhat of an oversight on the part of those who drew the Act that some special exemption in favour of a *bonâ fide* widow of a chemist was not made. He hoped, therefore, the Council would be very careful in applying the Act and not allow it to be made in any way oppressive in that direction.

Mr. Fitch (Hackney) said that whilst he fully endorsed all that had been said by the President he must say there was one part he had passed over very cursorily, and that was the question of co-operative stores. He had always considered that the stores did not protect themselves by having a qualified assistant to manage, and that probably there was something in the Act which would show that they were not exempt, and upon looking into the Act he had been confirmed in that opinion. But feeling some doubts upon the subject, he wrote to the Editor of the Journal, desiring to ventilate the question amongst his brethren, but his letter was not answered. That was in December, 1876. In that letter, he referred to the Pharmacy Act, 1868, and especially to clauses 1 and 17, which seemed directly to meet the case of co-operative stores dealing with the public, and asked him if any one could take proceedings under the Act, or if they must be taken by the Registrar of the Society, adding that if he received an answer to the effect that any one could prosecute, he was prepared to do it, because, when he joined the Society, he understood that a certain amount of education was required from its members, and that the Society would protect them and see that no one outside robbed them of their just privileges. Receiving no answer, he waited until January, and then thinking his letter might have miscarried,* he sent a subscription by a crossed cheque to the Secretary and enclosed it in the letter so as to be able to prove delivery, —that was on January 17, 1877. In it he referred to his former letter and asked if it had been received, for that he had taken legal advice and was informed that co-operative stores could be prosecuted. To that letter, as to any letter addressed to the Secretary, he received a polite reply, saying that if he would furnish him with the names of any persons who were infringing the Act he would take proceedings. He accordingly furnished him with the names, but he was not aware that any proceedings had been taken. He then proceeded to state in detail the steps which he had taken to prove the infringement of the Act by the dispensing of a prescription containing poison, and also the sale of tincture of aconite not properly labelled, at a place of business professing to be a co-operative store, the prescription being labelled, not with the name of the man who served it, or with the name of the establishment where it was served, but with the name of a Mr. Flowers, of 112, Victoria Street, which was a considerable distance off the place where he purchased it. When he got home he took the trouble to inquire of a friend if Mr. Flowers was alive, and heard that he died the day before. This was going on continuously,—he did not say at the civil service stores, because he believed they were conducted respectably—but at these Brummagem stores. He had a son, twelve years old, whom he thought of making a chemist, but he wanted to know if he might forego his education and the cost of passing the examination and buy a big shop and put a qualified assistant in it, and whether that would protect him the same as it did the stores. Legislation to be just must be fair and equal. If the stores were allowed to do it individuals were allowed to do it, and if a chemist were prosecuted for selling syrup of poppies without a label, as took place only recently, why was it that he could take up the price list of many of these stores, as for instance, the Provident Supply Association, which was recently defunct, and find poisons publicly advertised for sale? Was that to be allowed to go on or not? The last remark he had to make was with regard to widows. Could it be right that if any one of their number died his widow might not carry on the business by means of a qualified assistant, and yet the same business might be conducted by a co-operative store? He had not yet joined the new association, because he thought the work ought to have been done by the Council, and if the Society wanted more subscriptions it ought to appeal to the trade, and he, for one, would readily respond. In two years time they might have some other society coming forward and saying the Trade Association did not do the work properly, and that it was going to do it. His idea was, that in that Society they ought to be welded together in one body to give a superior class of education for the benefit of the public, and to shut out outsiders. Two years ago it was his misfortune to prescribe for a man—he could not help himself; a fortnight afterwards he called again, when he was out and asked for two ounces of laudanum. His assistant asked Mrs. Fitch what he should do, and she said he seemed a respectable man, he had better let him have it. However, his assistant had more sense than his wife, and only gave one ounce, and that he took home, and immediately tried to poison his whole family; fortunately he did not succeed, and but only managed to cut his own throat and one of his children's. He afterwards saw him at Horsemonger Lane gaol, when he wanted to know if he would speak for him at the trial and he said he would do so if properly subpœnaed. The trial in due time came on, but it was not reported, because the trial of Colonel Baker, which had much more interest for the public, happened to be on the same day; the gaol surgeon gave evidence, also a surgeon from Penge, and a mad doctor or medical expert was also called, and he himself also gave evidence. When Justice Brett came to sum up he said with regard to the medical evidence it was as usual; they seemed to come there more to air their theories than to enlighten the court on the facts of the case, and the first direct evidence they got was from the chemist at Hackney who clearly told them what the symptoms were and what he prescribed. Those were the words of one of the judges who might on another occasion have fined him £20 under like circumstances. He thought some resolution ought to be come to that the incoming Council be urged by every means in their power take up the prosecution of the stores as long as the secretary and directors were not on the register.

Mr. Humpage said his impression with regard to cooperative trading had been only confirmed by the statement of the last speaker; but at the same time the question struck him whether at a meeting of that kind

* This statement is hardly correct, nor was the inference justified. On the 6th of December last, a letter, which we suppose to be the one referred to, was received from Mr. Fitch, signed "M. P. S. G. B.," and its receipt was acknowledged under that signature on p. 488 of the Journal for December 9.—Ed. Ph. J.

it was a question which they could go into and decide. He agreed most fully with what had been said to a certain point, that they ought to know distinctly their real position, and if by the arrangements which these stores adopted the Act could be defied, it was well it should be known, and they must pocket the affront; but to go to a meeting like that, and point out the unfairness and the dishonesty and the disgrace of those who carried on the stores,—and he would add equally of those who encouraged their being carried on,—was of very little use. There was no law to prevent a person who called himself a gentleman from cleaning his own boots; and in the same way if a squire drove up to town, he might buy what he liked, and take it home in his carriage, and they could not prevent it. If they had the power to prevent these stores from selling poison, let them put it in operation; but he would not say a word against the action of the Council, because he believed they had on that Council gentlemen, not deficient in brains, who were desirous of doing all they could for the Society. If they found that the Council would willingly take up such cases if it had the power, but not having the power it did not do so, it was mere folly to come to the meeting and complain. He had been struck with the very few friends who had ever read or seemed to know anything of the extremely interesting pamphlet which was published in 1841 by Jacob Bell on the progress of pharmacy. There the case was stated most distinctly, how the apothecaries acted towards them in 1813 and 1814, and how the trade acted in reference to that attack. Finding their interests were about to be interfered with, they met together —all the leading men in London taking part—and said they could not assent to this Act of the apothecaries, which would virtually crush them. The meetings were carried on for more than a year, and at last a resolution was drawn up and agreed to by the Apothecaries' Company, that a certain clause should be inserted in the Act to leave chemists exactly as they then were, and that their successors should not be interfered with in the future. The apothecaries did not like it, as was clearly shown in this pamphlet, but they could not do better; therefore they accepted that clause, which was referred to counsel before it was agreed to, in order to prevent any mistake. From the year 1815 up to the year 1841 that clause did seem to protect chemists and druggists, for it was not upon record that any one had been prosecuted for the period of twenty-six years. Now, if the Apothecaries' Company, having the desire to interfere, took no action for twenty-six years, it was manifest it felt it could not. In 1841 Mr. Hawes brought forward a Bill, and there was then an attempt made to interfere with the rights of chemists. Their action was then repeated; the trade were called together and an arrangement was again come to, that a clause should be inserted so that the rights of chemists should not be interfered with in any shape or form. It was sometimes said that they must not use any of the money of the Society for legal purposes in defending actions and so on; that it was not their business to go to law. Now he was an enemy of law as much as any one, because he thought that the clients generally got the shells and the lawyers the oysters; but still occasion might arise when it was necessary, and he wished here to refer to what was done in 1841. After having obtained a second victory in that year, Jacob Bell, with his usual sagacity, said here was a valuable association of the trade,—why should it be dissolved? And the result was that the Pharmaceutical Society was founded, and £500 which had been invested by the consent of a meeting in 1815, as a fund for future proceedings, and which had accumulated to £800 in 1841, was handed over to the newly formed Society for the purpose of defence, and for promoting education. He therefore thought they had some claim on these funds for defending their rights, when they were attacked. With that clause, which had protected him for thirty-five years, he did not feel inclined now to submit to its being said that he was infringing the law and acting unfairly towards the medical profession. His father was one of the old apothecaries; after being two years in his surgery he was sent to one of the first houses in Bristol, and when he went there he found in that establishment prescribing was constantly practised by the principal who never thought if he asked a man to open his mouth that he would be prosecuted for it. He had travelled all over the kingdom and he never knew a chemist's shop where prescribing was not more or less carried on; but still it was a question of degree. While he would denounce any man who went beyond a fair line or represented himself as a medical man, he contended that chemists had their rights, which seemed now being nibbled away; and they ought to stand up for them. He thought that it would be well if the Council would say directly or indirectly that it was prepared to defend those rights. Reticence might be carried too far, and he was quite sure it would be very beneficial if their friends outside were to know that the Council was as much interested and as much disposed to do what it could in the matter as any outsider.

Mr. CHURCHILL (Birmingham), said he was surprised beyond measure to see that no reference was made in the report to this burning question of counter prescribing. As many of his friends knew, he was not at all in favour of counter prescribing, and in his shop there was as little of it as possible, and he believed that was the case with a great many of those who were present. He hoped the day would come when doctors would do all the prescribing and chemists all the dispensing; but he was afraid that day was still far distant, and until it came, when by mutual agreement or by parliamentary interference such a solution of the difficulty could be arrived at, it would be unwise for the guardians of the trade to budge an inch from the present position taken by the trade—namely that they claimed the right to prescribe in simple cases. Possibly the difficulty would some day be solved on this basis, that the medical man should be prevented from dispensing if there were a chemist within a certain distance, and that the chemist should be prevented from prescribing more than a single dose of medicine—that would get over all the difficulty of the chemist being called upon to precribe in a case of emergency. He was happy to know that the interests of the trade were now being well looked after by an association which took trading matters under its particular cognizance, and which would spare no expense in fighting out this matter of counter prescribing. Nevertheless, he was surprised that no allusion whatever was made to it in the report. With regard to co-operative trading, perhaps some had gone a little further in this matter than others, and those who had gone into it knew that the Council of the Society had in past years given attention to it and had found it surrounded with great difficulty. He did not think when the trade knew all the circumstances,—and there were some which it was very difficult to lay fully before the trade, because that would be equivalent to laying them before the public,—it would be seen that the Council, if it had acted weakly had very good reason for so doing. But he could not believe that the Council would now allow the matter to go entirely unheeded when such evidence was placed before it as had been offered by Mr. Fitch. It was very often said that it was difficult to lay hold of these societies, because they had a right to dispense for one another, but here was a case of one of the outside public going and obtaining such a poison as tincture of aconite.

The PRESIDENT asked if Mr. Fitch was a member of the co-operative association.

Mr. FITCH: No.

Mr. URWICK suggested that the particulars of the case should not be published and that the Council should take it up.

Mr. CHURCHILL asked how long ago this occurred.

Mr. FITCH replied on the 5th of April. The place referred to had used the label of a store which had become bankrupt and closed.

Mr. CHURCHILL said he hoped the particulars would not go beyond that room, that the Council would be able to institute proceedings. In another place on the previous day he had heard one gentlemen complain that the Council did not prevent co-operative stores selling Mrs. Allen's Hair Restorer for less than six shillings a bottle. Of course they knew the Society could not interfere with such matters as that, but when all the rising generation of chemists were educated at great trouble and expense in order to qualify themselves, it seemed to him from their point of view, to say nothing of the public point of view, it was their duty to look into such a flagrant case as that which had been described. There was another aspect of the question in regard to which he had heard of a great many complaints although he personally had not suffered from it. There were, to his knowledge, in Birmingham three cases, and in the surrounding districts many others, of young men opening what were to all intents and purposes chemists' shops, dispensing medicines, probably containing poisons, who had not passed the examinations. Very often these were young men who had tried to pass the examination but had failed, and it seemed to him that the Society was bound, seeing it received fees to qualify men, to prosecute those who set up in business without passing its examination. He did not wish to confound with such cases those of persons selling patent medicines, because he knew they could not be interfered with; but there were numerous instances of illegal trading, and in such cases the Society had not done its duty in not looking more actively after them. There was a strong feeling amongst some chemists that the habit of the officers of the Society of giving warning when information had been obtained acted very detrimentally in preventing the obtaining of similar evidence on a future occasion. If he went into a strange town where he knew illegal trading went on, and bought some laudanum or oxalic acid, and the matter were laid before the Council and the Secretary wrote a letter warning that man, it was not likely if he went to that town again that he should be able to obtain the poison, although the same person might continually supply his customers illegally. He was certain that that was done in many instances. But he was very happy to see the recent decision of the Treasury in reference to the fees, and he hoped it would encourage the Council to go on prosecuting many of those cases. But apart from that he considered it its duty to prosecute. Another matter he had greatly at heart was the Benevolent Fund. He would not say anything about the management because he thought they all felt that the Council managed the Fund economically and well; but on looking through the list he could not help seeing what a small list of donors there was in his own town and in the country generally. He also thought that many men who were well off threw 10*s.* 6*d.* to this Fund as they would 6*d.* to a railway porter. The proper way was not to give under a momentary impulse but to look into one's income and see how much one could afford to give. He might mention that two chemists in Birmingham determined to go into the matter and canvass the town thoroughly, and the result was that three-fourths of the trade in that town contributed to the Fund and he had no doubt would continue to do so in years to come. He mentioned that in the hope that others would do the same in their neighbourhood.

The PRESIDENT said he was astonished at one statement which had just been made, that cases of known infringement of the Act of Parliament existed in Birmingham to a large extent, which the Council had neglected to prosecute, because he might say that every case brought before the Council was attended to carefully. It was quite true that hitherto offenders had been warned before proceedings were taken, because it was not wished to carry out the Act in a vindictive manner, and it was thought to be advisable to warn offenders before proceeding further. He might appeal to the Solicitor whether he was not constantly required to get proper evidence for proceeding, and however painful it might be to some members of the Parliamentary Committee who had to examine these questions, still the Council never hesitated in going on with the prosecution if it was thought to be a just and proper thing to do.

Mr. CHURCHILL hoped that before the meeting closed the Secretary would be able to tell them how many cases had been prosecuted during last year.

Mr. FLUX (Solicitor) said he might state broadly that no proved case of any offence against the Act of Parliament had gone unpunished; and, with regard to the remarks of Mr. Churchill, he might add that if within his own knowledge there were numerous offenders who went unpunished, that was attributable not to any failure of duty on the part of the Council, but on the part of gentlemen who had the requisite knowledge, and did not carry it to the right quarter.

Mr. JONES said they had been disappointed at one or two meetings at Birmingham, when cases had been sent up, which they believed to be flagrant cases of breach of the law, on receiving letters afterwards from the Secretary stating that the parties had been cautioned. He suggested that such a letter of caution should not be written where the information was considered sufficient to warrant a prosecution, but that the parties should be at once proceeded against.

Mr. FLUX said cases, as they were sent up to London, were not sent generally in such a shape as could be used for the purpose of prosecution. A gentleman got some one else to make a purchase of the article, which passed through various hands, and in a general way came by post to London, and if he were to proceed on that case he should have to bring, at great expense, a number of witnesses into the witness box, all of whom would be reluctant, and scarcely one of whom but would prefer that his name should not be associated in any way with the case. The evidence thus brought forward was generally received as evidence that there was mischief going on. But the wishes of those resident in the district were, for the most part, respected so far as this, that a new process for acquiring evidence by some short and inexpensive mode was entered upon, and in the majority of cases they succeeded, more especially if gentlemen resident in the district would give the willing assistance which they could privately, and he did not know of any instance in which this confidence had been broken. He believed in all cases where gentlemen had given information, and desired that their names should not be disclosed, that had been accomplished.

Mr. JONES said he was not quite clear yet whether, if they sent up evidence which would be considered sufficient by the Solicitor, he would at once proceed without sending the written letter. They were ready to employ their secretary to collect evidence, presuming that, if sent up, such evidence as was considered satisfactory, and which their secretary would swear to the truth of, the Society would at once proceed against the party. But he wished to know whether this was so, or whether they would still consider it their duty to write him a letter first.

Mr. FLUX said no case came before him otherwise than through the Council, and when it came through him it was a case for a civil action. Now, in all cases of civil action, it was the right of the defendant not to come into court; he might pay the money into court, any day, or any minute, before the judge heard the case; and it was the common courtesy of the profession to send a man a letter before action, and charge him with it. In by far the larger number of cases the penalty came back with the costs of the letter. If he were to institute proceedings in the County Court, instead of writing a letter, it would just amount to this—that the 10*s.* he paid on taking out the summons would have to be paid by the defendant, instead of the 3*s.* 6*d.* which he charged for the letter. But to make a man feel the weight of the Act of Parliament, which was done when he was made to pay the penalty without the process of the Court, was what seemed to him the proper course of proceeding.

Mr. JONES said he was referring to the letter sent by the Secretary.

The PRESIDENT said he must state most clearly that the Council considered it its duty to consider every case on its merits, and in doing so it directed the Secretary to write to the supposed offenders, if they were not on the register, to know why they were carrying on business, and warning them against doing so. These persons then either proved that they had a right to be carrying on business, as had occurred in some cases that had been sent up from Birmingham, or, if not, a prosecution was commenced.

Mr. FRAZER said he could mention a case which occurred in Scotland, where, owing to some misunderstanding, proceedings were commenced immediately without a letter of warning having been sent, and he had been very much called to task by Mr. Giles, of Clifton, for having done so. This showed how difficult it was to meet the views of everybody.

Mr. CHURCHILL hoped Mr. Flux did not suppose that he or Mr. Jones wished in any way to teach him his business. The point they wished to be clear upon was whether the Registrar's letter would be sent, not as to how the matter was conducted by the Solicitor after it came into his hands.

Mr. FAIRLIE said there were several things in the report which he thought worthy of attention. The first point he would remark upon was that he had recently read an editorial statement that the Journal had become a profitable speculation. He had looked to see how this was made out, but he could not see anything on the receipts which would lead to any profit whatever, though he found on the expenditure side the Journal cost the Society upward of £600. He also saw in the same column the expenditure of the North British Branch, but there was no statement as to whether that branch contributed anything to the Society. It would be an advantage to the Scotch members particularly to know whether it was really a loss or profit to the Society; but on the whole he thought the report was satisfactory. It was well to know that the funds were increasing, although it was to be regretted that membership had been of late on the decrease. Some people had been of opinion that the institution of the Trade Association had done the Society some harm,—that it might have kept some others from sending up subscriptions or from joining it, but personally he should say that it had been the reverse. He knew the secretary of the Trade Association had taken the opportunity, when people spoke against the Pharmaceutical Society, of telling them that they ought to become members, and then they would have a voice in the management. At the last meeting of the Association held in Scotland, three gentlemen had been introduced to the Society. With respect to the Benevolent Fund, he somehow sympathized with the remarks made by one gentleman, that they ought not to hoard up so much money as they appeared to be doing. He saw that £600 had been invested during the last year; and though certainly a good deal had been given away in small sums besides the annuities, which showed that the committee in charge of the Fund had a great deal of work to do, yet the interest might be much increased if a general appeal were made to the entire trade. If the suggestion made by one speaker were adopted, and each district were to take in hand to subscribe as much money as would provide an annuity for one person, he thought a great deal nore money might be raised. He must say he had been much surprised at reading in the report of a recent meeting of the Council that that body was opposed to the use of the room to young men connected with the trade for holding their meetings. Possibly he might not have understood the exact terms in which they applied for it, but he thought the Council ought to encourage young men connected with the trade as much as they could in meeting together for mutual benefit and instruction. So far as Glasgow was concerned, unless they gave young men encouragement they could not get them to study as they ought to do, and he hoped, if a future application were made, with the omission of any statement which might not be conformable to the feeling of some of the Council, it would be granted. Possibly there might have been some other reason which did not appear; but if it was in the power of the Council to grant the use of the room he did not see why they should not have it. There was a students' association meeting in that building, but that was confined to those who attended the classes there. In connection with the Glasgow Association, they some years ago formed an assistants' section, which met monthly, and had been the means of doing a great deal of good, one of the members having since become secretary of the local association. He was very pleased to hear the remarks of the President with regard to local associations, because it was no doubt the fact that in all large centres, where such bodies exist, the great burden of the work rested on a few individuals, and he did not see why this should be. He hoped the members of the trade would interest themselves in local matters, and that this branch of operations would be further developed. He was sorry to see that only £40 had been spent throughout the year in grants to local societies, and though this might be the fault of the local societies, in not applying, he must say he regretted that the scheme which Mr. Schacht brought forward some time ago had fallen to the ground. He should have been glad to see it brought forward year by year until it was adopted. They all knew that in the House of Commons, when a member took up a particular measure, he generally laid it on the table year after year, and although he did not get much support at first, he ultimately carried his point, and, therefore, he regretted that Mr. Schacht did not persevere with this matter of provincial education. There was a great deal of money spent in that house on education, but they could not expect all young men to come up to London and study there. He sympathized with the remarks made about the Preliminary examination, and the desirability of young men passing it before they were apprenticed. But they could not carry that out in Scotland; in fact, he had given up taking apprentices altogether, because he could not get boys to pass the Preliminary examination before entering the trade. He looked forward to the time when, in addition to passing the examination, young men would be required to present a certificate that they had attended recognized classes in connection with their business. But before that was done some more perfect system of provincial education would have to be organized.

The PRESIDENT said it was quite true there was a balance against the Journal as shown by the balance sheet, but if credit were given for something like 5000 numbers a week, which were distributed to members of the Society, the balance would be on the other side, and they really had a right to credit themselves with something on that account.

Mr. FAIRLIE said he understood that, but he thought it would be well if the Journal account were more plainly stated.

Mr. CARTEIGHE said this question of the Journal was a most important one, and he agreed with Mr. Fairlie that the statement of it was not put quite so clearly as it might be. Perhaps the Secretary could inform him what was the annual cost of postage of the Journal.

THE SECRETARY said he could not say off hand; but about 300,000 copies were sent out in the year.

Mr. CARTEIGHE said that would come to at least £625, so that whereas the Journal appeared in the balance sheet as costing £629, the truth was the Journal cost the Society nothing, and the members received it free, having only to pay for the postage.

The PRESIDENT said, with regard to the North British Branch, that the receipts included both subscriptions and fees derived from the examinations. The whole receipts were paid into the common fund, and did not appear in the balance sheet as a separate item. As a matter of fact there was derived from the North British Branch a balance of about £100 towards the general expenses of the Society.

Mr. REYNOLDS (Leeds) said, with regard to the retiring members of the Council, the time was gone by when it could profit by any advice which had been given by preceding speakers; but, with regard to the incoming Council, he conceived that the meeting to-day had a most valuable and important office. Whether the Council had a policy or not, the speakers at that meeting showed that the Society itself had a policy, and that on the matter of the protection of trade interests it did require greater activity to be shown than had sometimes been thought necessary by the Council. It was evident that difficult questions were thickening around them, and he hoped before the meeting closed some assurance would be given of what measures were likely to be taken, or at least that active measures would be taken in the matter of Dr. Lush's Bill. On that point at any rate he imagined there would be no difficulty in the Society taking its position in the front of the opposition, rather than standing aside and leaving it to the Trade Association to undertake the defence of the trade, for that would be defeating the object of chemists throughout the country when they formed the Association. It would be seen that the matter of trade interests as compared with other subjects was placed very much in the background in the report, the principal portion being devoted to education and the operations of the Benevolent Fund. He must say he could not see why they had left the Trade Association to score a victory on the milk of sulphur case. When one of those prosecutions occurred in his own town he, as local secretary, applied to the Society when the case was pending and asked, if the verdict were adverse, that he might be authorized to apply for a case, but this was refused. He thought the Society made a great mistake in not empowering him to take such steps as would have given it the credit which now attached to the Trade Defence Association. However, he did not wish to complain of the past. He trusted that in the future the policy of the Society might be one of greater activity in defence of their interests, and that they might not treat them as the gentleman who said to the waiter after dinner—"What is the smallest possible coin I can give you without being thought mean?"

The PRESIDENT said the second reading of Dr. Lush's Bill was put down for the first of June; and he could assure the meeting it would be closely watched. It appeared to him they had no ground to oppose to the Bill as a bill. He should rather try to get introduced into it a clause defining the legitimate and right position which chemists ought to hold. It appeared to him there was an opportunity here for getting legislation which would be of great importance in settling a public question, and if that were so, he could not understand how they could oppose the Bill as a whole.

Mr. YOUNG said he had been informed that there was no chance of the Bill coming on this Session.

Mr. FAIRLIE said the Act of Parliament which this Bill was to amend said, in the 68th clause, that nothing in it should affect the interests of chemists and druggists; but if some such clause as had been indicated, defining precisely the position of chemists and druggists, were inserted, it would be a great advantage.

Mr. ANDREWS said he had been astonished at the absence from the report of any mention of the Nottingham prescribing case. He had felt great anxiety as to what the action of the Council would be in the case of any one of them being attacked by the Medical Defence Association. It was not only at the east end, but he was informed that before long the same thing would be tried at the west end, and that some of them would be summoned for counter prescribing. Now, if they were to be summoned, and put to great expense and anxiety, and perhaps fined £20 for doing what had been done from time immemorial, he thought it was high time some steps should be taken, and he should like to know whether, if he were summoned, the Council would defend him in a case of that sort. He was aware that such a resolution was passed at the Council some time ago, and he believed it was originally decided that Mr. Shepperley's case should be defended. He should like to know how it was that that had not been done, and that the case had been taken up by another association. In common with Mr. Churchill, he discouraged prescribing as much as possible; he much preferred dispensing, because it was more profitable, and he understood it better. But it was absolutely impossible to refuse to prescribe, and he maintained it was not only a privilege, but that they had a right to do so by long usage and regard for the public convenience. If a customer asked him the action of a certain drug, how could he refuse to say what it was? whether, in his opinion, it was suited to the particular case for which he was going to use it? A man would be branded as a fool if he could not answer such a question. Twelve or fourteen years ago, in that room, he had urged the claims of education for those about to become pharmacists; and any one who took apprentices must know how difficult it had always been to obtain those who had received such an education at school as prepared them for the business. He was glad to see that a little while ago, some remarks fell from one of the members of the Council with regard to education, and if they undertook this matter, he thought it should not only be for the very poorest members of the trade, but that it should be such an education as those might take advantage of who were in a respectable position, but who could not afford to spend very much on the education of their sons. It might be said that if they provided a special education, and the boys did not afterwards become pharmacists, the education would be thrown away; but it appeared to him that an education which would make a good pharmacist, would send a young man out into the world fit for almost any occupation.

The PRESIDENT said he believed from what he had heard from a very high authority in the medical profession, that it was the general desire of that body that, after a time, when all chemists throughout the country were really up to the mark, dispensing on the part of medical men should come to an end, and be entirely handed over to chemists and druggists.

Mr. FRAZER said he should have felt inclined, as a retired member of the Council, to reply to a great many of the strictures which had been put forward at that meeting, but he had already expressed his views in a paper read before the Glasgow Association, which would appear in print in the Journal of the following Saturday, to which he begged leave to refer.*

Mr. FLUX said if gentlemen would refer to the earliest records of the Society they would not find the word "prescribing" in the resolution which had reference to this counter practice. There was a great deal in a cry, and if they let medical men set up a cry on the word "prescribing," they would leave the game very much in their hands. If, however, they took their stand on "counter practice," as a necessity of the case for chemists and druggists, and for public convenience, he had no moral doubt whatever that the judges would go with them, as well as the Legislature.

Mr. WATTS said the word "advising" would be much better than "prescribing."

Mr. FLUX said the phrase for which the fight was made at the Crown and Anchor, as recorded in the early history of the Society, was "counter practice."

Mr. FAIRLIE remarked that the new Bill which had been referred to was intented to amend the Act of 1858.

* We are compelled, by the length of the report of the official proceedings, to defer the publication of this paper until next week.

Now, that Act was under the supervision of the Medical Council, and he should like to know whether it had received the assent of that body.

Mr. ATKINS said he had had an opportunity of seeing Dr. Lush, and asked him if the Bill had any reference to the position of chemists—if it would in any sense infringe on their rights; when he said it would not, as far as he knew. Dr. Lush was a medical man out of practice, a man of the broadest possible sympathies, who had not an atom of undue *esprit de corps*, or narrow prejudices, and he was perfectly sure that if this Bill did contain anything injurious to their interests, it only needed an intelligent and respectful representation to him for him to at once disown any connection with it.

Mr. HUMPAGE said this was very satisfactory; but he wished to go a little further, and to have it distinctly understood whether they were acting illegally or not in counter practice—whether they were, in fact, simply allowed to prescribe on sufferance; because to that he entirely demurred. He thought it was the duty of the Council, if an addition could be made to that Bill, to introduce a clause drawing the line of their privileges; and then if any one went beyond that they might leave him to get out of the difficulty as best he could, but if any of those who kept within it were attacked, they might take up the case jointly with the Association and fight it out to the last.

Mr. FLUX said he might once again interpose to state his most thorough and honest conviction that if there were a well conducted manly fight on that subject no chemist or druggist who kept within his own doors had anything to fear.

Mr. JONES, on behalf of the Trade Association desired to thank Mr. Flux very sincerely for the remarks he had made.

The resolution for the adoption of the report was then put and carried unanimously.

Mr. FITCH then moved—

"That it is the opinion of this meeting that it is expedient that the Council should at once take legal proceedings against the proprietors of one of the co-operative stores, in order that the legality of their action shall be finally settled."

Mr. VIZER seconded the resolution, as he had often urged it before, and there now appeared to be evidence very clearly brought forward.

Mr. URWICK said he was glad to hear that such evidence had been obtained, for he himself had tried in numerous instances to obtain poisons, and had not been able to do so. He could only get them through members of the stores and not personally.

The PRESIDENT said there had been great difficulty on several occasions in getting the legal evidence necessary, and he thought it very likely that the stores so-called, now referred to, was not a co-operative store at all, but simply a shop under another name, which was breaking the law, and, therefore, amenable to a penalty.

Mr. FITCH said he believed it was a limited company, the promoters of which had each taken one share of £1.

Mr. VIZER remarked that the resolution referred to co-operative stores generally.

Mr. W. WATTS suggested that counsel's opinion should be taken, whether any stores selling poisons and dispensing prescriptions containing poisons was not contrary to the Pharmacy Act?

Mr. VIZER said counsel's opinion had been taken over and over again.

Mr. SANDFORD wished, as a member of the new Council by lot to ask the meeting whether they intended to tie the Council hand and foot to prosecute against their judgment or against counsel's opinion, and against all the policy of the question.

Mr. HUMPAGE said certainly not.

Mr. SANDFORD said if they thought this question had not been agitated in the Council, they were very much mistaken, for it had occupied its attention a great deal during the last twelve months. One gentleman said they ought to take counsel's opinion, but if counsel's opinion were against them, what then? The gentleman seemed anxious to be told everything which was said in the council room, but if they knew what the Council did, and declined to do, as matter of judgment, he thought they should be satisfied. Proof had been given that day that it was watching these matters carefully. He would not go back to speak of the counter practice, but he might say he had recently had a conversation with a very eminent physician and mentioned that particular subject to him, and his opinion was that more or less druggists must prescribe. You could not fix a hard and fast line. What Baron Bramwell said was a most important point in their favour, namely, that taking the Act of 1815, a man who gave a draught for a headache did, according to the strict letter of the law, infringe it, but the Apothecaries' Company would be very absurd to prosecute such a man. He took that as the feeling of the highest authority on the law, and he knew it to be the feeling of the highest authority in the medical profession. He believed that by treating the question temperately and quietly they would do better than by violent declamation. There was an opportunity now in this Bill, which to-day came before them for the first time, which might be very serviceable because they could get a clause inserted to protect their rights, and it would be very important to take advantage of this opportunity to get a clause inserted which would more clearly define the existing privileges of chemists. It was not the interest of members of the Council to let co-operative stores take away their custom; they were injured in the same way as other people; but if the meeting tied the Council to a certain course, whether it deemed it right or not to take it, they would utterly destroy the good work which the Council might do. The Council knew the wish of the meeting, with which a great many of its members thoroughly agreed, and therefore he hoped they would leave it free to act for the best.

Mr. FITCH said he could mention cases where medical men told their patients to go to the stores because they could get the prescriptions made up cheaper.

Mr. HAMPSON said he occupied the position of not knowing whether he was going to be a councillor next year or not, and therefore he could speak somewhat freely, but at the same time he should do so with the utmost caution with regard to those whom he had worked with. He had strong views upon this co-operative trading question, and believed that it must be considered and settled. It stood in their path, and he thought going round it and looking at it as if it were a great bugbear that could not be removed was an entire mistake. He believed it was their duty to face it in spite of counsel's opinion or any other opinion. He believed that the Pharmacy Act, if it were allowed to be tampered with and destroyed in this manner, might as well be repealed. He held that the law ought to be applied with equality to all persons, but in this case it was not. The stores were doing an incalculable mischief. He did not mean in the sale of miscellaneous articles, but with regard to legitimate pharmaceutical business, by bringing discredit on their ordinary remunerative charges. He spoke now simply for himself, but if he were elected he should certainly feel bound to face the difficulty and should be ashamed of a seat on the Council if he did not. It must be faced in the interest of the Society, and especially in the interest of the public. The Pharmacy Act was passed in the interest of the public and he maintained they were not taking care of that interest by simply doing nothing. He admitted they had considered the question, and it had caused a deal of trouble and anxiety, but still that would try and settle the question. He believed if they took it in hand with proper resolution to solve it, they could solve it within the walls of the Act, but if they could not do so it was their duty to go for further powers.

Mr. LINFORD said there was a very old adage which some speakers seemed to forget, viz.: "That it was bad policy to bark when you could not bite." To send the new Council to their duties with an order that they must bark whether they could bite or not seemed to him the most foolish thing they could do.

Mr. WATTS said after the remarks of Mr. Sandford he would ask the mover of the resolution to withdraw it, and leave the matter in the hands of the Council.

Mr. FITCH said he should not consent to the withdrawal of the motion.

Mr. CARTEIGHE said he should move that they proceed to the next business.

Mr. VIZER said he was quite prepared to ask the mover to withdraw the motion. He was satisfied that the Council would be thoroughly impressed with its importance and would fairly consider it. Mr. Sandford spoke of dealing with the question temperately and quietly, but it appeared to him they had been dealing with it temperately so long that it was time they should now take it up in a stronger way.

The PRESIDENT said the strong opinion expressed at that meeting would have full weight with the Council in any consideration of this question.

Mr. FITCH, in deference to the opinion expressed, then withdrew his motion.

Mr. GOSTLING (Diss) remarked that he thought the usefulness of the Pharmaceutical Journal might be increased. There was a great deal in it which was very interesting to some of the more scientific members of the Society, but not so much so to a large proportion of their body and they thought it a pity when subjects affecting the trade were being discussed and when correspondence was sent, such as had been referred to, it was not inserted. It seemed as if there was a tendency to neglect and ignore the feelings and wishes of the members. He had recently seen an announcement that some gentleman of the name of Giles had been honoured with a Fellowship of some Geographical Society in Australia, but as far as he could see his only connection with the Society was a very indirect one, he being the cousin of Mr. Giles of Clifton. It seemed to him rather curious that space should be found for such matters when correspondence was excluded. He hoped more room would be allotted to this feature.

The PRESIDENT said he should be very sorry to see the Editor giving legal opinions, and when letters came, as he had sometimes seen, asking legal questions, the express desire of the Council was that the Editor should simply acknowledge the receipt.

Mr. FITCH said all he asked in his letter was in whom was the power vested for suing for penalties.

Mr. GOSTLING added that he should be sorry to oblige the Editor to print all the correspondence he received, but he thought he might give more space to it.

The PRESIDENT said he thought they would be very sorry to read very much of the correspondence with which the Editor had to deal.

Mr. CHURCHILL said he had frequently heard it remarked in country places, where pharmaceutical chemists were few and far between, that the Journal was about ten years a-head of the trade. He himself endeavoured to keep *au courant* with what occurred in chemistry, but still he was a tradesman, and he did not like to have new preparations such as guarana—he did not allude to the patent preparations—brought under his notice by wholesale druggists; he thought they should be brought before him first of all in the Pharmaceutical Journal. It was sometimes said to men who asked what they would get for their guinea if they joined the Society, that they would have the Journal, but he feared that a great many would not appreciate it very highly, and he held that, side by side with the scientific matter there should be a large infusion of trade subjects, which would be interesting to a large portion of the trade; in fact they were very similarly placed, with regard to trade information, to the Conservatives in Birmingham who got the Conservative paper for their politics and the Liberal one for their news.

The PRESIDENT said it might be interesting to know that over and above the circulation of nearly six thousand copies to the members, there was also a very large sale for the Journal, amounting to nearly one thousand copies a week.

The following Registers were placed before the Meeting by the Registrar in compliance with the provisions of the Pharmacy Acts, 1852 and 1868.

Register of Members, Associates and Apprentices of the Society.
Register of Pharmaceutical Chemists.
Register of Assistants.
Register of Apprentices and Students under the Pharmacy Act, 1852.
Register of Chemists and Druggists under the Pharmacy Act, 1868.

Scrutineers were then appointed to examine the voting papers, and after a vote of thanks to the President, the meeting was adjourned until Friday, at eleven o'clock, to receive the Scrutineers' report.

ADJOURNED MEETING.

Friday, May 18, 1877.

MR. JOHN WILLIAMS IN THE CHAIR.

The Scrutineers brought up their report as follows:—

SCRUTINEERS' REPORT.

We, the undersigned Scrutineers, appointed at the Thirty-sixth Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us and report the following:—

Voting papers received		1462
Disallowed from informality	23	
Received by post too late	106	
Unsigned by Voters on envelope	14	
		143
Votes Registered		1319

Hanbury	1000	Gostling	700
Bottle	989	Cracknell	682
Greenish	961		
Hampson	936	Deane	674
Atherton	920	Vizer	590
Shaw	895	Stacey	587
Williams	881	Baildon	546
Rimmington	845	Cubley	546
Betty	842	Richardson	496
Churchill	829	Wills	456
Robbins	789	Bulgin	455
Brown	772	Guyer	439

E. N. BUTT, *Chairman*.

W. K. HOPKIN.	JAMES M. FAIRLIE.
CHARLES CROYDEN.	FREDERICK TIBBS.
MATTHEW POUND.	HORACE DAVENPORT.
THOMAS E. GREENISH.	THOMAS BULLEN.
CHARLES SHAPLEY.	CHARLES E. TURNER.
HENRY GEORGE STACEY.	WILLIAM GULLIVER.
ROBERT ROWE.	MAURICE HOWELL.
WALTER HILLS.	JOHN J. MATTHIAS.

Mr. GREENISH drew attention to the large number of informal votes, amounting to about ten per cent. on the whole number. He also remarked on the small number of votes given as compared with the number of voting papers issued.

The Chairman of the Scrutineers (Mr. BUTT) said, in addition to the small number of votes given, it was remarkable that some districts appeared to be entirely unrepresented.

The New Council.

The Chairman then declared that the following gentlemen would constitute the Council for the ensuing twelve months:—

Atherton, John Henry, Long Row, Nottingham.
Atkins, Samuel Ralph, Market Place, Salisbury.
Betty, Samuel Chapman, 6, Park Street, Camden Town, N.W.
Bottle, Alexander, 37, Townwall Street, Dover.
Brown, William Scott, 113, Market Street, Manchester.
Churchill, Walter John, 46, New Street, Birmingham.
Cracknell, Charles, 217, Edgware Road, W.
Gostling, Thomas Preston, Diss.
Greenish, Thomas, 20, New Street, Dorset Square, N.W.
Hampson, Robert, 205, St. John Street Road, E.C.
Hanbury, Cornelius, Plough Court, Lombard Street, E.C.
Hills, Thomas Hyde, 338, Oxford Street, W.
Mackay, John, 119, George Street, Edinburgh.
Owen, John, 51, Holloway Road, N.
Rimmington, Felix M., 9, Bridge Street, Bradford, Yorks.
Robbins, John, 372, Oxford Street, W.
Sandford, George Webb, 47, Piccadilly, W.
Savage, William Dawson, 4, Park Road East, Brighton.
Schacht, George Frederick, 7, Regent Street, Clifton, Bristol.
Shaw, John, 24, Great George Place, Liverpool.
Williams, John, 16, Cross Street, Hatton Garden, E.C,

Auditors.

There being only the requisite number of Candidates (five) for the office of Auditors, the Chairman declared the following duly elected for the ensuing twelve months:—

Andrews, Frederick, 23, Leinster Ter., Hyde Park, W.
Barron, Frederick, 2, Bush Lane, Cannon Street, E.C.
Hodgkinson, William, 127, Aldersgate Street, E.C.
Horner, Edward, 20, Bucklersbury, E.C.
Squire, William, 5, Coleman Street, E.C.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

The annual meeting of the members of this Association was held on Tuesday last, at the Freemasons' Tavern, Great Queen Street; Mr. Jones, of Leamington, President of the Association, in the chair.

The Secretary having read the notice convening the meeting,

The Chairman expressed the very great pleasure he had in meeting his fellow chemists in the metropolis at a time when they wanted to form a strong bond of union among themselves. During the past year the executive had had some very difficult subjects to deal with, and had been attacked on various subjects by different parties. One or two questions had been settled, but it had one still under consideration which was one of the most serious it had had to contend with. He alluded to the prescribing question. But he referred to those members of the trade who simply prescribed in their own shops, behind their own counters, who did not visit persons out of doors, except in cases of humanity, where exceptions should be made, and he trusted none of them would shrink from attending such cases. Only a short time ago he had been called out of his shop to attend an old gentleman in the street, whose lips were pale and his pulse almost gone, and if he had not received speedy assistance he must undoubtedly have perished. In such cases of humanity they must not shrink from doing their duty; but such things as a room at the back of their shops, to give the semblance of medical consultation, they must avoid, if they did not wish to bring themselves within the meshes of the law. If, however, they were to be prosecuted for prescribing for a man who came into the shop with a sore throat, half the chemists in the country might as well shut up shops. A great deal had been made of looking at a man's throat; but there were two sides to that question. No right-minded man would undertake a case if it were at all serious, and, in the case referred to, if Mr. Shepperley had seen that the person calling on him had ulceration in progress, or ulcers already formed, he would no doubt have told him to go to a medical man for advice. The Executive Committee was unanimously of opinion that it should get the best counsel they could to argue this case and to get a decision in the High Court of Justice upon the point whether chemists were to be prohibited from simply prescribing behind their own counters and using simple remedies. If this should unfortunately prove unsuccessful, it would then have to take another course and appeal to Parliament, in which course he had no doubt it would be supported by the whole of the trade throughout the country. During the past year the members of the executive had had anxious duties to perform, but if their efforts were appreciated they would be well repaid.

The report and accounts, of which we gave a short *résumé* last week, having been taken as read,

Mr. Bell (Hull) moved their adoption. He thought the executive ought to be highly complimented on the success which had followed the endeavours to form this Association. He trusted it would go on progressing favourably, and that every chemist and druggist would join it and support it, not only by subscriptions but also by donations. They all knew a war could not be continued without funds, and there was a great battle looming in the distance, for the purpose of which the Committee would require substantial support, but he felt that if prescribing were stopped most of them would have to close their shops, and look after some other trade less harassed than that of the chemist and druggist.

Mr. Vizer (Brighton) seconded the resolution. He regarded the Association as wonderful, considering the apathy which they knew existed to so large an extent throughout the trade. He thought the report now presented showed that to a large extent that apathy had been shaken off, since there were nearly 3000 members, and close on £2000 had been subscribed. When the Society was first mentioned, some people said it was a mere trade speculation, but that idea was now quite abandoned. Some one must originate these things; and those who had the power of judging what was going on in the trade, and who came forward to meet the circumstances of the moment, and to start such an organization, ought to receive the gratitude of the whole body. The question was sometimes raised whether the Association was antagonistic to the Pharmaceutical Society. His opinion was that it was not in any way; and he should be very sorry if it were so. The Pharmaceutical Society, in its origin, was really and truly much the same as that Association: it was strictly a protective society, originated for the special object of defending the trade against legislation which was then proposed, by which chemists were to be brought under the auspices of the medical profession, licensed annually to carry on their business, and put under the control of a body composed of medical men. Under that proposed Act he believed a chemist would have been liable to a penalty for prescribing in any way over the counter. In those days, the difficulty raised by the medical profession was that of education: that the body of men then existing were not properly qualified to carry on their business satisfactorily. The Pharmaceutical Society then stepped forward to meet that difficulty and provide educational appliances, and, to cut a long story short, a Bill was ultimately carried by which it was deputed to look after the educational qualifications of the whole body. So far as its educational function was concerned, therefore, the object of the Pharmaceutical Society was attained. But then came the question whether it had carried out its protective function: and many of the members, he believed, were of opinion that it had not. Now, this organization, he believed, would be of the utmost value in days to come in protecting the interests of the trade. Looking through the report, he found abundant evidence of that fact. As page 9, it referred to the *lac sulphuris* question, which had been one in dispute for many years—in fact, since the days of his apprenticeship. Again, on page 8, there was another benefit obtained in the fact that there was now a body prepared to protect and defend in cases of informers going and purchasing drugs for analysis. When this was the case, the informer lost half his terror to the mind of the chemist. At page 10, there was another important question referred to, and it was said that no expense would be spared, or effort wanted on the part of the Committee to provide the very best obtainable talent for the purpose of the case with regard to prescribing. Now, that was most satisfactory. It was a very delicate question, because they all felt they were apparently in antagonism with those on whom most of them depended for a living. It might be absolutely detrimental to their interest to be contesting this matter, but where duty called they ought not to shrink. He was pleased to find a resolution had been passed by the Committee to the effect that the solicitor would defend cases of charges for prescribing, though at the same time it discouraged indiscriminate prescribing. There was a broad line to be drawn in this matter. He did not hold the idea that they were qualified to become medical men, though he knew there were some chemists who laid themselves out especially for prescribing business. He, himself, confessed he did not consider that was their vocation; but, at the same time, it was a physical and moral impossibility to carry on business unless they were allowed to express an opinion as to what was good for this or that trifling ailment. Only the previous week a lady came into his shop, and insisted upon having information given her as to the way in which she should take something which had been ordered, and what she should mix it with, although he repeatedly advised her to consult her physician. Since he entered the room he had heard that a Bill had been just brought in to make it penal for any one not registered to practise medicine or surgery; and if that passed he supposed he would have been held to be a transgressor for having given that simple information. Lastly, there was the question of co-operative stores, which was every day becoming more pressing, as they found to their cost. He was delighted to see that a case was being prepared to go before counsel. And here he could not but say that the Pharmaceutical Society had lacked woefully. But he looked upon that society as their guardians to a great extent. At any rate, it had the power of carrying out the Act of Parliament. This Act was passed with the idea of protecting the trade against illegal tradesmen, and he had heard an instance mentioned by the secretary in which a widow had been compelled to sell her business at a great sacrifice because she was unable to carry it on under the charge of a qualified assistant; and he believed there were many other cases of the same sort. Therefore, when co-operative stores came into existence he maintained that it was the imperative duty of the Society to have "taken the bull by the horns" at the time, and not allowed these stores to carry on business with impunity under the support of aristocratic tradespeople, simply putting in a qualified man to manage the dispensing, who might perhaps be a member of the Pharmaceutical Society, and put its arms upon his label. A case ought to have been tried, if for nothing else but that would be a satisfactory settlement of the question. It was possible that these stores might evade the law; but it ought to be proved clearly whether they were legal or not.

Mr. Andrews (London) remarked that it was stated in the *Lancet* of last Saturday that there was a great profusion of medical Bills just now, three of which were mentioned. One had been introduced and read a first time, containing this clause: "Any person who shall practise medicine or surgery for gain, unless such person holds the duly registered qualification, shall likewise pay £20." It occurred to him that that was carrying the matter far beyond anything which had been hitherto attempted.

Mr. Slipper (London) supported the resolution. With regard to the Bill just referred to, he might remark that taking out a tooth was a surgical operation, and some druggists could do it as well as many surgeons. But he was glad to find this Association had been formed, and he thought they owed their thanks to their country friends for the hearty manner in which they had taken it up, and the energy with which they had carried it on.

Mr. Bulgin (Gravesend) also supported the resolution. He said the Association was very badly wanted, as was shown by these new Bills referred to in the *Lancet*. He thought it would be their own fault if such a Bill were allowed to pass, for he did not believe Parliament would interfere with the chemist pursuing his vocation in a proper manner if the truth were properly put forward. He was no advocate for a chemist going out to prescribe; but if a man, woman, or child, came into his shop with a sore throat or a cut finger, or a bilious attack, he maintained that he was within his right by prescribing for them. If he could not do so, he could only say he would sell his business to the first man who offered him £10 for it, and go to Canada or Australia.

Mr. Preston said that although gentlemen representing the retail trade only had spoken hitherto, he thought it his duty to say that he believed the Association deserved the support of the whole trade. One great benefit had already been effected by it. The analysts had been more on their guard since it was known that a society was formed for the protection of those whom they might assail. No one who had regarded the action of the analysts in the past but must be aware that charges of the most frivolous nature were frequently brought against the retail trader, and carried on in a very litigious and oppressive manner. But he had noticed of late that analysts had taken a different position, and the prosecutions had not been so frivolous. An Act of Parliament having been passed enforcing a greater surveillance over articles sold by retail traders, it was quite clear that those who were appointed to look after the interests of the public had a perfect right to see that the things that were sold were genuine, and therefore he did not object to the action of analysts if they had fair ground to go upon; but he did object to their taking hold of articles about which there might be some little doubt, but the absolute purity of which was of very little consequence to the persons who bought them. It was evident that some of the cases which had been brought into court were more for the purpose of bringing the name of the analyst forward than for the protection of the public. But, with reference to the question of prescribing, he knew from his own experience, from having travelled for many years through the country, that it was impossible for a chemist to carry on his business if he were not to give advice to his customers. Was he to be told that a gentleman who had passed the examinations now prescribed by law was only to show his intelligence and knowledge by telling his customers, "I can give you no information whatever"? He knew many cases himself, especially in large country towns, where surgeons actually told their patients, if it were but a slight ailment, to go to Mr. So-and-So, the chemist, who could deal with it as well as he could. There was a large number of chemists in the trade who, from the long experience they had gained in the trifling ailments of human nature were far better qualified to act than the medical men; and medical men of real intelligence recognized that fact. In the case of tooth-drawing there were a number of chemists and druggists who drew teeth better than medical men; in fact, as a rule, surgeons did not like to draw teeth. In conclusion, he would say that if the society were to succeed, it must be supported by those who were principally interested in its success, for he did not believe in any society being founded substantially which relied on extraneous assistance.

Mr. Elwood (Leominster) said this matter of counter prescribing was of great importance to country chemists. If they were to be prohibited from so doing, or from the smaller acts of surgery, such as patching up a cut finger, they would have to leave the trade. It was a small country town where he resided, and he was sorry to say the four other druggists who were there did not support the Association. In that town they had a large country district to depend upon, and tooth extraction and minor operations of surgery became very important items. He had long since ceased to subscribe to the Pharmaceutical Society, because he felt that it had ceased to represent the interests of provincial chemists and druggists, and was now merely the representative of metropolitan chemists and druggists. He had not only ceased to subscribe, but he declined to pay the fee necessary to pass the Major examination, because he did not feel he could give that support to the Society which some members of the trade appeared to think it deserved. He supported this Association because he felt sure that it would, if energetically worked, make a better future for the trade.

Mr. Dean (Bow) did not believe in a chemist setting up to give advice gratis, or imitating surgeons' labels by saying he was at home at certain hours; but still they were able to prescribe for small complaints, and there were very few of them but what did. If a chemist at the east end depended on dispensing he would very soon go to the wall, and it was utterly impossible to carry on business in a poor neighbourhood without prescribing in simple cases. He had been in business for about twelve years, and had been able to do a little prescribing, but he had always been very careful in avoiding any serious cases, and he was on very friendly terms with a large number of surgeons in his neighbourhood. He did not see how the line was to be drawn, because it occurred to him that if it were legal to put up a cough mixture with a patent medicine stamp upon it, and sell it, it could be no greater offence to tell a person you could make him up something to suit him, and label it, "One sixth part to be taken every four hours."

Mr. Mellin (Wimbledon) said if the Pharmaceutical Society had done as it ought some years ago, there would have been no necessity for this Association at the present time. He lived in a neighbourhood where there was no necessity for counter prescribing, but he had had a shop previously in a country district, where two-thirds of the business was done in that way; and, in fact, through leaving it some time in the hands of an assistant who could not prescribe, the business fell off very considerably. He felt very strongly on the question of co-operative stores, for nineteen-twentieths of the people dealt at these places, and he found his business most prejudicially affected.

Another gentleman remarked that he was quite sure if they were pressed hard on this matter of counter prescribing they would be supported by the public, because it really affected them.

Mr. Churchill (Birmingham), as a member of the Finance Committee, wished to enforce the observations of Mr. Preston with regard to subscriptions, and at the same time to thank many of the large wholesale houses who had assisted them during the last year with donations. But still he was sensible of the fact that these donations could not be expected to continue, and that they must look in future to their own members, and he should therefore hope that gentlemen would not only join the society and subscribe, but would give donations as well.

The resolution was then put and carried unanimously.

Mr. John Owen moved the re-election of the President, Vice-President, Honorary Treasurer, and Honorary Secretary, and in doing so took occasion to protest against some few words of antagonism to the Pharmaceutical Society which had been expressed. He assured the meeting that a great deal of business took place at the Council which did not appear in public, and on some of the delicate questions which had been mentioned the Council felt great difficulty in acting. He hoped there would be nothing but the most friendly relations between the two bodies.

Mr. Croyden seconded the resolution, which was carried unanimously, and briefly responded to by the President.

Mr. Urwick moved the re-election of the Executive Committee. He did so with great pleasure, especially as he knew that none of those gentlemen were at all unfriendly to the great institution at Bloomsbury Square, in whose prosperity he felt the deepest interest.

Mr. Shepperley seconded the resolution. He said he had of course suffered some uneasiness from the legal proceedings with which his name was connected, but he was reassured by the support he had met with from the Trade Association. He always endeavoured to be as careful as possible in prescribing. He should have preferred it if his defence had been taken up by the Pharmaceutical Society, but it had not seen fit to do so, for some reasons which he could not of course divine; and he was therefore very grateful to the Birmingham Association for coming forward to support him.

The resolution was put and carried unanimously.

Mr. Horncastle, in moving the next resolution, said he was much pleased to think that there was the greatest harmony existing between this Association and the Pharmaceutical Society. He then moved the re-election of the General Committee, with the addition of a long list of additional names.

Mr. Fairlie seconded the resolution. He said the election of this committee was the grand feature of the Association, as it would lead men in the various localities to know one another better and take interest in matters affecting their business. Referring to the milk of sulphur case, he regretted that the costs were not allowed when the decision was in their favour.

Mr. R. Hampson moved that Mr. Glaisyer be reappointed solicitor to the Association, on the same terms as before, in doing which he paid a tribute to the ability and courtesy with which he had discharged his duties.

Mr. Churchill (Birmingham) seconded the resolution, which was carried unanimously.

Mr. Thomas Barclay (Birmingham) moved the re-election of Mr. Haydon, as secretary, which was seconded by Mr. Shaw, and carried unanimously.

Professor Attfield was then unanimously re-elected analytical referee, on the motion of Mr. Rimmington, seconded by Mr. Atherton. The auditors and bankers were also reappointed.

A vote of thanks was then passed to the London Committee for its exertions in connection with the meeting, and a vote of thanks to the chairman terminated the proceedings.

The Public Meeting.

A public meeting of the trade was held immediately at the conclusion of the annual meeting, when there was a very good attendance. Mr. Preston was voted to the chair.

The Chairman, in opening the proceedings, said he felt that somebody connected with the retail trade would have better occupied his position, but at the same time he did not shrink from coming forward to do what he could to enforce the claims of the Association. He had attended the meeting at Glasgow with very great pleasure, and since then a great deal of good work had been done. Their object now was to enlist the sympathy of all in the trade, more especially in London, in order that they should be prepared to work heartily and generously with those who had borne the burden of the day so far. Their object was to form a strong and useful Association in connection with the trade; and if they could not efficiently protect their own interests under the existing law, to apply to Parliament that they might have the same protection as was extended to those connected with the professions. He owned that of late he thought there had been a little too much the idea of thinking of chemists and druggists as professional men. They should not lose sight of the fact that they were connected with a trade, and their trade interests they were bound to protect. The trade of the chemist and druggist was one of the most important which could be carried on? The public generally recognized that they were men of ability and intelligence, and if an Act of Parliament were brought forward to show the necessity of protecting their rights, there would be no difficulty in enlisting the sympathy of the press, and he felt sure that they might, if they were determined, fully protect themselves against all attacks.

Mr. Pound (London) moved the first resolution:—"That this meeting of pharmaceutical chemists, and chemists and druggists, heartily approves of the formation of the Chemists and Druggists' Trade Association, and pledges itself to support the same by every means in its power." Something had been said at the previous meeting about an antagonistic feeling between the Pharmaceutical Society and that Association; but his opinion was, and that had induced him to subscribe to it, that each had its function, and that there were many things the Pharmaceutical Society could not do which this Association could; he felt very much pleased, therefore, that it had been formed.

Mr. Wiggington seconded the resolution.

Mr. Thomas Barclay (Birmingham) said the work set before the Executive Committee at the conference at Birmingham was the protection of the legitimate interests of chemists and druggists from unfair attacks and encroachments, and the protection of their common welfare; and as one of the Executive Council he was obliged to the meeting for the confidence it had shown in them by re-electing them. Perhaps a brief review of what had been done during the year might be of interest to the meeting. The first way in which the executive had to carry out the programme was the defence of members from vexatious and unjust prosecution under the Adulteration and Medical Acts. Allusion had been made that morning to the milk of sulphur case, which had caused a great amount of labour and anxiety. Several members of the Association objected to use the lime sulphur, and that difficulty had to be faced; but it was known, on the other hand, that there were medical men who thought that the lime preparation was the only one which ought to be supplied as milk of sulphur. The great question was this, however,—should a chemist who had never been in a police court or accused of any offence be branded as an adulterator, or one who broke the law, for selling a recognized preparation? Before this Association was formed, the chemists were put down all over the country; in some cases the verdict was in their favour; in others, against them. But now all members might feel secure, if they were doing their business legitimately, that they would have the whole force of the Association at their back to protect them. Now, instead of having ridiculous prosecutions here, there and everywhere, analysts were apparently reviewing their position, for they were doing next to nothing, and chemists were already feeling the benefit by not having to face these paltry prosecutions; in fact, the chemist might now say "*Nemo me impune lacessit.*" The next point was the defence of the members from unjust prosecutions under the Medical Act; and they were not long without an opportunity of showing that they were ready to carry out that part of the programme, and some good work had been already done. At Birmingham something of the kind had been attempted, for after Shepperley's case was heard, a Medical Defence Association was started, in that town. A secretary was appointed, and a circular was sent round, saying that Mr. Oliver Pemberton would become the president. The solicitor to the Defence Association brought actions against herbalists, and also against a chemist and druggist, who, however, had not yet been before the Police Court owing to some technicality. In the meantime, however, the local press got hold of the fact that a public officer had been used for the getting up of the evidence, and having drawn attention to this fact, the result was, the Watch Committee washed their hands of the whole affair, and said if the Medical Trade Union wished to do such work it must use its own officers. A considerable discussion ensued in the local newspapers, and the result was that Mr. Pemberton, who was supposed to be the president, wrote a strong letter, stating that he was thoroughly opposed to the spirit in which these prosecutions were undertaken, and that he would have no connection with them whatever. The secretary also wrote, saying it was quite clear the association was not wanted in Birmingham, and he begged to withdraw; and, following on, the solicitors wrote to say they never intended to prosecute chemists and druggists, it was only quacks and herbalists. But he mentioned this to show that even if they were beaten in the Queen's Bench, they would have the public and the press with them, and if they united in one strong body they would be able to insist on their rights and not be put down by any class whatever. The next point was the amendment of the Pharmacy Act to prevent the sale of poisons by unregistered men. This had been before the executive but it had not yet been able to do anything. Next was the exemption of all registered chemists and druggists from serving on juries, and probably some Bill would shortly come before Parliament in which they might co-operate with the Pharmaceutical Society in obtaining that exemption. The next point was the defence of the trade from encroachment by unauthorized dealers in drugs. There were a great many of these men carrying on business as chemists and druggists all over the country who were not authorized; but the Secretary had been hitherto so much engaged with the organization and general work, that he had not had opportunity to procure the necessary evidence. He believed, however, the Pharmaceutical Society would be ready to assist them in putting down illicit trading. The question of co-operative trading had already been mentioned, and it was a very vexed question. From all quarters there were all kinds of suggestions as to the way in which this could be put down. There was a universal outcry that the co-operative trading was unjust, and was working injuriously to the qualified chemist; and a conference, after a considerable amount of discussion, declared that it was wrong, and that it should be put down. This question was now in the hands of two of the most able and experienced of the Executive Council, who were getting all the information that they could, and endeavouring to put the solicitor in the position to go forward, and he hoped in some way or other they would be successful, or if the present law were not strong enough to get it altered, so that this very unjust and unfair method of competition should be put a stop to. If he could not take a partner, who was not a qualified chemist, into his business it was unfair that thousands of men all through the country should be sharing the profits of a large business. It was not like dealing in groceries or many other things. When a man had spent a deal of time and money in becoming properly qualified, it was unjust that those who had undergone no such preparation should compete with him to the detriment of the public. The last object placed before the members of the executive was to watch the proceedings of Parliament, with a view of preventing any injurious legislation. They had not had much to do in that direction, for although last session Sir William Frazer proposed to bring in a Bill, when they got one of his constituents to write and ask him the nature of it, he did not seem to have any clear views upon the matter, and nothing came of it eventually. They were now told that two or three Bills were likely to be before the House, and they might depend on the Committee doing everything in its power to protect the interests of chemists and druggists throughout the country. He thought the coming year would be the test of their success. Something like 3000 members had enrolled themselves during the last ten months, which was a success of which they were all proud; something like

£1000—besides subscriptions—had been given in money, of which about £300 had been contributed in donations of five or ten guineas, showing that something like £700 had come in smaller sums, which was very satisfactory, as showing the interest taken by chemists at large. But they had a great work before them and must not flag in their efforts. He hoped every gentleman present not already a member would give his subscription before leaving the room, in order to save the secretary the time and expense of collection. They had in Birmingham a motto, "Forward!", which he hoped they might adopt as the motto of that Association, and thoroughly act up to it.

Mr. Hampson said that, occupying a seat at the Council of the Pharmaceutical Society, he felt a considerable hesitancy at first in joining this Association, but after carefully considering the position of the trade and a man's independence in respect of his calling and connections, he felt it was the only step he could take, and that he ought to join the Association and support it as far as possible. Its success depended on the number of its subscribers and the energy of its members; and if they did not come forward and support it they did not deserve support at all. The matter was entirely in their own hands; of course, if they felt that their interests were not of any importance, they would not support the Association, but the evidence which had already appeared, namely, that 3000 members had already joined, was almost a sufficient answer to that idea, and a good augury for the future. With regard to the attitude of the Pharmaceutical Society towards that Association, he wished to say one word. He did not see there was any necessity for any antagonism whatever between the two. On the contrary, he thought every man should join that Assosiation, and that every one who was eligible should also join the Pharmaceutical Society, for they both had important work to do in the future. The Pharmaceutical Society had this important work to do, that it had to set the law in motion, and he must add that it rested with the members of the trade whether the law should be set in motion or whether it should be amended. He had taken considerable interest in one or two questions which had come before them, and particularly in the one with regard to co-operative stores. That subject had been looked upon as a great bugbear, which ought to be hidden rather than faced; but he believed in facing a thing, and they must face it in future. If he had a seat in the next Council, he should endeavour to face the question, and he hoped the Trade Association would also do its work well with respect to it. With regard to the Pharmaceutical Society, he had no doubt that it also would do its duty if the members expressed their opinion, for he must repeat, they had the matter in their own hands. If necessary, they could alter the character of the Council, though he did not wish that any undue pressure should be exercised, or that any wholesale change in the Council should take place; on the contrary, the men should be fairly tried, fairly judged; but still the same remark applied to the Pharmaceutical Society, as to that—it entirely rested with the members as to what the action should be. If there was a want of energy in the Council, there must be a want of energy in the members; and the same with them; if there was a want of energy in the Executive Committee, it must be from a similar want in the members at large. But he supported the resolution with much pleasure, and he almost hoped the London chemists would form a committee among themselves to give extra help to this Association. This was an age of over legislation; every year produced some kind of stupid Bill before the House, which, if carried into law, invaded somebody's rights and privileges. They had already had evidence that some persons were bringing forward a Bill to amend the Medical Act; and if it passed they would be simply prevented from carrying on a legitimate part of their business. The question of prescribing was a very delicate subject; but if they were simply apathetic and quiescent they would not only lose their independence, but would find that the aggressive spirit would be stronger. He did not believe in being trampled upon. Chemists and druggists were an important body, and could exercise great power over the legislature, and he believed that in case of an aggressive measure being introduced, they had sufficient power, if they were united, to prevent it passing. But they could never exercise that power unless they supported an organization which would bring it to bear when needed.

Mr. Mackenzie (Edinburgh) supported the resolution, because he felt the Association was needed. There seemed to be an organization on the part of some medical men to interfere with them, but he must say that things seemed much changed in the medical profession to what they used to be. A medical man's education was now in many cases little more than a farce, and he thought they ought, in fairness, to be a little more considerate towards chemists and druggists. He knew one medical man of high position, a professor, who told him that after he had been licensed from one of the first universities to practise medicine, he was afraid for some years to write a prescription, lest the intelligent dispensing chemist would have occasion to laugh at some inaccuracy: and he believed the same thing was pretty general, although not always so honestly confessed. Mr. Barclay had mentioned one motto, and just before he spoke of it he had been thinking of another, which he carried for some years as a volunteer, namely, "Defence, not Defiance"; but they were able, he hoped, to defend themselves, and when aroused by insult after insult, he thought it was time for them to stand up for themselves, and he was sure the country would support them. He might also say that as a member of the Pharmaceutical Society, he went in heartily for this Association. It was only in accordance with human nature to be somewhat supine in the hour of prosperity, and that might apply in some respects to the Council of the latter body, and, therefore, he though there was room for another Association. It was an old adage in Scotland, that an ill beginning oftentimes had a good ending. They had made a good beginning, but sometimes a good beginning was a misfortune, because people were flushed with victory, and thought themselves stronger than they really were, and this gave the enemy an advantage, and they must therefore be on their guard. If the thousands at present on the list would each one endeavour to bring an additional member in the year to come, their numbers would be doubled, and in that way they might secure the whole names on the register. That would not do the Pharmaceutical Society any harm, and would do an immense deal of good, whilst it would show all aggressors that they were in earnest in defending themselves.

Mr. Holdsworth (Hon. Sec.) said he hoped those gentlemen who had not already joined would not let idle sympathy take the place of efficient expression, and that no one would think it did not matter whether he joined the society or not. The balance sheet showed that the expenses were very heavy, even for a part of one year, and that the subscriptions were not sufficient of themselves to keep the society in successful operation. They had been largely dependent on donations from members of the wholesale trade, which they could not expect would be repeated. The subscription had been fixed at five shillings in the hope that every chemist in the kingdom would join; and he trusted that that hope would to a large extent be realized. The Association had won the milk of sulphur case, but had done so at a great cost; and as other cases were constantly coming up—for instance, this great case of counter prescribing—it was evident that it wanted continuous and hearty support. In dealing with a body of 8000 men every act was an expensive one, for they could not even send out a post-card at a less expense than £20. But he would ask every gentleman present who had subscribed whether he had not been amply paid by what he had received, whether he was not money in pocket, to say nothing of the peace of mind he obtained. In fact, he believed they would all agree that it was the best investment of five shillings they had ever made.

Mr. Wade, as a London member who had recently joined, said he felt satisfied that a great many others in London had abstained for the same reason as had operated with himself. He would not say anything about the jealousy shown in some quarters when the Association first started, on account of its being originated in a provincial town; but there was another feeling among the London members, and that was that one of the objects of the Association was to foster and encourage adulteration and the sale of inferior drugs. Many of them also thought that there was nothing particular to be got out of any action against co-operative stores, and those two feelings had kept a great many aloof. But a question was now brought forward which affected the whole trade—that of counter prescribing. It was also said, that if the Council of the Pharmaceutical Society represented the trade where was the necessity for this new Association? But his contention was that that Council did not fairly represent the whole trade, nor even the members of the Society, and therefore it became a necessity that a new society should be formed. They wished to uphold the law, not to infringe the law. When the Act of 1815 was passed, he considered it was a line distinctly drawn between the medical practitioner and the chemist and druggist, and it had been invariably understood ever since that chemists had a perfect right to prescribe for simple ailments over the counter, while they should in no way attempt to visit patients out of doors or prescribe for severe cases. If that was the case, why was it now impugned? Why, after sixty years of practice, should they be called upon for the first time to give up that right? He took it for granted there were none present who did not regret that the question had been raised, because it was a mistake for them to be put in antagonism with the medical profession, with whom they ought to work, if possible, harmoniously. But he did not believe medical men at large would interfere with them in any way. There were, no doubt, some chemists who had overstepped the mark, and with them they had no sympathy; but why should the whole of them be put down because of those men? They were, in fact, no more numerous than these prosecuting surgeons were amongst their own body. For he believed it was only some few pettifogging little surgeons with no practice of their own who were jealous of chemists who possessed the confidence of the public. Every man who had been in business for a number of years knew what he was about, and there were even chemists and druggists who had had experience in almost every branch, both in chemistry and surgery. Many of them might have held important positions in years gone by as assistants to surgeons, and were then considered qualified to perform all the duties of the surgeon in the business of their masters; yet, after years of experience, they were not now considered qualified to look at a man's tongue. He did not think they ought to go beyond simple prescribing; but he did say they were far better qualified in many respects than a young practitioner just coming from the hospitals, with nothing but his diploma to show, and that was often obtained with "crammed" knowledge. That was a strong argument, but not the one that they ought to stand upon. It was in reality a matter of public interest. If they went to Parliament, it should be on behalf of the public, that it should not be dragooned into going to medical men, and be forced to pay five shillings for what it could get at a chemist's for a few pence. He believed they were none of them desirous of fostering a prescribing trade, but it was really forced upon them by the public. It had been said that at the east end of the town there was very little done in the way of dispensing prescriptions, but he might add that within a stone's throw of Buckingham Palace there were shops that did not see a prescription once a day. It was not altogether because it was a place where prescriptions were not written, but because they were surrounded by medical men who sent out their own medicines. How, then, was a chemist to get a living, if he were not allowed to prescribe himself nor dispense a medical man's prescription? But if a chemist were not to prescribe, it would be only fair that surgeons should not send out their own medicines; but they not only did so, but sent out dietetics, instruments, and sundries as well.

The resolution was then put, and carried unanimously.

Mr. Reinhardt (Leeds), as one of the founders of the Pharmaceutical Society, wished to remind his fellow-members that if the Council did not represent them it was because they did not take the trouble to inquire into the merits of the persons coming forward. He was glad to find that there seemed now a prospect of candidates for office setting forth a programme of their views and showing what their ideas were, and he trusted that this plan would be followed in future. The trade in the west of London was conducted on very different principles from what it was in the country. The special question now before them was counter prescribing, and it ought to be taken up from one end of the country to the other. When they had been accustomed to this for sixty years, how was it that this mine was now sprung upon them in 1877? They could only meet force by force, and it was through Parliament they must gain their true position. On the one side they were attacked by co-operative stores, and on the other side by lower ranks of the medical profession. He said "lower ranks," because he had known men who had flourished for years as physicians recommend persons to go to his shop for advice in simple cases. He had written a letter to the editor of the *Pharmaceutical Journal*, which was not inserted, but which appeared in the *Chemist and Druggist*, saying, as his time was now at his own disposal, he would be willing to go all over the country, and try to influence the trade to make a stand on this important question, charging only his hotel and travelling expenses; that offer he begged now to repeat, because he felt it was necessary to rouse the feeling of the trade.

Mr. Jones said, as President of the Association, he could not but thank Mr. Reinhardt most heartily for the kind offer he had made.

Mr. Corey said the question of counter prescribing was one much more important to country chemists than to those in London, since they had not so many prescriptions to dispense. At the same time he did not think they had so many enemies amongst the medical men as in some larger centres. After giving an instance which had come under his own notice of the ignorance of two eminent physicians with regard to the proper dose of a powerful poison, he suggested that it would be a good plan for some one member in a country town to undertake the collection of subscriptions from the surrounding districts, and forward them to the secretary. He should be very happy to take this duty in his own neighbourhood; and he thought it would also be worthy of consideration whether the amount of subscriptions should be increased, or whether they should seek for small donations in addition.

Mr. Young said he had just purchased for a halfpenny, which was more than it was worth, the Medical Bill which had just been introduced in the House, and which, if passed, would entirely take away their power of prescribing. But he thought it would be very desirable if post-cards were sent to all in the trade asking them to write to their representatives in Parliament, requesting them to oppose this Bill, as being a violation of the rights of chemists and druggists.

Mr. Gostling (Diss) said if it was necessary for London tradesmen to speak out on behalf of counter prescribing, it was far more important for those in the country, for if this proposed Bill were passed, they would nearly all have to close their shops and train up their sons to be apothecaries instead of chemists and druggists. Having spoken at some length with reference to the universal practice of counter prescribing, he concluded by supporting the suggestion that petitions against the proposed Bill should be sent in.

Mr. Jones then moved a vote of thanks to the chairman, which was seconded by Mr. Greenish, and carried unanimously, and the proceedings terminated.

Provincial Transactions.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

A special meeting was held on Friday, the 27th ult., to bring to a conclusion the winter classes. Mr. Townsend, Secretary, mentioned that the classes, having been only held once a week, had been much better attended than in the previous year. The dispensing class especially had been well taken up, and he hoped that next year still better results would follow. Financially, the Association was in a prosperous condition, but from the fewer available members in the town than when the Association started, of course the number of members would be comparatively small.

The President, Mr. G. C. Druce, gave a short address, in which he suggested that the new laboratories of the Science and Art Department should be utilized at least for the chemistry classes of the Association in future; he also proposed that during the summer months a botany class should be held weekly, starting at 6 A.M. into the country, and then a night could be occasionally employed in looking over recent specimens. He referred to Mr. Hanbury's proposed alterations in reference to the herbarium prize, and thought they were excellent, though he considered the age should not exceed twenty-one. Having noticed recent legal matters connected with the trade, he concluded by hoping all would try to keep the Association in a flourishing condition.

Specimens of equisitum spores were shown under one of Swift's binocular microscopes. The thanks of the society were passed to various donors, including the Science and Art Department, for the loan of an analytical balance; to the Pharmaceutical Society for Journal; Mr. Saul for framed chemical chart; and Mr. Maxwell for some chemical apparatus.

Parliamentary and Law Proceedings.

A Bill to Amend the Medical Act of 1858.

The following Bill has been introduced into the House of Commons by Dr. Lush:—

Whereas an Act was passed in the twenty-first and twenty-second years of the reign of Her Majesty "to regulate the qualifications of practitioners in medicine and surgery;" and whereas it is expedient to amend the said Act:

Be it therefore enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

1. Section forty of the said recited Act shall be repealed, and in lieu thereof it is enacted: Any person who for the purpose of any Act of Parliament, or for the purpose of gain, shall take or use any medical or surgical name, title, or description, unless such person's qualification or qualifications entitle such person to take or use such name, title, or description, and such qualification or qualifications be also registered, shall, upon summary conviction for either or any such offence, pay a sum of *twenty pounds*: And it is further enacted, that any person not already registered or not qualified at the time of the passing of this Act to be registered under the said recited Act, who shall make, fill up, or sign any medical certificate for the purpose of any Act of Parliament, or who shall practise medicine or surgery for gain, unless such person holds a duly registered qualification or qualifications in both medicine and surgery, shall likewise, upon summary conviction for either or any such offence, pay a sum of *twenty pounds*.

2. Section forty-two of the said recited Act shall be repealed, and in lieu thereof it is enacted: Any sum or sums of money arising from conviction and recovery of penalties as aforesaid shall be paid to the treasurer of the General Medical Council, anything to the contrary contained in any Act passed before the passing of this Act notwithstanding.

3. To Schedule A. of the said recited Act it is enacted that this section shall be added: Doctor of Medicine, or Bachelor of Medicine, of any foreign or colonial university, whose examination is proved to the satisfaction of the General Medical Council by such university to be equal to that required, for the time being, by the College of Physicians of London for their qualification of membership, or to such other examination as may be fixed upon for the purpose by the said Council.

4. This Act to be read with and form part of the said recited Act.

5. This Act may be cited for all purposes as the Medical Acts Amendment Act, 1877.

Singular Charge of Adulteration against a Chemist and Druggise.

At the Sheffield Town Hall on Wednesday, a curious case, under the Sale of Food and Drugs Act, came before Mr. Webster and Mr. Stephenson. Mr. John Henry Dixon Jenkinson, chemist and druggist, of Duke Street, Park, was summoned under the 6th section of the Sale of Food and Drugs Act, 1865, "for that he, on the 28th April, did unlawfully sell to one William Brammer, the purchaser thereof, to his prejudice, a certain drug, to wit, half an ounce of jalap, which was not of the nature, substance, and quality of the article demanded by the purchaser." The Town Clerk appeared in support of the information, and Mr. Barker, barrister, appeared for the defendant.

The Town Clerk, having referred to the section under which the proceedings were taken, stated that a man named Richard Gillott, who lived in the Park, had two valuable dogs, and on the 27th ultimo he wished to administer to them a purgative. He sent to the defendant's shop, and purchased what he thought to be a pennyworth of jalap, which was given to the dogs. They both died within twenty minutes, and as they were of such value, the owner felt that he should like to have an analysis of the drug. Accordingly word was conveyed to Mr. Allen, the borough analyst, and one of the inspectors, William Brammer, was sent to the defendant's shop to purchase some jalap. The sample thus obtained was analysed by Mr. Allen, and was found to contain nux vomica or strychnine, a very deadly poison. Mr. Allen had given a certificate which he would hand to the bench, and he believed that Mr. Barker, on the part of the defendant, would plead guilty.

Mr. Webster asked what object the defendant could have in mixing jalap and nux vomica.

The Town Clerk said there could be no object whatever.

Mr. Webster said he believed there would be no pecuniary gain. If the jalap as bought had been administered to a human being instead of to dogs the consequences would have been very serious to Mr. Jenkinson. He would have been committed for manslaughter.

The Town Clerk said that was the case.

Mr. Baker said he would like to ask Mr. Allen a question or two. He would plead guilty on behalf of his client.

Mr. Allen, in reply to Mr. Barker, said in colour nux vomica and jalap were very much alike, and in price they were about the same. There could be no object in mixing the two powders.

Mr. Barker said he could not deny that his client had laid himself open to a penalty, but he was at a loss to know how the mistake had occurred. The drug was sold at a branch shop, and was part of a lot which was bought fifteen months ago. There was no nux vomica in the shop, and how it had got into the jalap his client did not know. Large quantities of it had been sold and no evil consequences had ensued, as must have been the case if the medicine sold had contained nux vomica. Mr. Jenkinson could have no possible object in mixing the powders.

Mr. Webster: There must have been great carelessness.

Mr. Barker said the case was not one in which any fraudulent intent was alleged, and he asked the bench to impose a nominal fine. The defendant was already threatened with an action by the owner of the dogs, who laid his damages at £30, and when the defendant had paid that amount he would have been sufficiently punished for his carelessness.

A fine of £2 and costs was imposed, Mr. Webster remarking that he thought that druggists ought not to keep branch shops unless they could personally attend to them.—*Sheffield Independent.*

Review.

THE HISTORY, PRODUCTS, AND PROCESSES OF THE ALKALI TRADE; including the most recent Improvements. By CHARLES THOMAS KINGZETT, F.C.S. With twenty-three Illustrations. London: Longmans, Green and Co., 1877.

To the many historical works already extant that have been written for our enjoyment and instruction, concerning history, *par excellence,* or men, or philosophy, there has been added a volume which, while dealing with none of these subjects especially, lays claim to be ranked in the same category. Under the title of the 'History, Products, and Processes of the Alkali Trade,' Mr. Kingzett gives us a most interesting account of a special branch of chemical industry, which, since it forms the largest chemical industry of this country, is one of the mainsprings of our boasted national wealth. This is the first time that it has been attempted to bring a work of so special a kind before the public, and we need scarcely say that the task has fallen into good hands, the practical experience and scientific reputation of the author being a sufficient guarantee of its value.

But the history before us does not confine itself to the mere narration of bygone circumstances; it deals not alone with the past, but treats of the all-important present and uncertain future of the alkali trade. It further differs from most histories in that it offers, unlike these, a scientific explanation of its related facts. The work indeed is, though essentially historical, by no means wholly so, but constitutes, as Mr. Kingzett tells us in his preface, a treatise in which much stress has been laid on matters of history interesting as these are in showing how gradually knowledge is perfected. To quote the author's own words: "It will, for instance, be seen that at no time in the history of the alkali trade has an inventor brought into use an entirely new process; so-called new processes are but the perfected forms of old ones, and are based upon previously known facts. Moreover, the greatest commercial successes have been achieved, not by the practical application of new ideas, but in the development of old ones." In urging strongly that scientific investigation must necessarily precede industry, Mr. Kingzett assures us that those who discuss the value of such scientific work "must be further prepared to discuss the good, for humanity, of all progress, not only in industry and commerce, but in every direction of civilization." These passages from the preface are well illustrative of the philosophical spirit which pervades the volume.

It will we feel sure be not uninteresting in again turning over the leaves of a volume which has caused us so much pleasure in its perusal to afford our readers some account of its scope and tendency.

In an opening chapter of much interest the author sketches briefly the early history of the trade and manufacturing industries generally, and points out in a general summary the products which go to form its basis.

In Chapter II., we have some most interesting details relating to pyrites, sulphur, and nitre; and in Chapter III. a masterly description of the manufacture of sulphuric acid. The illustration here and throughout the volume intensify exceedingly the value of the text. Among the more modern improvements, Dr. Sprengel's water spray apparatus is fully entered into. Mr. Kingzett next proceeds to consider the treatment of burnt pyrites, the extraction from these of copper, silver, and gold, and the manufacture of sulphate of copper. The chapter which follows forms a historical sketch of alkali manufacture, and the curious traditions and striking statistics which the author has brought to bear on his subject here find their most fascinating expression. We are next led to contemplate the manufacture of salt, and in connection with this that of sulphate of soda and hydrochloric acid. Leaving these matters we proceed to be instructed as to the making of carbonate and bicarbonate of soda from *black ash* or crude carbonate. Much space is here devoted to a consideration of the advantages of "revolving furnaces" and the chapter is admirably illustrated. This and the following chapters on caustic soda, alkali waste, regeneration of sulphur, etc., are of special interest and importance. Chapter X. includes the description of other soda processes than Leblanc's, and particular attention is drawn in it to the "ammonia process." Chapter XI. deals with soap making. The author defines soap commercially, as a "body which on treatment with water liberates alkali," a definition which includes the silicated soaps so lately introduced into general use by Mr. Gossage. Chapters XII. to XVI. deal with the bleaching industry. They rival the foregoing in interest and clear exposition, and form a most complete *résumé* of the practical industrial application of chlorine as a bleaching agent. The author brings his treatise to a gradual close with some general considerations relating to the trade, and some remarks on chemical climatology, and finally most fitly concludes with a chapter on statistics.

In treating of products and processes, Mr. Kingzett does not forget to remind his readers of the duties of those to whom these products and processes are a source of income and affluence, as the following eloquent passage shows:—"Manufacturers would do well to appreciate more fully than they do at present, that science is slow to progress, and that on that progress all improvement in industrial applications depends. Let them, therefore, encourage its development by employing competent chemists; and not only so, but rather aid research than war against it as they have too often done in the past. They cannot hinder the current of knowledge in its advance, but they can help to increase its rate of movement. In another direction they can also benefit humanity by creating the means whereby their workmen may elevate themselves, and train their children in a better way than is to be witnessed now. Men have other relations one to the other than those included in the commercial world of capital and labour, and this better side of life cannot be hidden even by the shadow of the Stock Exchange and the marts. Indeed, life may be compared to a spectrum with its bright and dark lines." (p. 241).

It is the duty of all impartial critics according to certain tenets to find fault, and if the faults of a work do not lie on the surface, to dive deeply in search of them. Perhaps the greatest fault that can be found with the present volume is its brevity, and yet many may consider this an advantage. Mr. Kingzett has, however, undertaken to give us an account of the alkali trade from an historical, an industrial, and a commercial point of view; in our opinion he has done this in a most able manner, and all must agree that the incorporation of the author's own researches in most important directions lend a particular value to the work.

We regret exceedingly that the nature of the subject matter of the volume necessarily precludes disjointed quotation. It may be said, however, without prejudice, that many of the more scientific and descriptive passages remind one not a little in their succinct conciseness of the terse manner of Rolleston, in his 'Forms of Animal Life.'

We have no doubt the volume will enjoy the welcome reception it merits both at the hands of those more particularly interested in these matters and from the general public. It is with this conviction and hope that we linger over its last page.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Aids to Chemistry. Specially designed for Students preparing for Examinations. Part I. Inorganic: Oxygen to the Metalloids inclusive. By C. E. Armand Semple, M.R.C.P., etc. London: Baillière, Tindall, and Co., 1877.

The Analyst, including the Proceedings of the "Society of Public Analysts." Edited by G. W. Wigner, F.C.S. Vol. I. London: W. Baxter. 1877.

A Guide to Therapeutics. By Robert Farquharson, M.D., etc. London: Smith, Elder, and Co. 1877.

Elementary Text-Book of Physics. By J. D. Everett, M.A., D.C.L., etc. London: Blackie and Son. 1877.

Report on the Adulteration of Food. Ottawa. 1877.

Nineteenth Annual Report of the Alumni Association of the Philadelphia College of Pharmacy. 1877.

Notes and Queries.

[545]. LOGWOOD.—Can you tell me the process which logwood chips undergo to develop a good colour—what I believe is called "liquoring down?"—A Subscriber.

[546]. DALE'S PLASTER.—Will any one kindly give the formula for "Dale's Plaster," as prepared and sold by chemists in the North of England?—J. P.

SALICYLIC ACID AND BORAX.—It may be interesting and perhaps useful for some readers of the Journal to know, that while a solution containing 10 grains of salicylic acid and 10 grains of borax in 1 ounce of water, has a very bitter taste and an acid reaction; a solution containing 10 grains of salicylic acid, and 15 grains of borax, has no disagreeable taste, and is nearly neutral. This solution appears to possess all the valuable properties of salicylic acid, and forms an agreeable means of using the acid internally or as a gargle.—S. N.

Obituary.

Notice has been received of the death of the following:—

On the 13th of April, 1877, Mr. Charles Morgan, Chemist and Druggist, Ross. Aged 57 years.

On the 13th of April, 1877, Mr. William Wilson, Chemist and Druggist, Oldham. Aged 51 years.

On the 18th of April, 1877, Mr. Joseph Farnell, Chemist and Druggist, Laisterdyke, Bradford. Aged 69 years.

On the 23rd of April, 1877, Mr. James Hood, Chemist and Druggist, Morpeth, Northumberland. Aged 60 years.

On the 6th of May, 1877, Mr. William Hancock Balkwill, Chemist and Druggist, Kingsbridge, Devon. Aged 66 years.

On the 8th of May, 1877, Mr. John Lockley Whitfield, Pharmaceutical Chemist, Worcester. Aged 82 years. Mr. Whitfield had been a Member of the Pharmaceutical Society since 1842.

Correspondence.

*** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Meaning of the Word "Dispense."

Sir,—I have (with many of your readers, I daresay) been on the look out for disquisitions on the meaning of the word "dispense" from the more prominent of your correspondents.

It appears certain that the result of the appeal in the case of the Apothecaries' Company *v.* Shepperley turns entirely upon the definition of this word.

It may, I think, be fairly argued to involve all that is implied in the words "dispensary" and "dispensatory." These terms are to be found in dictionaries long anterior to the passing of the Apothecaries Act in 1815.

In my copy of Bailey's 'Dictionary,' 1770, to "administer" is one of the meanings given to the term "dispense."

I hope that this now important word will receive in your columns the scrutinizing analysis it so well deserves.

J. W.

York, May 12, 1877.

H. S. Newzand.—Cochineal, ½ oz.; boiling water, 1 gallon; digest, strain, add ½ oz. sulphuric acid, and water to make up 2 gallons (Beasley).

F. G.—*Valerianella* sp., probably *elitoria;* the fruit is not well developed.

L. Thompson.—*Lathræa squamaria.*

A. R. T.—We believe the method is sometimes adopted of preserving the skin in the neighbourhood of the hair from the action of the dye by covering it with grease.

T. R. E.—The regular meetings of the Council are held on the first Wednesday in each month.

"*Anxious.*"—The "Ebert Prize" had its origin in a donation of 500 dollars, made in 1873, to the American Pharmaceutical Association, by Mr. A. E. Ebert. The annual interest on this sum was to have been given as a prize yearly "for the best essay or written contribution containing an original investigation of a medicinal substance or information respecting improved methods for the preparation of chemical or pharmaceutical products."

"*Trouvant.*"—"Aqua Toffana" was the name given to a poison prepared by an Italian woman living in the 17th century. Its composition is not known with certainty, but it was probably an arsenical solution.

Communications, Letters, etc., have been received from Professor Dymock, Mr. Taylor, Professor Bentley, Mr. Roberts, Mr. Bates, Mr. Cragg, Mr. Haldon, Mr. Rivers, Mr. Benger, Mr. Chipperfield, Mr. Ingham, A. P. S., J. P., Dictionary, Beginner, Novice.

"THE MONTH."

An old writer well says of May—

"Of all the moneths in the year
To mirthful May there is no peer."

May is, as it were, the childhood of the year, and it is only during this period that the freshness of foliage and profusion of flowers which characterize it are seen in full perfection. But this year the season is at least three weeks behind its usual time. "May blossom" is only just appearing, and the lily of the valley has not until this week ventured to put forth its fragrant bells. Instead of the flowers of May we have been presented with the sunshine and showers of April. Ere long, however, we may hope to see the London streets decked in their best, and the golden racemes of the laburnum, the lovely blossoms of the pink "may," the handsome white panicles of the horse-chestnut, and the fragrant lilac, vying with each other in vindicating the title of May to be considered the most charming month of the year.

Many forest trees and shrubs may be found in flower this month—more, perhaps, than in any other of the year. Among these the oak, willow, juniper, larch, and Scotch fir are of pharmaceutical interest. The Oak (*Quercus robur*, L.) is a very variable species, of which two comparatively distinct varieties are recognized by most botanists, and are sometimes even elevated into species. One of these is *Quercus pedunculata*, Ehrh., distinguished by having the pistillate flowers stalked, and the leaf-stalk very short. The other is *Quercus sessiliflora*, Salisb., which has the pistillate flowers sessile, and the leaf-stalk longer. The latter is usually a larger, taller, and handsomer tree, with longer leaves. Of these two varieties no less than thirty-two forms in all have been described by De Candolle. The flowers are monœcious, the staminate flowers being arranged in loose, slender, pendulous spikes (catkins), each flower consisting of six or eight short stamens surrounded by a calyx, deeply divided into six or eight strap-shaped toothed segments. The pistillate flowers are not so readily noticed, being very small, but may be found in the axils of the uppermost leaves, and are either solitary and stalkless, or two or three together on a stalk. The ovary is hidden in what looks like a scaly bud, but which is really an involucre of imbricated bracts, which afterwards forms the acorn cup, the 3-lobed stigma protruding above the cupule. The ovary, when young, is 3-celled, and each cell contains two ovules; but of these six ovules only one is ultimately developed and fills the whole of the ovary. The oak is perhaps more infested by gall insects than any other British tree; the leaves, buds, inflorescence, and roots all harbouring different species. The common round hard gall produced by *Cynips Kollari*, Gir., on coppice oak, contains, if gathered in August, 17 per cent. of tannin, and might perhaps be available if the Turkish war diminishes our supply of Aleppo galls.

Of the Willow several species are used in preparing salicin. The structure in all is very similar. The flowers are arranged in catkins, and are diœcious; the pistillate flower consists of a single ovary, having a hairy scale and a minute gland at its base. The ovary is one-celled, but is composed of two carpels, and contains hairy seeds; the staminate flower consists of two, three, or five stamens in different species, and has also a small scaly bract and a gland or nectary at its base. These glands may be seen on the side of the flower next to the axis of the catkin; they are very small and yellow, and serve to attract insects. The species said to contain most salicin is the *Salix Russelliana*, Sm., or Bedford willow. It has smooth long lanceolate serrate leaves, which are glaucous underneath, lateral stalked catkins, two distinct stamens in each flower, and a stalked lanceolate capsule which has a style as long as the forked stigma.

The Larch (*Pinus Larix*, L.) may be readily known from the other fir trees common in this country by its pale green leaves falling off in winter, and by their being arranged in tufts along the branches. Its small bright crimson catkins form very pretty objects in spring. The tufts of leaves are evidently only condensed branches, for the terminal tuft may frequently be found elongated into a slender twig, in which the leaves are distinctly alternate. The staminate flowers are arranged in small cones, and the anthers are almost sessile upon the thick central axis. The scales of the cones are flat, and somewhat irregular at the margin; hence the larch is sometimes placed in a separate genus. The Scotch fir, or *Pinus sylvestris*, has the leaves arranged in pairs, and the cones are ovate, conical, and acute, and when young are as long as the leaves, stalked and recurved. The essential oil of this plant has lately been used for throat complaints in the form of inhalation. The commercial article is, however, rarely pure, and is very different in taste to the pure article. A good idea of the purity of the oil may be obtained by comparing its taste with that of the leaves of the Scotch fir, which have a rather pleasant taste, somewhat resembling that of blackberries.

The Norway Spruce (*Pinus Abies*, L.), also commonly cultivated in plantations, parks, and shrubberies, often used for Christmas decorations, and known to pharmacists as the tree which should furnish the Burgundy pitch of commerce, is easily recognized by its very short four-cornered leaves, not growing in pairs, but close together in an irregular manner all round the branches, which nevertheless present a somewhat flattened appearance. The cones are long and cylindrical, and the scales flattened like those of the larch cone. Several other species, used medicinally, may be seen at Kew, but as they are all labelled, and the trees are more easily recognized by habit, the comparative length of the leaves and their arrangement, we will only mention the names of those which are of pharmaceutical interest; they are as follows: *Pinus Tæda*, L. and *P. palustris*, Mill, yielding American turpentine; *P. maritima*, Poir, from which Bordeaux turpentine is obtained; *P. picea*, L., the tree yielding Strassburg turpentine; *P. pumilio*, Hanke, from which an essential oil is distilled, and used for inhalation; *P. balsamea*, L., the Canada balsam tree; and *P. Canadensis*, Ait., the tree yielding the Canada pitch, or hemlock pitch, of the United States Pharmacopœia.

All the above flower in May; the larch, the Norway spruce, and the mountain pine (*P. Pumilio*) being the earliest to open.

Another plant of this family (*Juniperus communis*, L.), may now be found on chalky downs. The staminate flowers are arranged in small catkins about one eighth of an inch long, on separate plants, each scale of the catkin having three or four anther cells attached to its under surface. The cone consists, when young, of twelve to sixteen scales, all of which, except the three uppermost, are empty. The three topmost scales are thinner than the others, and of a pinkish tint; they surround three naked ovules. These three scales ultimately enlarge, become fleshy, and unite to form the small fleshy galbulus, commonly called a juniper berry, on the apex of which the junction of the three scales may be easily seen.

In the Chelsea Garden, the *Lobelia inflata* may now be seen in blossom in the hothouse. It is by no means the prettiest of the genus, the flowers being of a very dull pale lilac colour. It receives its name from the inflated ovary, which is large for the size of the flower. The ovary is inferior, and the very minute seeds, which are brown when ripe, are singularly reticulated, by which character they are easily recognized in cases of poisoning. The corolla is split on the upper side quite down to the base, and does not readily fall off, but withers on the calyx. The anthers and filaments are all united together around the style, and the stigma is furnished with a small tuft of hair. The seeds are often given by herbalists in large quantities, sometimes as much as a teaspoonful for a dose, as an emetic; and were it not that they usualy administer heroic doses of cayenne pepper with the lobelia seed, there would probably be many more cases of poisoning by this drug than are now recorded.

The labdanum plant, *Cistus creticus*, is also still in flower, and the rice, *Oryza sativa*, is just coming into flower in the water tank. The tips of the paleæ are of a black colour, which give the flowers the appearence of being smitten with mildew. The ligule, or appendage at the top of the leaf sheath, is very well developed in this plant. In the open ground several species of rhubarb are coming into flower. The Polygonaceæ, to which rhubarb belongs, and the Valerianaceæ, will be well represented in fields and gardens during the next month, and may be studied with advantage.

The *Actæa racemosa*, L., which of late years has been recommended in acute rheumatism, is now coming into blossom. Both in foliage and in flower it is very similar to the rare British species, *A. spicata*, L., which is found on a few limestone tracts in the north of England. The raceme of flowers is, however, longer than in *A. spicata*. The fruit in the two species is very different in appearance, *A. racemosa* having dry dehiscent follicles, and *A. spicata* a red juicy baccate fruit. On this account the former is sometimes placed in a distinct genus, *Cimicifuga*. The carraway, asarabacca and *Geranium maculatum* are also still to be seen in flower. *Ferula Tingitana*, the plant which yields African ammoniacum, will also shortly be in blossom, both in the Chelsea Gardens and at Kew. We are glad to see also that there are two small plants of *Euryangium Sumbul* growing at Chelsea.

At Kew there are only two plants of interest at present in blossom in the economic house. These are the chick pea, which is rarely seen in botanical gardens, and the ipecacuanha. The latter is by no means a showy plant, having a few small dense cymes of white flowers arising from the axils of the upper leaves. The leaves are dark green and oval in outline. The flowers are very small, and are so crowded together as to appear like a dense umbel or small capitulum. The ovary is inferior and crowned with a roundish disk, surrounding which is a small membranous ring, representing the limb of the calyx. The leaves, as in most Cinchonaceæ, are furnished with interpetiolar stipules. The flowers are dimorphic, some having long styles and short stamens, and others short styles and long stamens. The plant appears to be endowed with remarkable vitality, for it has been found that portions of the annulated root only one-sixteenth of an inch in thickness will grow into a perfect plant, and that even the petiole of the leaf is capable of producing young plants. Nevertheless, it does not seem to flourish well in the botanical gardens in this country. It is fortunate that the plant is so prolific in its native habitat, for from its slow growth and from being collected nearly all the year round, it would otherwise have become extinct.

In the herbaceous ground at Kew, there are many curious plants now in blossom. *Podophyllum peltatum* will shortly be in full bloom, and *Sarracenia purpurea* is already in bud. The Ranunculaceæ present many genera for observation by the botanist—*Trollius*, with about fifteen sepals and small linear petals, hidden under the stamens; *Aquilegia*, with its spurred petals, often exhibiting anthers turning into petals; *Peonia*, with its well marked disk, and persistent sepals; *Anemone*, with corolla wanting; and various species of *Clematis*, differing from nearly all the other ranunculaceous plants in having opposite leaves and a shrubby habit.

In the Papaveraceæ a curious plant is now to be seen in blossom in which the carpels are scarcely coherent even when young, appearing to hang together, without any real union, thus approaching the ovary of the Ranunculaceæ in structure. The stamens also are petaloid, whence its name *Platystemon Californicum*. Several rare British plants may also now be seen in flower at Kew, of which *Urtica pilulifera*, *Euphorbia hiberna*, *E. pilosa*, *Allium triquetrum* and *Scrophularia vernalis* are especially noticeable; the Violaceæ and Boraginaceæ are also in good condition for examination.

The broom, *Sarothamnus scoparius* is, however, almost the only medicinal plant, except the rhubarbs, which especially requires notice. The Spanish broom, *Spartium junceum*, which blossoms in July, when the common broom has ceased to flower, is often mistaken for it, being a common plant in shrubberies and parks; it may, however, be easily distinguished by its larger flowers and by the branches being quite round and smooth, like the leaves of the common rush. The true broom has branches which are more slender and very angular. The flowers are curiously constructed. The stamens are of two lengths, but the filaments are all united into a single tube surrounding the pistil. The pistil itself has a very long style which is concealed within the lower petal or keel. If a bee alights on the keel of a recently opened flower the shorter stamens only emerge and dust the under part of the bee; but if the flower be a day or two old the keel gives way suddenly and the longer stamens and pistil spring out with a jerk, the pistil being thus dusted over with pollen, which by virtue of its position the stigma deposits on the back of the bee. The pistil then curls into a kind of circle so that its stigma is presented to the under surface of any bee which may afterwards visit the flower. Thus, as Mr. Darwin observes, both the upper and under surface of the bee get dusted with pollen, which will be transferred to the stigma at two different periods.

Of the rhubarbs, *Rheum rhaponticum*, L., *R. compactum*, L., and *R. undulatum*, L., are very similar in general habit, but are distinguished chiefly by the character of the leaf-stalk and fruit-stalk.

In *R. undulatum* the petiole is channelled above, rounded at the back and not furrowed, and the pedicels are jointed near the base. In *R. rhaponticum* the leaf-stalk is flat above and rounded and furrowed beneath and the fruit-stalks are jointed near the middle. In *R. compactum* the leaf-stalks are furrowed and flat above and the margins of the leaves denticulate. *R. palmatum* is easily distinguished by its deeply divided palmate leaves, but it does not appear to thrive well in either of the botanical gardens, and we have not seen it in flower. The above species are those which have been chiefly cultivated as sources of rhubarb root in Europe. A little, however, has been produced in Silesia, by *R. australe*, Don., which is easily distinguished by its rounded soft looking leaves, the blood-red colour of the whole inflorescence, and the scabrous surface of all parts of the plant. But the king of all the species is *Rheum officinale*, Baill., with which in point of size and beauty of foliage none of the others will bear comparison. The petiole in this species is not channelled on the upper surface, and is covered throughout with a pale pubescence, and the leaves are hairy underneath; the flower spikes are long, tapering, and drooping. In the Regent's Park Botanical Gardens, the Barbadoes aloes, and the *Aloe plicatilis*, may be seen in blossom; also the *Cypripedium pubescens*, or American valerian, which has a showy yellow flower, furnished like most of this genus with two stamens, one on each side of the column. The root somewhat resembles that of valerian in appearance, but is more slender, wavy, and of a brighter brown colour. It is used by the eclectics in America and by herbalists in this country as a nervine tonic.

At the Edinburgh Botanical Gardens the following medicinal plants are in flower:—*Anemone Pulsatilla, Cochlearia officinalis, Sanguinaria Canadensis, Arctostaphylos Uva-ursi, Amygdalus communis, Rosmarinus officinalis, Asarum Europæum*, and *Coptis trifoliata*, all in the open ground, and *Aloe plicatilis* in the greenhouse. Two species of *Iris* which yield orris root, *I. Florentina* and *I. germanica*, are just coming into blossom. In the gardens at Glasnevin, Dublin, only one plant, not hitherto mentioned, is in flower, and that is the *Curcuma longa*. There is yet one more plant which will probably be over by the end of June, and should, therefore, be noticed now. This is the *Arum maculatum*, which yields a starch formerly prepared under the name of Portland arrowroot, and the corm of which has been occasionally taken in small doses for gout. The flowering spike or spadix has near its base a ring of ovaries, and above these again a ring of anthers, and above these again a ring of abortive ovaries with long hair-like styles, which point downwards, and which are exactly level with the contracted portion of the spathe that they serve to close. The stigmas mature first, and by the time the anthers shed their pollen the stigmas are no longer fit to receive it. It, therefore, drops to the bottom of the spathe, and is carried from thence to fertilize other flowers of the same species by minute insects that can enter the spathe at any time, but cannot get out until the hair-like styles have withered, which takes place soon after the shedding of the pollen.

In the drug market we have noticed several spurious drugs, among which were copalchi bark offered as angostura bark; Para bark, a worthless bark containing no alkaloid, but closely resembling quilled Calisaya in appearance; and *Stenostomum acutatum*, a spurious cinchona in long grey smooth quills very different in appearance from any other bark. Black or striated ipecacuanha (*Psychotria emetica*) has also been offered at a price a little below that of true ipecacuanha. The gum described by Guibourt as *Gomme pelliculée*, which has a thin layer of papery bark here and there on its surface, has also been seen. Indian dill seeds (*Anethum Sowa*, Roxb.) have been offered as Sowa seed. These closely resemble the ordinary dill seed in appearance, but are narrower and more oval. Japanese isinglass in square sticks, made from various species of seaweed, and consisting chiefly of gelose, has also figured in the sales. Large quantities of East Indian cinchona have appeared during the month, but do not seem to have had any influence upon the high price of quinine. It may naturally be expected that such drugs as are obtained from Turkey and Russia will now rise in value. Opium, Aleppo galls, otto of rose, and linseed, as well as a few other drugs, may be expected to be much dearer before the year is expired, and are already showing signs of a rise in price.

We are glad to see that there is a tendency abroad to make Materia Medica collections available for students at the medical schools of a better character than hitherto. Dr. Phillips, of Westminister Hospital, has lately presented the school there with a very handsome and complete set of specimens, which is undoubtedly the best and most complete in any of the London hospitals.

Since the mention of Casca bark in the report in the *British Medical Journal* of the excellent lectures by Dr. Lauder Brunton,* inquiries have been made concerning it from various parts of the country, and our readers may be interested to know that it is identical with the sassy bark described several years ago in the *Pharmaceutical Journal* as the ordeal bark of Liberia on the Western Coast of Africa.† Although not at present a commercial article, it is probable that some of this bark will shortly be on it way to this country.

Curaçoa aloes, which has lately come over in large quantities, deserves chemical investigation, its aloin, we believe, not having yet been examined.

If the number of remedies lately brought into notice be any criterion, skin diseases must cease, ere long, to be an opprobrium to the medical profession. The latest new specific of this class hails from China, and is known by the sonorous name of Tong pang chong, and is said to be the product of *Akebia quinata*, Decaisne, a berberidaceous plant. It is said, by Dr. Murray, to produce wonderful effects in some cases of tinea and eczema.‡

Euonymin and Iridin have been highly spoken of as cholagogues, by Dr. Rutherford and M. Vignal, in their late report to the scientific grants committee of the British Medical Association. Of the former they say, that it is "worthy of receiving far greater attention in practical medicine than it has done hitherto,"

* *British Medical Journal*, March 24, p. 345.
† *Pharm. Journ.*, 1st ser., vol. xvi. p. 233.
‡ *British Medical Journal*, May 19, p. 609.

and of the latter, "there seems every reason why it should be removed from its present obscurity, and placed in a prominent position in practical medicine."

Coca leaves, of which much was at one time expected, have at last received a practical application. Dr. S. McBean has found them of service in typhoid fever, and other febrile diseases.*

Macaulay once wrote "we know no spectacle so ridiculous as the British public in one of its periodical fits of morality. In general, elopements, divorces, and family quarrels, pass with little notice. We read the scandal, talk about it for a day, and forget it. But once in six or seven years our virtue becomes outrageous. We cannot suffer the laws of religion and decency to be violated. We must make a stand against vice."

The truth of these words cannot be disputed; the British virtue unmistakably breaks out at times in excessive forms and constitutes the only revolutionary phase of the national character. The English people as a rule progress by evolutionary changes, but when they depart from this standard the consequences are ridiculous. Witness for instance the recent anti-vivisection movement; what could possibly be more absurd than the dying phases of this, in which disgusting placards are circulated throughout our towns setting forth the tortures inflicted by vivisectional experiments? What better things can be expected of a nation estimated by Carlyle to contain so many fools?

Unfortunately it must be admitted that in the matter of which we have just spoken, there has existed and still exists, if not here at least elsewhere, too much ground for the objections raised by the outraged people against the practice of vivisection. It is quite true that the agitators have ignored the good that has resulted, and may still result to the human race from properly organized and studied methods of research. Had this branch of science produced no other result than the discovery of the circulation of the blood, its employment would stand justified; on the other hand the results have been many, various, and of the highest importance. Yet it must be confessed that through the exercise of uncerebrated research, much unnecessary pain has been inflicted upon animals, and a large percentage indeed of the total amount of vivisectional experiments have been worse than useless, having been carried out in an empirical unstudied manner, and yielding results not worth the paper upon which they have been recorded.

In former articles we have adverted to several instances which may fairly be included among such results, and now again another instance is before us. MM. Dujardin-Beaumetz and Audigé have found that 245 grams of glycerine, when injected under the skin of a dog with an equal quantity of water, kill the animal in forty-five minutes. It had been well for the dog to have died more quickly; it had been better that the experiment—stupid as it was—had never been performed. Imagine the effect of injecting nearly a pint of any liquid subcutaneously; death must be the inevitable result of such a rude experiment and a proceeding running counter to the conditions upon which life depends.

The other results obtained by these investigators are equally worthless. They found that death always follows the injection of ·8 of the animal's body-weight of glycerine, and that 1·25 gives rise to tetanic convulsions; the body temperature rises to 109°, and congestion of the cerebro-spinal meninges is seen.

Such experiments as these, having reference to no primary idea, and the attainment of no definite object, are as indefensible as another, quite as repugnant, of which information reached us some time since. It was this. The specific gravity of the urine of a dog was first taken, the bladder of the animal was then kept tied during a protracted period, after which the ligature was removed, and a second specific gravity determination effected. The professed object of this experiment was to ascertain whether under these conditions an increase in the density of the urine was caused by means of the absorption of water by the walls of the bladder. Surely the walls of the bladder were no more designed to absorb the water it is destined to store, than the pirate was erratic in putting forth to sea and breaking the eighth commandment. In observing the moral, the pirate would lose sight of his profession to steal.

As already stated, we are by no means at one with the anti-vivisectionists; public opinion, however, should not effect results by fits and starts; it should be well instructed, and uniformly exercised.

In regarding the physiological action of glycerine, we may compare the results obtained by M. Catillon* against those just commented upon. He finds that considerable doses decidedly lessen the decomposition both of the fatty and azotised constituents of the body, and that under its influence animals increase in weight and excrete less urea. That the urea is not stored in the system is proved by the fact that the proportion existing in the blood is not augmented by the glycerine administration. In moderate doses glycerine acts as a mild laxative and improves both the appetite and the digestive powers and all that enters the stomach is absorbed. This absorptive faculty, however, is limited, and if the limit be overstepped glycerine appears in the urine; it begins to be eliminated in less than an hour by the kidneys when the dose exceeds twenty grams. When a very large quantity, for instance, fifteen grams per kilo of body weight, is taken in one dose, death usually takes place, and the *post mortem* lesions are found to be similar to those effected by acute alcoholic poisoning.

With these remarks let us pass on to consider other matter relating to the month.

Quite recently the eighth report (new series) of the medical officer of the Privy Council and Local Government Board has been issued. This is the last one with which Mr. John Simon will be officially connected, and it is one of peculiar interest and importance. Dr. Sanderson contributes to it a further study of morbific ferments, and shows that the common ferment of putrid infusions is removed by filtration through porous porcelain. That this is so, is shown by the fact that the filtrate will not now undergo any further zymotic process in itself, and if introduced into the living body will not exercise any morbific influence (fever) on it. These results are important because they signify the particulate nature of such ferments, and no field of research could be more productive of good to humanity than a study

* *British Medical Journal*, March 10, p. 291.

* *Archives de Physiologie* (Janvier-Février, 1877).

of the ferment matter itself conducted upon chemical and mathematical principles. Indeed, it must be admitted that such a study is the one most urgently called for at the present time in chemico-physiological science.

The questions to be solved may be expressed as follows:—

(1) The chemical constitution of infusions which are liable to putrefaction.

(2) The alteration in constitution induced by putrefaction.

(3) The chemical constitution of the particulate matter removable by porcelain.

(4) The chemical constitution of the filtrate.

With the solution of these problems would come an insight into the nature of these particular ferments, the processes by which they are developed, and the conditions necessary for their existence. After this there would be some reasonable hope of finding an explanation of zymotic disease—at present there is not one.

Dr. Klein gives a report on the minute anatomy of scarlatina, and one on the so-called enteric fever of the pig; but elaborate as they are in detail they admit of no conclusions respecting contagium. It is true that specific changes are described, changes associated more or less with the development of micrococci and so forth; but there is no evidence to show how far these low forms of life—germs, in fact—are concerned with the cause of the disease. From certain important evidences it would seem that they are mere attributes of disease, while the causes depend for their existence upon ferments and upon chemical changes.

Dr. Creighton's report on the Infectiveness of Cancerous Tumours, contained in the blue book before us, lends weight to this view and supports an opinion which has been somewhat abandoned of late years. It would appear that such acts of infection are due to a specific ferment-power possessed by the elements of the primarily diseased parts; these changed matters have the power to cause new parts to desert their own former textural type, and as Mr. Simon puts it, "grow in a new way with new endowments, so as to become in form and ferment-power a repetition of the parent tumour."

The last report is by Dr. Thudichum on the Chemical Constitution of the Brain, and contains also the summarized substance of certain researches conducted conjointly with Mr. Kingzett. Some of these matters have already been noticed in this Journal, but other points may conveniently be referred to here. The further investigations regarding the constitution and nature of the phosphorized principles in brain substance, show that they all yield their phosphorus in decomposition by hydration, as glycerophosphoric acid ($C_3H_9PO_6$); they all yield their nitrogen in one form, but from certain chemical considerations the exact formula of the free base is a little doubtful. More probably it is $C_5H_{13}NO$, but perhaps it may be $C_5H_{15}NO_2$; this, however, is certain, that the platinic chloride combinations with the hydrochloride of the base have invariably a composition represented by $(C_5H_{13}NO)_2$, $2\,HCl,PtCl_4$. Sometimes, however, apparently by secondary decompositions, two other bases are obtained, but only as additions to the one already described as forming the chief amount. One of the salts has the empirical formula, $C_5H_{14}N_2O$, HCl, $PtCl_4$; and the other $(C_2H_7NO)_2$, 2HCl, $PtCl_4$.

The phosphorized principles of the brain therefore differ one from the other only in the nature of the fatty acids which they yield on decomposition. Lecithine yields margaric and oleic acids; kephaline yields one known (but not yet published), and one unknown acid; myeline is a general name for a number of substances of a type common to the foregoing, but differing from them apparently in being derived from a condensed (perhaps double) glycerine type, and yielding at least part of their nitrogen as amidated fatty acids. One of the fatty acids yielded by myeline is palmitic. All these principles need yet further study; but one point discovered by Thudihcum and Kingzett is particularly striking, viz., the identity of that peculiar phosphorized matter associated with blood corpuscles with one of the forms of brain myeline. The chemical constitution of cerebrine and certain allied principles yet remains to a large extent undetermined experimentally. A reasonable view, however, results from the observation that they yield sugar when boiled or heated in sealed tubes with hydrating agents, such as sulphuric acid. On this Mr. Simon remarks, that "it is highly suggestive in relation to the familiar occurrence of so-called "amyloid bodies" in the diseased nerve centres of persons who have suffered certain sorts of paralysis, and perhaps, also (in a different way), in relation to one interesting section in the obscure etiology of diabetes."

Space alone prevents us from following further the investigations detailed so fully in this report.

Among matters of more passing interest there is little calling for special attention.

Galippe* has recently communicated to the French Academy of Sciences some results having regard to the alleged poisonous effects of copper salts. He has found that the administration of large doses causes vomiting, but that the same compounds may be taken in increasing amounts for prolonged periods of time without the attendance of any painful symptoms. After referring to the experiments of Burq and Ducom, in which dogs were fed with food that had been cooked and cooled in vessels made of copper and previously exposed to the action of vinegar and salt, without experiencing poisonous effects, he proceeds to describe how he himself has lived on food similarly prepared. The various dishes thus partaken of, although often tinted green with the verdigris, gave rise to no dangerous or even unpleasant symptoms either in Galippe or his family.

These experiences support the opinion we have consistently expressed in these columns of the innocuous nature of traces of copper in foods, notably preserved peas and pickles. No matter how introduced, copper in minute quantity is a normal constituent of many animal tissues, although we admit it to be another question, and not an unimportant one either, as to the extent to which copper should be allowed to accumulate in the system. Speaking of the metallic constituents of the body, this forms a fitting place to notice a paper by Lechartier and Bellamy, which is printed in the same number of the *Comptes Rendus* as Galippe's research.

Lechartier and Bellamy state that they have found appreciable quantities of zinc in the liver of man and other animals, such as the calf, ox, and dog; and pursuing their investigations yet further, they also demonstrated the presence of zinc in hen's eggs, wheat, barley, maize, and haricot beans. Consider-

* *Comptes Rendus*, April 9, 1877.

ing the important bearing these results have on certain medico-legal questions, it is extremely desirable that they should be confirmed by other investigators before they receive acceptance.

Dr. Alford, the medical officer of health for Taunton, has reported to the local sanitary authority an outbreak of lead poisoning in his district, arising from the method of grinding flour adopted there. Some difficulty was experienced in ascertaining the source of the lead, but it was eventually found that all the persons affected had sent their corn to be ground at the same mill, and on examining this, Dr. Alford observed that a number of holes which had appeared in the mill stones had been repaired by pouring in molten lead. He therefore regards this as explanatory of the cases referred to. These were of a very decided nature, in which the blue lines on the gums, the cholic and other symptoms were plainly evinced. The mill had been repaired by means of lead, as described, during an illness of the owner, but it came out in the course of an examination, that what is more ordinarily used is a mixture of red-lead and borax, or alum and borax. The use of the first of these mixtures one might imagine to be rather more injurious than lead itself, but it is to be hoped that its employment is not extended and may be abolished.

Mendelejeff has recently communicated to the Russian Chemical Society the conclusions arrived at from an examination of the deposits of mineral oil in the Caucasus and in Pennsylvania. He disputes the correctness of the view that these are derived from the decomposition of fossil remains of organisms and concludes that they have their origin in a series of changes to which carbon and iron in the presence of water are liable under certain conditions, such as high temperature and great pressure. Under these influences Mendelejeff opines that metallic oxides and saturated hydrocarbons would be formed, and that the latter by permeation of the porous sand-stones of higher levels condense there, or undergo further change and become unsaturated hydrocarbons.

Kolbe* has described an improved method of preparing hydriodic acid. It consists in adding to ten parts of iodine contained in an atmosphere of carbonic anhydride one part of phosphorus little by little, slowly; on the mixture of di- and tri-iodide is poured four parts of water. From such a preparation abundance of hydriodic acid is generated on the application of a gentle heat, and it is not contaminated with free iodine. Everyone who has prepared hydriodic acid must be aware of the truth of Kolbe's statement to the effect that the methods given in most text-books give much water and little hydriodic acid; this arises from the general employment of too much iodine and water in proportion to the phosphorus used.

Radziszewski† has found that formic aldehyde and grape sugar, mixed with an alcoholic solution of caustic potash, and warmed in the presence of air, becomes phosphorescent. From this it is suggested that the burning sensation experienced on the skin and produced by *Noctiluca milicris*, owing to the secretion of formic aldehyde, which undergoes oxidation into formic acid. The phosphorescence above alluded to lends small weight to the view that grape sugar is an aldehyde in constitution.

* *Journ. Prakt. Chem.*, 1877, *xv.*, 1672.
† *Beiblatter Ann. Physik und Chemie*, 1877, *i.*, 242.

In the *Canadian Pharmaceutical Journal* for May, E. B. Shuttleworth contributes an interesting note, setting forth the advantages presented by the use of impermeable paper boxes in pharmacy. He points out that the Chinese, to whom we are indebted among other discoveries, for that of paper making, have long been familiar with the mode of waterproofing tissues of vegetable fibres, so that they could be employed for even containing liquids. Recently paper of a thick character has been employed to construct barrels which are cheaper and lighter than those made of wood. Mr. Shuttleworth described several methods of rendering paper boxes, etc., tight at the joints and impermeable, according to the nature of the substances to be contained in them. Thus they may be dipped into melted paraffin or an alcoholic solution of shellac; or another composition which may be used is silicate of calcium, obtained by dipping first in a bath of potassium or sodium silicate, and then in one of calcic chloride.

The Chinese use, as is well known, liquid blood albumen, with lime and alum, for rendering waterproof, articles made of paper and straw; and such a preparation does its work remarkably well.

The hints furnished by Mr. Shuttleworth are valuable, and there can be no doubt of the advantage to be gained by the use of such a cheap material as paper as against china or porcelain or even stoneware. Articles of semi-fluid or pillular consistence, such as extracts, confections, honey, ointments, for instance might be packed in impervious paper boxes.

Under the Sale of Food Act, a grocer of Freshwater in the Isle of Wight has been fined for the sale of mustard containing, according to the analyst's certificate, 30 per cent. of wheaten flour and a small quantity of turmeric employed to heighten the colour.

In conclusion we may note an important point which the Rev. W. H. Dallinger has established in the course of the researches which formed the topic of his discourse at the Royal Institution on the 11th inst. After describing the process of sporing by which monads appear to reproduce themselves, the lecturer stated that he had found the spores capable of resisting a temperature of above 300° F. for ten minutes, whereas the adults were readily killed by exposing them to a temperature of 140° F.

The importance of this fact lies in the explanation it affords of several matters which have recently formed the object of vehement discussion between Bastian on the one hand, and Pastem and Tyndall on the other hand. It will be remembered that the latter observers have contended that the temperature of boiling water is sufficient to destroy germs, whereas Bastian asserts that germ life often reveals itself, even in infusions which have been subjected to a higher temperature. From Mr. Dallinger's results it would seem that both sides were right, but that neither of them knew the whole truth. While, however, the bone of contention is thus removed, Bastian's assertion of spontaneous generation is involved in yet graver doubt, for, as we have seen, monad spores resist the critical temperature which even he has viewed as destructive of previously existing life. Before their spontaneous generation can be asserted as true it is essential to ascertain particularly when matter is absolutely dead and the conditions necessary for perfect isolation from living matter.

The Pharmaceutical Journal.

SATURDAY, MAY 26, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, *17, Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE OUTBREAK OF SCURVY IN THE RECENT ARCTIC EXPEDITION.

REGARDING the outbreak of scurvy in the recent Arctic Expedition, the Commission appointed by the Lords of the Admiralty has just issued a voluminous Report which will meet on most sides with the fate that many blue books of as great and much greater value experience, viz., comparative obscurity. And yet there is much important matter in these volumes whose burial is almost simultaneous with their birth. From the nature of the subject the present one is of peculiar interest, affecting as it does a disease continually appearing in the naval service, and treatment of which is so imperfectly understood.

In the Report before us, the early outbreak of scurvy in the spring sledging parties of the expedition is attributed to the absence of lime juice from the sledge dietaries, and the opinion is expressed that the winter of 142 days, involving absence of sunlight, confinement during the greater part of the twenty-four hours to a lower deck of necessity not free from damp and a comparatively vitiated atmosphere, and the deprivation of fresh meat, were circumstances which constituted predisposing causes of scurvy. It is further supposed that the severe cold and arduous labour encountered by the sledging parties aggravated the causes which led to the outbreak.

The adequacy of the provision made by the Admiralty in the way of food, medicines, and medical comforts, was in every respect good, and even more complete than that made for any previous expedition of a like nature. But the propriety of the orders given by the commander of the expedition for provisioning the sledge parties is strongly commented upon, as they did not include lime juice, thereby deviating from the 11th article of the Memorandum of Recommendations and Suggestions of the Medical Director-General.

In the early part of the Report there is a valuable paper, contributed by Dr. DONNET and Dr. FRASER, on the symptoms, pathology, and causes of scurvy, and it is seen that the medical evidence is almost unanimous as regards the direct causes of the disease. Here it is unnecessary to enter at all into the symptoms of the disease, but in relation to its pathology we may note that the characters may be regarded as representing the deterioration of the blood that exists as a result of depraved nutrition.

Mr. BUSK considered scurvy to be essentially a consequence of defective not deficient nutrition; in fact, a kind of starvation due to the want of "a particular element of the nature of which we are entirely ignorant." This element is apparently afforded by raw vegetable juices, and some are of opinion that fresh animal meat, notably in the raw state, and milk, are also possessed of powerful antiscorbutic properties.

There are, however, other medical men whose views do not quite coincide with those of the mass. Thus, Sir ROBERT CHRISTISON believes that a deficiency of the nitrogenous principles of food, and especially of albumen and casein, is a cause of scurvy. The reason however for this statement is not so satisfactory as might be wished, and if true at all, it must be taken as meaning albumen and casein of a particular character, for in certain more or less dry forms there was evidently abundance of these substances. Dr. GARROD refers the appearance of the disease mainly to the absence of potash, and Dr. ALDRIDGE assigns the greatest influence in the production of the disease to the absence or deficiency of phosphorus, sulphur lime, potash, and soda. It will be seen that these substances are contained in the ashes of vegetable and animal foods, and are present equally in dry as in fresh foods, and therefore the Commissioners report that the arguments in support of these opinions are not sufficient to lead to the general adoption of any of them. These may then for the present be left out of further consideration; they are not widely adopted, and are not based on sound chemical views.

In the present aspect of affairs it is somewhat difficult to perceive the cause of the ulcerations that occur in the advanced stages of scurvy—ulcers which sailors graphically term "bullock's liver," and which emit a very offensive odour. In this advanced condition, "every slight scratch degenerates into an ulcer, old scars break out afresh, and hæmorrhages are now frequent from different parts of the body." The only explanation is that the economy is so weak and reduced, by reason of a deficiency in some vital and necessary element, that it is no longer able to maintain by its food—such as it is—the conditions upon which health depends. The slightest causes are now able to disturb the balance, and with their appearance the purely chemical changes set in and overthrow the chemico-physiological concatenation of influences upon which health and even life depends. In good health the body lives by virtue of a predisposing cause apparently inherent in its protoplasm, and life is maintained so long as that protoplasm can, from the food properly presented to it, reproduce the various tissues and parts of which the body is constituted. But if that food be deficient in any vital particular, then, although reproduction of tissues may go on in a measure, the influences which hold them parts of a harmonious whole are disturbed, and outside agencies are powerful to still further disturb the equilibrium. The question then that has to be solved before the nature of scurvy is comprehended, relates to the missing element in the food by the partaking of which the disease is caused—that element, in short, of which we know nothing. And in tracing out the mystery we must begin at the beginning, and ascertain in what respects dry and preserved meat and vegetables differ from fresh foods.

Even at the onset we are baffled; these differences are unknown, but there is knowledge to hand from which some sort of insight may be obtained. Fresh meat or vegetables, or their juices, contain ferments which would in all probability lose their original form, and with it their power, by drying. It seems as if these ferments are extremely active in the wet, original state, but that their power is only associated with what we may call this nascent form, and that if at all present in dry or preserved nitrogenous foods they exist in a deteriorated condition, or so changed that they have lost their power to bring about those changes upon the matters associated with them and other foods in the stomach, through which digestive fluids are reproduced, and by means of which life and health are sustained.

The deficit in the supply of fresh meat to the crews of the vessels attached to the Arctic Expedition is exemplified by the fact that whilst the crew of the "Discovery" was able to obtain a sufficient supply of large game to permit of fresh meat being issued on fifty-three days, the crew of the "Alert" was restricted during the same period to an issue of fresh meat on only fourteen days.

Of the seventy men who wintered in the "Alert," forty-five (or 64 per cent.) were affected with scurvy; whereas only fifteen men (or 29 per cent.) out of the fifty-two who wintered in the "Discovery" were attacked. This disparity in numbers is explained as due to the more prolonged absence of sun-light, and the much greater deficiency of fresh meat experienced by the men on the "Alert." From the reports of the commanding officers of the two ships it is gathered that the dietary was quite sufficient as regards quantity, and was supplemented by the daily issue of at least one ounce of lime juice, the preserved and salted meat being substituted at times by fresh meat. From the analyses to which the various articles of food and lime juice were subjected by chemists employed by the Commission, these appear to have been of an ordinary good quality, except the salt beef, which was somewhat oversalted. The dry vegetables, represented by compressed cabbage and compressed mixed vegetables, were found to be somewhat deficient in saline constituents, but it is thought by the Commissioners that no deleterious effects can be traced to this deficiency.

The preserved vegetables, including moist tinned carrots and dry preserved potatoes, were ascertained, so it is said, to have maintained their quality and nutritive value a character the more important on account of the antiscorbutic reputation of vegetables—especially potatoes—which has been so well established. This matter is, in our opinion, a most important one, and we submit that whereas in all probability the antiscorbutic value of vegetables is a property directly connected with what may be called their living juice, it cannot be accepted as absolutely proved that preserved vegetables, in spite of the pressure and partial loss of moisture incidental to their storage, retain unaffected the nutritive qualities originally possessed by them. Indeed, there is considerable evidence to show that although preserved vegetables constitute valuable food matter, they are not nearly so nutritious as fresh ones.

From the nature and requirements of sledge travelling, especially in extended journeys, it is essential to carry as little weight as possible, and on the assumption that foods are not impaired by partial loss of their natural water and preserving; the sledge expeditions in the recent attempt to reach the Pole were largely supplied with these condensed forms of pabulum.

The Northern sledge party, consisting of two officers and fifteen men, were all affected with scurvy during the journey; and out of the Western sledge party, which altogether numbered fourteen men, only one man escaped. With the Eastern sledge party twenty-four men were connected, and among these seventeen cases of scurvy occurred.

It is unnecessary to go further into figures, but from the evidence contained in the Report it is seen that the great majority of cases of the disease occurred during the sledging expeditions. Insufficient nutrition cannot be regarded as the main cause of this outbreak, although most of the medical men examined were of opinion that the amount of preserved potato served out daily on the sledging expeditions was an insufficient one. But what is held accountable for this serious outbreak of scurvy is the omission of lime juice from the sledge dietary; lime juice being considered to have an established character of supplementing the deficiency in the vegetable element presented by the dietary among Arctic Expedition.

As for the exact action of lime juice, it is known that it is not sufficient to swallow it merely, "but the function" served by it "during the process of nutrition must be accomplished," and this is a function to secure which a definite plan must be adopted. In proof of this, it may be stated that alcoholic indulgence and other causes are sufficient to prevent this antiscorbutic action of lime juice, owing to the disturbing influence they exert upon the process in which lime juice plays its part—that of stomachic nutrition.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of the above Association will be held at 17, Bloomsbury Square, W.C., on Thursday evening next, May 31, when a paper will be read by Mr A. G. RICKARBY, on "Poisons."

Transactions of the Pharmaceutical Society.

DINNER IN AID OF THE

BENEVOLENT FUND.

The following Donations and Annual Subscriptions have been received or promised. Further contributions are solicited, and should be made payable to,

ELIAS BREMRIDGE,
17, *Bloomsbury Square, London, W.C.*

	Donations. £ s. d.	Annual Subscriptions. £ s. d.
A Friend, per Mr. Bottle	10 10 0	..
Abbott, A., 143, New Bond Street, W.	1 1 0	..
Aberdein, James, Glass, N.B	0 2 6	..
Abraham, John, 87, Bold Street, Liverpool	5 5 0	1 1 0
Adkins, Henry James, 32, Bull Street, Birmingham	..	0 10 6
Allen and Hanburys, Plough Court, 37, Lombard Street, E.C.	26 5 0	..
Allen (Stafford) and Sons, 8, Cowper Street, E.C.	5 5 0	..
Allis, F., 137, High Street, Tewkesbury	0 5 0	..
Andrew, Alfred, 14, Edward Street, Shude Hill, Manchester	1 1 0	..
Andrews, Frederick, 23, Leinster Terrace, W.	1 1 0	0 10 6
Arrandale, William, 169, Manchester Road, Denton, Lancs.	0 10 6	
Ashley, Henry, 152, Milton Road, Gravesend		0 5 0
Atherton, J. H., Long Row, Nottingham	1 1 0	..
Atkins, F. J., 68, Powis Street, Woolwich	1 1 0	..
Atkins, S. R., Market Place, Salisbury	2 2 0	..
Atkinson, G., 66, Aldersgate Street, E.C.	5 5 0	..
Atmore, George, High Street, Kings Lynn	1 1 0	..
Attfield, Professor, 17, Bloomsbury Sq., W.C.	5 5 0	..
Awbery, A. R., Henley-on-Thames	..	0 5 0
Bagshaw, William, 37, Yorkshire Street, Oldham	1 1 0	..
Baildon (H. C.) and Son, 73, Princes Street, Edinburgh	10 10 0	..
Bailey, J. R., 7, Poultry, E.C.	0 5 0	..
Baiss Brothers, and Co., Jewry Street, E.C.	10 10 0	..
Baker, Charles P., Chelmsford	1 1 0	..
Baker, F., Harnet Street, Sandwich	1 1 0	..
Balchin, Edward S., 135, Penton Place, Newington Butts, S.E.	..	1 1 0
Ball, Joseph, Oxton, Birkenhead	0 5 0	..
Ballard, Edwin, Market Place, Highworth, Wilts	..	0 5 0
Banbury, W., Spittal Street, Great Marlow	..	0 2 6
Bannister, R., Inland Revenue Laboratory, Somerset House, W.C.	1 1 0	..
Barber, J., 2, Orange Street, Red Lion Square, W.C.	..	0 10 6
Barclay and Sons, 95, Farringdon Street, E.C.	10 10 0	..
Barlow, Frederick, Balsall Heath Road, Birmingham	..	0 5 0
Barnes, J. B., 1, Trevor Terrace, Knightsbridge, S.W.	1 1 0	..
Barnes, Wm. James, 34, Biggin St., Dover	..	0 2 6
Barron, Frederick, 2, Bush Lane, E.C.	26 5 0	..
Barron, Harveys, and Simpson, 6, Giltspur Street, E.C.	26 5 0	..
Bartleet, John, 1, Duke Street, Cardiff	0 5 0	0 2 6
Batchelor, C. J. H., 6, Nugent Terrace, Abbey Place, St. John's Wood, N.W.	0 5 0	
Bates, James, Wellington, Salop		0 5 0
Bates, John, 214, High Street, Deritend, Birmingham	..	0 10 6
Bates, William Isaac, 116, Mill Street, Macclesfield	1 1 0	..
Battle, J. R., Lincoln	1 1 0	..
Battley and Watts, 32, Lower Whitecross Street, E.C.	10 10 0	..
Baynes, James, 24, Waterworks Street, Hull	1 1 0	0 10 6
Bell, Charles B., Spring Bank, Hull	1 1 0	..
Bell, Jacob, in Memory of, per T. H. Hills	10 10 0	..
Bell (John) and Co., 338, Oxford Street, W.	10 10 0	..
Bell, Thomas, Ambleside	0 5 0	..
Bellamy, John, 1, Easy Row, Paradise Street, Birmingham	..	0 10 6
Bennett, E. H., Commercial Road, Lambeth, S.E.	1 1 0	..
Bennett, Henry, 112, Upper George Street, Kingstown, Ireland	1 1 0	..
Bennett, Dr. J. Risdon, F.R.S., 22, Cavendish Square, W.	2 2 0	..
Bentley, Professor, 17, Bloomsbury Sq., W.C.	5 5 0	..
Betty, Samuel C., 6, Park Street, Camden Town, N.W.	1 1 0	..
Bew, John, 89, Lloyd Street, Greenheys, Manchester	..	1 1 0
Biddiscombe, Chas., 2, Queen's Terrace, St. John's Wood, N.W.	0 5 0	..
Bidwell, Sons, and Co., Kingsland Road, E.	3 3 0	..
Bills, Martha Cam, Bishop's Castle, Salop	..	0 10 6
Bird (Alfred) and Sons, 69, Worcester Street, Birmingham	..	1 1 0
Bird, Augustus, Wood Lane, Shepherd's Bush, W.	10 10 0	..
Bird and Storey, 42, Castle Street East, Oxford Street, W.	5 5 0	..
Bishop, Alfred, 17, Speck's Fields, Mile End New Town, E.	21 0 0	..
Bishop, Walter, 17, Speck's Fields, Mile End New Town, E.	..	1 1 0
Blackburn, Arthur, 100, Longmore Street, Birmingham	..	0 10 6
Blagg, E., 120, White Ladies Road, Clifton, Bristol	0 2 6	..
Blanshard, George, Leith Walk, Edinburgh	1 1 0	..
Bluett, —, 7, Poultry, E.C.	0 5 0	..
Boor, George C., 55, Bishopsgate Street Without, E.C.	3 3 0	1 1 0
Boorne, Charles, Union Street, Bristol	1 1 0	..
Borland, John, 7, King Street, Kilmarnock	1 1 0	..
Bottle, Alexander, 37, Townwall Street Dover	2 2 0	..
Boucher, John, 4, Union Street, Bristol	0 10 6	..
Bourdas, Isaiah, 7, Pont Street, Belgrave Square, S.W.	10 10 0	..
Bourdas, Isaiah, jun., 48, Belgrave Rd., S.W.	5 5 0	..
Bower, W., 96, Tottenham Court Road, W.	1 1 0	..
Boyfield, J. R., 16, Cross Street, Hatton Garden, E.C.	0 10 6	..
Bracher, Edwin, Mere, Wilts	0 4 0	..
Brassington, William R., Moseley, Worcestershire	..	0 10 6
Bray, W., 67, St. John Street Road, E.C.	0 10 6	..
Broad, John, Rise House, Hornsey Rise, N.	1 1 0	..
Broad, John Morris, Rise House, Hornsey Rise, N.	1 1 0	..
Brook, Robert, 11, Silver Street, Halifax	0 10 6	..
Brown, Thomas, Lutterworth	..	0 10 6
Brown and Smart, 27, Aldgate, E.	..	0 10 6
Brunton, Dr. T. Lauder, F.R.S., 23, Somerset Street, Portman Square, W.	2 2 0	..
Buchanan, Dr. G., 24, Nottingham Place, W.	2 2 0	..
Buchanan, James, 52, North Bridge, Edinburgh	5 5 0	..
Buckle, C. F., 77, Gray's Inn Road, W.C.	0 10 0	..
Bullock, J. Lloyd, 3, Hanover Street, W.	3 3 0	..
Bunting, H., 300, High Holborn, W.C.	0 2 6	..
Burden, Edward, 38, Duke Street, Grosvenor Square, W.	5 5 0	0 5 0
Burgoyne, Burbidges, Cyriax and Farries, 16, Coleman Street, E.C.	10 10 0	..
Burn, David Haitly, Arbroath, N.B.	0 5 0	..
Burton, Joseph, 397, Cambridge Road, E.	0 10 6	..
Bush (W. J.) and Co., 21, Artillery Lane, E.	3 3 0	..
Butler, Charles, 130, High Street, Notting Hill, W	0 5 0	..
Butler, Edward T., 106, King's Cross Road, W.C.	..	0 10 6
Butt, E. Northway, 13, Curzon Street, Mayfair, W.	10 10 0	..
Caley, A. J., Bedford Street, Norwich	2 2 0	..
Candish, C. J., 143, New Bond Street, W.	1 1 0	..
Canning, William, Great Hampton Street, Birmingham	..	1 1 6
Carteighe, M., 172, New Bond Street, W.	10 10 0	..
Carter, William, 2, Union Terrace, Cheetham Hill, Manchester	0 10 6	..
Casey, Edward, 10, Canal St., Ancoats, Manchester	0 2 6	..
Chadwick, George W., 26, London Road, Gloucester	0 5 0	..
Challice, W. G. W., 34, Villiers Street, Strand, W.C.	0 5 0	..
Chater, E. M. and M. T., Watford, Herts	4 4 0	..
Chubb, James C., 29, Old Street, E.C.	1 1 0	..
Churchill, J. and A., 11, New Burlington Street, W.	5 5 0	..
Churchill, Walter J., 46, New Street, Birmingham	1 1 0	..
Churchouse, W. B., Fore Street, Chard	1 1 0	..
Clarabut, John B., 170, Lower Street, Deal	0 10 6	..
Clark, Dr. Andrew, 16, Cavendish Square, W.	2 2 0	..
Clarke Charles, Mare Street, Hackney, E.	..	0 10 6

	Donations. £ s. d.	Annual Subscriptions. £ s. d.
Clemishaw, Joseph, Hounslow, Middlesex	..	0 5 0
Close and Legg, 28, Jewry Street, E.	5 5 0	..
Cohen, Moss, 28, Whitechapel High St., E.	1 1 0	..
Cole, F. A., 33, St. Botolph's Street, Colchester	1 1 0	..
Cole, J. J., 45, Museum Street, Bloomsbury, W.C.	2 2 0	..
Collie, J. C., Westbury-on-Trim, near Bristol	..	0 5 0
Cooke, P. M., Enniscorthy	0 10 0	..
Cooper, Albert, 80, Gloucester Road, South Kensington, S.W.	3 3 0	..
Cooper, Mark, Blackburn Road, Church	0 10 6	..
Corbyn, Stacey and Co. 300 High Holborn, W.C.	10 10 0	..
Cornell, William, Ipswich	2 2 0	..
Cotton, John, 65, Church St., St. Helen's	1 1 0	..
Couchman, Thomas, Wadhurst, Sussex	0 10 6	..
Coulson and Jacombs, 52, Ludgate Hill, Birmingham	0 10 6	..
Court, Alfred, 35, Bull Street, Birmingham	..	0 10 6
Cracknell, Charles, 217, Edgware Road, W.	3 3 0	..
Crapper, J. S., The White House, Hanley	1 1 0	..
Crisp, Frederick A., 270, Walworth Road, S.E.	10 10 0	..
Critten, Robert P., High Street, Southwold	..	0 2 6
Crookes, James, 227, Bristol Street, Birmingham	..	0 10 6
Crossley, Edmund, 11, Princes Street, Bury	0 5 0	..
Crovden, Charles, 45 Wigmore Street, W.	1 1 0	..
Cuff, Robert C., 25, College Green, Bristol	..	0 10 0
Cyriax, Julius, 16, Coleman Street, E.C.	..	1 1 0
Darby and Gosden, 140, Leadenhall Street, E.C.	5 5 0	..
Davenport, Horace, 33, Gt. Russell St., W.C.	5 5 0	..
Davenport, John T., 33, Gt. Russell St., W.C.	5 5 0	..
Davidson, Alex., 55, Grosvenor Street, W.	..	0 5 0
Davy, Yates, and Routledge, 64, Park Street, Southwark, S.E.	10 10 0	..
Day, Charles, 24, Holywell Street, W.C.	0 2 6	..
Deane (Hy.) and Co., Clapham Common, S.W.	5 5 0	..
Delves, George, 187, High Street, Exeter	1 1 0	..
Dinneford and Co., 172, New Bond Street, W.	10 10 0	..
Dixon, Robert, 41, Upper Brook Street, Derby	..	0 5 0
Donovan, W., 300, High Holborn, W.C.	0 2 6	..
Dorsey, Martin, 12, Cardington Street, Euston Square, N.W.	..	0 2 6
Dover Chemists' Association, per Mr. Bottle	3 3 0	..
Down, Dr. Langdon, 39, Welbeck Street, W.	5 5 0	..
Downes, Thomas R. Downesbury, Steele's Road, Haverstock Hill, N.W.	1 1 0	..
Duncan, Alexander, Commercial Road, Bournemouth	5 5 0	..
Duncan, Flockhart and Co., 52, North Bridge, Edinburgh	5 5 0	..
Dunn, Spencer, 15, Woburn Square, W.C.	5 5 0	..
Dyson, W. B., 21, Gloucester Road, South Kensington, S.W.	1 1 0	..
Earle, Francis, 22, Market Place, Hull	2 2 0	..
Edden, J., 2, Bush Lane, E.C.	1 1 0	..
Edwards (William) and Son, 38, Old Change, E.C.	21 0 0	..
Ellis, Bartlet, 34, High Street, Banff	0 10 6	..
Elmslie, Jno. A., 16, Cross Street, Hatton Garden, E.C.	0 10 6	..
Esam, Richard, Kelham, Newark	..	0 5 0
Evan, William Bevan, 367, Moseley Road, Highgate, Birmingham	..	0 5 0
Evans, D. C., Tonbridge Road, Maidstone	..	0 5 0
Evans, Lescher, and Evans, 60, Bartholomew Close, E.C.	10 10 0	..
Evans, Samuel, 5, Townsend Lane, Anfield, Liverpool	..	0 10 6
Evans, Sons and Co., Liverpool	10 10 0	..
Evans, Thomas, 9, St. George's St., Chorley Lancs.	..	0 5 0
Evershed, George Shurlock, 153, New Kent Road, S.E.	..	0 5 0
Everson, H. C., 16, Cross Street, Hatton Garden, E.C.	0 10 6	..
Eyre, J. J., 12, Fern Acre, Cheetham, Manchester	0 10 6	..
Eyre, Jonathan Symes, High Street, Launceston	2 2 0	..
Fallowfield, Jonathan, 36, Lower Marsh, Lambeth, S.E.	2 2 0	..
Farnworth, William, 49, King William Street, Blackburn	1 1 0	..
Farre, Dr. F. J., 61, St. George's Square, S.W.	1 1 0	..
Faulconer, R. S., 272, Walworth Road, S.E.	10 10 0	..
Fenn, J. W. T., 6, Harwood Terrace, King's Road, Fulham, S.W.	0 5 0	..
Fennings, Alfred, West Cowes, Isle of Wight	5 5 0	..
Fentiman, A., 2, Upper East Smithfield, E.	..	0 10 6
Field, W. C., 9, North Street, Taunton	..	0 10 6

	Donations. £ s. d.	Annual Subscriptions. £ s. d.
Fleeming and Son, Queen Square, Wolverhampton	..	1 1 0
Fletcher and Palmer, Cheltenham	1 1 0	..
Fletcher, J. B., Totton, near Southampton	..	0 10 0
Flood, William Wright, 102, Blackman Street, S.E.	5 5 0	..
Flux and Co., 3, East India Avenue, E.C.	10 10 0	..
Forbes, James W., 51, Great Moor St., Bolton	0 10 6	..
Ford and Shapland, 6, Great Turnstile, High Holborn, W.C.	2 2 0	..
Forrest, Richard, 20, Cork St., Bond St., W.	1 1 0	..
Forth, W. P., South Norwood	0 10 6	..
Fowler, Dr. Robert, 145, Bishopsgate Street Without, E.C.	1 1 0	..
Fox (W.) and Sons, 109, Bethnal Green Road, E.	21 0 0	..
Francis, G. Baggett, 5, Coleman Street, E.C.	5 5 0	..
Frazer, Daniel, 113, Buchanan St., Glasgow	10 10 0	..
French, Joseph B., London	2 2 0	..
Froom, William Henry, 75, Aldersgate Street, E.C.	2 2 0	..
Furnival, John D., Market Square, Hanley	..	1 1 0
Gall, Frederick, 33, High Street, Guildford	..	0 2 6
Gardner and Ainslie, 58, George St., Edinburgh	3 3 0	..
Garlike, Thomas, Ripley, Surrey	..	0 10 6
Garnham, A. W., 18, Borough High Street S.E.	..	0 5 0
Gerrard, A. W., University College Hospital	..	0 10 6
Gibson, Frederick T., 93, Gooch Street, Birmingham	..	0 10 6
Glover, Dr. J. G., 33, Compton Terrace, N.	1 1 0	..
Goddard, Joseph, Avenue Villa, Stoneygate, Leicester	5 5 0	..
Godfrey and Cooke, 30, Conduit St., W.	5 5 0	..
Goldfinch, George, Hendon	0 5 0	..
Golding, William, 172, Albany Street, N.W.	1 0 0	..
Goodchild, Thomas A., 6, Magdala Street, Belfast	..	0 2 6
Goss, Samuel, High Street, Barnstaple	0 10 0	..
Gostling and Son, Market Hill, Diss	2 2 0	..
Gostling, Thomas P., Market Hill, Diss	1 1 0	..
Greaves, S., Spiceal Street, Birmingham	..	0 5 0
Greaves, William Samuel, Ironville, Derbyshire	0 10 6	..
Green, Isaac, 210, Camp Hill, Birmingham	..	0 10 6
Greenhough, David W., 9, Mincing Lane, E.C.	5 5 0	1 1 0
Greenhow, Dr. E. Headlam, F.R.S., 14A, Manchester Square, W.	2 2 0	..
Greenish, Thomas, 20, New St., Dorset Square, N.W.	1 1 0	..
Gresswell, A., 7, Poultry, E.C.	0 5 0	..
Greenwood (J.) and Sons, 10, Arthur Street, West, E.C.	1 0 0	..
Grisbrook, S., 51, Wellington Street, Woolwich	5 5 0	..
Groves, Thomas B., 80, St. Mary Street, Weymouth	2 2 0	..
Groves, Mrs. W. E., Blandford	..	1 1 0
Gulliver, William, 6, Lower Belgrave Street, S.W.	2 2 0	..
Gwatkin, James Thomas, 49, Grand Parade, Brighton	1 1 0	..
Hall, E., 7, Poultry, E.C.	0 5 0	..
Haller, Frederick W., 79, High Street, Boston	0 5 0	0 5 0
Hamand, S., Stoke, Devonport	0 10 0	..
Hampson, Robt., 205, St. John Street Rd., E.C.	1 1 0	..
Handford, Edwin, High Street, Torrington	..	0 5 0
Handley, Charles, 41, High Street, Stoke Newington, N.	0 10 6	..
Hannah, J., 63, Causeyside St., Paisley	0 2 6	0 5 0
Harris, Daniel Rotely, 55, St. James's Street, S.W.	5 5 0	..
Harris, Philip and Co., Bull Ring, Birmingham	..	2 2 0
Havill, Paul, 15, Fore Street, Tiverton	0 10 0	..
Hawke (W.) and Son, Wild Court, Great Queen Street, W.C.	5 5 0	..
Hawthorne, G., Wallsgrave, near Coventry	..	0 10 6
Haydon, W. F., Burlington Chambers, New Street, Birmingham	..	0 10 6
Hayes, James, Great Warley, Essex	..	0 5 0
Hayward, W. W., Trowbridge	..	0 5 0
Hearon, Squire, and Francis, 5, Coleman St., E.C.	10 10 0	..
Henry, Henry C., 48, Compton Street, Brunswick Square, W.C.	0 10 6	..
Herington, Joseph, Leighton Buzzard	..	1 1 0
Heron, James, 139, Princes Street, Edinburgh	..	1 1 0
Herring, John, 40, Aldersgate Street, E.C.	10 10 0	..
Herrings and Co., 40, Aldersgate Street, E.C.	10 10 0	..
Hill, Arthur B., 101, Southwark Street, S.E.	10 10 0	..
Hills, Henry Wm., 2, Etloe Terrace, Carlisle Road, Leyton, E.	..	0 5 [illegible]

	Donations £	s.	d.	Annual Subscriptions £	s.	d.
Hills, Henry, 282, Old Kent Road, S.E.	..			0	10	6
Hills, T. C., Chemical Works, Deptford	1	1	0	..		
Hodgkinson (Thomas), Prestons, and King, 88, Leadenhall Street, E.C.	10	10	0	..		
Hodgkinsons, Stead and Treacher, 127, Aldersgate Street, E.C.	10	10	0	..		
Hogg, Thomas, Bideford	0	7	6	..		
Holland, W., Market Deeping	5	5	0	..		
Holmes, E. G., 17, Bloomsbury Square, W.C.	5	5	0	..		
Homer, F. G., 234, Bradford Street, Birmingham	..			0	5	0
Hopkin, William King, 16, Cross Street, Hatton Garden, E.C.	10	10	0	..		
Horncastle, John, 17, Craven Road, W.	1	1	0	..		
Horner and Sons, 20, Bucklersbury, E.C.	25	0	0	..		
Horsley, Thomas W., 274, Portobello Rd., W.	..			0	10	6
Horton, George D., 38, New Town Road, Aston Cross, Birmingham	..			0	10	6
Hovenden (R.) & Sons, Great Marlboro' St., W.	10	10	0	..		
Howard, David, City Mills, Stratford, E.	5	5	0	..		
Howard, W. D., City Mills, Stratford, E.	5	5	0	..		
Howden, Robert, 78, Gracechurch St., E.C.	10	10	0	..		
Howell, Evan John, Market Sq., Narberth	..			0	10	6
Howes, Henry, 110, Bristol St. Birmingham	..			0	10	6
Howlett, Samuel, 4, Lindley St., Mile End, E.	..			1	1	0
Hubbard, G., Downham Market	1	0	0	..		
Hudson (W. B.) and Son, 27, Haymarket, S.W.	5	5	0	..		
Hughes, William, Presteign, Radnorshire	..			0	10	6
Hulley, John, 97, Manchester Road, Heaton Norris	0	10	6	..		
Humby, L. W., Market Place, Warminster	0	5	0	..		
Humpage, Benjamin, 6, Albert Place, Turnham Green, W.	5	5	0	..		
Hunn, Benjamin, Henley-on-Thames	..			0	5	0
Hunt, Charles, 29, Chapel Street, Belgrave Square, S.W.	2	2	0	..		
Huskisson, Henry O., 77, Swinton Street, Gray's Inn Road, W.C.	..			1	1	0
Huxham, William, 197, Moseley Road, Birmingham	..			0	10	6
Hyslop, John Cahill, 39, Church Street, Marylebone, N.W.	..			0	10	6
Ingham, John, Upper Tooting	0	5	0	..		
Ingram and Co., 119, Queen Victoria St., E.C.	1	1	0	..		
Jackson, J. H., Finkle Street, Stockton-on-Tees	..			0	10	6
Jacques, W., 5, Fenchurch St. Buildings, E.C.	0	10	6	..		
Jagg, J. Henry, 127, Buckingham Palace Rd.	..			0	10	6
James, W., 300, High Holborn, W.C.	0	2	6	..		
Jewsbury and Brown, 113, Market Street, Manchester	10	10	0	..		
Job, J., West End, Redruth	0	10	0	..		
Jobson, Robert, 125, Scotswood Road, Newcastle-on-Tyne	0	10	6	..		
John, D. W., Pembroke	0	10	6	..		
Johnson, Matthey and Co., Hatton Garden	10	10	0	..		
Johnson and Sons, 23, Cross Street, Finsbury, E.C.	..			1	1	0
Johnson, T. S., 75, Bury New Rd. Manchester	2	2	0	..		
Jones, Alfred M., 42, King Street, Brynmawr	..			0	10	6
Jones (E. B.) and Son, Carmarthen	0	10	6	..		
Jones, Frank, 83, Oxford St., Liverpool	..			0	2	6
Jones, J. P., 2, Bridge Street, Aberayron	0	2	6	..		
Jones, W., 2, High Street, Birmingham	..			1	1	0
Jones, W. J., 3, Newland Terrace, Kensington, W.	1	1	0	..		
Kent, Thomas, 226, Blackfriars Road, S.E.	1	1	0	..		
Key, Astley Cooper, 221, Coldharbour Lane, Camberwell, S.E.	1	0	0	..		
K. H., per Mr. Frederick Barron	0	5	0	..		
Kiloh, E. P.	0	10	6	..		
King, T. R. M., Gorleston	2	2	0	..		
Kinnear, F. C., Wool Exchange, Coleman Street, E.C.	1	1	0	..		
Kirby and Co., 14, Newman St., Oxford St., W.	2	2	0	..		
Kirkus, Robert W., 125, Vauxhall Road, Liverpool	..			0	5	0
Kitchen, James, 163, Berkley St., Glasgow	..			0	5	0
Knight, B. W., 217, Regent Street, W.	1	1	0	..		
Lake, Richard, 63, Lupus Street, S.W.	1	1	0	..		
Lamble, John Alfred, 23, Pembroke Street, Devonport	0	2	6	..		
Lavers, Henry R., 20, Albion Rd., Holloway, N.	0	10	6	..		
Leamington, The Chemists of, per Mr. S. U. Jones	9	5	0	..		
Lear and Son, Walsall Road, Birchfield, Birmingham	..			0	10	6
Leech, Elizabeth, Laurel Bank, Fulham, S.W.	..			0	10	6
Llewelyn, Ynyr, Broad Street, Eye	1	1	0	1	1	0
Lloyd, Arthur, 98, St. Paul's Road, Camden Town, N.	5	5	0	..		
Lloyd, Robert, Claycross	..			0	10	6
Lockyer, George, 208, High Street, Deptford.	1	1	0	..		
Longbotham, Joseph, Chester-le-Street	0	5	0	..		

	Donations £	s.	d.	Annual Subscriptions £	s.	d.
Lorimer and Fletcher, Chemical Works, Holloway Road, N.	5	5	0	..		
Lum, Aubrey, Chesham	..			1	0	0
McDonald, James, Fraserburgh	0	10	6	..		
Macfarlan (J. F.) and Co., Edinburgh	10	10	0	..		
Mackay, James B. L., 11, Grey Street, Newcastle-on-Tyne	..			0	5	0
Mackay, John, 119, George Steeet, Edinburgh	10	10	0	..		
Mackenzie, Charles A., 114, St. Andrew's Road, Hastings	..			0	5	0
Mackereth, H. W., Market Place, Ulverston	0	10	6	..		
Maclagan, Dr. Douglas, 28, Heriot Row, Edinburgh	5	5	0	..		
McLean, Kenneth, Loftus, Saltburn-by-the-Sea	1	1	0	..		
McMullen, Dr., 166, Coldharbour Lane, Camberwell, S.E.	1	1	0	..		
McOscar, Dr. John, 4, Argyle Street, W.	1	1	0	..		
Mager, William K., 55, Grosvenor Street, W.	..			0	7	6
Manley, Henry, Aston, Cheshire	0	2	6	..		
Mann, A., 110, Cannon Street, E.C.	1	1	0	..		
March, Frederick, 70, High Street, Stamford	..			0	5	0
Marshall, B. C., 8, Brownlow Street, W.C.	1	1	0	..		
Martindale, W., 10, New Cavendish Street, W.	1	1	0	..		
Mason, H., 16, Cross St., Hatton Garden, E.C.	0	10	6	..		
Mason, William W., Shortwood, Nailsworth	0	2	6	..		
Mather, James, 31, Cross Street, Bolton	0	2	6	..		
Mather, William, Manchester	10	10	0	..		
Maw, Son, and Thompson, Aldersgate Street, E.C.	26	5	0	..		
May and Baker, Garden Wharf, Battersea, S.W.	5	5	0	..		
Meadows, Henry, 15, Westgate Street, Gloucester.	..			0	10	6
Mee, George, 79, Grosvenor Road, Highbury New Park, N.	1	1	0	..		
Meggeson and Co., 147, Cannon Street, E.C.	10	10	0	..		
Miller and Son, 107, Hockley Hill, Birmingham	0	5	0	..		
Millard (R. H.) and Sons, 44, Barbican, E.C.	..			2	2	0
Milligan, William M., Newton Stewart, N.B.	..			0	10	6
Millington, Edward, 98, Queen's Rd., Dalston, E.	0	10	0	..		
Mills, R. M., Market Place, Bourne	0	10	0	..		
Morgan, Daniel, 1, Furnival's Inn, E.C.	1	1	0	..		
Morris, —., 110, Bristol Street, Birmingham	..			0	10	6
Morson (T.) and Son, 124, Southampton Row, W.C.	10	10	0	..		
Mote, Benjn., 3, Summer Lane, Birmingham	..			0	10	6
Moyle, Joseph, 27, Broadway, Hammersmith	0	10	6	..		
Mumby, Charles, 47, High Street, Gosport	5	5	0	..		
Mumby, C. J. E., 47, High Street, Gosport	1	1	0	..		
Muter, Dr., Central Public Laboratory, Kennington Lane, S.E.	5	5	0	..		
Naylor, W. A. H., 300, High Holborn, W.C.	0	5	0	..		
Neale, William, 21, George Street, Woolwich	..			1	1	0
Negus, Samuel, 55, Gold Street, Northampton	0	10	0	..		
Newbery (Francis) and Co., 37, Newgate Street, E.C.	7	7	0	..		
Nicholls, T., 99, Wick Rd., South Hackney, E.	1	1	0	..		
Nuttall, R. H., 204, Bury New Road, Manchester	0	10	6	..		
Orme, John, 65, Barbican, E.C.	..			2	2	0
Owen, George, Soho Street, Handsworth, Birmingham	..			0	10	6
Owen, John, 51, Holloway Road, N.	1	1	0	..		
Packwood, Charles, 14, Summer Lane, Birmingham	..			0	10	6
Paffard, F., 36, Town Hall Street, Blackburn	0	10	6			
Paget, John, 9, Church Gate, Loughborough	0	10	6			
Parkinson and Son, 27, Southampton Row, W.C.	2	2	0	..		
Parry, C. D., 18, Borough High Street, S.E.	..			0	5	0
Partridge, Wm., Moseley Road, Balsall Heath, Birmingham	..			0	10	6
Pasmore, J. H., 116, Tottenham Court Road, W.	0	5	0	..		
Passmore, Francis, 17, Bloomsbury Square, W.C.	5	5	0	..		
Paternoster, W., 71, Old Kent Road, S.E.	0	10	6	..		
Patterson, D. J., Westhill, Mansfield	0	10	6	..		
Pears, A. and F., 91, Great Russell Street, W.C.	10	10	0	..		
Pearson, Charles J., 4, Russell Street, Swansea	1	1	0	..		
Peatson, Henry, 110, Broughton Road, Salford, Manchester	..			0	10	6
Pedler, George S., 199, Fleet Street, E.C.	3	3		..		
Perry, H. W., Henley-on-Thames	..			0	2	6
Pharmacy Club, per Richard Bremridge, Hon. Secretary	10	10	0	..		
Pickup, Thomas H., 4, Salford, Blackburn	1	1	0	..		
Pike, William, 36, Lower Kennington Lane, S.E.	..			0	10	0
Pilley, Henry T., 9, Strait Bargate, Boston	2	2	0	..		
Pitman, John, 50, Redcliff Hill, Bristol	1	1	0	..		

	Donations £	s.	d.	Annual Subscriptions £	s.	d.
Plumb, Jas. Edwin, Soho Hill, Birmingham	..			0	10	6
Plumridge, Charles, 81, Cornwall Road, W.	2	2	0	1	1	0
Pointon, George, Aston Cross, Birmingham	..			0	5	0
Pond, George Peter, 68, Fleet Street, E.C.	..			1	1	0
Postans, Arthur William, 35, Baker St., W.	1	1	0	..		
Postans and Garrod, 23, Rood Lane, E.C.	0	10	6	..		
Potter, William, Fleckney, near Market Harborough	0	5	0	..		
Potts, Charles, Ilkestone	..			0	5	0
Pound, Matthew, 60, Leather Lane, E.C.	1	1	0	..		
Povey, J., 300, High Holborn, W.C.	0	2	6	..		
Power, E., Walton on Thames	..			0	10	6
Pratt, G. W., 47, Cavendish Street, Manchester	0	10	6	..		
Pratt, Richard M., Cattle Market, Otley	1	1	0	..		
Price, Wm., 157, Bromsgrove Street, Birmingham	..			0	10	6
Probyn, Clifford, 55, Grosvenor Street, W.	10	10	0	1	1	0
Prockter and Forth, High Street, Cheltenham	1	1	0	..		
Pugh, George, 11, Granville Square, W.C.	2	2	0	..		
Purdue, Thomas, Witney, Oxon	0	10	0	..		
Pyne, Joseph John, St. Germans Villa, St. Lawrence Road, Notting Hill, W.	1	1	0	..		
Quincey, Roger de Q., jun., 143, Fenchurch Street, E.C.	5	5	0	..		
R. M., per Mr. Frederick Barron	0	5	0	..		
Radley, William V., 74, Market Place, Sheffield	1	1	0	..		
Raimes, Richard, Bonnington Park, Edinburgh	1	1	0	..		
Randall, William B., 146, High Street, Southampton	5	5	0	..		
Rayson, J. T., Swineshead, Lincolnshire	..			0	5	0
Read, John Henry, 2, Market Terrace, Upper Holloway, N.	..			0	5	0
Redwood, Professor, 17, Bloomsbury Square, W.C.	5	5	0	..		
Rees, Dr. G. Owen, F.R.S., 26, Albemarle Street, W.	3	3	0	..		
Reynolds, Richard, 13, Briggate, Leeds	2	2	0	..		
Richards, S. E., Llanbordy	0	10	6	..		
Richardson (John) and Co., Houghton House, Stoneygate, Leicester	10	10	0	..		
Rimmington and Sons, 9, Bridge Street, Bradford	1	1	0	..		
Risdon, Robert, 2, James Street, Buckingham Gate, S W.	2	2	0	..		
Roach (Pope) and Son, 8, St. James's Street, S.W.	2	2	0	..		
Robinson, E., 166, High Street, Deritend, Birmingham	0	5	0	..		
Robbins, John, 372, Oxford Street, W.	10	10	0	..		
Rogerson and Son, Bradford	10	10	0	..		
Rossiter, George, Brampton Street, Tiverton	0	5	0	..		
Rouch, William White, 180, Strand, W.C.	5	5	0	..		
Roulston, B. W., 39, Aire Street, Goole	..			1	1	0
Rowe, Robert, 40, Alfred Place West, South Kensington, S.W.	3	3	0	..		
Rowland, E. E., Bryn Offa, Wrexham	..			0	5	0
Rutter, Edmund T., 106, King's Cross Rd., W.C.	..			0	10	6
Salt, John William, Whitehead Road, Aston New Town, Birmingham	..			0	5	0
Sandford, Geo. Webb, 47, Piccadilly, W.	10	10	0	..		
Sangers and Sons, 152, Oxford Street, W.	52	10	0	..		
Sansom, Dr., 29, Duncan Terrace, N.	2	2	0	..		
Saunders, Thomas, 30, Conduit Street, W.	1	1	0	2	2	0
Savage, W. Dawson, 4, Park Road East, Brighton	5	5	0	..		
Saville, William, Chapel Allerton	..			0	5	0
Savory and Moore, 143, New Bond St. W.	52	10	0	..		
Schacht, G. F., 7, Regent St., Clifton, Bristol	1	1	0	..		
Schacht (Wm.) and Co., 6, Finsbury Place South, E.C.	1	1	0	..		
Schweitzer, Julius, 79, Pavilion Road, Sloane Street, S.W.	2	2	0	..		
Sellers, J., 1, Bouverie Street, E.C.	..			0	10	6
Sharpe and Son, 34, High St., Notting Hill, W.	5	5	0	..		
Shaw, Alexander Henry, 13, Lower Hillgate, Stockport	1	1	0	..		
Shaw, John, 24, Great George Place, Liverpool	1	1	0	..		
Shepheard, Thos., 12, Bridge St. Row, Chester	5	5	0	..		
Shepperley, James, 79, Goldsmith Street, Nottingham	1	1	0	..		
Shippam, H., Alfreton Road, Nottingham	..			0	5	0
Shirley, J. G., 2, Westbourne Grove, W.	1	1	0	..		
Shirley, Stephen S., 2, Westbourne Grove, W.	..			0	10	6
Silverlock, H. T. and W. B., 96, Blackfriars Road, S.E.	5	5	0	..		
Simpson, Henry D., 3, Corn Market, Louth	1	1	0	..		
Simpson, Thomas, Bloxham, Oxon	0	2	6	0	2	6
Slater, Arthur, Auburn Place, New Whittington	0	5	0	..		
Slipper, J., 86, Leather Lane, E.C.	2	2	0	..		
Smith, Arthur Harry, Broad Street, Hanley	2	2	0	..		
Smith (Nathaniel) and Co., 373, High Street, Cheltenham	5	5	0	..		
Smith, Samuel, 132, Borough High Street, S.E.	5	5	0	..		
Smith, W. F., 280, Walworth Road, S.E.	3	3	0	..		
Southall Bros., and Barclay, 17, Bull Street, Birmingham	10	10	0	..		
Sowerby, W., Inner Circle, Regent's Park, N.W	2	2	0	..		
Spalding and Hodge, 101, Drury Lane, W.C.	5	5	0	..		
Sparshott, Harry, Soho Street, Handsworth, Birmingham	..			0	10	6
Spencer, Thomas, Wokingham	0	10	6	..		
Squire, Peter, 277, Oxford Street, W.	10	10	0	..		
Squire, Peter W., 277, Oxford Street, W.	5	5	0	..		
Squire, William, 5, Coleman Street, E.C.	10	10	0	..		
Stacey, J. B., 300, High Holborn, W.C.	0	2	6	..		
Stamp, Edward B., 29, High St., Hampstead	..			0	10	6
Stannard, F. J., 15, Broad Green, Croydon	..			0	10	6
Starling, Henry W., 1, Lancaster Gate, W.	..			1	1	0
Stenhouse, Dr., John, F.R.S., 17, Rodney Street, Pentonville, N.	..			1	1	0
Stephenson, J. B., 71, George Street, Edinburgh	..			0	10	6
Stevens, Peter Augustus, 70, Hyde Road, Hoxton, N.	..			0	10	6
Stevens and Richardson, 5, Great Queen Street, Lincoln's Inn Fields, W.C.	5	5	0	..		
Stewart, A. Y., Apothecaries' Hall, E.C.	3	3	0	..		
Stiles, M. H., 300, High Holborn, W.C.	..			0	5	0
Stocken, James, 40, Euston Square, N.W.	..			0	10	6
Street, George, 265, Whitechapel Road, E.	0	5	0	0	10	6
Strickett, John, 161, St. George's Road, Peckham, S.E.	0	9	6	..		
Stuart, John Edward, 172, New Bond St., W.	10	10	0	..		
Sutton, Henry, 32, Sun Street, Finsbury, E.C.	1	1	0	..		
Sutton and Nuthall, Bank Plain, Norwich	5	5	0	..		
Swift, T. P., 38, Crosschurch Street, Huddersfield	1	1	0	..		
Swinn, Charles, 125, Upper Moss Lane, Hulme, Manchester	..			0	10	6
Taubman, Robert, 33, Southampton Row, W.C.	..			0	10	6
Taylor, Frederick J., Newport Pagnell	5	5	0	..		
Taylor, George, Walton on the Hill, Liverpool	1	1	0	..		
Taylor, Thomas, Newport Pagnell	..			1	1	0
Taylor, Thomas, 81, High Street, Peckham, S.E.	1	1	0	..		
Tharle, C. A., 300, High Holborn, W.C.	0	2	6	..		
Thiellay, E. H., 5, Amersham Rd., New Cross	1	1	0	..		
Thornley, C., Stow-on-the-Wold	..			0	10	6
Tilsley, James, Berriew, Montgomeryshire	..			0	5	0
Thompson, Henry Ayscough, 22, Worship Street, E.C.	5	5	0	..		
Thompson, J. W., Sedgley, Staffordshire	..			0	10	6
Todd, Ralph, 1, Regent Square, W.C.	2	2	0	..		
Tomlinson, C. K., Lincoln	1	1	0	..		
Toogood, W., 37, Mount Street, W.	5	5	0	..		
Townsend, Charles, 4, Union Street, Bristol	2	2	0	..		
Treble (Geo.) and Son, Gloucester Street, Hoxton, N.	2	2	0	..		
Tucker, Charles, South Street, Bridport	1	1	0	..		
Tupholme, John T., 1, Coleherne Terrace, West Brompton, S.W.	5	5	0	..		
Turnell, Tom, 221, Coldharbour Lane, Camberwell, S.E.	0	5	0	..		
Turner, Chas. E., 63, Great Russell St., W.C.	1	1	0	..		
Tyrer, Thos., Garden Wharf, Battersea, S.W.	1	1	0	..		
Urwick, W. W., 60, St. George's Rd., Pimlico, S.W.	1	1	0	..		
Veitch, A, 103, King Street, Castle Douglas, N.B.	..			0	5	0
Vialls, J. B., 10, Clare Market, W.C.	1	1	0	..		
Virgo, Charles, The Foregate, Worcester	5	5	0	..		
Vizer, Edwin B., Church Road, Cliftonville, Brighton	..			1	1	0
Voelcker, Augustus, 39, Argyll Road, Kensington, W.	1	1	0	..		
Waites, E. W., 8, Morgan Street, Tredegar	2	2	0	..		
Walker, Joseph, 124, High Street, Tewkesbury	..			0	5	0
Walker, Robert, 128, Brompton Road, S.W.	0	10	6	..		
Walker, W. H., Lord Street, Southport	1	1	0	..		
Wand, Stephen, 18, Haymarket, Leicester	0	10	6	..		
Waring, A. W., 7, Poultry, E.C.	0	5	0	..		
Warrell, — Caledonian Road, N.	0	10	6	..		
Warrick, Robert B., Old Swan Lane, Upper Thames Street, E.C.	5	5	0	..		
Waters, W. A., High Street, Rye	..			0	5	6
Watmore, James, Peach Street, Wokingham	0	5	0	..		
Watson, James B., Chipping, near Preston	..			0	5	0
Watts, (J.) and Co., 217, Edgware Road, W.	5	5	0	..		
Welborne, George, Boughton, Kent	..			0	5	0
West, Thomas, Stretford, Manchester	0	5	0	..		
Weston, Samuel J., 151, Westbourne Terrace, W.	2	2	0	..		
Wheeler, John, Rock House, Chipping Sodbury	0	10	6	..		
Wheeler, J. B., 60, Cheyne Walk, Chelsea, S.W.	..			0	10	6
Whiffen, Thos., Lombard Rd., Battersea, S.W.	21	0	0	1	1	0

	Donations. £	s.	d.	Annual Subscriptions. £	s.	d.
Whiffen, T. J., Lombard Rd., Battersea, S.W.	1	1	0	...		
Whitaker and Grossmith, 120, Fore Street, E.C.	..			2	2	0
White, Charles Thomas, 102, High Street, Ashford, Kent	..			0	5	0
White, T. R. and A., Castle Street, Saffron Hill, E.C.	10	10	0	..		
Whitehouse, John, 194, High Street, Deritend, Birmingham	1	0	0	..		
Whitfield, Henry, 45, High Street, Worcester	5	5	0	..		
Whitton, Joseph, 7, Poultry E.C.	1	0	0	...		
Wilkinson, Benj. J. 1, Middleton Road, Dalston, E.	0	10	6	..		
Wilkinson, George, 267, Waterloo Road, Manchester	1	1	0	..		
Wilkinson, Thos., 270, Regent Street, W.	3	3	0	..		
Wilkinson, William, 263, Cheetham Hill, Manchester	1	1	0	..		
Williams, Griffith, Llanerchymedd, Anglesea	..			0	5	0
Williams, Henry A., 1, Beaufort Sq., Chepstow	1	1	0	1	1	0
Williams, John, 72, Camp Hill, Birmingham	..			0	5	0
Williams, John, 16, Cross Street, Hatton Garden, E.C.	21	0	0	..		
Williams, J. W., London	2	2	0	..		
Williams, William, 265, Crown St., Liverpool	..			0	5	0
Willmott, Robert, Congresbury, near Bristol	..			0	5	0
Willmott, William, King's College Hospital, W.C.	1	1	0	..		
Wills, George S. V., 62, Lambeth Road, S.E.	5	5	0	..		
Willsher, Stephen Henry, Tenterden	1	1	0	0	10	6
Wilson, Edward, London Road, Sheffield	5	5	0	..		
Wilson, Gaudern, Crowland, Lincolnshire	0	10	0	..		
Wilson, Richard, High Street, Claycross	0	10	6	..		
Wodderspoon and Shave, 7, Serle Street, Lincoln's Inn Fields, W.C.	1	1	0	..		
Wood, William, Pontypool	0	10	6	..		
Woolcott, Charles, 49, Parade, Leamington	0	10	0	..		
Wooster, J. R., 4, Broadway, Turnham Green	1	1	0	..		
Wright, G. H., 103, Borough High Street, S.E.	1	1	0	..		
Wright, Layman, and Umney, 50, Southwark Street, S.E.	10	10	0	2	2	0
Wright, W., 27, Wolborough Street, Newton Abbot	1	1	0	..		
Wright, W. V., 50, Southwark Street, S.E	5	5	0	..		
Wylde, George, 53, King's Road, S.W.	0	10	6	..		
Wylie, Thomas, 9, Fore Street, Port Glasgow	..			0	5	0
Wyman, John, 122, Fore St., Cripplegate, E.	5	5	0	..		
Yarde, Giles, 60, Lamb's Conduit Street, W.C.	5	5	0	..		
York Glass Co., York	10	10	0	..		
Young, R. F., Station Road, New Barnet	2	12	6	..		

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

Annual General Meeting.

The annual business meeting of this Association was held in the Manager's Library, of Anderson's College, on Monday evening, 7th inst.; Mr. Daniel Frazer, President, in the chair. After the usual preliminary business had been disposed of, the Hon. Sec. (Mr. James M. Fairlie) was called upon to read the Annual Report of the Council, of which the following is an abstract:

This document referred, in the first place, to the visit of the Pharmaceutical Conference and the arrangements connected therewith. It stated that upwards of £200 was expended by the local pharmacists in furtherance of the meetings in connection with it, and that the balance of the subscriptions had been handed over to the Association, and would be expended in books for the library. On account of the Conference, the scientific meetings had commenced later than usual, but there had been eight held during the session, three of which had been addressed by Dr. Machattie. The other work of the Association had been chiefly connected with the classes. Fifteen students were enrolled for the practical chemistry class, conducted at the laboratory, 88, Hope Street, by Dr. Machattie and assistants, and several of the students who attended that class had since passed their examination. An examination had been held at the end of the session, when a competition took place for two prizes offered by the Council. Mr. John Macnicol obtained the first prize, and Mr. George William Watt the second. Thirty-one members had been enrolled for the tutorial class, conducted by Mr. Archibald Fairlie, C.M., who had also reported favourably regarding the attendance and progress of the class. An examination was held at the close of the session, to decide the recipients of the Council's prizes. Mr. William Blain was entitled to the first prize in the senior division, and Mr. Hugh Campbell second; Mr. Alexander Skirving being first in the junior division, and Mr. John Lawrence jun., second. Twenty members had been enrolled for the botany class, conducted by Professor Keddie, F.R.S.E., in the Science Class Room of the Free Church College, and Professor Keddie had spoken very highly of this class. An examination would be held at the close of the session in June, and the Council's prizes would then be competed for and presented. The Library of the Association had been greatly taken advantage of this session as in past years. Ninety-five exchanges had taken place during the session, and twenty-five of the volumes were then in circulation. The best thanks of the members were due to Mr. James Murdoch, who had had the whole management of the books in his hands. The microscope had been put to good service by the numerous interesting objects supplied from time to time by Mr. John C. Hunter and Mr. John Edmond Fairlie, both of whom had done much to render the microscope a popular study among the students. The materia medica cabinet, or rather cabinets (a second one having been handsomely presented to the Association in course of the session by Mr. S. M. Frazer), had also been eagerly inspected from time to time by the students preparing for their examinations. The Price List Committee had been at work during the winter, and a new edition had been issued with a dispensing card attached, at the usual price of one shilling. The old edition was entirely sold out, and many were anxious for a new list. The increase made on the prices of many of the things, particularly the dispensing scale, had met with a little opposition at first, but it was believed it was being gradually adopted as a whole, with advantage to the chemist, and no complaints on the part of the public. The formation of the Chemists and Druggists' Trade Association was referred to, and the Scottish branch with head quarters at Glasgow. The earlier closing question had come to the front again, and an opinion was expressed that the assistants must certainly get more leisure for their studies, and the masters would benefit perhaps both in pocket and in health if a complete understanding could be come to on the subject. The Financial Statement showed that the number of members had slightly decreased from last year, which was acounted for by a number of country chemists enrolling themselves last session in connection with the special effort made in anticipation of the Conference meetings, but who had not renewed their subscription. It was understood that the University authorities had made an application to the proper quarter for the appointments of a Professor of Pharmacy at Gilmorehill. If the government give their consent, it would behove the Association to see that a thoroughly qualified person was appointed, one who, while upholding the dignity of the University, would also assist in placing the Profession of Pharmacy in the place it should be amongst the sciences.

The Treasurer read his Financial Statement, which showed that while there was an apparent cash deficit, there was a stock of price lists on hand which would soon realize as much as would clear it off.

On the motion of Mr. John Currie, sen., seconded by Mr. William Whyte (of Brown Brothers and Co.), the reports were unanimously adopted as read, and the hearty thanks of the Association given to Messrs. Fairlie and Mackenzie for their arduous labours connected with the Association for so many years.

The Chairman (Mr. Frazer) thereupon read his valedictory address, as follows

The President's Address.

Gentlemen,—The closing words—the last word itself—of many a speech, and of, I fear, many a sermon, is not unfrequently the most welcomed by the hearers of both. So with "the closing address of the session," by the chairmen of all sorts of educational associations. In such cases, and quite irrespective of the length or quality of the address itself, the mere fact of its being delivered tells of a longer or of a shorter term of work—alike by the teacher and the taught—being brought to a close, and of a holiday being about to be entered upon by both. Thus will it be with the present address. It will be welcomed by the students and scholars who have worked, many of them under great disadvantages, the hardest, as giving them a well-earned respite from the toil and moil of a laborious session; and it will be doubly welcomed by those who have *not* worked hard, as telling them that now, whatever it may have been in the past, they will no longer have to furbish up the wonted excuse for the ill-prepared task, or for the frequent absence. At the same time I trust that though the compulsory attendances at the class or lecture is over for the season, the long summer holidays on which we are entering will not pass without recording much voluntary and, therefore, pleasant work done. Hugh Miller, in one of his famous leading articles, told how he laboured hard at his task in the long summer days, and saved the half of his wages that he might have the long winter nights, "all to himself," to prosecute the study of science and of literature. How well Mr. Miller succeeded in this is known to all. What he did so well on the chosen field of his labours I trust not a few of you will do on yours. If so, pharmacy will, by and by, be the gainer, and you yourselves all the richer—richer in knowledge at all events, and I hope also in even the meaner riches that, no doubt, form the first stimulus to study and hard work with most of us. As I do not wish you to weary too keenly for the "last word" of this address, as I fear I gave you cause for doing at the opening of the session, in the few remarks that I propose now to make on two or three matters that have somewhat exercised the pharmaceutical world for some months back, I will content myself with doing little more than give the headings of the different subjects to be mentioned, and upon which, but for sparing your time and my own, I could quite easily have written pretty largely. The first of these is the milk of sulphur question. Every dog has his day, and the dog of the pharmacists during the last few months has certainly been the said milk of sulphur question. In letters, lectures, speeches, and articles in the *Pharmaceutical Journal*, and in the *Chemist and Druggist*, and discussions in the law courts, this has been the burning question of the season. Many men, many minds—and as men, happily, are not automatons—this diversity of opinion is not only natural in itself, but is at once inevitable and right. Where there is life there is animation. Where there is death there is only stagnation. In the present case, Tom swears by the "genuine old milk of sulphur," and Dick by the "sulph. præcip., B. P.," while Harry goes in for both. Well, I suppose I better be out with it; I go in with Dick for the B. P. article. Doing this myself I am quite sure you will not wonder that I think everyone who does not is just as far wrong as they are bound to believe I am. My reasons are very simply stated. Sulphur is sulphur: it is not sulphur and lime. Sulphur is prescribed by medical men, and the public ask for sulphur, or for milk of sulphur. Unquestionably, ninety-nine medical men out of one hundred mean the pure article, and just as large a portion, I believe, of the chemically ignorant public mean the same. When they ask for the milk of thing—be it what it may—surely common sense tells that something better is meant than the article without the prefix is in itself. The cream that rises upon the surface of new milk does not gather up any foreign substance to it; it is the richest part of the milk. Such, I am quite sure, is the idea the average purchasers of milk of sulphur have when they purchase it rather than the flower of sulphur. Will any pharmacist tell me that if he frankly told his customers that the milk of sulphur he was selling contained a large percentage of lime, whereas the flower of sulphur was comparatively a pure article, and only a half or a third of the price, he has so low an opinion of the intelligence of his customers as to say he would, after such an honest statement of fact, give a preference to the mixed article? I am told that in some districts in England some druggists sell a hundredweight or more of the milk of sulphur in a month. I am extremely curious to know this, if these druggists could purchase the sulph. præcip. for 5*d.* and have to pay 8*d.* for the said milk, would they continue to supply the lime article, merely because the public had been, as is alleged, accustomed to it and found it so much easier to mix? Would they not do, as I had to do some thirty years ago, when introducing pure linseed meal and genuine brown mustard, and ponderous magnesia instead of the light—instruct the public that the new articles were better than the old? I believe they would, and with the same success as I had with these articles. I confess that it took an immense amount of persuasion to induce the public to substitute the pure articles for the adulterated ones, but I would give them nothing else, and now they come to me from all quarters to get them. Besides, I believe it is all a bugbear about the public insisting upon getting the mixed article. The much-abused public, as a rule, know nothing whatever of the composition of the article sold. And most delighted am I to record it here; it was brought out in the famous Runcorn trial, that out of fifty samples of milk of sulphur examined by the public analyst, forty-five were found by him to be pure! Surely this thoroughly disposes of the question as to the difficulty of inducing the public to purchase a genuine article. Another question that has caused some, as I think quite needless, discussion, is the tea, dessert, and table-spoon measure, one. I have a strong impression that if every body would be content to attend to their own business, the world would be none the worse, but all the better for it. As to the bearing of this very trite remark in the present case, it is simply this, our business is not to prescribe, but to dispense, and in dispensing we have but to "do as the doctor orders." He knows quite as well as we do how much the spoons in domestic use vary, and we are bound to believe him intelligent enough to take this variation into calculation when writing out his prescriptions. I was very glad to see this view advocated in one of the last letters on the subject that appeared in the *Journal*, but was, I confess, surprised that so very able and experienced a pharmacist as Mr. Proctor, of Newcastle, should have put himself to so much trouble in a matter that, for the life of me, I cannot see pharmacists have anything to do with. When speaking of prescribing, I wish to say here that I was surprised last year at a discussion that occupied the columns of the *Journal* for some time—viz., as to the dispenser retaining the prescriptions from the patient, and charging for copies of it. I maintain that the prescription is as much the property of the patient, and as little that of the dispenser of it, as are his spectacles, or his household furniture, or anything that is his—his by purchase or by inheritance. As to prescribing by pharmacists, I remain of precisely the same opinion as I was when I referred to the subject in my opening address. As long as we honestly seek to confine ourselves to our own legitimate field, and do not encroach upon the proper domains of the medical practitioner by making a trade, if I may so term it, of prescribing, no respectable body of men will interfere with us, and no law will be put in force against us. Regarding the famous Nottingham case, it is true that the actual case selected for trial does appear to bear hard on the pharmacists, but it is at least equally true that the party in the particular case tried was reported to be regularly in the habit of trespassing, and trespassing very largely, on.

the domain of medical men of the town, and doing so in a manner to bring great gains to himself. As for the Trade Association, I will not rediscuss this question. Suffice it to say, I abide absolutely by all I stated on the subject in my opening address. Indeed, I confess all that has happened since has only strengthened my views on the subject. Notably amongst others things that have strengthened me in my views, were its defence of the sale of the lime milk of sulphur, and of the prescribing Nottingham pharmacist. I still maintain that in a law-governed country such as ours, the common law of the country is amply sufficient to protect every man in it in the honest and lawful prosecution of his own legitimate business, and so, if the two chemists involved in the above cases had not trangressed that law, they would have needed no defence society and no lawyers to defend them, any more than I should have needed their assistance had I not sold wine without a wine licence. I have only one more general topic to mention: it is as to the mode of sending representatives to the London Council. At this hour the whole country is called upon to elect fourteen councillors to supply that number of vacancies. You, in Glasgow, are asked to record your vote for men you never saw and never heard of—at least, there are not a few names of whom I have never heard, and whom, to my knowledge, I have never seen. I felt this to be an anomaly the first time I sat at the Council table, when every face but that of Mr. Mackay was strange to me, and our Vice-President came all the way from Dartford, in the extreme South of England. I said to him then he could know nothing of me, as I could know as little of him. I then suggested territorial representation: that the country should be divided into districts—London of course, getting the lion's share in the representation—each sending a man known to it. Scotland, I suggested, should have two, one for the east, and one for the west half, or for the north and south halves, as might be arranged, etc. I broached this subject frequently in private, and would have brought it before the Council by a motion, could I have got any support to warrant me; but failing this, I left the matter over. This is one point in which I agree with the Trade Association, territorial representation; and if they take this topic up as it bears upon the London Council, I, for one, will wish it every success in it. It only remains that I should thank you most heartily for the kind expression of feeling exhibited towards me in the unanimous vote of thanks passed in my favour at your last meeting; for your thanks for what services I have been able to render to you on the London Council during the last six years; and for the very kind expression of regret at my retiring from it at this time. I assure you I value this expression greatly, but I confess that it, with similar expressions of feeling of regret for the same step conveyed to me by my friends in the Council itself, has only greatly deepened my own intense regret at having felt myself shut up, from family reasons, to take the step I did. Your loss you can repair by sending such a man as Mr. Bailton, who in many respects is better able to fill the seat I occupied at the Council Board than I can pretend to be, but my own loss cannot be made up, for though the friendships made in London, with Londoners and London visitors, will, I believe, remain; the opportunities of exhibiting the ties made must now be of the rarest. I think it is right in all frankness here to add, that though the first thoughts of retiring from the Council arose in my mind from great disappointment felt at the *unanimity* with which my views of the Trade Association were condemned at a meeting held for discussing these views as well as from other representations made to me privately as to my views on the vexed milk of sulphur questions: it was not upon these my retirement ultimately turned. All that irritation had passed away, and my resolution to retire turned upon the questions of the intended removal of my house to a place where I should be some two miles from the nearest neighbour, save the villagers of Cumbernauld, and my desire to get a few days a month to myself there. Now, though I cannot go there, I am even more shut up in the step I took, for I as yet do not know where my house is to be situated. I have now only to thank you for your kind attention, and the patience shown in listening to this much too hastily prepared address.

The President then presented some of the prizes to the successful competitors amidst applause.

The following motion was proposed by Mr. J. A. Clarke, and seconded by Mr. J. Fenwick, viz.:

"That the Association impresses upon all connected with the trade the importance of adhering, as far as possible, to the retail price list, published by a commitee of the trade, under the auspices of the Association; that each prescription be marked distinctly when first dispensed; and that the trade mark attached to the list alone be used."

After some discussion the motion was put to the meeting, and unanimously agreed to.

Mr. Davidson then proposed, and Mr. Whyte seconded, the following, viz.:

"That in order to permit of the young men connected with the trade to obtain the full advantages of the classes organised by the Association, all employers are respectfully requested to assist the earlier closing movement by putting up their shutters, and relieving their assistants, at eight o'clock *prompt*."

The motion on being put to the meeting was also agreed to unanimously.

The election of officers and council was then proceeded with, the result being as follows:—

President, Mr. Daniel Frazer; Vice-President, Mr. James M. Fairlie; Treasurer, Mr. Joseph A. Clarke; Secretary, Mr. James L. Macmillan (Globe Manufacturing Company); Council, Messrs. John Currie, senr., A. Kinninmont, T. Davison, W. Whyte, W. Greig, R. M'Adam, A. Paul, J. W. Pettigrew, R. Brodie, W. Mackenzie, J. C. Steele, and R. MacDonald; Auditors, Messrs. John Jaap and J. L. Hatrick; Librarian Mr. James Murdoch.

A hearty vote of thanks to the chairman brought the proceedings to a close.

MANCHESTER CHEMISTS AND DRUGGISTS ASSOCIATION AND SCHOOL OF PHARMACY

The concluding meeting of the Session was held at the Memorial Hall, Albert Square, on Friday evening, May 11th; Mr. J. T. Slugg, F.R.A.S., Vice-President, occupied the chair. The minutes of the previous meeting having been read by one of the Secretaries (Mr. Benger), and confirmed, the Chairman called on Mr. Louis Siebold, F.C.S., to read his annual report of the classes as follows:

In presenting to you the Fifth Annual Report of the Manchester School of Pharmacy, I have much pleasure in stating that the session now terminating has been a very prosperous and successful one, and that the favourable expectations I ventured to express at the last annual meeting have been fully realized. Four courses of lectures were delivered during the session, viz., thirty-three lectures on pharmaceutical chemistry, on Fridays from 7.30 to 9 p.m.; twenty-seven lectures on materia medica and pharmacy, on Tuesdays from 7.30 to 8.45 pm.; fifteen lectures on botany, on Fridays from 9 to 10 p.m.; and twenty lectures on qualitative analysis, on Tuesdays from 8.45 to 9.45 p.m. Twenty-five students entered for the chemistry course, twenty-three for materia medica and pharmacy, nineteen for botany, and seventeen for the course on analytical chemistry, making a total of eighty-four entries or thirty-two more than in the previous year. The botany lectures were delivered by Mr. Leo H. Grindon, whose able and most lucid instructions were highly appreciated by all attending his class. The fees were 30*s*. for the chemistry course, 25*s*. for the materia medica and pharmacy, 20*s*. for the analytical course, or £3 5*s*. for the three; and 15*s*. for that on botany. The total amount of fees received was £91 10*s*., or £29 in excess of those of last session. The attendance throughout the session was very good indeed, and the interest and attention on the part of the great majority of the students was all that could be desired. Competitive examinations were held at the close of the session and prizes awarded to the successful competitors. Eleven candidates competed for the chemistry prizes, nine for the materia medica, and the same number for the botany prizes. The awards are as follows:

Chemistry.

1st prize to Mr. C. Challinor; 2nd prize to Mr. Frederic Percy Wood.

Materia Medica and Pharmacy.

1st prize to Mr. Frederic Percy Wood; 2nd prize to Mr. T. C. Blaymire.

Botany.

1st prize to Mr. C. Challinor; 2nd prize to Mr. J. C. Crompton.

Mr. Grindon expresses himself very well satisfied with the progress of his students. The majority of papers in these examinations were very satisfactory, and proved that their authors had made good use of the opportunities afforded to them. The result of the session, both as regards numbers of students and the quality of their work, is highly encouraging, and goes far to prove that the Manchester School of Pharmacy may henceforth be regarded as a self-supporting institution.

The following are the questions given in the competitive examination:

Chemistry.

1. Explain by equations the action of sulphuric acid, nitric acid, and hydrochloric acid upon metallic copper.
2. How is potassium cyanide prepared?
3. Describe and explain various processes for the preparation of potassium chlorate.
4. How would you prove that the correct formula for free cyanogen is C_2N_2 and not CN?
5. Explain the action of boiling hydrochloric acid on calomel.
6. How would you show the presence of mercury (mercuric), bismuth, and copper in a solution containing no other metals?
7. Explain the terms alcohol and aldehyde, and give examples of each.
8. Give the distinguishing tests for arsenites and arseniates.
9. Briefly explain the officinal processes for the preparation of potassium permanganate, sodium arseniate, and spirit of nitrous ether.
10. How would you prove heavy spar to be a sulphate?
11. How are the three oxides of lead obtained? Mention their composition and chemical properties.
12. Give the formula of the following preparations:—Ammonium phosphate, potassium ferricyanide, bismuth subcarbonate, borax, acetic ether, nitro-benzol, oil of bitter almonds, and salicylic acid.

Materia Medica and Pharmacy.

1. Name the different kinds of rhatany met with in commerce, and state how they may be distinguished; also give the botanical source of each.
2. Name and describe the various drugs known as Pareira brava.
3. Describe the processes of maceration and percolation.
4. Recognize the eight specimens of drugs placed before you, and assign to each its botanical source, natural order and habitat.
5. Classify the officinal extracts according to their mode of preparation.
6. How would you ascertain the purity of copaiba.
7. Give a short description of the roots of belladonna, scammony and gentian.
8. Describe a convenient process for rapid filtration.
9. Name and describe the principal kinds of aloes.
10. Write about a dozen lines on the chemical composition of essential oils.

Botany (by Mr. Leo H. Grindon).

1. Enumerate the organs found in a complete flower; say which are essential and which are non-essential, and describe the functions of the former.
2. How are plants primarily classified? Give the names of the great primary classes.
3. How many natural orders are there? Say what you understand by a natural order.

BY MR. LEO H. GRINDON.

4. What are the characters of the Ranunculaceæ? In what particulars do the Rosaceæ differ from the Ranunculaceæ?
5. What are the leading features of the natural order Umbelliferæ? Mention the names of several important plants of this order.
6. To what natural orders do the following belong:—Hyoscyamus, Calumbo, Mustard, Irish Moss, Peruvian Bark, Chamomile, Balsam of Peru, Turpentine?
7. Describe the Foxglove (*Digitalis purpurea*) in botanical terms as nearly as you can.

The Chairman and other members having spoken on the very encouraging report just read, Mr. George S. Woolley took the chair, and Mr. J. T. Slugg delivered a short lecture on—

THE CHEMISTRY OF THE SUN,

of which the following is a brief report:

Mr. Slugg said that previous to the invention of the telescope nothing was known as to the physical constitution of the sun. In 1769 Dr. A. Wilson as the result of careful observation, discovered that sun-spots were cavities in a luminous atmosphere surrounding a darker body. Sir W. Herschell afterwards assumed that there are three concentric coverings of the sun, first a vaporous, then a luminous, and lastly, a cloudy and imperfectly transparent atmosphere. It was not till 1842 that attention was directed to the existence of the red prominences which are noticed surrounding the black disk seen in the sky during a total eclipse of the sun. The first question asked was, "Do they belong to the sun or to the moon?" This question was not answered till 1851, when a total eclipse of the sun took place, and when the Astronomer Royal produced evidence that they belonged to the sun. In 1860 this was confirmed by the application of photography during the eclipse of that year. Still the question, "What are they?" remained unsolved. In 1868 a total eclipse occurred which was visible in India, when for the first time that marvellous instrument, destined to rival the telescope in the importance of its discoveries—the spectroscope—was applied. It was discovered that these flames principally consist of hydrogen gas. Up to this point, owing to the glare of the sun, they could only be observed during a total eclipse of the sun. Astronomers, however, never rested until they discovered a method of observing them whenever the sun is visible. The spectroscope has revealed to us the existence in the sun of iron, nickel, zinc, copper, chromium, magnesium, calcium, sodium, potassium, barium, strontium, manganese, lead, cobalt, and one or two new elements, as well as hydrogen. After describing the great solar storm witnessed by Professor Young in 1871, the lecturer expressed his admiration of the able and devoted labours of such men as Huggins and Lockyer in this field of science, and stated his belief that before long, we shall be in possession of further important information respecting the physical constitution of the sun.

A cordial vote of thanks to Mr. Slugg, for his interesting lecture, was carried by acclamation.

LEEDS CHEMISTS' ASSOCIATION.

The Seventh General Meeting of this Association for the session 1876-77, was held in the Library on Wednesday evening, Apil 11; the President, Mr. Yewdall, occupying the chair.

The minutes of the previous meeting having been read and confirmed, letters were read by the Secretary, from Mr. F. Reynolds, expressing his regret that in future he would be unable to attend the evening meetings; from Mr. Bremridge, to the effect that a gift of a copy each of the 'Calendar' of the Pharmaceutical Society, and of the 'Register' for the present year had been made to the Association by the Council of the Pharmaceutical Society; and from Mr. Henry Pocklington, stating that owing to his having been unexpectedly summoned to attend a police inquiry that evening, he would be unable to read his promised paper on "The Physics of Pharmacy."

On the motion of Mr. Pick, seconded by Mr. Highmoor, "The best thanks of the Association were tendered to the Council of the Pharmaceutical Society for the gift of the Calendar and Register."

The Chairman said he was very sorry the meeting would be deprived of the pleasure of hearing Mr. Pocklington that evening, and he was sure that nothing but the force of circumstances would have prevented that gentleman from keeping his engagement; but was glad to find from the tenor of his note that the delivery of the paper was only postponed. In the meantime, he would suggest that a conversation take place amongst those present respecting the recent prosecution of a chemist at Nottingham for prescribing.

A free discussion ensued: the unanimous opinion being that should the decission in the Court of Queen's Bench in this case be adverse, the Chemists and Druggists' Trade Association should be encouraged and assisted to carry the case to the House of Lords, and should its decission be against the trade, an appeal to Parliament supported by public petition should be made for an alteration of the law.

The Fourteenth Annual Meeting was held in the Library on Wednesday afternoon, May 9; the President, Mr. Yewdall, in the chair.

After the minutes of the previous meeting had as usual been read and confirmed, the Report was read by the Secretary.

The Report stated that in accordance with a resolution passed at a special general meeting of the Association, held on the 18th of October last, whereby that part of Rule 5 providing for the holding of the annual general meeting in October was so altered that that meeting was now to be held in May, the committee had called the meeting that afternoon, in order that the Officers and Committee for the ensuing year might be elected, and afford an opportunity of discussing the proceedings of the Association, of which the following is a report for the last eighteen months. The Association consisted of forty-three members and thirty-nine Associates, being an increase in the number of members of two, and a decrease in that of Associates of four, upon the members of 1875-76; and an increase of three members and a decrease of seven Associates since the last report was presented. The financial condition of the Association as shown by the balance sheet might be said to be sound; the subscriptions being slightly on the increase, and the reserve fund in the hands of the Treasurer remaining untouched. The Library table had been supplied with the usual periodical literature, but an addition had been made during the present year of an extra copy each of the two representative Journals, and cases for holding the current numbers of periodicals provided. The 'Calendar' of the Pharmaceutical Society, the 'Register of Chemists and Druggists' for the present year, and one copy weekly of the *Pharmaceutical Journal*, have been presented to the Association by the Council of the Pharmaceutical Society, and the 'Year Book of Pharmacy' by the Executive Committee of the Pharmaceutical Conference. Owing to the amount spent in binding, the Committee had not had much cash to spare for the purchase of new books. It was however resolved a short time ago, that the new editions of Fownes' 'Manual of Chemistry,' in two vols., Squire's 'Pharmacopœias of the London Hospitals,' and Squire's 'Companion to the British Pharmacopœia,' should be added to the Library. During the eighteen months past there have been held nineteen general meetings, namely, twelve during the year 1875-76, and eight during the session just over. The Committee reports that perhaps the greatest discouragement it had had to contend with had been the miserably poor attendance at these meetings. Unless there was an improvement in this matter, it would be absolutely impossible ere long for the Committee to get a good man to read a paper before the Association, as it was ridiculous, if not actually insulting, to ask a gentleman to take the trouble of getting up a paper, and then when he came to read it, salute him with an array of empty benches. Besides which it was a complete waste of funds, the amount expended in getting up these meetings being very considerable. During the two past sessions classes in botany, under Mr. Abbott, and in chemistry, under Mr. Ward, both in connection with the Science and Art Department, had been held for the benefit of the Associates. Six students attended the former in the session 1875-76, three of whom went up for examination, one obtaining a second-class certificate in the elementary stage. This year the number of students is sixteen, seven of whom are going in for examination in the elementary stage. Nine of the Associates attended Mr. Ward's Chemistry Classes in 1875-76; two of whom obtained second-class certificates in Elementary Inorganic Chemistry; one a second-class Elementary, and one a first advanced Inorganic Chemistry, with laboratory practice, and a first Elementary Organic, with laboratory practice. The results of the present year were not yet known. Two prizes had been offered by the Committee, of the respective value of 15*s.* and 7*s.* 6*d.* to be competed for in each of these classes of the last session. There was yet £20 of the Pharmaceutical Society's grant for educational purposes in the possession of the Association, and no doubt the Committee to be elected that day would expend it judiciously in assisting the studies of the Associates, in response to the slightest wish on the part of the latter to be assisted. The report concluded with a reference to the part the Association had taken in respect to the discussion on the establishment of a museum of apparatus at Bloomsbury Square, the Sale of Food and Drugs Act, the use of methylated spirit in liniments, and the establishment of the Chemists and Druggists' Trade Association.

The adoption of the report was moved by Mr. Richard Reynolds, seconded by Mr. Edward Brown, and carried.

The following gentlemen were then, by ballot, elected to serve on the Committee and act as Auditors during the ensuing year, viz.:—President, Mr. Peter Jefferson; Vice-President, Mr. Richard Pick; Secretary, Mr. Samuel Taylor; Committee, Messrs. Joseph Beedle, John Bowman, Edward Brown, John Hellowell, T. B. Stead, and Edwin Yewdall; Auditors, Messrs. F. Reynolds and James Abbott.

A vote of thanks to the retiring officers for the manner in which they had conducted the affairs of the Association during the past eighteen months was passed on the motion of Mr. Richard Reynolds, seconded by Mr. Abbott.

The thanks of the Association were also tendered to the Council of the Pharmaceutical Society for the weekly copy of the *Journal* supplied gratuitously last year, and to the Executive Committee of the Pharmaceutical Conference for the gift of the 'Year Book of Pharmacy' for the present year.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

On Tuesday evening, May 1, a meeting of this Association was held in the rooms, Halford Street, when a lecture on the "Codex Française" was given by Mr. E. Jones.

The Lecturer spoke of the report to the Emperor from the Ministers of Agriculture and Public Instruction, regarding the necessity for such a work as the Codex to guard against quackery and roguery, as well as to be the guide of the doctor and pharmacien. The dates of the former Pharmacopœias were given, and various parts of the preface referring to the densities and thermometers explained, and the fact was pointed out that in France medicines are not measured, but weighed. The lecturer named the substances, together with many of their properties, which are contained in the Codex but which are not mentioned in the British Pharmacopœia. He stated the laws which govern chemists, and which did not allow any but chemists to deal in drugs. He also referred to the stringency of the examination which a chemist is required to pass before able to commence business for himself. In concluding, the lecturer mentioned that the chemists in Paris opened their shops late in the morning and closed about eleven and twelve at night.

At the close of the lecture a hearty vote of thanks was accorded to Mr. Jones, which was duly responded to.

A vote of thanks to the Chairman (Mr. H. Cooper) concluded the meeting.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, May 17th; W. Crookes, F.R.S., Vice-President, in the chair. The minutes of the previous meeting having been read and confirmed, the Chairman announced that the extraordinary general meeting would be held on May 31, at 8 p.m., in the Society's room.

Mr. Tribe gave notice that at this meeting he would move the following resolution: "That this Society is of opinion that the present system of election to its fellowship does not promote its interests or sustain its dignity, and that in place of this system, the Council of the Society should recommend to the Fellows annually not more than twenty of the more meritorious candidates for election to its fellowship."

The following certificate was read for the first time: F. H. T. Allan.

The following papers were then read by the Secretary, Dr. Armstrong:

1. *On a Slight Modification of Hofmann's Vapour Density Apparatus.* By M. M. P. Muir and S. Suguira.—The original apparatus consisted (*Deut. Chem. Ges. Ber.* ix. 1304) of an ungraduated barometer tube which could be closed under mercury at its lower end by a caoutchouc plate, when the level of the mercury, which is of course depressed until the whole of the liquid under examination is converted into vapour, remains constant; the apparatus is then allowed to cool, and the height of the mercury marked by a slip of gummed paper. The tube is now displaced, and the amount of mercury necessary to fill the tube to the paper mark weighed. The authors propose to omit the closing with the indiarubber plate and to read off the height of the mercury by a cathetometer. When the tube has cooled sufficiently, by means of the cathetometer a piece of gummed paper is placed at the exact level at which the meniscus stood. The authors do not claim absolute accuracy, but quickness and facility for the method; thus with isoneptane the theoretical number is 50 by experiment, 48·3 was obtained, and with terpene from sage oil, 68 theory, and 67·5 experiment.

2. *Note on the Fluid contained in a Cavity in Fluorspar.* By J. W. Mallet, Virginia.—The author possessed a specimen of green fluor from Alston Moor, containing a cavity of considerable size with fluid contents, and a readily mobile bubble. The largest crystal was 14 m.m. on the side; the cavity is irregular and flattened about 6 m.m. by 2·5 m.m., and 1 m.m. deep. On gradually heating the mass to 150° C. the bubble increased in size and lost its mobility. On cooling the bubble required a sharp jerk to make it change its place. Under the microscope the crystal, after heating, showed signs of incipient splitting. No viscidity was observed in the liquid after heating—in all probability the liquid was water.

Professor Church remarked that he had examined a crystal of fluorspar resembling very much the one mentioned in the paper; in it there was a cavity containing some liquid and a mobile bubble. On heating it, below 100° C., the bubble enlarged, filled the cavity, and the liquid disappeared; on cooling the crystal was evidently fissured, and the liquid had vanished. No evidence could be obtained of the presence of carbonic anhydride.

Mr. Crookes suggested the examination of the enclosed gas in a vacuum by the induction spark-spectroscope, after fracturing the crystal by heat.

3. *Examination of Substances by the Time Method.* By J. B. Hannay.—The author has determined with great care the loss of weight sustained by various hydrates in equal and successive intervals of time when submitted in a Liebig's drying tube to a current of air forced over them at various temperatures. He finds by this method that a hydrate usually begins to lose water more or less rapidly up to a certain point when the rate of loss becomes suddenly less rapid, up to another point when the rate of loss is again decreased, and so on. These alterations in the rate of loss indicate the formation of other and lower hydrates which lose water less rapidly, and so evidence of the existence of hitherto unknown hydrates has been obtained. Thus magnesium sulphate at 100° C. lost in five minutes 8·36 per cent. = $MgSO_4 6H_2O$, the loss is then pretty regular until about 29 to 30 per cent. has been lost in forty-five minutes, leaving $MgSO_4 3H_2O$ when the rate falls; the weight then diminishes slowly till $MgSO_4 2H_2O$ is left when the loss becomes suddenly very slow until $MgSO_4 H_2O$ remains. Sodium sulphate, zinc sulphate (which presents some anomalies), ferrous sulphate, calcium and strontium chlorides were examined. Numerous tables and graphic curves illustrate this paper.

4. *On the Dehydration of Hydrates by the Time Method.* By W. Ramsay, Ph.D. Part I., Iron and Aluminum Hydrates.—The method employed was similar to that used by Mr. Hannay. The substances first examined were the hydrates of aluminum and iron. The author considers that hydrates such as $Al_2O_3 4H_2O$ $Al_2O_3 3H_2O$, etc. (excepting $Fe_2O_3 H_2O$) have no existence, or that a very large number of hydrates exist, the vapour tensions of which are very slightly different from each other; the hydrates of copper and lead were also examined and evidence obtained of the existence of $3PbOH_2O$ and $2PbOH_2O$.

Mr. Groves said that the author seemed only to have determined the loss at one pressure, viz., that of the atmosphere; it would be interesting to know what would happen if the pressure as well as the temperature were varied.

Professor Church suggested the name of baro-hydrates for substances whose water of hydration varies with pressure, and hydro-hydrates for those which vary with the moisture of the atmosphere.

Dr. Armstrong considered Mr. Hannay's method valuable and likely to give important information, but thought on the whole it would be preferable to determine the vapour tension directly.

Mr. Crookes called attention to the fact that small quantities of hygroscopic moisture would not come off from glass surfaces for weeks in a vacuum with strong sulphuric acid, but required the aid of heat.

5. *On the Transformation of Aurin into Rosaniline.* By R. S. Dale, B.A. and C. Schorlemmer, F.R.S.—By the action of ammonia on aurin, peonin, or red aurin is formed; by heating peonin to 150° C. for several days

with alcoholic ammonia the red colour disappears and a yellow liquid is obtained; on adding water a white crystalline precipitate is deposited which presents all the characteristic properties of rosaniline. It is soluble in acetic acid with a splendid crimson colour, etc. The reaction by which the rosaniline is formed is $C_{20}H_{14}O_3 + 3NH_3 = C_{20}H_{17}N_3 + 3H_2O$. According to Hofmann the formula of rosaniline is $C_{20}H_{19}N_3$; on this point the authors promise a careful investigation of the base and its salts. The authors believe aurin and rosolic acid to be identical; pure aurin is prepared without difficulty by heating a mixture of sulphuric acid and pure phenol on a water-bath and adding oxalic acid gradually, leaving always an excess of phenol.

6. *On certain Bismuth Compounds.* Part IV. By M. M. P. Muir.—After an historical sketch of the attempts made to prepare hypobismuthous oxide the author describes its preparation by Schneider's method, viz., dissolving stannous chloride and bismuthous oxide in hydrochloric acid, pouring the solution into strong potash and washing the black precipitate with weak potash. By heating to 180° C. hypobismuthous oxide (Bi_2O_2) is oxidized; it readily parts with its oxygen to reducing agents. By subliming bismuthous chloride or by the action of nitrogen trioxide on fused bismuthous chloride an oxychloride ($Bi_3Cl_3O_2$ or $Bi_4Cl_4O_3$), is produced; by a similar reaction on oxybromide $Bi_8Br_6O_{15}$ can be formed. Bromide of bismuth is more readily oxidized than the chloride. The author compares phosphorus with bismuthous chloride. By the action of sulphur on bismuthous chloride sulphbismuthyl chloride BiSCl is prepared; $BiSCl_3$ could not be obtained. The author also failed to prepare a bromochloride containing five atoms of bromine and chlorine. By acting on metallic bismuth or bismuthous oxide suspended in strong potash with bromine bismuthic hydrate is very readily produced.

7. *On the Theory of the Luminous and Non-Luminous Flame.* By J. Philippson. In this paper the author merely states what he considers to be the causes of luminosity or non-luminosity of flames.

After the thanks of the Society had been returned to the authors of the above papers it was announced that the present volume of the 'Royal Society's Proceedings,' was nearly completed, and that any Fellow of the Society wishing to have the next volume was requested to send his subscription (10*s.*) forthwith to Mr. Hall or to Messrs. Taylor and Francis.

The Society then adjourned till June 7, when the following papers will be read:—

1. "On the Gases Enclosed in Lignite," by J. W. Thomas. 2. "On Narcotine, Cotarnine, and Hydrocotarnine," by Dr. Wright. 3. "On Otto of Limes," by C. H. Piesse and Dr. Wright.

A general meeting will be held on Thursday, May 31, at 8 p.m.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Meaning of the Word "Dispense."

Sir,—I observe in your last issue a correspondent points out that Bailey's Dictionary (1770) gives "to administer" as among the meanings of the above word.

It may be interesting to know that it still holds the same meaning, as I find it appears so in Boag's 'Imperial Lexicon' (A. Fullarton and Co., publishers, Edinburgh and London).

Probably these facts can be further corroborated, and will prove serviceable in the next hearing of the Shepperley case.

Derby, May 22, 1877. Forward.

The Election of the Council.

Sir,—Mr. Greenish has done an excellent service in calling attention to the circumstance that in the annual election for the Council, only a small number of the voting papers issued to the members are actually used and returned.

There may be several reasons for this apparent indifference, but one I know to be that many of the voters have so imperfect a knowledge of the views and purposes of the candidates, that they instinctively abstain from voting at all, fearing to promote the election of one opposed to their own views, or to hinder one in favour of them—in either case a matter of chance.

To remove all doubt and hesitation, it is much to be desired that on all future occasions, the candidates should abandon their un-English silence, and manfully give full publicity to their opinions and intentions.

R. H.

May 21, 1877.

Sir,—The difficulty in voting for the members of the Council, alluded to by Mr. Frazer, at Glasgow, must have been felt by many, if not all, country chemists. As he says, we are annually "called upon to record our votes for men we never saw and never heard of." Mr. Frazer suggests, as an improvement, "territorial representation," but there would be many difficulties in arranging such a scheme. Why not take a hint from School Board elections, and adopt the "cumulative vote?" While avoiding the difficulties of any territorial arrangements, such a mode would secure, to a great extent, its practical advantages, and enable all or most chemists to vote with discrimination, instead of (as must now be too often the case) obliterating a certain number of names on the list at random.

W. Symons.

Barnstaple, May 18, 1877.

A New Form of Commission.

Sir,—Some time ago the *Times* called public attention to the abuse of "commissions," and more recently the *Examiner* in one of its "Variorum Notes," referred to a rumour that some medical men received fees or commissions from undertakers. Your own columns have contained some severe strictures upon private arrangements between members of the faculty and chemists. The following indicates a new form (to me) of this Protean evil. I suppress names and would only say that the first letter is from a person absolutely unknown to me at the time, but I have been since informed that he holds a responsible position. The letter was written upon the official stationery of a well-known firm, who publish advertisements in their monthly price list, etc.

"———, 9th May, 1877.

"Mr. Pollard, High Street, Ryde.

"Dear Sir,—Your name has been given to me by Mr. ———, of ———, as likely to want an apprentice, I can introduce one to you on good terms (and should, of course, look for a £20 commission), if you would give me full particulars. Waiting reply,

"Yours faithfully,

"Private" "———.

To this I replied:

"May 10, 1877.

"Mr. ———, Sir,—I am in receipt of yours of yesterday, offering to introduce an apprentice to me for £20 commission. I shall be happy to negotiate on condition that you will make your charge direct to the parties who would have to pay it; from which course the double advantage would issue that your clients would learn the great value of your services, and being willing to pay such a sum for the mention of my name would doubtless be also willing to give me an exceedingly handsome premium for the very much greater trouble I should have. As the course you propose is the ramification of a crying evil, I must decline to regard any part of your note private except the signature.

"I am, etc.,

"———."

Withholding the name of the writer, I sent copies to the firm, expressing the opinion that such a proposal was an insult to an honourable man, and unless disowned, a reflection upon the house whence it emanated. I received the following:

"We thank you for your letter of the 10th, and shall give the matter our immediate attention,

"Yours faithfully,

"———."

It will be observed that no opinion is expressed as to the policy I condemned. I am not able to say whether this is accounted for by the fact which has subsequently come to my knowledge, that my name was not originally given to the writer of the first letter, but to a member of the firm in whose service he appears to be engaged. I am not able to appraise the expression "of course" in the above, but if it indicates a custom at all prevalent, I think the unsophisticated should be put upon their guard. I do not feel called upon to determine whether a charge should be made for introducing apprentices such as we pay at registry offices for servants. I know of no such custom amongst wholesale houses, and if it existed, the transaction, whether at 5 or 50 per cent., should be as open in one case as the other; but the form of this proposition removes it altogether from such a category. The proposed apprentice may be *eximiâ spe, summæ virtutis adolescens*, and worth £20 to anybody, or self-conceit might insinuate that such a recommendation was worth the addition of that sum to the premium secretly; but common sense would suspect that the youth was for sale to any man who would pay the price or purloin the additional premium, and honour forbids the bargain. Instead of the satisfaction with which business used to be done, every tenth customer grumbles because the tariff of the "stores" is not adopted; surely it is not desirable (were it honest) to be further embarrassed with "wire-pulling" commissions and secret understandings, in which one knows not which is the more sold, men or things.

HENRY H. POLLARD.

140, *High Street, Ryde, May* 21, 1877.

UNG. PLUMBI SUBACET. CO.

Sir,—As the formula for the above, which we have in the Pharmacopœia, at present is rather an unsatisfactory one, owing to the difficulty of its keeping, I have made several experiments, and one which seems to be very satisfactory I wish to bring before your notice, under the name of "Ung. Plumbi Subacet. Co. c. Vaselin." By substituting the vaselin for the almond oil, we have an ointment of a good colour, and one that will keep, I may say, for any ordinary length of time. I have some by me now that has been made six weeks, and still is perfectly fresh and good colour; whereas, as is well known, the B. P. preparation becomes rancid in a short time, and through that is to be found in very few pharmacies ready when a prescription is presented for it. The formula I introduce is as follows:

Cera Alba	℥j.
Vaseline	℥vss.
Liq. Plumbi Subacet.	℥iss.
Camphor	gr.xv.

Melt the wax on a water bath, liquefy the vaseline, and add it to the wax; take from the fire, add the camphor, and when it begins to thicken, gradually add the liq. plumbi, stirring constantly.

J. MUNDAY.

14, *Rue de la Paix, Paris.*

SUNDAY CLOSING.

Sir,—Permit me to say a few words in reply to your correspondent, "Eusebius," on the above subject. I will trespass but very little upon your valuable space.

I must inform him that I entirely indorse what he says, in a religious point of view, and I endeavour (as much as the nature of the business will allow me) to keep the Sabbath day holy, and I close my shop more from principle than anything else, and nothing but medicine is supplied on that day.

When I first broached the subject, I did not consider it prudent to disclose religious controversy in my letter.

No doubt that "Eusebius" will agree with me in this, that if you interrogate a man as to "Why he opens his shop on Sunday," he will make the following excuses:

1st. That if he did not, it would decrease his cash returns.

2nd. That he is obliged to, as he dispenses for two or three surgeons.

3rd. That he must do it, as Mr. So-and-So, lower down, does it

Poor excuses these! and, as I have said before, principle would not allow me to open upon any account. And, I will say in conclusion, that if any business is dependent, directly or indirectly, upon what little there is to do on Sunday, the sooner it is shut up the better.

I am happy to say we have moved in the right direction of early closing, and I trust it will soon become universal throughout London.

A BEGINNER.

Highbury Park, May 14, 1877.

Corrections.—On p. 939, at bottom of first column, instead of the passage in Mr. Vizer's speech, commencing "As one engaged in the business," read,—"As one engaged in business, I must say that if the Council could not see clouds casting their shadows before them, it was to my mind most peculiar. Who could not have foreseen that some day or other steps would be taken to settle this all-important question with reference to counter prescribing? What do we now find in the *Lancet* of last Saturday? The paragraph to which I refer is in the *Lancet* of the 12th instant, where it is said," etc.

We have received from Mr. Mackenzie, of Edinburgh, a letter, in which he explains with respect to the phrase in his speech, as reported on p. 952, that he referred only to the pharmaceutical portion of "a medical man's education," when he said "it was now in many cases little more than a farce."

We are informed by Mr. Mumby, of Gosport, that he spoke the words on p. 940, attributed to Mr. Bullen, of Westrup, and take the opportunity of saying that it is sometimes extremely difficult to arrive at the name of a speaker who may not happen to be well-known, unless the chairman is enabled to announce it before he commences to speak.

In reference to our editorial remarks last week, we have received a letter from Mr. M. J. Ellwood, of Leominster, in which he states that he subscribed for four years to the Pharmaceutical Society. We are happy to make this correction, but we think it does not affect our argument that his better plan would have been to have remained a subscriber, and, if he thought it necessary, followed a course of action similar to that adopted by the members of whose conduct he speaks with approval in his letter.

"*Williams.*"—(1) *Mercurialis perennis*; (2) *Arum maculatum*; (3) *Chœrophyllum temulum*; (4) *Scolopendrium vulgare*; (5) *Sarothamnus scoparius*; (6) *Lychnis diurna*; (7) *Digitalis purpurea.*

F. B. Marchant.—*Stellaria Holostea.*

J. D. Jenkinson.—We do not think the paragraph sent adds in any way to the information given in the report last week.

J. A. Barrett.—We shall be glad to assist you, provided that the specimens be sent in as perfect a state as possible, and that you first make an effort to name them yourself.

"*An Associate.*"—A solution of peroxide of hydrogen is generally used.

W. L.—Neutral carbonate of ammonium.

E. E. R.—Apply at Apothecaries' Hall, Blackfriars, E.C.

"*Novice.*"—We are not aware that any stains would be left that could not be removed by soap and hot water.

"*Dictionary.*"—Maynes' 'Medical Vocabulary' (Churchill), price 10*s.*

"*Manduell.*"—Aq. Menth. Vir. should be used.

A. F. F.—Dissolve the chlorate of potash in the water, and add the syrup. To the tinct. camph. co. add the tinct. tolu, and throw these upon the above solution contained in a bottle, and shake briskly. It is impossible to prevent some separation of tolu resin.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Haydon, Mr. Brain, Mr. Barrett, Mr. Bailey, Mr. Towler, R. H., B. M. S.

NOTES ON INDIAN DRUGS.

BY W. DYMOCK.

(*Continued from page* 731.)

(*Continued from page* 731.)

CASSIA ALATA.—*Local name,* DADMURDUN.

This shrub is only found in gardens in this part of India. The leaves are two feet long or more, and consist of a triangular petiole with from 8—14 pairs of leaflets. The first pairare the smallest and are placed near the branch and separated from the second pair by a longer interval than there is between the other pairs. The terminal leaflets are as much as 5—6 inches in length. They are all obovate-oblong, obtuse, mucronate, and glabrous on both sides; and taste like senna, but less nauseous; their properties are fully described in the 'Pharmacopœia of India.'

CASSIA AURICULATA.—*Local name,* TURWAR or AWUL.

The bark as generally met with is about as thick as cinnamon, nearly smooth, externally reddish-brown, internally olive-green; it occurs in small strips or quills. Taste sweetish, and moderately astringent. Sections examined under the microscope show a deposit of crystals arranged like rows of beads in the course of the vessels, otherwise there is nothing remarkable. Turwar bark is astringent, but not nearly so powerfully so as many other common Indian barks. The small flat heart-shaped seeds are administered by the native doctors as a cooling medicine; their use as an application to the eyes is noticed in the 'Pharmacopœia of India.'

DÆMIA EXTENSA.—*Local name,* OOTERNEE.

The leaves of this climbing plant are roundish, cordate, acuminated, acute, auricled at the base, downy, glaucous beneath. They vary in size, but are generally from one to two inches in diameter. The peduncles are long, slender, and hoary; odour mousey, and peculiar. Examined with a lens both the upper and under sides of the dry leaf present a green mossy surface, thickly studded with short white hairs. The taste is faintly bitter and somewhat nauseous. This drug has a general reputation in Western India as an expectorant and emetic. In Goa, and probably elsewhere, the juice of the leaves is applied to rheumatic swellings. Ainslie mentions its use as an anthelmintic.

AILANTHUS EXCELSA.—*Local name,* MAHAROOK.

Bark light coloured, very thick and granular; externally hoary, rough from the presence of numerous longitudinal scabrous ridges; internal surface yellowish-white, and finely fibrous; when soaked in water it swells greatly and becomes glutinous on the surface; odour when moist acrid and disagreeable; taste very bitter. Sections for the microscope show that a great portion of the bark consists of large stony cells collected together in groups. There are also many conglomerate raphides. Maharook is as bitter as quassia, and is a promising drug. Its bitter principle does not appear to have been examined. Ainslie's description of the bark as pleasant tasted and somewhat aromatic is hardly correct; it is intensely bitter. The name Maharook is also applied to the *Cinnamomum Tamala*, by the

Concanist gardeners of Bombay. The large pinnate leaves of *A. excelsa* are in great repute as a tonic, especially in debility after childbirth.

DILIVARIA ILICIFOLIA.—*Local name,* MORANNA.

A shrub, common in salt marshes, with elliptic-sinuate, dentate-spinous waved leaves, just like those of our common holly. It is used at Goa as a fomentation in rheumatic and neuralgic pains; it is mucilaginous.

ABUTILON INDICUM, var. *carpels not acute; plant very tomentose, hoary.*—*Local name of seed,* BULBIJ.

A shrubby plant, having a hoary appearance, covered all over with a dense silky tomentum of simple hairs; leaves cordate, unequally and sharply serrated; calyx five-cleft; pedicels axillary, jointed near the flowers, which are of an orange colour, and open in the evening; capsules truncated, longer than the calyx; carpels about twenty, not awned, hairy on the dorsum; seeds reniform, about $\frac{1}{10}$th of an inch long, and nearly as broad at the larger end, three in each carpel; testa very hard, dull brown, covered with simple hairs, rising from a conical base, which is attached to the testa by several radiating processes like roots. The seeds are mucilaginous, and like many others having this property are supposed to be restoratives of the virile powers; they are kept in all the shops. The plant described was obtained by sowing the bazaar seed.

CORCHORUS FASCICULARIS.—*Local name,* HIRUNKHOREE.

A small procumbent woody plant with oblong or lanceolate serrated leaves; peduncles 2—5 flowered, opposite to the leaves; capsules linear-oblong, nearly terete, rostrate, three-celled, about half an inch long ('Bombay Flora,' p. 24). The capsules are clothed with simple hairs; they contain a number of small dark-brown angular seeds. The plant is very mucilaginous and somewhat astringent; it is valued on this account as a restorative. Hirunkhoree is the name given to it by the country people and means deer's hoof; many of the capsules are in pairs and somewhat resemble the hoof of a deer. In the Bombay shops it is called Bhauphulli, which must not be confounded with Bhaphulli, the Mahratta name of *Pastinaca grandis*.

INDIGOFERA, Sp. ?—*Local name,* WEKARIA.

The plant raised from bazaar seed very nearly resembles *I. glandulosa*, but the legumes are longer and six-seeded. Wékaria seeds are oblong, less than $\frac{1}{16}$th of an inch in length, polished, yellowish, and marked with dull red blotches; they taste like dried beans or peas, and are prescribed along with various mucilaginous drugs as a restorative.

BRACHYRAMPHUS SONCHIFOLIUS.—*Local name,* VOONDRACHA KAN.

Rats' ear, or Goa Taraxacum, is a glabrous plant: stem erect, leafy at the base, naked at the top, sparingly branched; leaves membranaceous, stem-clasping, obovate, somewhat runcinate and waved, bristle-ciliated on the margins; capitula remotely spicato-racemose; pedicels a little scaly, short; achenia oblong, sub-compressed, transversely muricated, attenuated into a short beak; pappus white, soft ('Bombay Flora,' p. 132). The whole plant is used as a substitute for Taraxacum, at Goa, and called by the Portuguese Taraxaco.

BOERHAVIA DIFFUSA.—*Local name,* PUNANARVA.

A common creeping weed on waste ground and road sides; stalks numerous, about two feet long, slender, procumbent; leaves cordate, ovate, unequal, opposite, edges waved; flowers small, pink, sessile on the apex of the pedicel; peduncles from the axils and ends of the branches; fruit oblong, dull green, or brownish, viscid, about the size of a carraway seed, longitudinally five-grooved, studded all over with glandular hairs; root twisted, often as thick as the finger, when fresh; whitish, fleshy, two or three branched, a foot long or more; taste bitterish, nauseous. A microscopic section shows that the structure is loaded with needle-shaped crystals, otherwise there is nothing peculiar. The dried herb without the root is met with in the shops. Its properties as an expectorant are noticed in the 'Pharmacopœia of India.' In Goa it is esteemed as a diuretic in gonorrhœa. In Peru, *B. scandens* is used for the same purpose ('Flora Peruviana,' vol. iv., p. 4). Ainslie mentions the use of the dry root in doses of a teaspoonful of the powder twice daily as a laxative.

MIMUSOPS ELENGI.—*Local name,* WOWLEE.

The bark is red, woody, and fibrous, and has a thin grey epidermis studded with lichens; its general appearance when dry reminds one of red cinchona, but the inner surface is marked with whitish stains as if it were mildewed. On breaking the bark these stains are seen to penetrate the substance to some depth; they are caused by the drying of the milky juice with which the tree abounds. Upon soaking a piece of dry bark in water it becomes coated with mucilage, and a milky fluid can be squeezed out from its freshly cut surface. Microscopic examination discovers no distinctive characteristics. Wowlee bark is bitter and astringent. I have no experience of its use. *Mimusops Kauki,* the Adam's fruit of Goa, has much the same properties. The olive-shaped berries of both trees are edible.

SALIX TETRASPERMA.—*Local name,* WALLOONJ.

The bark of this tree is noticed in the 'Pharmacopœia of India'; it is a thick red bark, very light and corky, deeply fissured longitudinally and cracked transversely on the outer surface. Microscopic sections show that the greater portion of the bark consists of a corky parenchyma, much charged with red colouring matter. Walloonj bark is insipid and stains the saliva red; it is probably quite inert.

SHOREA ROBUSTA. VATERIA INDICA. CANARIUM STRICTUM. *Trees producing Dammar.*

European and American resins are in Bombay so much cheaper and better than the produce of these trees that they are practically of little importance for medicinal or commercial purposes.

SOYMIDA FEBRIFUGA—*Local name,* ROHUN.

As the authors of the 'Pharmacographia' have only described very young bark, I may mention that old bark has a ragged dry suber, quarter of an inch thick, and of a rusty blackish-brown colour, deeply fissured longitudinally, and minutely cracked transversely; the small corky warts described by Hanbury on young bark are still visible here and there between the fissures. Old bark is generally in half quills, the total thickness being about half an inch; its colour is a rich red brown; its substance when soaked in water becomes very compact. The microscopic appearances are the same as described in the 'Pharmacographia,' except that the corky outer part of the bark is much more developed. Rohun is rarely to be met with in the Bombay shops; my specimen was obtained from the Botanical Gardens, Poonah. The tree grows wild in the northern parts of this Presidency.

HEYDOTIS HEYNEI.—*Local name,* POPATO and KAZURI.

A small plant common in cultivated ground. It is erect, about one foot high, dichotomous, glabrous; stem acutely four-angled; leaves linear-lanceolate; pedicels one-flowered, axillary; capsule nearly round, opening at the apex; root small and fibrous. The plant turns black when dry. It is kept in the druggists' shops at Goa, and is in use there as an alterative in low forms of fever. It is administered in combination with *Adiantum lunulatum* and *Hydrocotyle asiatica.* I have never seen it in the Bombay shops.

GARUGA PINNATA.—*Local name,* KOORAK.

The gum of this tree is greenish-yellow, translucent, in small mamilliform masses, having a mild terebinthinate odour and taste. Only a very small part of it is soluble in rectified spirit, causing a slight turbidity; in water it rapidly disintegrates, forming a tolerably thick mucilage, in which globules of oleoresin (?) may be seen with the microscope; the insoluble portion is amorphous, flaky, and white. The mucilage is precipitated milk-white by rectified spirit. I am not aware of this gum having been used for any purpose. The tree is nowhere very abundant; my specimen came from North Canara.

LASIOSIPHON SPECIOSUS.—*Local Name,* RAMETA.

A hard brittle bark, in flat pieces or half quills from $\frac{1}{10}$th to $\frac{2}{10}$ths of an inch thick; external surface marked by numerous slightly elevated longitudinal ridges of a dull brown colour, with a pinkish tinge; internal surface striated of a dull red or dirty pink colour. The epidermis has generally been removed, but a small patch of a dirty white colour is occasionally met with. The bark when soaked in water becomes very friable, and coated with thick mucilage; it has a mildly astringent mucilaginous taste with a faint aroma. The microscope shows numerous bundles of needle-shaped crystals and of large liber cells thickly scattered throughout its substance. There is also much colouring matter, but no specially remarkable character. Rameta is one of the mucilaginous barks which find so much favour with native doctors, from their supposed restorative properties.

RHAMNUS WIGHTII.—*Local Name,* RUGTRORA.

The bark as met with in the shops is in irregular pieces or half quills about $\frac{1}{4}$ of an inch thick; texture fibrous; external surface decorticated, dull red, nearly smooth; internal surface dull red, faintly striated. A transverse section shows numerous waved medullary rays of a darker colour than the rest of the bark. Under the microscope many dotted vessels and cells are seen; most of the cells contain red colouring matter. There are no distinctive characters. Portions of the grey epidermis may often be found adhering to the bark. Rugtrora is in considerable repute among the natives as a tonic and astringent. The tree grows upon the highest hills in the northern parts of this Presidency.

ERYTHRÆA ROXBURGHII.—*Local Name*, CHOTA CHIRAYTA.

A very delicate little plant, from 4—10 inches high, appearing in cultivated ground after the rains. This year, owing to want of rain, it is very scarce. The root is small and fibrous, sparingly branched; the stem quadrangular and winged; lower leaves obovate-oblong, obtuse, those on the stem linear-acuminate; cymes dichotomous; flowers bright pink, starlike; capsules oblong, mucronate, ¼ of an inch long, dehiscing, 2 celled, covered by the long sepals, and the inflated silver-paper like tube of the corolla. The plant is a good bitter, and may be found useful occasionally when Chiretta is scarce or dear, but from its small size, it is not likely to compete with that drug as a commercial article.

(*To be continued.*)

THE SUPPOSED MERCURIAL POISONING BY COLOURED VULCANITE.

The interest excited by the publication of a statement by Dr. Bathurst Woodman, to the effect that he had met with several cases where patients had shown symptoms of mercurial poisoning for which he could find no other explanation than that they were wearing artificial gums or palates coloured with vermilion,* led the Odontological Society to appoint a committee to collect evidence and report upon the subject.

The report, which has just appeared in the *Transactions of the Odontological Society*, for April, is made under two heads:—(1) Evidence derived from the observation of cases occurring in practice; (2) Evidence as to the *à priori* probability or possibility of the supposed poisonous effects. In order to collect evidence under the first head a number of circulars containing a series of questions were issued. Of these, 96 were filled in and returned. The answers in 66 cases gave a decided negative as to having seen any symptoms which they attributed to the use of coloured vulcanite; 30 replied that they had seen local symptoms, but in the opinion of the committee 21 of these answers were inconclusive; and in no single instance were such symptoms related as would lead the committee to infer that the effect was due to mercury rather than to other and more direct causes.

Under the second the committee includes a report by Professor Attfield, which had been placed at their disposal by Messrs. Ash and Sons, to the following effect:—

"In accordance with your instructions, I have made 'an investigation of the influence, if any, of saliva and the other fluids of the human body on the pink and red varieties of vulcanite used by dentists in making artificial teeth-plates, gums, and palates'; and I now report results.

"I understand from you that these tinted varieties of vulcanite are made by heating pink or red 'dental rubber,' under pressure, to a temperature of 310° to 315° F. (154° to 157° C.), and that this 'dental rubber' is prepared by incorporating sulphur and vermilion with pure india-rubber.

"The innocuous nature of two of the three components of tinted vulcanite is admitted by everybody; sulphur and the india-rubber of vulcanite, as exposed in the mouths of persons wearing artificial teeth, are perfectly harmless. Vermilion, however, demands detailed notice from me. I will afterwards describe my experiments on the completed vulcanite made from these three substances.

"Vermilion, sometimes termed cinnabar or red sulphide of mercury, has been celebrated from the earliest recorded times for its beautiful scarlet-red colour, both Jeremiah and Ezekiel alluding to it as a paint or pigment. As a medicinal agent it has always been found to be inactive and useless. It is true that until recent years the medical colleges of most countries gave, in their Pharmacopœias, directions for its preparation. But it was recognized medicinally only as a fumigating agent in certain affections of the mouth and throat, being, for this purpose, sprinkled freely on a hot iron shovel and the fumes inhaled. Even under these circumstances any medicinal action that was produced was not due to the vermilion as vermilion, but to other compounds of mercury as well as to certain sulphurous gases into which the vermilion was converted by the heat. Vermilion itself, according to the experiments and observations of the greatest French authority on such matters, Orfila, is inert, for he found that 'no effects were produced on dogs by half an ounce, either when applied to wounds or when taken into the stomach.' In America it appears to be used rarely even in fumigation. In the 'United States Dispensatory,' however (twelfth edition, 1865), there is a statement which shows that if given internally the dose may be from ten to thirty grains in electuary or bolus. From this, by the way, an inference may fairly be drawn that if the wearer of a tinted vulcanite teeth-plate swallowed the whole of it, the vermilion in it, even if unprotected by the india-rubber, could not do him any harm. In Great Britain, vermilion or cinnabar is not now recognized as a medicinal agent. Taylor ('On Poisons,' second edition, page 475) says:—'Cinnabar . . is well known as a red pigment, and is often employed in colouring confectionery and wafers. I have not,' he says, 'been able to find any instance of its having acted as a poison on man. . . . . Cinnabar is sometimes used for giving a red colour to ointments—*e. g.*, the sulphur ointment. In such cases,' he continues, 'the quantity is very small, and can do no injury even if swallowed.'

"In short, vermilion is obviously so harmless a substance,—that is to say, its action on the human system is so insignificant,—as to be unworthy the notice of medical men, and, therefore, of the public generally.

"Combined with sulphur and india-rubber, vermilion might, with reason, be expected to be even still less likely to be affected by, or to affect, the fluids of the human frame. For india-rubber and the hardened india-rubber termed vulcanite are each of so insoluble and inactive a nature that either would probably retard rather than accelerate any action between a substance mixed with it and the saliva or gastric fluids. Then no soluble chemical compound of vermilion and indiarubber is known or is likely to exist, or ever to be found. Nevertheless, the importance of the question now under investigation, on account of the wide-spread use of tinted vulcanite, demands that actual experiments shall decide on the inaction or action, if any, of saliva, and even of stronger saline acid and alkaline fluids on pink and red vermilion-coloured artificial gums, palates, and teeth-plates.

"In the experiments about to be described the influence of various liquids both on pink and on red vulcanite was first examined. Secondly, the effect of the fluids on an unvulcanized mixture of the ingredients of tinted vulcanite,—that is to say, their action on

* See *Pharm. Journ.* [3], vol. v., p. 484.

'dental rubber,'—was investigated. Thirdly, the question was decided as to whether or not any compound of mercury soluble in saliva, etc., is set free when the metallic pins and braces used by dentists are heated with dental rubber in the process of vulcanization.

"*Experiments on Tinted Vulcanite.*—The vulcanite was finely shredded and a small teaspoonful of the shreds placed in the respective fluids. Thirteen fluids were selected, representing the liquids of the mouth and stomach, solutions of salts, acids, alkalies, and spirits. The pink and red varieties of the vulcanite were separately treated. One set of twenty-six vessels containing the shreds and solvents was placed in a chamber carefully and continuously warmed to 98° F. (37° C.); that is to say, the mixtures were kept at about the natural temperature of the mouth. The temperature of other vessels and their contents varied with the temperature of the air in January, February, and March. Each mixture was frequently stirred or shaken, so that each was freely exposed to atmospheric influences. The experiments were continued from day to day for one, two, three, and four weeks, and each fluid was tested from time to time for mercury by sulphuretted hydrogen, by electrolysis, and, in short, by the most delicate tests known to chemists.

"1. *Saliva.*—At ordinary temperatures there was no action on the first day, nor on the second day. After another day or two the mixtures smelled sour, and after two or three days had the smell of decaying beef; no action. At the end of a fortnight no action.

"Other mixtures of the pink shreds and saliva, and of the red shreds and saliva, were exposed at the temperature of the mouth for six hours daily for several weeks. The fluids were frequently tested for mercury, but no trace of that metal was detected.

"2, 3, 4. *Solutions of* (2) *sulpho-cyanide of potassium, two parts in one thousand parts of water;* (3) *of chloride of sodium, of similar strength; and* (4) *of the sulpho-cyanide one part, the chloride one part, and water one thousand parts.* In these respective liquids the different shreds of vulcanite were exposed as already described. During the first week of treatment no action occurred; at the end of the second week, no action; at the end of a month, no action.

5. *Pepsin.*—The influence of pepsin was next investigated. Ten parts of pepsin and one thousand of water, containing fifteen of strong hydrochloric acid, were mixed. Such a mixture, kept at 98° Fahr. for a few hours, will, as is well known, dissolve solid food in the manner in which solid food is dissolved in the stomach; indeed, it may be regarded, for all experimental digestive purposes, as the actual digestive fluid of the healthy sheep, pig, or calf, from which pepsin itself is obtained. Portions of the tinted vulcanite shreds were placed in different quantities of this pepsin fluid at the temperature of the body, treated as before mentioned, and occasionally tested for mercury. No action occurred after one day, two days, a week, two weeks, four weeks.

"6, 7, 8. *Alkaline Liquids.*—In aqueous solutions of (6) caustic potash, (7) hydrate of sodium, and (8) ammonia, each having a strength of about five per cent., the shreds were soaked, at the temperature of the body, for days and weeks. Not the slightest trace of mercury was dissolved.

"9, 10, 11, 12. *Acids.*—The vulcanite shreds, pink and red separately, were also soaked, under the conditions just described, in (9) vinegar containing about five per cent. of acetic acid; in (10) a mixture of nitric acid one part to water five parts; in (11) sulphuric acid and water, one to seven; and (12) in diluted hydrochloric acid, one to nine. The digestion was continued as before for six hours daily for three weeks. The hydrochloric acid, when tested, yielded faint traces of a metal, so slight that by no reagent could it be proved to be due to mercury. The other acid liquids afforded not the slightest evidence of the presence of mercury.

"13. *Alcohol.*—Spirit of wine one part to water three parts did not extract a trace of mercury from the vulcanites at any temperature.

"*Experiments on 'Dental Rubber.'*—The object of these experiments was the determination of the action, if any, of the thirteen solvents previously described, not only on imperfectly vulcanized materials, but on the actual raw material of vulcanite. A description of these experiments is unnecessary; they were conducted as before for ten days or a fortnight. The dental rubber was also cut into shreds so as to expose as great a surface to the fluid as possible, and thus to make the experiments fully as severe as the former set. The results may be summed up in one sentence. Neither saliva, acids, alkalies, saline solutions, nor spirits, affected the dental rubber.

"*Experiments on the Action of Metals on 'Dental Rubber,' at the Temperature of Vulcanization, and on the Influence, if any, of Saliva, etc., on Vulcanite containing such Metals.*—The metals employed in these experiments were those commonly used for fastening artificial teeth into vulcanite, and for bracing and strengthening the different parts of the teeth-plate, namely, sixteen-carat gold, hard platinum (iridio-platinum), and 'dental alloy' (platinum one, silver three parts). Some other metals, stated to have been found embedded in vulcanite teeth-plates, were also experimented upon, namely, nine-carat gold, German silver (copper, zinc, and nickel), brass (copper and zinc), iron, steel, copper, tin, and lead. Two wires of each metal were imbedded in a tablet of dental rubber tinted with vermilion; indeed, there were prepared two such red tablets for each metal. The twenty-two tablets were then vulcanized in the usual way by heating to the proper temperature, and under the proper pressure, for the proper length of time. One of each couple of tablets was then physically and chemically examined, the other being kept for future reference. A smart blow of a hammer on a chisel laid bare a wire and its bed. After a careful scrutiny, both with the naked eye and with the aid of the microscope, the wire and vulcanite fragments were gently warmed with nitric acid and water (one to eight) the resulting liquid evaporated to dryness, the residue moistened with strong hydrochloric acid, again evaporated to dryness, and the latter treatment repeated. The last residue was finally diluted with water, and tested for mercury. Besides this severe process, some milder methods were employed in appropriate cases.

"The sixteen-carat gold and the nine-carat gold, when chiselled out of the vulcanite were found to be slightly tarnished, and the channel which the wire had occupied had a dull metallic appearance, but neither the wire nor the fragments of vulcanite yielded the slightest trace of mercury to the acids or any of the many solvents already mentioned.

"The platinum, the dental alloy, the tin, and the German silver, were not altered in appearance. No evidence of the occurrence of free mercury or any soluble compound of mercury could be obtained from the wires or from the beds they had occupied.

"The steel had scarcely been affected by the vulcanizing operation, and had not produced any mercury or, as proved by experiments with solvents, any soluble compound of mercury.

"The iron was superficially converted into sulphide of iron, doubtless by the free sulphur of the 'dental rubber,' for no mercury could be extracted by the solvents.

"The lead had similarly affected and been affected by the dental rubber, but no soluble form of mercury could be detected.

"The copper and the brass were somewhat deeply corroded by the sulphur of the prepared rubber; but the cinnabar of the mixture was not degraded. In both cases the corrosion was proved to be due to the formation of a thick coat of sulphide of copper, which crumbled readily between the fingers; but no trace of mercury was detected, and even moderately strong acids failed to extract mercury in any form.

"*Conclusions.*—1. So far as any action on man is concerned, vermilion is a harmless substance.

"2. So far as any effect or influence of the vermilion is concerned, the mixture of vermilion, sulphur, and india-rubber, commonly termed 'dental rubber,' is also a perfectly innocuous substance.

"3. Pink or red dental vulcanite, even when placed under the severest conditions of experiment, does not yield any trace of mercury to saliva or indeed to other far more powerful solvents.

"4. The metallic pins and braces in dental vulcanite do not displace mercury, or induce the formation of any compound of mercury soluble in saliva or in more powerful solvents.

"5. The results of this investigation are such as would be anticipated by chemists. For, first, vermilion is well known to be of the most repellent or sluggish nature as regards any action on it by ordinary solvents, or even by corrosive fluids. Secondly, india-rubber, or the sulphurized or hardened india-rubber termed vulcanite, is, as regards resistance to corrosion or solution, one of the most chemically obstinate of substances, and would well play the part, if necessary, of protector from chemical attack of any material well mixed in it. Thirdly, even if metals extracted sulphur from vermilion, at the low temperature of vulcanization, as they do at a far higher temperature, they would do so because of their great affinity for sulphur; hence would properly be expected to combine with the free sulphur mixed with the vermilion and india-rubber in preference to the sulphur already intimately chemically combined with the mercury.

"6. The harmlessness of vermilion vulcanite should also be anticipated by medical practitioners; for it has been extensively used for the last fifteen years, and during that time hundreds of thousands of persons in Europe and America have worn, and are now wearing, pink and red vulcanite teeth-plates, and it is inconceivable that any wide-spread or even occasional harm resulting therefrom could elude the trained powers of observation of physicians and surgeons. The medical records, extending over many years, show that only three writers have ever suspected or regarded vermilion vulcanite as liable, in extremely rare cases, to be somewhat mischievous, and in these case that the fault lay with the vermilion was not conclusively proved.

"7. Though, however, chemistry and medicine would concur in forecasting the innocuous nature of vermilion vulcanite, experimental evidence of its harmlessness should be most acceptable; for the integrity of a substance worn within the mouths of men and women in all civilized countries must be beyond suspicion.

"8. I am of opinion that vermilion vulcanite teeth-plates are practically unaffected by saliva, or by any substance which ever gains access to the mouth; and, in short, that the pink and red vulcanite artificial gums and palates now so generally worn are absolutely harmless."

In concluding this section of their report the committee call attention to a fact which bears upon the *à priori* probility of deleterious results following prolonged contact with vermilion, even when not locked up in the interstices of vulcanized rubber—namely, that men employed in vermilion-works, who are constantly red from head to foot while engaged in their occupation, do not suffer from any local or constitutional symptom of mercurial poisoning.

The committee, however, are of opinion that in a certain small percentage of cases vulcanite may exercise some irritating effects upon the tissue with which it is in immediate contact; but there is not the smallest evidence that these effects are due to its chemical composition, or, at all events, to the vermilion which it contains, inasmuch as precisely similar results are recorded as occurring in connection with the use of the uncoloured vulcanite.

AN EASTER HOLIDAY IN LIGURIA.*

BY PROFESSOR FLUCKIGER.

(*Continued from p.* 853.)

But especially the lemon trees occur in this district in such large numbers that their light shining leaves stand out in most conspicuous contrast to the seriousness of the olive. The lemon tree is throughout almost the entire year favoured simultaneously with its red-tipped flowers and with fruit, but the principal harvest is obtained about the middle of May. The fruit requires more shelter than most of the other allied *agrumi* (acid fruits), as the entire genus is here called, so that not even in the Riviera di Ponente is there a large quantity of lemons available for exportation. Indeed, the position of Nizza is too cold, although an abundance of oranges are to be found there. The lemons are much more profitable, and the plant is therefore preferred everywhere in this country, where it can be tolerably well cultivated. The greatest enemy of the lemon tree is probably the wind, which will sometimes strip the branches clean of leaves, through which the activity of the tree is frequently injured for a time. On the heights east of Mentone, close to the Italian frontier, where the south-west storms have freer access than in Mentone even, the most beautiful lemons utter their moan, for there they hang until they perish upon the naked boughs. It is remarkable how small a quantity of fallen fruit is met with in these lemon gardens, certainly far less than is usual in a German orchard.

The lemons of the Riviera are the fruit known in Germany and France as citrons: they are more juicy and richer in citric acid than the true citron, although both fruits may have been developed from the same species. The Italian botanists separate entirely the lemon tree (*Citrus limonum*, Risso) from the citron tree (*C. medica*, Risso), the *cédratier* of the French, and the fruits are so different as to serve quite different purposes. The lemon is used on account of the considerable amount of acid it contains and in the production of the essential oil; the usually much larger citron is used only in the preparation of candied peel: the lemon has so thin a rind as not to be suitable for the latter purpose. In the citron the white inner tissue of the rind is generally preponderant in weight, and so little juice is present, and that so slightly acid, that these true citrons cannot render the same service as lemons in the pharmacy and kitchen.

As an article of commerce the lemon is the most valued of all the *agrumi*, and is also probably the least perishable among these fruits. From the Riviera di Ponente they are carried off at good prices by ships from New York and Boston, and the absence of the Americans in any future year might lead to a very disagreeable disenchantment.

The sweet or China oranges are in this country cultivated only here and there. At Nizza they predominate. Still more limited is the culture of the other *agrumi*, such as the bitter fruited orange (*Citrus vulgaris*, Risso), and the citron (*C. medica*, Risso). Savona has some repute on account of its mandarins, the fine fruit of *C. myrtifolia* and *C. sinensis*. Here and there, but only as a curiosity, one meets with the bergamot, a graft on the *C. vulgaris*; an insignificant pale yellow orange, with an aroma as fine as its taste is abominably bitter. This fruit appears to have been first produced in cultivation in the seventeenth century, but whether it stands in any relation to the state of Bergamo is not known. The oil of bergamot was known in Germany at the end of that century; for instance, in a pharmacy in Giessen. The so-called Adam's apple, which is in this country insipid and remarkable only for its size, is seen occasionally in the gardens, but hardly perhaps in memory of the crusaders who brought information respecting this large fruit to Europe. In fact, it was first mentioned at the commencement of the thirteenth century by Jacques de Vitry (Jacobus de

* From the *N. Repertorium f. Pharmacie*, vol. xxv. 1876

Vitriaco), Bishop of Accon, the St. Jean d'Acre of the present day, in his 'Historia Hierosolymitana;' and in the sixteenth century the *poma Adami* appears to have been obtainable in German pharmacies.

Consequently, of the essential oils to be obtained from the *agrumi* only the oil of lemon is dealt in the Riviera, and even that is prepared in but limited quantity, when the fruit no longer finds a good market. At Mentone, however, there is a well-regulated and beautifully situated establishment, belonging to M. Médecin, where two kinds of oil of lemon are prepared: the "essence de citron au zeste," and the "essence de citron distillée," the name oil of lemon being unknown in the trade. The former sort is obtained by rupturing the oil cells, which are situated in the outermost layer of the rind of all these fruits. For this purpose are used *écuelles à piquer*, which are tin basins supported upon a hollow stem and provided with numerous upright brass needles. Each *ecuelle* is fastened by its stem into a depression in the table, and a workman rubs the lemons upon the upright needles, turning and pressing them so that the contents of the largest possible number of oil vessels may escape. This essential oil mixes with the watery juice from the neighbouring parenchyma cells, and collects in the hollow stem, from which it is empted into a clarifying vessel. Here, after a short time, a layer of clear oil rises to the top, which after filtration is at once sent to market. This oil therefore comes directly from the vessel in which it is formed, and is of much greater value than the other. Those oil cells that escape puncture in the *écuelle à piquer* are afterwards emptied by distillation. The rind is removed from the punctured lemons, and there is thus obtained a second quality oil which is an instructive instance of the change that may be produced in an oil by distillation alone, as in their aroma the two kinds differ very much. The whole residue of the lemons is finally eaten with avidity by cattle, and appears to be a not unsatisfactory substitute for the fodder roots which are absent from the south.

Eau de fleurs d'oranger, the German *aqua naphæ*, is another leading article of the manufactory of M. Médecin, for which the flowers of the bitter-fruited orange tree are chiefly used. In Nizza, also, is distilled the oil of these flowers, the oil of neroli, of a magnificent blue colour with a red fluorescence. This oil is never brought pure into commerce in consequence of its high price. The same oil is obtained in smaller quantity at Nervi, near Genoa.

The Riviera indeed presents only an imperfect view of the entire industry that is based upon the *agrumi*; probably the separate branches have always been limited to certain points. This oil of bergamot is manufactured only at Reggio, Messina, and near Palermo; oil of neroli only in South France. Other districts again are occupied in the preservation of the peel of citrons, oranges, mandarins, etc. The pharmaceutical world in the Riviera appears to be far removed from these branches of industry. In a curious pharmacy in Ventimiglia there was neither any information relative to them, nor perhaps at any time a distillatory appatatus to be found. This establishment, however, is truly classical through the wonderful prospect over the Roia valley, the lofty maritime alps and the sea. The shop vessels and a portion of their paltry contents originated in the earlier decades of the last century, and probably also some of the dust and dirt.

Let the eye rove over those olive groves that border the coast, the animated hill slopes, and the valleys filled with pleasant shadows. The question rises, What might have been the appearance of this land at a time when the olive was not yet introduced, when the *agrumi* did not ripen here their odoriferous fruit, and even the fig and the vine were absent? Covered with needle-leaved trees and evergreens, probably mountain and valley looked no less charming. But what would the future of the people of the Riviera be should the olive commerce be menaced with a more strenuous competition? At the present time the revenue laboriously wrung from the olive tree remunerates the small cultivator very moderately. The only advantage possessed by olive oil over other fat oils is in its fine flavour; for other purposes than as food it can be replaced by other fats, so that a considerable portion of the "olive oil" exported from Italy even consists principally of cotton seed oil which has been pressed in Marseilles. Were olive oil, either in this underhand way or more openly, gradually excluded from the world's market, what reaction would it produce upon the Riviera? To what plant would the sober olive give place?

One tree of the future, at least—one of hope for the poorly wooded districts of Italy,—may to a certain extent be recognized in the *Eucalyptus globulus*, Labill. This tree is sufficiently heterogeneous to give, in the event of its extensive cultivation, an entirely altered appearance to the landscape. For this, however, the Riviera has yet a long time to wait; for of systematic forest cultivation of the eucalyptus nothing is yet known, and scarcely anything of the cultivation of forestry itself. But there is sufficient opportunity of seeing fine specimens of this tree everywhere, from Genoa to Cannes. Many entire lengths of road are planted with it, and in very many gardens these Australian citizens already tower boldly above their surroundings, and warrant the expectation that in this country they will not remain far below the height of 100 metres that they attain in Tasmania. The tree was discovered in the south of that island on the 6th of May, 1792, in the neighbourhood of the Entrecasteaux Channel, by Jacques Jules Labillardière, when botanist to an expedition, consisting of the "Recherché" and the "Espérance," fitted out by order of the French National Assembly to search for La Pérouse, who had disappeared since 1788. But a less learned collector might well have been attracted by this striking gigantic tree. In the first place, the entirely different appearance of the full-grown tree is remarkable. In the young tree the quandrangular branches are furnished with broad opposite amplexicaul leaves; but instead of these, while still quite in its early years, on the new shoots, and afterwards on all the subsequent ones, there are formed small long-stalked pointed leaves, which often take a sickle-like form. The latter form alone is shown by La Billardière in his great work, together with the fruit, which he compared to the fashionable button of the day, and on that account he named the new species *Eucalyptus globulus*. The broad ovate leaves and the young shoots are covered with wax, imparting to the quite young trees a dull grey green colour, which is not so much the case with the small later leaves. These hang loosely downwards from the long rather horizontal branches, and are swayed by the wind like aspen leaves, notwithstanding their thick coriaceous texture. It is known that the chemical properties of a leaf hanging perpendicularly differ from those of a leaf occurring in the ordinary nearly horizontal direction. Robert Brown noticed, for instance, that in respect to the stomata in the eucalyptus leaves an important difference exists. The broad sessile leaves have stomata only on the under side; but the pendent stalked leaves are provided with them on both sides. The action of the sun's rays upon the two kinds of leaf must likewise be very different. Most probably even the oils occurring in the two leaf-forms do not correspond.

The trunk of the *E. globulus* (and other species) throws off very long strips of brown bark in a similar manner as the plane scales off its shorter but much wider pieces of bark. The entire family of *Myrtaceæ* is distinguished by its richness in essential oils, and the genus *Eucalyptus*, which belongs to it, is not an exception. When a leaf is held against the light numberless oil glands can be seen; even the bark torn off by the wind is still aromatic; that collected in Australia far more so then that of this country. This essential oil has procured for the tree a considerable reputation during the short period of its naturalization in Italy, South France, Algeria, Spain, and Portugal. In pharmaceutical literature it has been a standing subject since about 1866, and it has become not less important in the horticulture of the South.

With respect to the essential oil no definite conclusion has yet been arrived at. It appears probable that it is essentially a mixture of cymol, $C_{10}H_{14}$, and terebene, $C_{10}H_{16}$, with an oxygenated oil, $C_{10}H_{14}O$; that is to say, these constituents were recognized in commercial eucalyptus oil, which was probably distilled from *E. amygdalina*, Labill., in Australia; but without further investigation this could be scarcely identified. Ferdinand Müller, the honoured botanist of the colony of Victoria, enumerates about sixty species of *Eucalyptus* in his 'Fragmenta Phytographiæ Australiæ,' and a glance at the names alone would awaken the expectation of considerable chemical variations. Amongst them are found such designations as *citriodora, elæophora, eudesmoides, odorata, oleosa, piperita*. This fact allows the conclusion that there are important differences in the smell of the oil of the aromatic leaves, and that nearly as the species may stand in botanical relation to each other, they still produce chemically different oils. Moreover, judging by the odour, the *E. globulus* contains in the large and numerous oil cells of its fruit a different oil from that in its leaves and bark. In the garden of the Palazzo Orengo, besides some fine specimens of *E. globulus*, there are some very young trees of *E. eugenioides*, Sieb. (referred by Müller to *E. hæmostoma*, Smith), the leaves of which upon being rubbed give off a very remarkable smell of butyric acid, exactly resembling St. John's bread. The work upon the only eucalyptus oil at present examined is not yet finished, and of the oils of the other species we have no knowledge, so that these trees still present an immense field for chemical research.

Whether the final judgment of medicine upon the eucalyptus leaf be favourable or unfavourable, gardeners and foresters are probably perfectly right in advocating the propagation of this tree in the South. Febrifuge or not, its greater diffusion will naturally make the district healthier by intercepting the scorching rays and contributing to the more active distribution of atmospheric moisture. Such expectations will be doubtless quickly fulfilled where regular woods of eucalyptus are planted, as in Algeria, the Campagna di Roma, and the Delta of the Var, near Nizza. For these inestimable services eucalyptus trees are preeminently suited by their remarkably rapid growth. Throughout this district the *E. globulus* alone has been planted. Next to *E. amygdalina* this species attains the greatest height and it probably owes its more frequent cultivation in Europe to its having been the first introduced. But it is a question whether other species also, both the shrubby and tree forms, would not be equally well adapted to the South European climate. In the gardens of South France, the *E. globulus* occurred as a curiosity as early as 1822, and in Algeria in 1854; but real cultural experiments were not undertaken till 1863. At present, a tree fifteen years old, about 28 metres high, with numerous enormous branches, stands in the public gardens at Antibes, and at a man's height is 2·25 metres in circumference. Another in the garden of the Palazzo di Orengo, near Mentone, only seven years old, has a circumference of 1·30 metre, and is 19 metres high. This is a development which is not attained by any other indigenous or introduced tree in Southern Europe. The olive, chestnut, walnut, and ceratonia grow much more slowly, and do not present so tall, straight, and columnar a trunk. Labillardière called attention to the extraordinary hardness of the wood. It is evident how valuable such a tree would be in this woodless land; but in the Riviera the reign of indolence is not yet broken by the eucalyptus. In Algeria and the Roman Campagna, on the other hand, very promising and extensive plantations appears to be in full development. Separately and in small groups the *E. globulus* is sufficiently frequent in the Riviera de Ponente to compel closer consideration. As to whether it is to be described as a beautiful tree opinions are much divided, and on account of its peculiarity it is difficult to form a definite judgment in the matter, because at different stages of its growth it changes far more in respect to its branching and foliage than any European tree. When it bears the small sickle-formed leaves, their great mobility introduces a very pleasant liveliness among the surrounding stiff-leaved olive, ceratonia, and lemon trees. However, the foliage of the eucalyptus cannot on the whole be called particularly rich; in this respect, and also as to the pendent leaves, it might be compared to the birch. But this tree is much more branched, and fine specimens therefore make a far more striking impresion.

What the effect as to appearance in the Riviera will be at some future time of a tall straight-stemmed wood of *E. globulus*, the foliage of which would probably not amount to much before the trees attained a height of 30 metres, must remain undecided. However, it can scarcely be expected that trees 100 metres high, a height to which this species attains in Tasmania, will afford a really beautiful prospect. The species which grows to the greatest height, *E. amygdalina*, the stems of which, 145 metres high, exceed that of the tower of Strassburg Minster (142 metres), or the present height of the Cheops Pyramid (137 metres), appears not to be yet cultivated in Europe; but probably some of the smaller partially bushy species might become rivals to *E. globulus* as to appearance. Obviously, the climate of the Riviera, and the still more favourably situated district of central and southern Italy, not too far removed from the coast, suits the *E. globulus* as well as that of Algeria, Andalusia or Portugal. It prospers also near the north Italian lakes; on the other hand, its success in Lombardy, Istria, and in South France westward of Cannes is as yet doubtful; neither has Pisa proved favourable. It sounds, therefore surprising that a specimen should have survived the winters of 1873 and 1874, in the Marly Garden, near Sans Souci. Possibly species might be found that would not suffer from the mild winter of southern England.

The juices of several eucalyptus trees correspond with the kino from *Pterocarpus Marsupium*, Roxb., especially those of *E. citriodora*, Hook., *E. corymbosa*, Sm., *E. vostrata*, Schlecht., and *E. resinifera*, Sm. The last named is represented by some young trees in the grounds of the Palazzo Orengo. It can only be hoped, therefore, that in the near future the vigorous group of the eucalypti may produce a picturesque alteration in the olive groves of the Riviera. In the public grounds a similar part has hitherto been played by the handsome *Schinus Molle*, L., of the family Anacardiaceæ. But this small South American tree, with its somewhat pungent red berries—known on that account in Italy as the "pepper tree"—is much less vigorous than the eucalypti, and up to the present time no special interest has attached to the *Schinus*.

The date palm, also (*Phœnix dactylifera*, L.), which from a practical point of view is scarcely of so high importance as the eucalyptus, occupies in the landscape of this district a prominent place, and produces illusions that could not emanate from the Australian tree which has no history. Indeed, the palm form has a much more remarkable appearance, especially to the northener. To Europe belongs only the dwarf palm, *Chamærops humilis*, L., a very ordinary ornament in our plant houses; but the date palm is a much more imposing representative of this family, and is most generally the tree meant when the palm is spoken of in Germany. Involuntarily upon the bare mention of the word "palm," there is associated with it pictures of oriental peculiarities in nature, history, and customs, with a fulness dependent upon the extent and depth of the imagination of the thinker; whilst the history of the eucalyptus, begun under our eyes, carries us indeed farther away to the Antipodes, but not into the cradle lands of the oldest cultivators, where the palm is particularly at home. Here in the Riviera the palm tops are sufficiently frequent for their light shadows to favour the impression. Already the form of the stem with the remarkable traces of numerous preliminary rosettes of leaves, is thoroughly different in appearance from the trees of Central Europe, and still more from the mature state of the palm, with its wide-spreading tufts of leaves. Whilst the gentlest breadth of wind sways the loosely hanging sickle-shaped leaves of the eucalyptus, the great palm fronds remain in undisturbed peace until startled by a much rougher shock, and even the storm only seldom overcomes the strong mutually supporting petioles. Many trunks deviate in different ways from the exact perpendicular, and such deviation occurs especially in groups of palms up which the ivy and smilax have climbed. Bunches of fruit also, shining with nearly ripe berries, give at least an indication of the blessings which the date palm confers upon its native country, although its fruit in this country cannot compete either in size or flavour with the North African fruit.

Five degrees further south, at a short distance from the Spanish coast, in the province of Alicante, is Elché, famed for its palms. The date woods there number about 100,000 trees, yielding a considerable quantity of palatable fruit, a result that has not yet been attained in the Riviera. But except Elché, this is the only district in Europe where palms can be seen in such numbers as to warrant the designation palm groves. This is limited, however, to Bordighera and San Remo, as even the vigorous palms of Nizza only form a boundary, certainly a very picturesque one, to the Paglione, which, when it has any water, flows through the town. Throughout the whole of the Riviera di Ponente the gardens are adorned with isolated palms, making altogether a very large number, of which many are a foot in diameter and exceed 10 to 20 metres in height; but they occur in thousands only in Bordighera. They are used here, as also in Elché, in the ceremonies of the Catholic Church at Easter time, especially on Palm Sunday. The preparation and forwarding of palm leaves for this purpose form, in the Bordighera and San Remo, a very fluctuating occupation, as there is a similar requirement for the Jewish services. Well-informed persons estimate the palm trees in the Bordighera at 10,000, and this number is continually increased by the plantation of Egyptian seeds. Many of the trees are wretchedly maltreated, the elegant outspreading tufts of fronds being in summer time bound together and covered with straw, so that the formation of chlorophyll in the innermost fronds is stayed. These more delicate and paler fronds, as a symbol of purity, are at Easter time valued doubly as high as the ordinary ones. Of less importance is the plaiting of beautiful small mats and hats from the split palm leaves.

Although the planting of the palm in Italy dates from ancient times, its more general distribution through Sicily, Southern Italy, Southern Spain, and Sardinia was the work of the Arabs. Whether the trees of the Riviera are to be referred back to those times may remain undecided. The fanciful inhabitants of this district, justly proud of their Paradise, appear to be of this opinion, and reckon the age of their largest date palms by centuries, if not at a thousand years and more. But it appears that, in general, the *Phœnix dactylifera* does not attain any great age, and if the opinion be taken of unprejuced observers of mature age as to the age of date palms sown by themselves, the conclusion will be arrived at that only a few of the trees could have seen the next previous century. Palms seem, however, to have long been used for ecclesiastical purposes in San Remo, since Pope Sixtus V., in the year 1584, is said to have bestowed on Captain Brescia, of San Remo, the important privilege exclusively to provide the palm leaves required for the *casa apostolica* every Easter.

At the points of the Riviera where most frequently the foreign traveller stays longest the *Eucalyptus globulus* and *Phœnix dactylifera* are at present sufficiently numerous to be considered well-settled and indeed very prominent members of the flora. They are indications of the meteorological conditions of this strip of coast, which render possible the success of a flora, that is only again to to found several degrees farther south. These two trees proclaim, more clearly than all the thermometer observations in the land, the true south, where belated winter nights in May no longer pinch the promising shoots. Occasional shortness of water and violent storms are, however, enemies to be reckoned with here, which sometimes cause very perceptible damage. The shortness of water is confined within certain limits by the industry of the cultivators, and even the storm does not penetrate everywhere. At any rate these two evils do not act upon the vegetation so definitely as regularly recurring spring frosts.

OSTRUTHIN.*

BY E. VON GORUP-BESANEZ.

This body was discovered by the author in 1874, in the root of *Imperatoria ostruthium*. The following is an outline of the process by which the largest yield has been obtained:—

The young roots of masterwort, one to two years old, are cut and digested with 90 per cent. alcohol at 50 to 60° C. until the liquid ceases to become coloured; the mixed tinctures are distilled to one-third, and this then evaporated until on cooling a thick liquid remains. This residue is exhausted by a mixture of three parts of ether and one of ligroin, of low boiling point, until a firm plaster-like mass remains. The solution is mixed with more ligroin, which separates a brown sticky mass, and the decanted liquor is evaporated spontaneously from flat dishes, and if necessary decanted from the oily sediment forming. Yellow crystals are afterwards deposited, which are freed from adhering resinous matter by spreading them upon porous plaster tiles. The crystals are then dissolved in ether, the solution again mixed with some ligroin, freed from the deposited oily matter, and evaporated spontaneously. Repeated recrystallization from ether yields larger but still yellow crystals, which are obtained white by dissolving them in alcohol and adding water until a permanent precipitate begins to appear.

Ostruthin crystallizes from ether in the triclinic system, the crystals resembling rhombohedrons. It fuses at 115° C. and congeals at 91° C. to a wax-like mass, becoming crystalline; it is inodorous, tasteless, burns with a bright smoky flame, and yields by dry distillation a thick yellowish oil, with an odour resembling Canada balsam. It is insoluble in cold water, sparingly soluble in benzol and petroleum benzin and freely soluble in alcohol and ether. The alcoholic solution has a faint blue fluorescence, which becomes magnificently blue on the addition of water; more water precipitates it. All its solutions are neutral and optically inactive. Its composition is $C_{14}H_{17}O_2$.

Ostruthin Hydrochlorate, $C_{14}H_{17}O_2HCl$, is obtained by passing muriatic acid gas into a not very dilute alcoholic solution of ostruthin, which congeals; the mass is then washed with water and crystallized from ether. It forms white, tasteless and inodorous needles, soluble in alcohol, ether, benzol and chloroform, less so in petroleum benzin.

Ostruthin Hydrobromate is prepared in the same way, but on attempting to crystallize from ether it was decomposed, bromine being liberated.

A combination with hydriodic acid could not be obtained, owing to the liberation of iodine.

Among the products of decomposition obtained by adding ostruthin to fusing potassa, *resorcin* was found. Treated with strong nitric acid, it is first converted into a resinous body and finally into *oxalic* acid; but when boiled for a long time with nitric acid, diluted with three parts of water, it yields *styphnic* and a little *oxalic acid*.

Chlorine yields with difficulty, bromine more readily, substitution compounds.

* Liebig's *Ann. d. Chem.*, clxxxiii., p. 321-343. From the *American Journal of Pharmacy*, for May, 1877.

The Pharmaceutical Journal.

SATURDAY, JUNE 2, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE MEDICAL ACTS AMENDMENT BILL.

WITH the utmost satisfaction we are able to announce that the action of the Council of the Pharmaceutical Society in relation to the clause in the Medical Acts Amendment Bill which recently gave such reasonable cause for alarm to chemists and druggists has been entirely successful, and that the objectionable words are virtually abandoned by the promoters of the Bill. On the 17th of May,—the second day after the printing of the Bill,—a deputation appointed by the late Council had an interview with Dr. LUSH at the House of Commons and laid before him arguments against the Bill passing as it stood. On the 19th, Mr. ATKINS, who was a member of the deputation, received an intimation from Dr. LUSH that at the proper time he would move the omission of the words, "or who shall practise medicine or surgery for gain," from the first clause of the Bill. Although, in consequence of the Whitsuntide recess having intervened, notice of the proposed erasure has not yet appeared on the Parliamentary papers, there is little doubt that this arrangement will be carried out, and there is nothing else in the Bill which would interest chemists and druggists in its ultimate fate.

The opinion expressed by Mr. ATKINS at the Annual Meeting, that it would only require an intelligent and respectful representation to Dr. LUSH as to the injurious nature of the Bill to lead him to modify it, has therefore been justified. Indeed, we are informed that Dr. LUSH has stated that it was not until he had received a deputation from the Council of the Pharmaceutical Society that he had any idea his Bill would interfere with the counter business of druggists. Further, in a published extract from a letter received by Mr. BALKWILL, of Plymouth, Dr. LUSH says, "The Pharmacy Act is so "much more stringent as regards the exclusion of "unfit and unlicensed persons from your business "than the present Medical Act is with regard to "quacks and pretenders in mine, that I in no way "intend to interfere with it."

But although this is the opinion of one of the more conspicuous promoters of the Bill now before Parliament, it would be idle to pretend that it probably represents the views of all its advocates, for there is reason to believe that chemists and druggists were not wrong in the construction they put upon the presence in the Bill of the words now to be omitted. As, therefore, it is possible that the attempt may be renewed, it will be well to refer here to an important expression of opinion by the Medical Council in respect to such legislation. The question came up on the presentation of a report from the Committee appointed by the Medical Council to consider legislation now before Parliament affecting medicine. The Committee reported that it could not recommend the Medical Council to give approval to Clause 1 of Dr. LUSH's Bill as it stood, and stated that it did not believe that a clause of such stringency, even if it could be recommended by the Council, would have any chance of being accepted by the legislature. The Committee also suggested that endeavours to strengthen the Medical Acts "in their penal relations "to medical imposture" would probably be best postponed until those Acts shall have received all essential amendments in relation to the profession itself. Discussion upon this report was initiated by Mr. SIMON, who moved that the consideration of the question of introducing more stringent penal clauses into the Medical Acts should be postponed till such time as those Acts shall have received all essential amendments in the provisions relative to the profession itself. This motion it will be seen was merely an echo of the report. Dr. WOOD considered that its adoption would be "deferring *ad Græcas Kalendas* "the consideration of a very important subject," but Mr. SIMON pointed out that the members of the Council could not conveniently consider the question of trespassers upon their province until they knew what were the limits of their profession as fixed by law. In this the other members of the Council appear to have concurred, for the motion was carried.

Reverting to the withdrawal of the obnoxious words, we think it may be claimed that the Council of the Pharmaceutical Society has thus proved its willingness and ability to defend the interests of the trade from unjust attack. It will be seen also by a report on another page, that the executive of the Chemists and Druggists' Trade Association has been making active preparations for the parliamentary campaign which fortunately has become no longer necessary, and we are glad to notice that it was only the assumed urgency of the occasion that led to these steps being taken last Friday independently of the Pharmaceutical Society. Of course, the dispute upon which the proposed legislation turned is by no means settled, and the time may yet come when the joint efforts of the Society and Association will be required. But the important evidence evolved by the recent movement, that the most influential portion of the medical profession has no sympathy with the recent attempt to disturb chemists and druggists in the exercise of long-established rights is a clear gain in the struggle.

LONDON MILK SUPPLY.

A REPRESENTATION has been made to us on behalf of The Aylesbury Dairy Company, Limited, purporting that the remarks on "Milk Supply," which appeared in our number of the 28th of April, are understood to convey an attack upon that company or the article supplied by it, and asking us to give insertion to a lengthy letter detailing sundry precautions, said to be enforced by the company. It is difficult to trace in those remarks anything which can properly be so understood, and we cannot comply with the request to insert the letter which has been received, unless on the usual terms of an advertisement; but we do not hesitate to disclaim any intention to make an attack on the company or the article supplied by it, and we may repeat by way of quotation a sentence from our remarks: "We are assured that "the Aylesbury Dairy Company do their best to give "their customers the best and safest article they can "command. Doubtless this is so, and it is equally "true of many other companies and individuals."

A SUPPOSED REMEDY FOR RABIES AND LEPROSY FROM COCHIN CHINA.

So far back as 1875, an account appeared in some scientific notes in *Les Missions Catholiques*, of the discovery in Tonquin of a sure remedy against hydrophobia and leprosy. This discovery was made by the Roman Catholic Missionaries, prominent amongst whom was a Monsignor GAUTHIER. The remedy was known as the "Hoâng-nan" and was referred to a red scurf covering the bark of a climbing shrubby plant having some analogy with the ivy. The plant is described as being found on the mountains, particularly in calcareous soils. In some provinces it is more abundant than in others and the quality also varies apparently according to soil and climate.

Large quantities of the powder are in constant use, and it is said to have been employed with success in the cure of ulcers, cancerous and syphilitic affections, leprosy, snake bites and hydrophobia. With a remedy having such a reputation it was most important, if there was really anything in it, that the plant should be known that produced it. On this point, however, little has been said until the appearance of M. BERNARDIN's little pamphlet on the commercial products of Central Africa, where under the head of *Drugs* we are told that the Hoâng-nan of Tonquin has been described by M. PIERRE, Director of the Botanic Garden at Saigon, as a species of Strychnos under the name of *S. gautheriana*. The reason of its being referred to amongst African products is, M. BERNARDIN says, that the *Strychnos* of the Gabon is also covered with a similar reddish powder which may have properties analogous to that referred to above.

THE SANITARY INFLUENCE OF THE EUCALYPTUS.

WE learn from the *Meteorological Magazine*, that at the Easter réunion at the Sorbonne, some information was given by Dr. DE PIETRA SANTRA, a delegate from the Climatological Society of Algiers, as to the results of an investigation made in Algeria to ascertain the importance and value of the *Eucalyptus globulus* in relation to public health. It appears that reports were received from fifty localities where the aggregate number of blue gum trees is nearly one million, and from these reports the following conclusions have been drawn:—(1) It is incontestably proved that the Eucalyptus possesses sanitary influence; for (2) wherever it has been cultivated intermittent fever has considerably decreased both in intensity and in frequency; and (3) marshy and uncultivated lands have thus been rendered healthy and quite transformed. Similar results have been obtained in Corsica, where it is computed that at the end of the present year there will be upwards of 600,000 plants of eucalyptus in full growth.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of the above Association will be held at 17, Bloomsbury Square, on Thursday evening next, June 7th, at eight o'clock, when papers will be read by Mr. E. RICHARDSON, on "The Conditions attending the Production of a Current of Voltaic Electricity;" and by Mr. S. HARDWICKE, on "ILES's New Test for Boracic Acid."

THE COLLECTION OF MASTERWORT AND OTHER ROOTS ON THE CONTINENT.

A RECENT communication to the *Pharmaceutische Zeitung* is of interest in connection with some admixtures that have been the subject of recent papers in this Journal. The writer says were it once seen how the root diggers in the Alps proceed in the collection and drying of the roots, it would no longer be wondered at that all roots from that source contain numerous admixtures. These people principally go out to dig gentian, the collection of gentian being farmed out in many districts of the Alps, but they also take the opportunity of collecting anything else that is valuable. The gatherings are afterwards dried in their houses, heaped pell mell upon hurdles, or on large stone hearths, or sometimes in the sun. The sorting is not carried out so carefully but that something is overlooked or thrown upon the wrong heap. In this respect special reference is made to the rhizoma imperatoriæ, which, the writer says, always contains foreign, and generally poisonous admixtures. In many districts rhizoma imperatoriæ is a favourite popular remedy, sold under the name of "masterwort," and usually taken in brandy. For several years he has obtained supplies from different drug houses, but never found them free from admixture. Veratrum rhizomes and aconite roots were scarcely ever absent, although not present in very large quantity.

The admixture thus pointed out is just the reverse of that recently described in this Journal by Mr. HOLMES, and is, of course, much more dangerous. It is fresh evidence, were it required, of the necessity, in the absence of any provision for the inspection of imported drugs, that the pharmacist himself should exercise a vigilant and intelligent supervision over such articles before placing them in stock.

Provincial Transactions.

CHEMISTS AND DRUGGISTS OF PLYMOUTH.

At a large and influential Meeting of the Chemists and Druggists of Plymouth, Devonport, and Stonehouse, held at the Exmouth Hall, Manor Street, Stonehouse, on the 25th May, 1877:—

The following resolutions were unanimously passed:

Moved by Mr. Chas. Rowe, J.P., seconded by Mr. J. H. Filmer, and resolved—

"That in the opinion of this meeting the Bill now before Parliament entitled 'The Medical Acts Amendment Act, 1877,' if passed, will make it illegal for chemists aud druggists to give advice to their customers in their own shops respecting the use of medicines, or to continue their counter practice according to their long established usage."

Moved by Mr. S. B. Turney, seconded by Mr. J. Allen, and resolved—

"That this would be a most unjust interference with the existing rights and customs of the trade, and injurious to the best interests of the public."

Moved by Mr. S. Maitland, seconded by Mr. J. Burdwood, and resolved—

"That this meeting therefore considers it a duty to the public and themselves, to use every effort to obtain such an amendment of the first clause, as shall secure the long established usages of the trade."

Moved by Mr. W. Wilson, seconded by Mr S. Daymond, and resolved—

"That a copy of the foregoing resolutions, be sent to the Home Secretary, and to each of the local Members of Parliament."

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The Annual Meeting of this Association was held at the room of the Association, Britannia Chambers, Pelham Street, on Friday, May 25th, the chair being occupied by the President, Mr. J. H. Atherton, F.C.S. After the transaction of some preliminary business, the Hon. Secretary, Mr. Roberts Jackson, read the following

Annual Report of the Council.

The Council have pleasure in presenting their Annual Report to the members of the Nottingham and Notts Chemists' Association, and in congratulating them on the general and financial success of the Society during the past year.

Four monthly meetings have been held, at which interesting papers and lectures were given, and discussions ensued, besides which two open meetings of the trade have been called for the consideration of matters of importance not properly within the legal limits of discussion by the Association.

The attendance at the former has been very limited, while the latter were largely attended. Your Council have again to express their regret at the want of interest shown in the educational work of the Association as exemplified by the poor attendance of the members at the general meetings. On the other hand, it is gratifying to find that most of the chemists in the town are members of the Association. The number of members is 55 (51 town and 4 country) being an increase of five on the number recorded last year, while the number of associates is only 20 against 27 the previous session. The number of associates must necessarily vary very considerably owing to frequent changes, but your Council would earnestly urge the members to use their influence with the young men in their employ to avail themselves of the advantages offered to the associates.

The Council, at the commencement of the session, arranged a course of lectures on pharmaceutical chemistry, to which 18 associates subscribed, besides which, as an inducement to the practical study of chemistry, 16 associates were presented with tickets for laboratory practice at the Mechanics' Institution.

In connection with the former class the Council offered two prizes for competition, but only five students presented themselves for the examination. The names of the successful candidates will be announced and the prizes delivered at the next meeting.

The room of the Association has been open every Friday night during the session for the use of the associates; twenty-one meetings have been held with very variable attendance, numerous at the commencement, with the usual dwindling down of numbers afterwards, giving the poor average of 6 during the whole session. The principal work done by this improvement class has been pharmacy, materia medica, examination of specimens in the museum, microscopic examination and practice in the use of the instrument. The use of the library is still limited, but the report shows an increase in the demand for books as compared with last session.

A good workable microscope was purchased at the commencement of the session for the use of members and associates, an addition to the educational resources of the Society which has been much appreciated by the associates.

Your Council have to acknowledge with gratitude the handsome donation of £10 from Mr. F. J. Clarke of Lincoln, which very materially augments the balance in the Treasurer's hands, and your Council would be glad to see so good an example followed by others of a similar or even less amounts.

The annual supper was held in January, at the Flying Horse Hotel, and it is almost needless to say proved by far the most successful meeting of the year.

It is very gratifying to find that the Society has this year a balance in hand of £25 5*s.* 1*d.*, and it will be for the incoming Council to determine in what manner a portion of that sum can be most effectively used to promote the educational objects of the Association.

The Council now retiring would suggest to their successors that a portion should be used to purchase books to increase the museum.

A matter of considerable importance to the trade has occurred during the past session, which was thought would materially interfere with the ordinary conduct of the business of a chemist and druggist, and although trade matters cannot (according to present rules) be discussed by the Association, a general meeting of the trade was called by the Secretary at the instigation of the Council to take the matter of "counter prescribing" into consideration. Considerable alarm was naturally felt and expressed at this meeting, and it was considered utterly impossible to carry on business unless allowed either by sanction or law to give simple medicines for simple ailments.

Your Council have given the matter their serious consideration and feel they are justified in expressing a decided opinion that even if the law is at present against such practice, the moderate use of the privilege of counter prescribing is too much a public convenience to be interfered with.

A bill has been read the first time in Parliament to amend the Medical Acts, and it is satisfactory to note that the Council of the Pharmaceutical Society has already taken steps to try and effect an alteration in the objectionable clauses in the Apothecaries Act, and to define the relative positions of medicine and pharmacy.

Mr. H. Shippam and Mr. M. H. Humphreys were appointed auditors of treasurer's accounts, which showed a balance in hand of £25 5*s.* 1*d.* After a long discussion on various points, both reports were unanimously passed. The following officers were then re-elected:—President, Mr. J. H. Atherton, F.C.S.; Vice-President, Mr. R. Fitzhugh, F.C.S.; Treasurer, Mr. J. Rayner; Hon. Secretary, Mr. Roberts Jackson. Council, Messrs. C. A. Bolton, T. B. Fletcher, J. T. Jenkins, J. Lewis, J. Lomas, W. Smith, F. White, and J. Wilford.

A vote of thanks to the officers and council for their past services brought the proceeedings to a conclusion.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

A meeting of the Executive Committee was held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, on the 25th of May.

Mr. S. U. Jones, President, in the chair; Mr. Thomas Barclay, Vice-President.

Present,—Messrs. Andrews (London), Arblaster (Birmingham), Brevitt (Wolverhampton), Churchill (Birmingham), Cross (Shrewsbury), Greaves (Chesterfield), Greenish (London), Hampson (London), Jervis (Sheffield), Laird (Dundee), Southall (Birmingham), Shaw (Liverpool), Walker (Birmingham), and the Solicitor of the Association.

Letters were read from Messrs Delves, Holdsworth, Johnson, Mackenzie and Fairlie, regretting their inability to attend.

The minutes of the previous meeting were read and approved.

The President said they would now proceed to consider the "Medical Acts Amendment Bill," a portion of the first clause of which he considered required their serious attention.

Mr. Hampson said he had looked through the bill and no doubt they ought all to consider it as a very serious question. They had to determine as to what practical steps should be taken, and as to what method they should adopt either to oppose the bill or to amend it. They ought to regard it as a deliberate intention on the part of the medical men to put a stop to counter practice. The matter, then, came before them in a form which led them to consider whether they should oppose the bill, or endeavour to amend it. His view was that they ought distinctly to oppose the bill. If they did not oppose it they would have to alter it, and on the face of it he held that it would not be acceptable without such alterations as they could not hope to obtain from the promoters of the bill. The object of the promoters was undoubtedly to cripple the chemists and druggists. He therefore thought the best policy would be that of opposition. He should wish that the bill should be discussed in the House of Commons, and to that end it was necessary that there should be formal opposition. If an attempt was made to frame a clause which would satisfy all parties it would be found to be an almost impossible task. They ought to impress upon medical men that they were not to be put down, and that they would defend their rights as much as possible. He thought that the first step should be to get some member of parliament to move the rejection of the bill. The next step would be for them to present a petition against the bill. The Pharmaceutical Society were active in the matter, but they seemed to think that the Medical Association might possibly be induced to frame an amendment or rather a clause that would guarantee the rights of the chemists. He however, did not think this possible. They ought to move forward in a straightforward way to reassert their rights. They should argue for their right of giving simple remedies over the counter in simple cases.

Some little discussion then took place. A strong feeling was expressed that it would be very desirable to act with the Pharmaceutical Society in this matter, but it was felt that the time was too short (the second reading of the bill coming on within a week) for the Association to take any effective action after the delay such a course would involve.

It was moved by the President: "That this Association take immediate steps to oppose 'A Bill to amend the Medical Act of 1858,' now before the House of Commons on its second reading."

Mr. Brevitt seconded the resolution. He said it would strengthen the case for the Association to go forward independently. He thought they would find no difficulty in getting petitions signed.

Mr. Hampson supported the resolution.

Mr. Greenish thought that they should move at once as there was no time to be lost, and said he had great pleasure in supporting the resolution.

Mr. Shaw said he did not think there could be the least expectation of their being successful in any attempt they might make to have the bill amended. He thought they should at once look round for some honourable member who would look at the public interests involved in that bill, and take up the opposition from a public point of view. Whatever action the Pharmaceutical Society might take, and he had no doubt they would take action, they would be in a position to unite.

The resolution was then put to the meeting and carried unanimously.

It was moved by Mr. Andrews, seconded by Mr. Arblaster, that steps be taken to invite members of parliament to oppose the Medical Bill now before the House of Commons, on its second reading.

Mr. Southall said they should take care that the opposition was brought forward at the second reading. It would be well also that the Secretary should address letters to well known friends in important towns, asking them to communicate with their representatives, setting forth the views of the druggists upon the matter. The question would be more weightily considered if they could get a number of members imbued with similar views.

Mr. Barclay said he had been informed that Dr. Lush, who had introduced the obnoxious bill, was in reality friendly towards the chemists and had no intention to injure them; if this was the case Dr. Lush would no doubt be ready to meet the wishes of the chemists as far as possible. Whatever was to be done he agreed ought to be done immediately. Let them do what they could and no doubt the Pharmaceutical Society would gladly come forward and join in opposing the bill. He had no doubt that Mr. Chamberlain, one of their local members, would be willing to help them. They ought then to address circulars to the members of the trade asking or advising them to consult their members.

Mr. Andrews said he had received some information of which he could not very well give the source, and it was corroborative of the views expressed by Mr. Hampson.

Mr. Glaisyer said that he believed that Dr. Lush did not know the intention of the bill, and therefore it would be but courteous for the committee to appoint a deputation to see that gentleman.

The following form of petition was then adopted:—

"To the Honourable the Commons of Great Britain and Ireland, in Parliament assembled."

"The Humble Petition of Pharmaceutical Chemists and Chemists and Druggists residing at

____

in the County of ______________

"Sheweth,

"That your petitioners desire to call your attention to a Bill now before your Honourable House, intituled 'A Bill to Amend the Medical Act of 1858,' which bill, if passed into law, would act prejudicially to Her Majesty's subjects by creating a monopoly, and preventing the public obtaining relief for simple complaints, and in cases of emergency, from chemists and druggists and all other persons other than medical practitioners.

"Your petitioners would direct attention to the fact that one of the clauses of the said bill renders it a penal offence for any person to supply the simplest remedy, or perform the most trivial surgical operation for gain, unless he be a medical man. This enactment would press with extreme harshness and severity upon the poor and others who have hitherto been able to obtain simple remedies from chemists and druggists without being compelled in all cases to consult a physician or surgeon.

"Your petitioners respectfully urge that the provisions of this bill, if it obtains the sanction of your honourable house, would also deprive them of a right which they have exercised from time immemorial, and which they maintain has not been detrimental to the community, but, on the contrary, of the greatest public advantage.

"And your petitioners will every pray, etc."

The Secretary was instructed to forward a copy of a circular with a written copy of the petition to prominent members of the trade in 150 of the principal towns in Great Britain, asking them to obtain the signatures of local chemists to the petition, and forward the same to one of their members of parliament.

It was moved by Mr. Barclay, seconded by Mr. Brevitt, and unanimously resolved:—"That a deputation, consisting of the officers of the Association, together with Messrs. Arblaster, Churchill and the Solicitor of the Association, be hereby empowered to wait upon Joseph Chamberlain, Esq., M.P. for Birmingham, to invite him to give formal notice of opposition to the Medical Acts Amendment Bill now before the House of Commons."

Moved by Mr. Greaves, seconded by Mr. Walker, and unanimously resolved:—"That the deputation appointed to wait on Mr. Chamberlain be empowered to secure some other Member of Parliament to give notice of opposition to the Bill if Mr. Chamberlain declined."

Law, Finance, and General Purposes Committees were then appointed.

A vote of thanks to the President for presiding terminated the proceedings.

The deputation had an interview with J. Chamberlain, Esq., M.P., on the 28th ult., when he said he should have been pleased to have moved the rejection of the bill, but local business of an important nature, connected with Mr. Gladstone's visit to the town, would prevent his being present in the House on the 1st of June, when the bill would be called on for second reading. The deputation subsequently waited upon Sampson S. Lloyd, Esq., M.P., who consented to oppose the bill on its second reading.

Proceedings of Scientific Societies.

PHILADELPHIA COLLEGE OF PHARMACY.

A meeting of this College was held on the 17th of April, Mr. A. P. Brown in the chair.

A specimen was exhibited of the so-called "cream of tartar fruit," from the Orange Free State. Professor Maisch stated that it belonged to the genus *Adansonia*, and probably to *A. Gregorii*, which is stated to be a native of Northern Australia. The fruit is smaller, and the taste of the acidulous pulp differs from that of *A. digitata*, the baobab, of which handsome specimens had been on exhibition from Jamaica. In answer to a question he stated that he had not had the time yet to ascertain the composition of the pulp. He also called attention to the Latin names by which some Japanese chemicals exhibited were designated, and which were similar to those used in Germany and Holland; for instance, *Zincum oxydatum sulfuricum*.

Professor Remington read a paper on "Aromatic Elixir of Licorice," and its effectiveness for disguising the bitter taste of sulphate of quinia. Mr. Brown stated that he made such an elixir by dissolving 8 grains of ammoniacal glycyrrhizin in one fluid ounce of simple elixir. Inquiry having been made about a *compound elixir of eucalyptus*, which has been recently introduced for the same purpose, it was stated to owe its effects likewise to glycyrrhizin, but appeared to be flavoured with oil of eucalyptus, besides other aromatics.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held at 17, Bloomsbury Square, on Thursday, May 10, Mr. C. Hutchinson in the chair.

The first paper was by Mr. Harold Senier, on the Luminosity of Flame, of which the following is an abstract:—

Flame may be defined as the luminous envelope which marks, in some cases, the limit of union between a combustible and a supporter of combustion. The colour of all flames is due to incandescence, but all incandescence is not flame. There are four kinds of incandescence: (1) of solids by their own oxidation; (2) of gases by their own oxidation; (3) of solids by external heat; and (4) of gases by external heat. Flames can be divided into two classes: luminous, which give a continuous spectrum, and non-luminous, which give a non-continuous spectrum. The luminous class, to which by far the greater number of flames belong, may be subdivided into those (1) in which at the temperature necessary for their existence solid particles are present, and those in (2) which at that temperature solid particles can no longer exist. Davy's theory of the structure of some luminous flames and Frankland's theory of the second class of luminous flames were explained and illustrated by experiment, a candle flame being taken as the type of the former and arsenicum burning in oxygen as a type of the latter. Several experiments were also shown which appeared to point to the conclusion that compressed air retards combustion of gases and rarefied air renders it more complete. Frankland's theory in explanation is that the particles of oxygen in a rarefied atmosphere have greater freedom of motion and consequently have more ready access to the luminous cone of the flame and more completely prevent the separation of carbon. The paper concluded with an account of the latest researches on the Bunsen flame and of an experiment made by the author to ascertain in what relation this flame stood in regard to its heating power when burning in common air to one burning in CO_2. A Bunsen burning a fixed quantity of coal gas, to which air was admitted freely, was allowed to play against the bottom of a flask containing 500 c.c. of water, the flame being protected from all draughts and other varying influences. When the water had been heated to 80°, the time taken to heat it 20° more was accurately taken, and found to be 1 min. 32 secs. When CO_2 was substituted for air, under precisely similar conditions, the time taken was 2 minutes, showing that the relation was as 3 to 4.

A vote of thanks to the author was passed unanimously.

The next paper read was entitled—

TABLES FOR THE QUALITATIVE ANALYSIS OF THE MORE COMMONLY OCCURRING SCALE PREPARATIONS, ALKALOIDS, ETC.

BY DR. A. SENIER, F.C.S.

In presenting to you these tables, which have been used with satisfactory results in the laboratories of the Pharmaceutical Society, I must, in the first place, disclaim all intention of giving you original matter, for although I have never seen such tables in print I am aware that similar ones have been used from time to time by teachers in our laboratories, as well as in other schools.

Like all charts which have been constructed to facilitate analysis, they may be used both properly and improperly. I would draw special attention to this. In the laboratories of the Pharmaceutical Society, where these charts have been used, it has always been required that the student should have previously prepared one or more alkaloids and scale preparations, and should have made himself familiar with their behaviour towards reagents and solvents. He is then in a position to use these tables intelligently and correctly. For students who have not done this they are not intended and will be found in practice to be of little use.

TABLE FOR THE QUALITATIVE ANALYSIS OF ORDINARY SCALE COMPOUNDS.

ALKALOIDS.

Quinia. Quinidia. Beberia. Cinchonia. Cinchonidia. Strychnia.

Dissolve a portion in H_2O, and add NH_4HO cautiously (Precipitate=Alkaloids (except Strychnia) and sometimes $Fe_2 6 HO$). Add NH_4HO in excess (insoluble Precipitate=Cinchonia or Cinchonidia, or perhaps $Fe_2 6 HO$). Agitate the mixture with Ether and separate, by means of a pipette, the ethereal solution, aqueous solution and insoluble precipitate.

Ethereal Solution.

May contain quinia, quinidia, or beberia. To solution in a test-tube add H_2O, acidulated with $HC_2H_3O_2$ and boil, burning off the ether. To a portion of the acetic solution, add Cl water and afterwards NH_4HO.

Green Colour (thalleioquin.)

Solution is fluorescent, and contains either quinia or quinidia. Concentrate the remainder of the solution and divide into two parts. To one add KI, and to the other add $(NH_4)_2C_2O_4$. KI precipitates *quinidia*, not quinia. $(NH_4)_2C_2O_4$ precipitates *quinia*, not quinidia.

No Green.

To a portion of the acetic solution add KHO, a yellow precipitate = *beberia.*

Insoluble Precipitate.

Is cinchonia, cinchonidia, or $Fe_2 6 HO$. Benzole may be employed to separate the cinchonia or cinchonidia, it being afterwards removed by heat. Dissolve in dilute $HC_2H_3O_2$, and to part of the solution add $Na_2C_4H_4O_6$, when a precipitate occurs in the case of *cinchonidia*, and no precipitate in that of *cinchonia.*

The solution in $HC_2H_3O_2$ is not fluorescent, and gives no thalleioquin.

Aqueous Solution.

May contain strychnia. Agitate with $CHCl_3$ and separate chloroformic solution. Evaporate chloroformic solution and moisten residue with concentrated H_2SO_4. Draw across the acid film a small moistened crystal of $K_2Cr_2O_7$ when a transient play of colours—violet to red = *strychnia.* No colours = no strychnia. In case of doubt add NH_4HO to original solution. Agitate with chloroform, and proceed as before.

ACIDS.

Pyrophosphoric. Hypophosphorous (generally converted into pyrophosphoric.) Sulphuric. Hydrochloric (as a contamination.) Tartaric. Citric.

Dissolve in H_2O, add KHO, in slight excess, and warm. Note here whether NH_3 is evolved by action upon litmus paper (*Ammonium*). Filter (reserve precipitate), boil a portion of the filtrate with HNO_3 in slight excess and add a few drops of the acid solution to excess of molybdate of ammonium and again boil.

A Yellow Precipitate.

Pyrophosphoric or hypophosphorous acid. To another portion of the filtrate from KHO, neutralized, add $AgNO_3$.

- White precip. soluble in nitric acid = *pyrophosphoric acid.*
- White to black precipitate, soluble in nitric acid = *hypophosphorous acid.*

No Yellow Precipitate.

To another portion of the filtrate from KHO add HNO_3 to acid reaction and divide into two parts. To one add $BaCl_2$ (precipitate = *sulphuric acid*). To the other add $AgNO_3$ (precipitate = *hydrochloric acid*). Neutralize another portion of the KHO filtrate and add $AgNO_3$.

Precipitate Grey to Black.

Add very little NH_4HO (not sufficient to dissolve the whole precipitate) and heat. A silver mirror=*tartaric acid.*

$CaCl_2$ and $Ca 2HO$ precipitate neutral solution (if concentrated) in the cold the precip. redissolving on boiling.

Precipitate White.

Citric acid gives no mirror. $CaCl_2$ and $Ca 2 HO$ do not precipitate citric acid in the cold, but upon boiling (if solution be sufficiently concentrated) precipitation occurs.

Confirm tartaric or citric acid.—To slightly acidified KHO filtrate, add NH_4HO in slight excess and considerable quantity of NH_4Cl and $CaCl_2$. *Tartrates* are precipitated completely in the cold with agitation and rest for about ten minutes. To the solution (or filtrate, if tartrates are present) add three volumes of spirits of wine when *Citrates* are precipitated. If sulphates have been found disregard slight precipitate with spirits of wine.

INORGANIC BASES.

Ammonium (often as a contamination.) Ferric Iron. Potassium. Sodium (rare).

Ammonium — already sought. *Iron*—precipitate by KHO (previously reserved) may be dissolved in HCl, and the solution tested for iron by K_4FeCy_6, KCyS, etc.

Potassium and Sodium. Ignite a small quantity of the scale, and moisten the residue with water. Test moistened residue with litmus paper. If alkaline examine for potassium and sodium by the colour imparted to flame, and for potassium by HCl and $PtCl_4$.

TABLE FOR THE IDENTIFICATION OF THE FOLLOWING ALKALOIDS, ACIDS, ALOINS, ETC.

ALKALOIDS, ETC. { MORPHIA. QUINIA. SALICIN.		STRYCHNIA. BRUCIA. QUINIDIA.		CINCHONIA. CINCHONIDIA.		ACIDS. { SULPHURIC. HYDROCHLORIC. PHOSPHORIC.			ACETIC. MECONIC CITRIC.		ALOINS { SOCALOIN. NATALOIN. BARBALOIN.	
To a small quantity on a porcelain plate add conc. HNO_3.		If no Morphia or Brucia, moisten a small quantity on a porcelain plate with conc. H_2SO_4.		If Morphia, Brucia, Salicin, and Strychnia, are absent, make a solution—using a little acid if necessary—and add NH_4HO in excess.		Make a solution with a slight excess of HNO_3, divide it into three portions, and test as follows:—			Make a neutral solution, divide it into two portions, and test as follows:—		To Aloin, or powdered aloes—on a porcelain plate—add concentrated HNO_3.	
An Orange Colour, decolorized by $SnCl_2$, $Na_2S_2H_2O_4$, or $NaHS$ = *Morphia.** Confirm by— Fe_2Cl_6 (neut.), which gives with morphia or its salts a blue colour. HIO_3 is decomposed by morphia or its compounds, with liberation of iodine which may be recognized by starch.	*A red colour*, changed to violet by $SnCl_2$ $Na_2S_2H_2O_4$ or $NaHS$ = *Brucia.*	*A deep red colour* = *Salicin.* Confirm by boiling the substance with water to which has been added a few drops of dilute H_2SO_4. Then neutralize the acid and examine for glucose.	*No colour, or only a slight colour.* Draw a moistened crystal of $K_2Cr_2O_7$ across the acid film when a transient play of colours, violet to red, = *Strychnia.*	*Precipitate dissolves with difficulty in excess* = Quinia or Quinidia. Confirm— Solution fluorescent. Sol. with chlorine water and NH_4HO gives a green colour (thalleioquin). Alkaloids soluble in ether. Distinguish— Make a concentrated, slightly acetic, solution, divide into two portions; to one add conc. sol. of KI, and to the other add conc. sol. $(NH_4)_2C_2O_4$. *Quinidia* is precipitated by KI and not by $(NH_4)_2C_2O_4$. *Quinia* is precipitated by $(NH_4)_2C_2O_4$, and not by KI.	*Precipitate does not dissolve in excess* = Cinchonia or Cinchonidia. Confirm— No fluorescence. No thalleioquin. Alkaloids insoluble in ether (cinchonidia sol. 1 in 150). Distinguish— Make a concentrated slightly acetic solution, add $Na_2C_4H_4O_6$. Precipitate = *Cinchonidia.* No precipitate = *Cinchonia.*	*First portion.* Add $BaCl_2$ A precipitate = *Sulphuric Acid.*	*Second portion.* Add $AgNO_3$ A precipitate soluble in NH_4HO = *Hydrochloric Acid.*	*Third portion.* Boil for a time and then add a few drops to an excess of solution of molybdate of ammonium, and boil. A yellow precipitate = *Phosphoric Acid.*	*First portion.* Add neutral Fe_2Cl_6. A red color indicates acetic or meconic acid. Distinguish Decolorized by boiling = *Acetic Acid.* Not decolorized by boiling *Meconic Acid.*	*Second portion.* If no acetic or meconic acid, add $AgNO_3$. Precipitate (white, with a tendency to darken) soluble in HNO_3 = *Citric Acid.* Confirm by adding $CaCl_2$ to a neutral conc. solution and boiling, when a white precipitate of citrate of calcium separates.	*No colour* = *Socaloin.*	*Crimson colour.* Nataloin or Barbaloin. To another portion add concentrated H_2SO_4 and vapour of N_2O_4. *A blue colour* = Nataloin. *No blue colour* = Barbaloin.

* Strychnia of commerce often gives an orange or red colour, due to contamination with brucia.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE MOLECULE AND THE ATOM.*

BY PROFESSOR G. F. BARKER.

(*Concluded from p.* 866.)

The illustrations of this third law which are given by Berthelot, are numerous and interesting. Considering, in the first place, direct combinations, he shows that while the union of nitrogen dioxide with oxygen to form the trioxide evolves ten calories, its union with oxygen to form the tetroxide evolves seventeen. Hence, the latter is always formed in the presence of an excess of oxygen. Tin in forming stannous oxide evolves 36·9 calories, in forming stannic oxide 72·7; the latter is the body universally formed. Hydrogen sets free in forming water 34·5 calories; but in forming hydrogen dioxide, only 23·5; hence, it is the former which hydrogen gives on burning. In confirmation of this statement is the fact that the formation of the dioxide is attended with an absorption of heat, and hence, that it cannot be produced from water and oxygen without the intervention of foreign energy. On the other hand, the oxides of nitrogen and of chlorine, nitrous chloride, acetylene, and marsh gas are all formed from their elements with the absorption of heat. None of them can be formed by the aid of the energy contained in their elements alone; the assistance of foreign energy is required, electrical in the case of acetylene and marsh gas for example, and in the case of the oxides of chlorine, energy derived from the simultaneous formation of a metallic chloride which evolves heat. Chemical decompositions also furnish many striking illustrations of this law. If the formation of a body which absorbs heat cannot take place without the aid of foreign energy, so a body formed from its elements with the evolution of heat cannot decompose without the aid of foreign energy—either that of heat, light, electricity, chemism, or of physical disaggregation. If the compound has been formed with absorption of heat, however, it is either spontaneously decomposable—like the chlorine oxides and nitrogen chloride—or it is readily susceptible of undergoing changes attended with the evolution of heat—as acetylene, cyanogen, and nitrogen dioxide. In relation to the question of substitution, the law says if a body A, in uniting with a metal produces more heat than another B, then A will displace B. Because chlorine, in uniting with the metals, sets free more heat than bromine or iodine, it displaces these bodies from their metallic combinations. Whenever a metal displaces another from a compound, it is because the production of the new salt corresponds to an increased evolution of heat. The phenomena of double decomposition give rise to some curious applications of the law. Dry hydrochloric acid gas acting on dry mercuric cyanide decomposes it at once, since it evolves 5·3 calories. But in solution, hydrocyanic acid decomposes at once mercuric chloride, since in this reaction 15·5 calories are set free. So silver chloride and hydriodic acid give silver iodide and hydrochloric acid, a total decomposition, whether gaseous or in solution; while silver iodide and chlorine give at once silver chloride and iodine, an apparent reversal of attraction. But, on the one hand, chlorine evolves 15 calories more than iodine in uniting with silver; and on the other, hydriodic acid evolves 31·8 calories liquid, and 51·3 gaseous in acting on silver oxide, hydrochloric acid evolving only 20·6 and 38 calories respectively. We must not, however, extend this portion of our subject to any greater length. Enough has been said to show the controlling agency of thermo-chemical considerations in any theory we may orm of chemism.

It must be confessed, however, that notwithstanding all the assistance which physics has rendered chemistry in helping it to a rational conception of its fundamental attraction, the real underlying essence of this attraction remains as completely hidden as before. But this fact should by no means be considered a discouraging one when we remember that we know absolutely nothing of the cause of any other form of attraction, nor even whether the force resides in the attracting body itself, or is caused by outside agencies, as is now more than suspected. Indeed, the cause of the attraction of gravitation is itself unknown. But two modes of accounting for it, consistent with present ideas, are suggested: the one that it is due to differences of pressure in a substance continously filling all space, the other that it is due to the impact of particles. The latter hypothesis, suggested long ago by Le Sage of Geneva,* has received a large share of attention in recent times. It supposes that the particles of matter are subject to bombardment by an infinite number of still minuter particles which are darting about with inconceivably great velocities. As each material particle screens its fellow on one side from this rain of particles, the final effect is to force them together. It may be easily shown that the result of this action is an apparent attraction which follows exactly the law of gravitation, *i.e.*, varying as the inverse square of the distance, and—admitting the free passage of most of the particles through the matter—being directly as the product of their masses. Chemical and physical attraction are bound up in the same category with the attraction of gravitation; he who succeeds in explaining the one will have found the key to the whole.†

Finally, we have to ask: What is this atom about which we have said so much? Has science any conception of such a thing? This brings us to the most important atomic theory of the day, the theory of vortex-atoms of Helmholtz, as worked out by Thomson.‡ In his investigations upon the laws of fluid motion, Helmholtz§ examined exhaustively the equations of motion of an incompressible frictionless fluid, admitting that this motion could be rotational. He proved that any portions of such a fluid which possess rotation must possess it for ever, and are thus isolated particles; and that these portions must be arranged in filaments whose direction at each point is the axis of rotation, these filaments being endless, or terminating in the free surface of the fluid. Accepting these results, Thomson conceived the hypothesis that what we call matter may consist of the rotating portions of a perfect fluid which continuously fills space. If any portions of such a fluid have this vortex-motion communicated to them, they will retain it for ever, thus constituting what Thomson calls a vortex-atom. Moreover, since the only necessary condition of the existence of a vortex-atom is that the filament should rotate on its axis and should be endless, it is plain that there may be various kinds of such atoms according to the shapes of the vortices.|| The simplest form is a plain ring, like a smoke-ring. But the filament may undergo any number of knottings and twistings, and yet comply with the definition. As nothing short of creative power could annihilate such an atom, so nothing short of this could launch it into existence. Moreover, such an atom would have actually the properties of the metaphysical

* Address before the Chemical Section. From the *American Chemist*, November, 1876.

* Deux traités de physique mécanique, publiés par Pierre Prévost. Génève et Paris, 1818.

† "If such heterogeneity (that of matter) were only pronounced enough, it appears that the law of gravitation would be capable of accounting for at least the greater number of effects at present attributed to the so-called molecular forces and the course of chemical affinity."—Stewart and Tait, loc. cit., 95.

‡ 'Trans. Roy. Soc. Ed.,' xxv., 217, 1868.

§ Ueber Integrale der hydrodynamischen Gleichungen welche dem Wirbelbewegungen entsprechen. Crelle Ann., 1858; *Phil. Mag.*, 1867, 1.

|| Tait. *Recent Advances*, 294. Since the number of possible forms is almost infinite, the explanation of the existence of only sixty-three elements is difficult.

atom; it cannot be cut, from its very nature. This marvellous hypothesis is as yet, of course, only a matter of speculation. Much more work must be done upon it before it can even be accepted as probable. But it is not too much to say of it now that it explains most satisfactorily many vexed problems in molecular and atomic science.

It only remains for me now, after this lengthy discussion, to ask what are the bearings of the facts and of the generalizations from them, which have now been stated, upon chemical science? What is the conception which we should now hold of the atom, and of the various changes in which it may perform a part? In the first place, it seems to be clear that, in the opinion of modern science, the atom has a real existence; that there is a fixed portion of matter, definite for each element, which is the smallest quantity of it capable of taking part in a chemical change. If this be true, then the restiveness shown in certain directions in using the word atom, and the attempts made to substitute some other idea for it, are entirely needless.

In the second place, it is evident that our equations representing chemical changes need to be more significant, by including in them the changes of energy involved.* The equations of Stahl, of phlogistic memory, did this. Thus the (metallic calx+phlogiston)=metallic calx+heat. This Lavoisier translated thus: metal+(oxygen+heat)=metallic oxide+free heat. To-day we should say: (metal+m units of energy)+(oxygen +n units of energy)=(metallic oxide+p units of energy)+(exterior energy represented by $m+n-p$ units). The power of prediction in chemistry, the power which characterizes an exact science, appears to lie in a clear comprehension of the transformations of energy which take place during chemical action.

Again, the real existence of atoms occupying space forbids the assumption too often based upon our present system of graphic formulas—but unfairly, as it seems to me—that the atoms in a molecule all lie in one plane; and thus gives rise to a chemistry of three dimensions. This idea was distinctly expressed by Kekulé in 1866, in his Lehrbuch,† where he gives perspective views of the constitution of the benzene atom. And in Clarke's paper, already referred to, the conditions under which solid molecules are possible are satisfactorily discussed. I by no means wish to imply that graphic formulas are useless. I would have the idea clearly held that they only express the mode in which the atoms are combined with each other, considered statically, and not the manner of their arrangement in space.

Lastly, the fact is clearly before us that the atoms are not at rest within the molecule, and therefore that they cannot occupy positions fixed in space. We have seen that it is the belief of eminent authority that they even exchange molecules in their rapid motion; moreover, this conception of atomic motion is strengthened by the fact observed by Hofmann,‡ that one isomeric form of an aromatic monamine may be converted into another by what he calls a wandering of the atoms within the molecule. Indeed, so obvious is this atomic motion, and so necessary is it to take account of it in chemical theory, that Kekulé has founded upon it his explanation of equivalence.§ According to him, the equivalence of any atom is the relative number of impacts which it receives from other atoms in a unit of time. The view of Michaelis is analogous to this.|| He supposes that during the vibration of the atom it attains certain positions, at each of which it is capable of exercising chemical action upon other atoms. The number of such positions constitutes the equivalence of the atom. If we suppose the total force unequally distributed, the atom will exert different amounts in its different positions, thus accounting for variable equivalence. And if the total force has no fixed ratio to the number of positions, the fact is accounted for that there is no necessary relation between chemism and equivalence.

The task which I have allotted to myself is now accomplished. I have attempted to set before you, as clearly as I was able, the conception which the science of to-day holds concerning the molecule and the atom. If I have contributed, in doing this, to make more precise the ideas which are commonly held upon this subject, I shall feel that an essential service has been rendered to a science which more than any other calls to its aid creative energy, and produces continually new forms of matter to astonish and delight mankind.

* 'Wurtz's Dictionnaire de Chimie,' I., i., 824, Art. "Chaleur."

† Lehrbuch der organischen Chemie II., 515, 1866.

‡ *Ber. Berl. Chem. Ges.*, vii., 526, 1874.

§ *Ann. Chem. Pharm.*, clxii., 86.

|| *Ber. Berl. Chem. Ges.*, v., 48, 463, 1872.

Parliamentary and Law Proceedings.

Poisoning by Laudanum.

On Monday an inquest was held at Portsmouth on the body of Fleet-Surgeon Dyas, of the *Warrior*, who was found in an insensible condition on board that ship, and died in a short time. The evidence showed that the deceased had suffered from rheumatism, but had otherwise enjoyed good health. He had been in the habit of taking tincture of opium as a sedative every night, and had also been in the habit of lying down after luncheon on a couch in the sick bay, which was in the dispensary. At ten o'clock on Saturday morning he went in to lie down, this being the first time he had done so in the morning, and at half-past one, as a man had to be examined, the door, being locked, was forced, and deceased was found lying on the couch. A glass was on the table in which were a few drops of laudanum.

Surgeon Collett, of the *Repulse*, said he was called, and found deceased perfectly insensible, with symptoms showing that he had taken a poisonous dose of opium. The stomach-pump was used, and deceased rallied for a short time, but soon collapsed. Remedies were applied, but deceased sank, and died at five o'clock. The cause of death was a poisonous dose of tincture of opium, commonly called laudanum.

Paymaster Penfold, of the *Warrior*, said he had cautioned deceased against taking opium, and he had promised not to do so.

The jury found that deceased died from an overdose of tincture of opium, but whether taken accidentally or otherwise there was no evidence to show.

Suicide of a Chemist and Druggist.

Last week Mr. Carter held an inquiry, at the Hope Tavern, Bird Street, Newington, into the circumstances attending the death of Mr. John Middleton, aged 36, a dispensing chemist, carrying on business at 6, Bird Street, who was found lying dead on the threshold of his premises by his wife on Tuesday morning.

From the evidence of Mrs. Elizabeth Middleton, it appeared that the deceased had been very much depressed of late through reading in the public and medical journals certain articles which had for their tendency an interference with the interests of chemists generally, and this much preyed upon his mind, as he had an apprehension that his trade would be taken from him. He had great fear that certain authorities would, to use his own words, "come down upon him." He was a remakably steady man. The deceased had two children, and said he was afraid lest his business might be interfered with. Witness sat up with him all night, though he wished her to retire to rest, but she sat up with him, because he appeared so strange, and it made her very nervous. Previously to this he had been under medical treatment. She had been advised to go to the authorities of Bedlam

Hospital, and he was to have been removed to that institution on the morning that he died. From the medical evidence there appeared to be no doubt that he died from the effects of prussic acid, and the jury returned a verdict of "Suicide while in an unsound state of mind."

Notes and Queries.

[547.] BLEACHING OF FERNS.—F. S. SEYMOUR WIMBORNE will be glad if any one will inform him how he may bleach ferns, without injuring the veins, causing them to have a whitish or transparent appearance.

[548]. MANGANESE BATTERY.—What is the composition of the plates, and how are they made, in the battery known as a Manganese Battery?—B. M. S.

Obituary.

JOSEPH-BIENAIME CAVENTOU.

In Joseph-Bienaimé Caventou, Honorary Professor in the Paris School of Pharmacy, who died a few days since in Paris, has passed away one whose name is indissolubly connected with the history of chemistry, especially in its relations to pharmacy. For the following sketch of his career we are indebted to *Le Mouvement medical.*

Joseph-Bienaimé Caventou was still an *interne* at the Pitié, when, in 1816, a note upon the properties of the narcissus drew towards him the attention of the scientific world. It was the first step in a road along which he advanced rapidly from success to success. In a short time, in fact, either alone, or with his colleague, Pelletier, he isolated a long series of alkaloids and active principles, with which his name will remain always associated. Veratrine was the first, in 1818, then, in 1820, quinine, the discovery of which alone would be sufficient to make a man famous; a little while afterwards, strychnine and brucine, and lastly, not to mention others, cafeine.

About the same time, Caventou demonstrated the existence of a special substance, chlorophyll, in the green parts of plants.

Such services claimed exceptional acknowledgment, and this explains the admission of Caventou to the Academy of Medicine, at its institution in 1823, although then scarcely twenty-seven years of age. When he died he was Dean of the Academy, and had had the satisfaction of seeing his son and his son-in-law take their seats by his side.

Entrusted in 1826 with the course of toxicology in the School of Pharmacy, he continued to act as Professor during thirty years with great success. In 1858, from a sentiment of exaggerated modesty, the eminent chemist imagined that the methods which he had instituted, and of which he had made such brilliant applications, were no longer *en rapport* with the progress recently realized; he desired to leave to younger men the care of continuing the teaching, and, still full of vigour and intelligence, he descended from his chair in spite of the representations of his colleagues and pupils.

Caventou's modesty became still more manifest after twenty years of retirement, and down to the time of his death. In accordance with his last wishes, no military honours were rendered to him, and no discourse was pronounced over his tomb. He could not, however, prevent those who had known and loved him from attending his obsequies, which took place on the 7th of May, in the church of Saint-Roch, in the midst of an immense concourse of relatives and friends. All the members of the Academy of Medicine and the Superior School of Pharmacie, headed by the Director, were there to render a last and solemn homage to this man, whom French science may claim as one of its most worthy representatives, and humanity can honour as one of its benefactors.

Notice has been received of the death of the following:—

On the 15th of April, 1877, Mr. Thomson Brown, Pharmaceutical Chemist, Trongate, Glasgow. Aged 48 years. Mr. Brown had been a Member of the Pharmaceutical Society since 1853.

On the 7th of May, 1877, Mr. Archibald James Herron, Chemist and Druggist, Margate. Aged 35 years. Mr. Herron had been an Associate of the Pharmaceutical Society since 1870.

On the 17th of May, 1877, Mr. Charles Miller Brown, Chemist and Druggist, Witney, Oxon. Aged 45 years.

On the 23rd of May, 1877, Mr. Henry Fairbairn, Chemist and Druggist, Alnwick. Aged 73 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

ELECTION OF COUNCIL.

Sir,—I perfectly agree with your correspondent R. H., that Mr. Greenish did well in calling attention to the small number of voting papers returned by members at the election of Council, but not entirely in his conclusion that an expression of the views of candidates on pharmaceutical politics would of itself secure a better result.

I think those who have taken an interest in these elections for any length of time are pretty unanimous in their conviction that at present little less than a panic on some vital question will arouse our brethren to anything like real action. That this apathetic indifference, together with the ultra-conservative principle of "leaving things as they are," might be largely removed were the Council to adopt means of drawing out the personal interest of the trade in matters directly relating to themselves, I feel satisfied, and that such would react again to the untold benefit of the Council and the Society I am equally convinced.

Hoping that the expressions of feelings at the last Annual Meeting may awaken the Council to more activity, I venture to throw out a few suggestions, which possibly may be considered worth a passing notice, as tending to produce a greater amount of interest among our friends in the general doings of the Society.

First and foremost I would say, let the report of Council meetings be more fully recorded than hitherto. There was a time when no report whatever was given; that barrier was ultimately broken down, thanks I believe to Mr. Hampson, but a still further advance is needed, by the admission of independent reporters from recognized organs of pharmaceutical lore, so that those journals may have the privilege of receiving their information without its first passing through official sieves. Again, the names of those voting on divisions at Council meetings were for a time, after the admission of the reporter, given monthly, but of late these records of actual fruit have become "finer by degrees and beautifully less," so that our knowledge of the representative qualities of our Council is reduced to comparatively nil. The admission of independent reporters would at once put aside this silence.

In reference to the election of Council, I would say, omit altogether that significant star affixed to the names of old councillors, by which an undue preference is inferred, and too often accepted by members, who instinctively erase all names against which such prefix is unseen. The result being that the same gentlemen, with rare exceptions, are elected year after year, perfectly regardless of personal merit, and unless an actual vacancy occurs through the retirement of a member, it is next to impossible to introduce new blood into the executive. In place of this official recognition I would suggest that together with the voting papers, an analysis of the actual work of the preceding year should be issued, showing the attendance of each member at the Council meetings, and also on committees. Members would then have before them distinct evidence of the active services of their representatives, which, together with the monthly reports, would enable them to judge pretty accurately as to their personal merits, and thus lead them to use their own judgment in giving their vote.

With regard to new candidates, the plan recently adopted by some of issuing an address is most desirable, in addition to which, the recommendation of provincial associations might profitably and legitimately be brought to bear in favour of representatives of known experience. The Council would by these means become increasingly a really representative body.

If some of our more active friends upon the Council would take up these and other suggestions, and persevere in them until they succeed, they would receive the hearty sympathy and approval of the trade.

May, 28, 1877. "OBSERVER."

COUNTER PRESCRIBING.

Sir,—To prohibit entirely the right, now threatened, of druggists prescribing at the counter, would have such a calamitous effect on the interests of many, that I for one regret exceedingly that the Council were not willing to undertake the defence of the case now pending. With co-operative stores, in almost every large town in the kingdom, selling every article considered to belong to a druggist's business, at little more than nominal profits,—with some selfish member of the trade in most of such towns acting similarly, seldom or never to his own aggrandisement, but greatly to the injury of those who decline to retaliate and so consummate the ruin of all, and with hucksters' and other shops supplying well nigh every drug and chemical in general requisition,—with all these enemies to their welfare to contend against, which did not exist in days of yore, if the right and privilege of counter prescribing, which they have enjoyed from time immemorial, were to be taken from them, one half the druggists who now manage to pay twenty shillings in the pound would cease to obtain a livelihood.

This is a matter not only of vital importance to the great majority of druggists, but of extreme importance to the great majority of the public, interference with whose rights and liberties it threatens. Poor people who have hitherto been accustomed when they or any of their children may be slightly ailing to obtain from some druggist in whom they have confidence the medicine needed, for perhaps a shilling or even a few pence, would be prevented from obtaining any, as they would be quite unable to pay the charges of a "doctor." Respectable practitioners too, throughout the length and breadth of the land, will be far from desiring the prohibition sought for. Imagine application being made to them in every case where "sixpenny worth of something for a cough" is required, or "something for worms" desired, when a like liberal outlay is the *maximum* expenditure meditated.

Again, in case of sudden illness, when possibly every "doctor" in the neighbourhood may be absent visiting his patients, and not expected home for some hours, what a boon it often is to the public to have an intelligent druggist to whom to have recourse. Suppose a case of colic or spasms or syncope suddenly occurring under such circumstances, is a druggist to tell any one so suffering, applying to him for relief, "I dare not prescribe for you but possibly the publican who keeps the neighbouring gin ship will"? The druggist is content to know that he possesses no *legal* qualification to prescribe, and therefore cannot sue for a debt incurred under such circumstances. But to interfere with the liberty of the public, and prevent them from obtaining from any druggist whom they desire to supply them, such remedies as the druggist deems they require, is an act of tyranny well nigh inconceivable—and more inconceivable, when it is considered that the education of druggists nowadays to fit them for such vocation is far in advance of that which obtained twenty years since. Nowadays there is scarcely one druggist in one hundred who is not too intelligent to prescribe himself the heterogeneous and incompatible mixtures which ever and anon he is called upon to dispense, ordered perhaps by a physician considered "one of the leading men of the day!" Striplings may occupy the twofold position of groom and dispenser to a surgeon, without the concurrence or even the cognizance of the patients who swallow the physic prepared by their skilful and careful hands, but my neighbour may not procure from me a bottle of medicine for his bilious attack, though I be willing to supply him, and he anxious to procure it from me. The thing is as I have said, monstrous. Again, any ignorant old woman may, by sticking a three-halfpenny government stamp on the bottle, distribute far and wide articles scheduled as poisons with impunity. I think the Chemists and Druggists' Trade Protection Society are much to be thanked for defending the case in question, and although I do not approve of their every act, I am of opinion that in this matter they merit the support of every druggist in the kingdom, and that on the strength of it each one should contribute a guinea to their funds.

ROBERT CHIPPERFIELD.

THE MEANING OF THE WORD "DISPENSE."

Sir,—As you have inserted two letters on "the meaning of the word 'dispense,'" perhaps you will not object to a third; though it seems almost absurd to write about the meaning of a word which every one ought to know. Of course the word "dispense" means to "administer," but what does administer mean? According to Webster, whose dictionary is made the standard of post office telegraphy, the word administer means to "afford, give, or furnish; as, to administer relief. Syn.: to manage; conduct; minister: supply; dispense; contribute." Consequently, counter prescribing is legal, and I do not think that it has ever been pronounced otherwise by any authority in the kingdom. But if Dr. Lush's Bill should become law, counter prescribing will be no longer legal. Why? Because the word "practise" in the said Bill means to "use medical methods or experiments," and as the Bill does not make a distinction between practice in a small way behind one's counter and the going out of one's shop to practise, we shall cease to be acting legally when we administer a "pick-me-up," or dose for a "belly-ache;" nor shall we be able to "strap up" a cut finger or attend an accident which has occurred in the street, nor extract a tooth, nor even apply a drop of laudanum, etc., to a painful nerve. All such acts will be unlawful!

It was well known when the Act of 1815 passed that chemists prescribed over the counter, and the word "dispensing" in that Act was, no doubt, put in to show that counter prescribing might be continued. For if counter prescribing was not intended why use the word at all, since in the same sentence occurs the word "preparing," which has reference to preparing physicians' prescriptions; and the word "dispensing" also occurs therein to allow the continuance of an immemorial custom of chemists to administer, to give, and to afford relief over the counter?

No additional Act of Parliament is necessary to define the duties of chemists and druggists, and if the words "or who shall practise medicine or surgery for gain," in Dr. Lush's Bill, be omitted, neither chemists nor the public, in my opinion, could object to the Bill becoming law. That simple omission would meet the whole case, and at the same time would not interfere with the rest of the Bill or its objects.

Dr. Lush's Bill must not pass in its present form.

GEORGE P. POND.

CHEMISTS' ASSISTANTS' ASSOCIATION.

Sir,—It has long been thought necessary that there should be something more sociable than the scientific meetings at the Square to promote good fellowship between chemists' assistants, and though much has been written and many suggestions offered I believe that it is only lately that a determined attempt to put them in actual practice has begun. The advantages of such an association are too obvious to need any comment, but I may suggest that the first and foremost place in the discussions that will result from its formation ought to be given to the subject of early closing. I suppose chemists must consider themselves as being public servants, but still let there be a limit to such servancy, and let those chemists who live in the West End, and can afford to lose a few small customers, initiate the movement. At the meeting held a few weeks ago in the lecture theatre there seemed a pretty general disposition amongst those present to endeavour to curtail the long hours of business; let us hope that we may hear some good come of the talk that took place.

Anent the Assistants' Association, I was sorry to observe a tendency on the part of some members of the trade to throw cold water on the scheme and to regard it in the light of a trade union. Now I do not see anything to justify that feeling, and should very deeply deplore a circumstance which I hope is improbable. With unanimity I think that the movement cannot fail to be successful, and I earnestly ask all those who have advocated the formation of an association to work hand-in-hand to secure the desired end.

Plumstead, Kent, May 26, 1877. AN ASSOCIATE.

THE SALE OF THE METHYLATED SPIRIT.

Sir,—In the Journal of November 25, 1876, a case is reported in which a dealer was fined for selling methylated spirit, which was afterwards used as a beverage. Wishing to know what retailers were liable to, I wrote to the Inland Revenue Office, and, after repeated applications, obtained the following answer to my questions, which is so curious that I think it may be well for retailers to be made acquainted with it.

The questions asked were:

1. Can methylated spirit be sold for any purpose apart from manufactures, or be used for domestic purposes?

2. Is a retail dealer required to ascertain what purpose methylated spirit is required for before selling?

H. GOODALL.

"Inland Revenue Office,
"Somerset House, London.
"January 20, 1877.

"Sir,—In reply to your communication, dated the 12th instant, I am directed by the Commissioners of Inland Revenue to inform you that,

"1. You can legally sell methylated spirit to be used for burning in lamps and for purposes not connected with manufacture.

"2. The law does not expressly bind you to know what purpose it is for before selling it, but if you sell methylated spirit and if it is afterwards used as a beverage you are thereby rendered liable to the penalty of £100, imposed by the Act 24 and 25 Vic., cap. 91, sec. 6, upon any person who 'shall sell any such spirit as and for a beverage.'

"WILLIAM ROSSETTI,
"*Assistant Secretary.*"

THE COPYING OF PRESCRIPTIONS.

Sir,—The now universal custom of copying prescriptions is felt by many chemists to be a vexatious expenditure of time. Just permit me, Mr. Editor, one or two remarks on the subject, in order to suggest how the evil may be remedied.

If prescriptions are to continue to be copied into books, as at present, it is absolutely necessary that some abbreviated method of copying be resorted to. If all were acquainted with phonetic shorthand we would have a ready means of economizing our labours, but the use of that system is in the meantime impracticable, since nine out of every ten are ignorant of it. Moreover, when the number of medico-pharmaceutical words is so very limited, it may be questioned whether it would be the best system to employ for the purpose. It would be very easy to invent a number of simple and appropriate signs representing prescription-language, which would economize time in a considerably greater degree than even phonetic shorthand.

But why should we copy our prescriptions at all? All the benefits arising from copying (which are neither numerous nor important) could be obtained in several ways in a much easier manner. What, for example, is to prevent chemists keeping the original prescriptions, numbering and filing them so as to be ready for immediate reference when required. This may not be the best conceivable system, but I venture to say it would be vastly preferable to that now in operation, even if for no other reason than that it would effect a saving of time in prescription-dispensing by nearly one-half. I hope pharmacists will take this subject into consideration.

And, by the bye, another source of lost time to chemists is the illegible manner in which prescriptions are frequently written; and if it be really an impossible thing for the busy practitioner to write in a human fashion, might not the medical profession, at the request of pharmacists, be induced to adopt some uniform style of penmanship, resembling, perhaps, the "engrossing hand" of lawyers? Clearness is doubtless an essential requisite of legal documents, but it is at least equally important that prescriptions should be written in a readily-read and unambiguous manner. R. HALDON.

AVOIRDUPOIS WEIGHTS AND FLUID MEASURES.

Sir,—In your next impression will you allow me space for a few remarks on the mode adopted by Mr. Squire in his 'Companion to the British Pharmacopœia' in expressing formulæ for preparations.

Throughout Mr. Squire's popular work the proportions of ingredients prescribed for pharmaceutical and other compounds are given in parts.

For example page 205, 10th edition, we read—

Ext. Opii 1; S. V. R. 16; Water 4.

In dispensing above it is customary to translate the parts as pounds, ounces, or drachms, as most convenient or required, and some dispensers I find, requiring a few ounces only of this preparation, weigh of the extract of opium one drachm (60 grains), and measure sixteen and four fluid drachms of the two other ingredients respectively, and thus commit an error, amounting to an excess of 5½ grains of opium extract.

This method of arranging formulæ, whilst being somewhat convenient, is, as I have endeavoured to point out, not without danger, and until we have a more perfect system of weights and measures should, I think, be discontinued, or accompanied with a few words of caution.

Newcastle-on-Tyne. JOSEPH ROBERTS.

Sir,—The enclosed has been sent me, and under the impression it is the same Mr. Fitch who spoke at the Annual Meeting, I enclose it to you, seeking to know if it be so, and whether his doctrine is like that animating some of our divines, Do as I say, not as I do.

BYAN WALKER.

26, *Clapham Road, May* 30, 1876.

Sir,—At the Annual Meeting of the Society there were many members who listened to the remarks of Mr. Fitch, of Hackney, with great attention, and thought, in him we have indeed a champion to fight co-operative societies and underselling chemists. Some unknown malicious person—no doubt connected with stores—has, I fear, perpetrated a cruel joke, by sending to me the enclosed handbill,* and a statement likewise that all drugs are sold at equally low prices, and refers me to the page of the Journal where Mr. Fitch's remarks appear. I can only look upon the matter as a shameful hoax and imposition.

May 29, 1877. JOHN WADE.

[*** We have received two other letters on this subject, but as it is to some extent a personal matter, and the writers do not sign their names, we think it will be sufficient to say that they are of the same purport as the foregoing.—ED. PHARM. JOURN.]

G. Dove.—(1) *Helleborus viridis.* (2) *Silene inflata.* (3) Apply to the Secretary for a copy of the Regulations.

"*Hexad.*"—Read the article on atomicity in Watts's 'Dictionary' or Fownes's 'Chemistry.'

W. M. Bates.—No doubt prescriptions are sometimes written that manifest a deficient knowledge of the chemical relations of the several ingredients, but we fail to see that this has any bearing upon the subject of counter practice.

"*Vincere.*"—(1) *Cardamine hirsuta.* (2) *Veronica serpyllifolia.* (3) *Cerastium glomeratum.* (4) *Sagina procumbens.*

"*Syrupus.*"—(1 *and* 2) *Weissia controversa.* (3) *Ceratodon purpureus.* (4) *Tortula vinealis.*

The Pharmaceutical Society and the Organization of the Chemical Profession.—We have received from Mr. Luff a letter in reference to this subject, but since his remarks are based on a misapprehension of the position of the Pharmaceutical Society we do not think its publication desirable.

Castor Oil Emulsion.—See before, p. 835. Also vol. v., p. 314.

Errata.—In the list of Donations to the Benevolent Fund published last week, for "Butler, Edward T.," *read* "Butler, Edmund T."; also in the address of Messrs. Silverlock, for 96, Blackfriars Road *read* 92.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Richardson, Mr. Pollard, Mr. Wilson, Mr Jackson, Mr. Patterson, Messrs. Newbery, Mr. Wilson, Mr. Churchill, Mr. Twelton, Justitia, Caryoph.

* This handbill is headed "Cooperative Stores and competition defied!!!" and it offers patent medicines at discount prices.

NOTES ON SOME OF THE PHARMACEUTICAL PRODUCTS EXHIBITED IN THE PHILADELPHIA EXHIBITION OF 1876.

BY JOHN R. JACKSON.

At the monster gathering at Philadelphia last year medicinal products seem to have been fairly represented, indeed in some individual countries they appear to have been made a special feature. From the catalogues of the Venezuelan and Mexican departments we may gather a fairly good notion of the extent of the pharmaceutical exhibits of these two countries. Taking those of Venezuela first, we find many that are not only well known, but that are also included in our own Pharmacopœia. Among such is the castor oil from the seeds of *Ricinus communis*, which, however, though one of the most common plants in Venezuela, does not supply the oil for medicinal use in the country, the preparation of it being too expensive; consequently the demand is furnished from Europe. Other well-known products are quassia wood (*Quassia amara*), the purgative pods of *Cassia fistula*, ginger (*Zingiber officinale*), turmeric (*Curcuma longa*), both of which are cultivated, the purgative oil of *Jatropha curcas*, and several others Of less known plants may be mentioned the Guacima, *Guazuma tomentosa*, H.B.K., and *G. ulmifolia*, Lam., the barks of which are mucilaginous and refreshing. Nutritive properties have been ascribed to the mucilage which abounds equally in the leaves and bark of the former species. It is readily extracted by water and has been used as a substitute for gelatine or albumen in clarifying sugar; an infusion of the bark has also been administered internally as a remedy in cutaneous diseases. Two or three species of *Aristolochia* are considered aromatic and antispasmodic. *A. barbata* is known as the Raiz de Mato, the latter name being that of a large lizard, and derived, it is said, from the popular belief that this reptile eats the roots after having been bitten by a venomous snake. *A. maxima*, Jacq., is known by the name of "Bejues de Santa Maria," and like the other species is used as an aromatic and antispasmodic. Chica, the red pigment prepared by the Indians of the Orinoco from the leaves of *Bignonia Chica*, H.B.K., has the reputation of being a remedy in erysipelas. To extract this pigment the leaves of the plant are left to macerate for some time, when the colouring matter separates and settles at the bottom of the vessels and is afterwards collected, dried, and formed into balls or cakes. Cola nuts, under the name of "Papas de Cola" (*Cola acuminata*, R. Br.), are cultivated, but are not common; the seeds are used in liver complaints. One of the most popular medicines for purifying the blood is known as the escorzonera (*Craniolaria annua*, L). The root is the part used in a dry state in medicine, and when fresh and fleshy it is sometimes preserved in sugar and eaten as a delicacy. From the seeds of *Mucuna pruriens*, which is known locally as the "Ojo de Zamuro," or eye of carrion vulture, an alcoholic extract is prepared which is reputed to be a remedy for asthma. The seeds of the tonquin bean (*Dipteryx odorata*) are included in these pharmaceutical products of Venezuela. In 1872–3, some 66,663 kilograms were exported from Ciudad Bolivar.

Leaving the Venezuelan collection and turning to that of Mexico, we find a very interesting series of chemical and pharmaceutical products. Amongst chemical products are first pipitzahoic acid and pipitzahuina, the extracts of a composite plant variously stated by different writers as *Perezia fruticosa*, *Acourtia rigida*, *Dumerilia Alamani*, and in the Mexican catalogue as *Trixis pipitzahoac*. The organic compounds extracted from this plant are described as interesting, not only because of their novelty but of their prospects of future usefulness. Pipitzahoic acid is of a "brilliant golden colour, and of a soft silky texture being contained either in an amorphous state or crystallized in small prisms and laminæ." At present, pipitzahoic acid is employed in medicine as a drastic purgative, and it can be used as a colouring matter. A fine sample of this substance, together with roots, foliage and flowers, is contained in the Kew museum. Its price in Mexico is 11 cents. a gram. Pipitzahuina is described as being white, fusible, and volatile at over 100° C.; when treated by sublimation it crystallizes in prismatic needles and when obtained by evaporation the crystals assume the laminar form. It is soluble in ether and chloroform, but insoluble in water. A substance known as Tebetosa or Tevetosin, which crystallizes in four-sided prisms, is inodorous, and very sour to the taste, likewise insoluble in water, but soluble in alcohol. It is a new product and is referred to hereafter under the order Apocynaceæ. In the section "medicine," a classified list of medicinal products of vegetable origin is given, sent by the Society of Natural History, and amongst which it is said there are specimens of great therapeutical interest. As comparatively few readers of the *Pharmaceutical Journal* will have had the opportunity of seeing this collection at Philadelphia, and as the circulation of the catalogue itself will necessarily be somewhat limited, a brief summary of the description of these products will no doubt prove interesting, more especially as comparatively little is really known about Mexican products. The arrangement in the catalogue is on a scientific basis, the plants being classified under each order, commencing with the cryptogams and ending with the magnoliaceæ. In many instances, most egregious mistakes occur in the spelling of the order, genera, species, or description of the plant and its uses. It will, we think, be more convenient for the readers of the Journal if we classify the products under the natural order as they occur in the 'Genera Plantarum,' so far as that work at present goes; the arrangement there adopted being that now most generally acknowledged. Reversing, then, the order of arrangement in the catalogue and commencing with—

MAGNOLIACEÆ.

Magnolia mexicana is the only plant mentioned. It is described as growing in the State of Morelos, and the flowers as containing "essential oil, green resin, quercitrine, tannin, extractive and salts." The infusion of the flowers is used as an antispasmodic, and the tincture as a tonic.

MALVACEÆ.

Malva angustifolia, Cav., "Yerba del Negro." Table land. Leaves and roots emollient.

ZYGOPHYLLEÆ.

Zygophyllum fabago, L. "Gobernadora." Leaves used in bathing to cure arthritic pains.

RUTACEÆ.

Zanthoxylum pentanome, D.C., "Palo mulato."

Valley of Mexico; wood and bark used as stimulant and tonic.

AMPELIDEÆ.

Cissus tiliacea, H. B. K. "Tripa de Judas." Table land. Decoction used in rheumatism.

ANACARDIACEÆ.

Amyris lignaloe, "Linaloe." Used chiefly as a perfume, which is extracted from the wood. This perfume was introduced into the English perfumery trade some few years since, and the wood was then said to be a species of *Bursera*. We can find no authenticity for the specific name *lignaloe*.

Schinus molle, L. Peru and Chili. This is a plant of some interest, both medicinally and botanically; medicinally on account of the uses of the roots and of the resin which is astringent. In Chili a kind of wine is prepared from the fruits, and the small twigs are used as toothpicks. The botanical interest is thus described in the *Botanical Register*. "The leaves of some of the species are so filled with a resinous fluid that the least degree of unusual repletion of the tissue causes it to be discharged; thus some of them fill the air with fragrance after rain, and *S. molle*, and some others expel their resin with such violence when immersed in water as to have the appearance of spontaneous motion in consequence of the recoil."

(*To be continued.*)

CRITICAL NOTES ON MUSCARINE, AND SOME ALLIED BASES.

BY CHARLES T. KINGZETT, F.C.S.

In a recent issue (p. 774) there appeared in this Journal an abstract of a paper by O. Schmiedeberg and E. Harnack,* on 'Muscarine,' a base which from its apparent connection with other bases of animal and vegetable origin, is possessed of much interest not only to the chemist, but to the physiologist. The authors of the paper in question appear, nevertheless, to entertain some erratic ideas regarding some of these bases and their sources. To render the subject clear it will be requisite to give some historical account of these nitrogenous substances.

O. Liebreich,† in his study of some brain principles, obtained by boiling them with baryta water a base soluble in alcohol, which he did not examine in any minuteness. But Diakonow‡ in a similar investigation, conducted on the same principles, examined this nitrogenous base more in detail, and gave to it the formula $C_5H_{15}NO_2$. He viewed it as *neurine*, or trimethyl-oxaethylammonium-hydroxide. Strecker§ obtained a like base by the decomposition of lecithine from eggs, with boiling baryta water. So far as the lecithine is concerned, it is sufficient for the present purpose to note here its identity with the lecithine prepared from brain matter. It should, however, be further stated that brain lecithine is one of a number of phosphorized principles built on a common type, and existing in the brains of men and oxen. None of these phosphorized principles are derived from albumin, nor have they any characters in common with that substance; they are conjugated compounds, which may be viewed as derived from glycerine by the replacement of hydroxyls by fatty acid radicles on the one hand, and by phosphoryl on the other hand: the phosphoryl, in its turn, has one hydroxyl replaced by an ammonium base, and that base is the one of which we have been treating. From all the phosphorized principles it is the same base which is obtained as a main product, but under certain conditions other bases may be obtained which exhibit a close relation to the main one, and which are probably by-products from a secondary decomposition of it.

The exact formula for this base is not absolutely established. We have seen that Diakonow and Strecker both regard it as $C_5H_{15}NO_2$, but in Thudichum's researches, with which the writer was associated for some years, the base obtained could scarcely be viewed as possessing such a composition. From kephaline, lecithine and certain forms of myeline there was obtained a base identical in all instances if judged by the empirical formula of its hydrochloride platinic chloride combination, which on analysis invariably gave figures corresponding to the formula $2(C_5H_{13}NO)\,2HCl.PtCl_4$; it should however be observed that different crystalline forms of the salt were obtained.

Writing of this compound Thudichum says,* "the formula of $C_5H_{15}NO_2$ is rather presumed than proved as regards the exact quantity of the hydrogen and oxygen, for if the HCl were like the $PtCl_4$ merely an addition, then the formula of the free base would be $C_5H_{13}NO$; but if the chloride were a product by substitution of hydroxyl by Cl, and expulsion of the hydroxyl as H_2O, then the larger formula for the free body would be correct."

In my opinion there is not the least reason for such a gratuitous assumption which the formula $C_5H_{15}NO_2$ necessitates according to the above observations. The base from brain sources has undoubtedly a formula of $C_5H_{13}NO$, although of course it is just possible that as a hydrate it would have the composition $C_5H_{13}NO.H_2O$.

The secondary by-products obtained in the above researches gave combinations which had the formula $2(C_2H_7NO)\,2HCl.PtCl_4$ and $C_5H_{14}N_2O.HCl.PtCl_4$. Viewing for the moment the main base as trimethyl-oxaethylammonium, then perhaps the first of these secondary substances may be regarded as oxethylamine,

$$\left.\begin{matrix}C_2H_5O\\H\\H\end{matrix}\right\}N\text{, or as dimethylamine hydroxide, }\left.\begin{matrix}CH_3\\CH_3\\HO\end{matrix}\right\}N$$

The relation of the other secondary product to the main base is not so clearly perceptible.

These lengthened observations are necessary in order to show that Schmiedeberg and Harnack are in error when they write of "lecithine from albumin." Lecithine may be obtained from many sources, including the brain, bile, eggs, the roe of certain fishes etc.; it is in no instance derived from the albumin, but constitutes in itself a principle, which on decomposition with baryta water splits up into glycerophosphoric acid, oleic and margaric acids, and a nitrogenous base.

Strecker gave the formula $C_{42}H_{84}NPO_9$ to egg lecithine, and showed its decomposition with baryta water, by the following equation:

$$C_{42}H_{84}NPO_9+3H_2O= \\ C_3H_9PO_6+C_{18}H_{34}O_2+C_{16}H_{32}O_2+C_5H_{15}NO_2$$

* *Archiv fur Experimentelle Pathologie u. Pharmakologie*, vol. vi. p. 101.
† *Ann. Chem.*, 134, 29.
‡ *Centr. bl.* No. 1, 1868, and *Centr. bl.* No. 7, 1868.
§ *Sitz. Ber. d. Acad. d. W. München*, 1869, 2, 269.

* *Rep. Med. Off.*, etc., New Series, No. VIII., p. 127.

Baeyer* produced this nitrogenized base, which is generally named choline by Liebreich's process, and purified it by combination with phosphowolframic acid and decomposition of the precipitate with baryta water. The free base thus obtained he converted into hydrochlorate, and from this he made the platinic chloride combinations. In his analyses of various preparations he obtained discordant results, which indicated the existence of the following three compounds:

(a) $2(C_5H_{13}N)2(HCl)PtCl_4$
(b) $2(C_5H_{11}N)2(HCl)PtCl_4$
(c) $2(C_5H_{13}NO)2(HCl)PtCl_4$

By heating in a sealed tube to 120—150°C. during some hours, a mixture of concentrated solution of the base, obtained as described, with concentrated hydriodic acid and phosphorus, Baeyer obtained large colourless prismatic crystals of the formula $(C_5H_{13}N)I_2$, from which, freshly precipitated chloride of silver removed one atom of iodine and gave up a chlorine in its place, thus furnishing a substance which combined with platinic chloride had the formula, $2((C_5H_{13}N)ICl)PtCl_4$.

When digested in the warm with silver oxide, the iodide lost both iodines, and yielded a base which when converted into hydrochlorate, and this combined with platinic chloride, etc., had the constant empiric composition, $C_{10}H_{24}N_2O2HClPtCl_4$. It is difficult to draw conclusions of a satisfactory nature from Baeyer's researches in this matter. In the first place he obtained from brain principles a mixture of allied bases, and among them the principal one which all other investigators before and since have obtained, and proceeding further he obtained bodies having here and there evident relations, which however disappear equally often.

To pass on to A. W. Hofmann's researches. He obtained a substance of the composition $(C_5H_{13}N)Br_2$ by treating an aqueous or alcoholic solution of trimethylamine with ethylene bromide; the product gave up to nitrate of silver one bromine, leaving a substance which, combined with platinic chloride, had the formula $2(C_5H_{13}N)Br_2Cl_2,PtCl_4$. Both bromines are removable by oxide of silver. Now from the compound which Baeyer obtained viz. $(C_5H_{13}N)I_2$, which is probably trimethyl-iodoethyl-ammonium iodide $(N(CH_3)_3\,(C_2H_4I)I)$ it becomes evident, that Baeyer's mixture may have contained either trimethylvinyl-ammonium-hydroxide, $(N(CH_3)_3\,(C_2H_3)HO)$, or trimethyl-oxethyl-ammonium-hydroxide, $(N(CH_3)_3\,(C_2H_4(HO)HO)$; it is probable that he had several bases in his hands under the name of neurine.

Summing up this evidence it will be seen that the substance represented by the formula $C_5H_{13}NO$ is the oxide of the base $C_5H_{13}N$, and that it is possible to obtain a large number of bases of allied characters, and referable to the one or to the other of these.

Von Babo and Huschbrunn,† obtained sinkaline as a product of decomposition of sinapine, an ingredient of mustard; and A. Clauss and C. Kessé‡ claim to have established the identity of sinkaline with choline (meaning probably $C_5H_{15}NO_2$).

Harnack (§) has found in the red fungus which yields muscarine (said to be isomeric with betaine), another alkaloid, said also to be isomeric with choline, which he names amanitine and regards as—

$$N\left\{\begin{array}{l}(CH_3)_3\\ CHOH{-}CH_3\\ OH\end{array}\right. \text{ or } C_5H_{15}NO_2$$

Now in the paper alluded to in commencing, Schmiedeberg and Harnack state that choline or neurine, sinkaline, and synthetically prepared hydrox-ethylentrimethyl-ammonium are identical, and all yield muscarine upon oxidation.

They regard muscarine as

$$N\left\{\begin{array}{l}(CH_3)_3\\ CHOH{-}CHO\\ OH\end{array}\right. \text{ or } C_5H_{13}NO_2 \text{ capable of}$$

forming the salt $C_5H_{13}NO_2\ HCl\ Pt\ Cl_4$, and the salt $C_5H_{13}NO_2\ 2HCl\ PtCl_4+2H_2O$. Muscarine is therefore said to be isomeric with betaine. By treatment of muscarine chloride with moist oxide of silver, the hydroxide is obtained.

$$N\left\{\begin{array}{l}(CH_3)_3\\ C_2H_5O_2\\ OH\end{array}\right. \text{ or } C_5H_{15}NO_3$$

The oxidation of choline and its so-called isomers into muscarine is not effected, according to Schmiedeberg and Harnack by means of such bodies as potassic permanganate and chromic acid, but requires strong nitric acid containing as little water as possible, and evaporation therewith to dryness.

The only difference between the two bodies is seen to be 2H.

$$\begin{array}{r}\text{Thus choline} = C_5H_{15}NO_2\\ \text{muscarine} = C_5H_{13}NO_2\\ \hline H_2\end{array}$$

and yet strong nitric acid and evaporation to dryness is required to remove these two hydrogens!

This and the various other facts stated, is sufficient to throw their conclusions into grave doubt; at least there is apparent a terrible confusion which is most bewildering in its effects upon those who have worked upon this subject, and which renders it impossible *pro tem.* to accept their results as entirely representing the truth.

Moreover, their reason for regarding muscarine as isomeric with betaine is not evident. This last-named substance has been built up synthetically by Peter Griess,* who regards it is trimethylglycocine $C_2H_2(CH_3)_3NO_2$ or $C_5H_{11}NO_2$. Griess obtained it by acting on glycocine in alkaline solution with methyl iodide, and although it may be identical with Scheibleis' betaine from beet-root, it is certainly not identical, as is stated, with oxyneurine or choline from brain sources.

It must be remembered that there are a series of betaines, or trebly substituted amido acids, the betaines, *par excellence*, being trimethyl and triethyl glycocine. (See paper by J. W. Brühl.†)

To conclude this article, it may be stated that most of the difficulty experienced in the study of these various bodies arises from the inability to determine accurately the percentage of hydrogen in them; it is almost impossible to do this to an atom of hydrogen, and yet the difference of an atom makes all the difference in the world to conclusions drawn from such work.

The method of analysis introduced by Liebig can yet do much towards completing our partial knowledge of these compounds; but it is futile to explain isomerism, the elucidation of which awaits the outburst of a new epoch in chemical science.

* *Ann. Chem.*, 140, 306. † *Ann Chem*, 84, 10.
‡ *Journ. P. Chem.*, 102, (1867), 24.
§ *Chem. Centr.*, 1875, 629-630.

* *Deut. Chem. Ges. Ber.* vii., 1406.
† *Deut. Chem. Ges. Ber.* ix., 34-42.

THE "STANDARD" ON THE PROPOSED AMENDMENT OF THE MEDICAL ACTS.

The following "editorial" which appeared in the *Standard* last Wednesday will be read with interest :—

"A deputation of medical men waited the other day upon the Home Secretary to complain of the inefficacy of the present administration of the laws intended to enforce the possession of proper qualifications by persons practising as surgeons and physicians. They pointed out in particular that a number of certificates of death are signed by unqualified persons; and inasmuch as in this case a legal requisition is in question, it would seem tolerably easy to deal with an obvious violation of the law. The practical mischief of the existing laxity was illustrated by Dr. Carpenter, who held a bundle of certificates all signed by the same person and all giving as the cause of death effusion on the brain—a form of fatal disease not common enough to render it possible that it should have occurred in so great a number of instances within the practice of a single "druggist's assistant." Now the purposes for which the law demands a certificate of the cause of death before a corpse is buried are very obvious. If nothing of the kind were required there would be very great probability of impunity in cases of manslaughter or murder not of a character to attract the notice of neighbours and provoke a coroner's inquest, especially among the poorer classes. But in order that the legal certificate may have any value as a security against malpractices it must evidently be signed by a qualified and responsible person, presumably capable of recognizing the distinctions between various forms of fatal disease, and of detecting the suspicious appearances which indicate poison, neglect, or ill-usage. If certificates are accepted indiscriminately from quacks or druggists' assistants, as well as from qualified surgeons and physicians, the object of the requirement is entirely defeated.

"The demand of the deputation for more stringent measures against "practising quacks" is not so easily to be satisfied. We have no sympathy whatever with any class of unqualified practitioners; nor will our readers suspect us of any lurking weakness in favour of any of those questionable therapeutic methods which occupy the border ground between regular medicine and downright imposture. But it is obvious that the existence of this latter class of practitioners, and the confidence reposed in them by a large number of persons who, however ignorant they may be of medicine, are not uneducated, and must be allowed to take their own way where their own health is concerned, interposes a serious difficulty in the way of any rigorous dealing with quackery. In order to punish or to put down quacks quackery must be legally defined, and we doubt whether any of the deputation, had Mr. Cross asked them for a definition, could have furnished one which a legal draughtsman would have ventured to embody in an Act of Parliament. Some of them might perhaps have given such a definition to their own satisfaction by insisting that no one not possessing a formal qualification either as a member of the College of Physicians or the College of Surgeons, or as a medical graduate of one of our own universities, should be allowed to practise the healing art in any form whatever. But it is obvious that so stringent a prohibition could not be obtained from Parliament, and could not be enforced against the convictions of a large number of persons firmly attached to practices which orthodox medical men regard as little better than quackery. No statesman, except perhaps Mr. Lowe, would venture on so high-handed an interference with personal liberty, or on the manifestation of so profound a contempt for the opinions of the numerous medical heretics to be found in all classes of society. We presume that, in the opinion of at least a majority of the deputation, the rules of homœopathy, formal and simple as they are, might be applied almost as safely by a druggist's assistant as by a qualified graduate of the University of London, if any such graduates believe in the theory of Hahnemann. It would not be easy to insist that no man not duly qualified as a medical practitioner should keep a hydropathic establishment. It might not even be possible either to forbid the employment of mesmerism in cases of serious illness, or to insist that every mesmerist should have the qualifications which Elliotson and one or two other almost equally celebrated mesmerists undoubtedly possessed. Even the suppression of herbalists would be felt as a practical grievance by a certain number of electors whose votes their Parliamentary representatives might not care to lose.

"Nor is it easy to see how homœopathists, hydropathists, mesmerists, and herbalists are to be legally distinguished from that most infamous class of quacks to whose malpractices the deputation especially referred. Morally, no doubt, there is the widest possible distinction between men, however weak their intellect, who believe in new-fangled methods of treatment, aquatic, vegetarian, or mystic, and designing advertisers who make fortunes out of the ignorance and the imprudences of youth. The latter are among the worst moral pests of the age. They not only poison the constitutions of thousands, but in many cases extort large sums by threatening to make known the secrets which have been professionally entrusted to them. The extreme rarity of the instances in in which such conduct is detected and punished affords no measure whatever of the frequency of its occurrence. It is obvious that not one in a thousand of those who find out that they have been imposed upon will tell their story in a court of justice. The very motive which sends them to these quacks—desire for secrecy—prevents them, however grossly wronged, from publishing their case. If the complaining physicians can afford us any satisfactory definition by which this class of quacks can be distinguished from merely preverse or heretical practitioners of unauthorized therapeutic systems we should heartily accept their proposal, and should think no punishment they might propose too severe for the class of offenders in question. But obviously it is impossible to forbid the use of any supposed curative process by persons not graduates of certain universities or licencees of certain professional bodies; and short of this we hardly see what measure could effectually reach the advertising quacks. Of course they can at present be punished for assuming qualifications they do not possess, and the punishment might be enhanced. But it is not necessary to them to call themselves physicians, surgeons, or even doctors; for now-a-days almost every one knows that many of the ablest regular practitioners do not bear the academic title of doctor. The quacks therefore could afford to drop this and every other recognized professional title, and could still carry on their practices as before.

"It is, moreover, impossible to prohibit chemists, who fill the place of the old apothecaries, from prescribing in apparently trivial cases for the poor. The latter cannot afford, whenever they or their children are ailing, even the smallest fee required by a regular practitioner, or the time necessary to obtain advice at an hospital. They go naturally to the person who can give them a rhubarb pill or a sedative powder over his counter; and we have no doubt that in nine cases out of ten the chemist's advice is good, and that his irregular practice of medicine and dentistry, though perhaps in strictness illegitimate, is indispensable to the respectable poor. All these considerations show how exceedingly delicate and difficult would be the task of a statesman who should undertake the repression of quackery by legislative measures; and we greatly doubt whether, except in the somewhat stricter enforcement of the regulations already existing, it be possible to put down by law the evils which have naturally excited the indignation of the profession. Common sense and the diffusion of education will no doubt greatly diminish the influence of medical delusions and the profits of imposture; and with this we fear that society and the doctors must for the present be content."

The Pharmaceutical Journal.

SATURDAY, JUNE 9, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, *17, Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE REPORTS OF THE GOVERNMENT VISITORS ON THE EXAMINATIONS.

"To see oursel's as others see us" was the aspiration of the Scotch bard, and, by the wisdom of Parliament and the courtesy of the Lords of the Privy Council, the Board of Examiners is from time to time provided with this safeguard against "blunders" and "foolish notions." But the reports of the Visitors to the Examinations on behalf of the Public have also a wider interest, extending to all who have the future welfare of pharmacy at heart, and one at least of those which were laid before the Council on Wednesday last is equal in importance to any that have preceded it.

Dr. MACLAGAN has given fresh proof that he exercises the important trust confided to him *con amore*, by the able and thorough way in which he discusses the results of the pharmaceutical examinations held in Edinburgh during the year 1876. Nor do we doubt that a perusal of the entire report from Dr. GREENHOW on the examinations in London would evidence the same spirit, but our knowledge of it is at present limited to the extremely satisfactory testimony that the examinations were conducted in such a manner as to "constitute an ample guarantee to the public of the practical competency of "persons admitted to register as Chemists and "Druggists under the Pharmacy Act of 1868."

The proportion of failures to pass the Major and Minor examinations in Edinburgh having been rather larger than in the previous year, Dr. MACLAGAN appears to think the satisfaction to be derived from the contemplation of this fact is confined to the evidence it affords that the examiners continue rigidly and impartially to discharge their duty in remitting candidates who are not up to the mark. It may be remarked, however, that the gross number of examinations in Scotland—Major, 2, and Minor, 84—was rather small for the purpose of an average, and that on the larger number examined in Great Britain the average of failures showed a considerable decrease. Moreover, the opinion that "these results certainly "show that there is no marked improvement in the "qualification of the bulk of the candidates" appears to require such qualification as is to be found in the increased stringency of the examinations instituted in 1876. A result of this increased stringency is perhaps to be traced in the greater correctness of answer to question and the more scientific style of answer noticed by Dr. MACLAGAN in the really good candidates.

One feature that will be sure to attract attention in Dr. MACLAGAN's report is the classified list of failures to obtain four tenths of the available marks. It is not very clear whether the figures given represent absolute or relative numbers, or what were the conditions under which they were obtained, for we presume that when a candidate has manifested a certain amount of incompetency he is remitted although he may not have been examined in all the subjects, and therefore the order in which the subjects were taken might have a decided influence on the figures. But even though it may be a somewhat rough indication of the comparative weakness of the unsuccessful candidates in the several subjects, there is a sharp contrast between the first three, prescription reading, practical dispensing, and materia medica, and the last three, pharmacy, chemistry and botany, that is very significant, the former each showing four failures, whilst the latter are respectively 12, 13 and 17. It may be that the explanation is to be found in the fact that many young pharmacists still receive during their apprenticeship solely empirical training, which is moreover of a very limited extent, affording little opportunity of acquiring chemical or botanical knowledge. The general success in detecting unusual doses and deciphering prescriptions, notwithstanding a manifest unfamiliarity with the Latin language, the ability to dispense, and the acquaintance with materia medica would allow of such a theory. Even the large number of failures in the important subject of pharmacy, involving not only the recognition of official preparations by their colour, smell and taste, but the knowledge of how these are prepared according to the Pharmacopœia, which was in fact the weak point, is due, probably, rather to the too frequent absence during apprenticeship of opportunities of becoming practically acquainted with the preparation of such compounds than to the neglect of opportunities. Such a deprivation, as Dr. MACLAGAN remarks, cannot be recovered by an attempt to commit the Pharmacopœia to memory.

The largest proportion of failures, as might be expected, was in the strictly scientific departments of chemistry and botany. Dr. MACLAGAN nevertheless urges the necessity of insisting on thorough knowledge of these branches as a means of raising the scientific character of the pharmaceutical profession, and in this he endorses the action of the Pharmaceutical Society since its foundation. As to the tendency to the display of chemical skill mentioned this may not be unaccountable from the impression the candidates may naturally acquire as to the character of the particular examination.

The careful consideration which Dr. MACLAGAN has evidently given to every part of this report makes doubly welcome the fact that he is found to be in accord with Dr. GREENHOW in stating his conviction that the various examiners, including those who have been added to the Board since his last Report, discharge their duties with a judicious combination of strictness, impartiality and consideration for candidates.

ELECTION OF ANNUITANTS ON THE BENEVOLENT FUND.

AMONGST the business that came before the new Pharmaceutical Council at its meeting last Wednesday, was the consideration of the expediency (financially) of electing annuitants on the Benevolent Fund, in October next. The decision to elect six fresh annuitants, a larger number than on any previous occasion, is one that will, we believe, meet with the approval of all the subscribers, and as it will represent an annual responsibility of £180 probably for several years, it cannot be said that the Council is lacking in confidence in the generosity of the trade. We regret, however, to learn from the Secretary's announcement that the ordinary annual subscriptions received during the present year are about £150 below the usual amount at this date.

We refer to this fact more particularly here, lest the long list of subscriptions, the first part of which appears in this week's Journal and which will be completed next week, might have a misleading effect.

THE MEDICAL ACT AMENDMENT BILL.

ON Friday, the 1st inst., Dr. LUSH carried out his promise to remove the objections of chemists and druggists, by withdrawing his Bill, and asking leave to introduce a fresh one. The new Bill was read a first time on Monday, June 4, and has since been printed. Upon comparison, it proves to be an exact counterpart of the previous Bill, with the exception that the words, "or who shall practise medicine or surgery for gain," are omitted. Chemists and druggists have therefore no further grounds for opposing the legislation proposed.

The wide-spread disfavour with which the manifest objects, of the extreme supporters of the late Bill was regarged is very significant. Not only did the Medical Council refuse to countenance it, but the medical press has not ventured to support it; in fact, one medical journal has gone so far as to express a regret that the original Bill was introduced at all, on the ground that it was little better than a chimera, and there was no advantage in the ventilation of impossible hopes. The subject has, however, attracted the attention of the public press generally, and there can be little doubt that the temperately written leader that appeared in the *Standard* on Wednesday, and which will be found on p. 1000, represents fairly the opinion of a very large section of the public on the question.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, June 6, 1877.

Present,—Messrs. Atherton, Atkins, Betty, Bottle, Churchill, Cracknell, Gostling, Greenish, Hampson, Hills, Owen, Rimmington, Robbins, Sandford, Savage, Schacht, Shaw, and Williams.

The chair having been taken by Mr. John Williams, the minutes of the previous meetings of May 2 and 16, were read and confirmed.

Mr. SCHACHT stated that owing to the liberality of the Council the Bristol Pharmaceutical Association had been able to purchase books to the value of £37, the first portion of which had just been placed on the shelves, and he had been complimented on the excellence of the selection. The arrangement of the materia medica museum had been entrusted to a small sub-committee, which had already received from the Curator of the Society's Museum a large proportion of the articles asked for, and the arrangement would soon be completed.

ELECTION OF PRESIDENT.

The first business was the election of President for the ensuing year, a ballot having been taken—

MR. JOHN WILLIAMS

was unanimously re-elected.

Mr. WILLIAMS thanked the Council for the honour done him, and for the support which he had received in carrying on the business of the Society during the past year.

ELECTION OF VICE-PRESIDENT.

On a ballot being taken—

MR. WILLIAM DAWSON SAVAGE

was re-elected Vice-President for the ensuing year.

Mr. SAVAGE briefly acknowledged his sense of the kindness of his colleagues in the expression of their confidence in him.

ELECTION OF TREASURER.

Mr. SANDFORD proposed that—

MR. CORNELIUS HANBURY

be re-elected Treasurer without the formality of a ballot.

The motion was agreed to.

APPOINTMENT OF SECRETARY AND ASSISTANT-SECRETARY.

Elias Bremridge was re-appointed Secretary and Registrar, and Richard Bremridge Assistant-Secretary and Deputy-Registrar for the ensuing year.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemist.

Marshall, Eli........................London.

Chemists and Druggists.

The following registered chemists and druggists were elected Members of the Society:—

Alexander, John Grieve ....Galashiels.
Lloyd, Thomas Howard .... Leicester.

ASSOCIATES IN BUSINESS.

The following having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Campbell, Colin ....Dumbarton.
Cartwright, William Adam......Astley Bridge.
Fox, Thomas Augustine ....St. Helens.

Geldart, William ....Boroughbridge.
Hall, Ralph ....Kingsland Road.
Holdcroft, George ....Victoria Park.
Hughes, Evan Grismond.........Gloucester.
Kimber, Benjamin Tindall......Tollington Park.
Martin, Henry Stephen ....East Grinstead.
Milton, Thomas, jun. ....Bristol.
Saville, George ....Wakefield.
Smith, Charles ....Heywood.
Spencer, James Hampson ......Chester.
Tripp, Zeno ....Stratford.

Modified.

Bedford, Christopher ....London.
Borthwick, Alexander John ...Selkirk.
Butcher, George Stephen ......Salford.
Daymond, Samuel ....Stonehouse.
Jagg, John Henry ....London.
Lincoln, Nathaniel ....Norwich.

ASSOCIATES.

The following having passed their respective examinations, and having tendered their subscriptions for the current year, or having paid the subscriptions of Apprentices or Students, were elected "Associates" of the Society:—

Minor.

Broadbent, John ....Manchester.
Capes, Howard Hawksley ......Epworth.
Dixon, Richard Dobson ....Sharrow.
Furness, Thomas ....Chesterfield.
Hall, Robert..........................Hartlepool.
Hulland, Charles Richard ......Bath.
Jones, Thomas ....Seacombe.
Simpkins, George Starr ....Minchinhampton.
Trood, Richard.......................Bath.
Wills, Vincent Andover ....Blaenavon.

Modified.

Davies, Charles Edward ....London.
Garrett, Thomas Philip ....London.
Hussey, Robert.......................London.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Andrew, Edward Oliver ....Welshpool.
Bowman, Edmund ....Leith.
Broadhead, Richard...............Levenshulme.
Brothwood, Harry Skarratt ...Shrewsbury.
Brown, Thomas Land ....Ripon.
Careless, John ....Birmingham.
Clarkson, Richard Bell ....Newark.
Crofts, John Ernest................Leicester.
Eaton, Charles Arthur ....Hull.
Evans, John Thomas Richard...Rhyl.
Fawcett, Christopher Airey ...Windermere.
Gascoigne, Charles ....Hurworth.
Hall, Charles.........................Leighton Buzzard.
Haward, Edgar.......................Darlington.
Heaton, John ....Burnley.
Jackson, William Edward ......Newark.
Jowett, Henry ....Leeds.
Morgan, George, jun. ....Market Drayton.
Owen, John Hart....................Bala.
Parkinson, William Armor......Preston.
Peat, Joseph ....Accrington.
Perry, John ....London.
Priestley, William Jepson ......Kingston-on-Thames
Richards, John Wesley ....Saltburn-by-the-Sea.
Riddle, James Pearson...........South Shields.
Spencer, George ....Bucklersbury.
Stanford, Frederick W............London.
Summerland, William Randle...Dudley.
Temple, Arthur William.........Thrapston.
Winch, John Miller.................Colchester.

Several individuals were restored to their former status in the Society, upon payment of the current year's subscriptions and a fine.

The names of the following persons were restored to the Register of Chemists and Druggists:—

Mary Jane Henderson, 4, Ferrier Street, Leith.
John Place, 24, King Street, Cambridge.
John Jonathan Goodlad, The Square, Isleworth.
William Boyd Johnstone, 2, Hilton Terrace, Shields Road, Byker, Newcastle-upon-Tyne.

APPOINTMENT OF COMMITTEES.

The Council next proceeded to appoint the Committees:—

General Purposes.—The whole of the Council; four to form a quorum, to meet as occasion may require.

Mr. SCHACHT suggested that if members residing in the country were appointed on Committees meeting in the middle of the month, their travelling expenses should be provided for. He would not move a resolution on the subject without notice, but if there were a general feeling that this should be done he would give notice of motion for next month.

Mr. BOTTLE reminded his country colleagues that they were now in a majority on the Council and must be prepared to take a fair share of Committee work.

Finance.—Messrs. Bottle, Cracknell, Greenish, Owen, Rimmington, and Robbins. The Committee to meet at three o'clock on the day preceding the Council Meeting.

Library, Museum, and Laboratory.—Messrs. Betty, Bottle, Gostling, Greenish, Hampson, Hanbury, Hills, Robbins, Sandford, and Schacht; to meet at eleven o'clock on the second Wednesday in each month except August and September.

House.—The same as the Library, Museum, and Laboratory Committee; to meet as occasion may require.

Benevolent Fund.—Mr. SHAW suggested that the whole of the Council should be appointed on this Committee.

The proposition was supported by Mr. Robbins and the President.

Mr. HAMPSON thought this would be a mistake, and that the work would not be done so well.

Mr. GOSTLING thought it would be well for all members to be on this Committee, as they all took a deep interest in the Fund.

Mr. CHURCHILL said he should be happy to serve upon it.

Mr. ATKINS thought it would be well to appoint the whole Council.

Mr. SCHACHT did not see the use of appointing Committees consisting of all the members of Council. The whole of the work might as well be done in Council. By having smaller Committees two could sit at one time.

After some further remarks from Mr. Hampson,

Mr. SANDFORD said though he saw the advantage of having gentlemen on that Committee from all parts of the country he still felt with Mr. Hampson that the work would be done better by a smaller Committee.

Ultimately the following names were agreed to as forming the Committee:—Messrs. Atherton, Betty, Bottle, Churchill, Gostling, Greenish, Owen, Rimmington, Robbins, Sandford and Shaw. The Committee to meet at four o'clock on the day before the Council Meeting.

Law and Parliamentary.—The whole of the Council; to meet on the Tuesday evening previous to the Council meeting, or as occasion may require.

THE EVENING MEETINGS.

Mr. GREENISH said it was usual to make arrangements for the evening meetings, but he begged leave on this occasion to move that the appointment of a Committee to make arrangements for the evening meetings for the ensuing session be referred to the Library, Museum and

Laboratory Committee, to report to the Council at the next meeting. He did so because he did not think the arrangements for the evening meetings had been everything that could be desired, and he had some suggestions to make which he could do better in the Committee than at the Council Board.

Mr. SCHACHT thought this motion was hardly regular. The Council was now appointing Committees, and he did not see how the desirability of appointing of one Committee could be referred to another. After some further conversation he said he would move as an amendment,

"That the President, the Vice-President, the Professors and the Editor be appointed a Committee to regulate the proceedings of the evening meetings."

Mr. BETTY seconded the amendment.

Mr. CHURCHILL said he should support Mr. Greenish's motion, because he felt anything which could improve the arrangements of the evening meetings should be supported.

Mr. HAMPSON asked if there were any record of the proceedings of the Committee for the past year.

The PRESIDENT said the Committee had in fact not acted.

The amendment was then negatived, and Mr. Greenish's motion carried by a large majority.

APPOINTMENT OF THE EDITOR AND SUB-EDITOR OF THE JOURNAL.

Dr. Paul was re-appointed Editor of the Society's Journal for the ensuing year, and Mr. F. Passmore Sub-Editor.

LOCAL SECRETARIES.

The SECRETARY suggested that the appointment of Local Secretaries should be deferred to next month, and that the Library, Museum, and Laboratory Committee should then present a revised list. He said the fact was that from 110 towns no returns had been received, and that the appointment of Local Secretaries appeared to be regarded with great apathy by members of the Society in the provinces. It was very important that the Local Secretaries should be carefully selected.

Mr. BOTTLE asked if the present Local Secretaries would remain in office until their successors were appointed, because there might be matters of legislation coming on with regard to which the co-operation of country members might be required.

The SECRETARY said there would be no difference on that score.

It was resolved that the matter be referred to the Committee as suggested.

THE CONVERSAZIONE.

Votes of thanks were passed to the Lords of the Committee of Council on Education for their kindness in allowing the use of the South Kensington Museum for the Annual Conversazione, and to the members of the official staff of the Museum for their services on the same occasion.

REPORTS OF COMMITTEES.

LIBRARY, MUSEUM, AND LABORATORY.

The Librarian had reported the average attendance in the library during the previous month to have been, day, 22; evening, 10. Circulation of books, in town, 160; country to 24 places, 42.

The Committee recommended the purchase for the Library of the 'Manchester Science Lectures' (continuation).

The Curator had reported the average attendance in the Museum to have been, morning, 15; evening, 5. Also that the whole of the chemical portion of the catalogue was now in print, and that the animal materia medica catalogue would be in the printer's hands immediately.

Professor Attfield had reported 83 entries in the Laboratory since the beginning of the session, 46 being now at work, and that the conduct of the students was satisfactory.

Professor Bentley had also reported satisfactorily of the progress of his class.

The report and recommendation of the Committee were received and adopted.

Mr. GREENISH suggested that it would be an assistance to the Librarian and Committee, if members who required any particular book which was not in the Library, would request the Librarian to enter it in his list to be brought before the Committee.

HOUSE.

The report of this Committee was received and adopted.

EXPENDITURE ON EDUCATION.

In accordance with a resolution passed at the last meeting the Secretary laid upon the table a return showing that during the past year the sum of £718 1*s*. 3*d*. had been expended by the Society on purposes in connection with education, including the endowment of the professorial chairs.

A further return was ordered, giving information as to the number of students attending the lectures of the professors and working in the laboratory during the year 1876; and also an apportionment of the rent and other charges not already included in the present return.

LAW AND PARLIAMENTARY.

The report of this Committee consisted mainly of the correspondence which had taken place with the Privy Council relative to the application of a proposed association of "professional chemists" to have their rules, etc., registered by the Board of Trade. The Solicitor had been requested to draft a letter to be sent in reply, which had been submitted to the Committee at a second meeting, and approved, and sent to the Privy Council. The purport of it was that though the Council was always glad to welcome any efforts for the advancement of chemical science it did not approve of powers being granted to any newly constituted body to grant certificates of competency, and objected to the proposed title of "professional chemists" as being vague and likely to lead to confusion. The Committee had also had under consideration the Medical Act Amendment Bill, which it was decided to oppose unless a clause were inserted to protect and define the existing rights of chemists and druggists.

The SECRETARY said that since the report was drawn up the Bill had been withdrawn and another one introduced, copies of which were now on the table.

Mr. SANDFORD suggested that the report of the Committee be received and adopted, and the Council could then discuss the state of affairs as now existing.

This was unanimously agreed to.

The PRESIDENT said he had received a letter from Dr. Frankland, President of the new Association, stating that the Committee had carefully considered the objections made by the Council and being anxious to meet the views of the Pharmaceutical Society recommended that the name be changed to that of the "Institute of Chemistry," and that the clause with regard to granting certificates to which objection had been taken should be struck out. He added that no interference with the rights and privileges of the Pharmaceutical Society was contemplated, and under these circumstances he hoped that all objection would now be withdrawn. He thought this letter was very satisfactory, and the Council would simply have to write to the Privy Council and to Dr. Frankland withdrawing all opposition.

Mr. ATKINS said it was very satisfactory to find that the careful consideration that had been given to this matter had been so well received by the promoters of the new Association. The Pharmaceutical Society was by no means opposed to the advancement of the higher practice of chemistry, but quite the reverse.

Mr. SANDFORD remarked that he believed it was the solicitor employed to draw up the rules who had inserted the objectionable clauses. He would move that these clauses having been removed no further objection be raised by the Society to the registration of the rules of the new association.

Mr. Betty thought it would be well to carefully examine the rules as amended before withdrawing all opposition. He suggested that they should again be submitted to the Society's Solicitor.

After some further conversation, it was resolved that the President, Mr. Sandford, and the Solicitor be requested to examine the amended rules, and if they proved unobjectionable, to write to the Privy Council and to Dr. Frankland accordingly.

THE MEDICAL ACT AMENDMENT BILL.

Mr. Sandford said as he had been one of those deputed to wait on Dr. Lush, he might mention what had happened, especially as some misapprenhension seemed to have been entertained about it, and some idea that the Council had neglected its duty. He might perhaps take some blame to himself for not having published a note he had received from Mr. Atkins, under the circumstances he would explain. On the day following the annual meeting, May 17th, the President, Mr. Hills, Mr. Atkins, and himself, went down to the House of Commons to see Sir Trevor Lawrence and Dr. Lush. Mr. Hills and he went up-stairs to the Committee room while Mr. Atkins and the President remained below. They saw Sir Trevor Lawrence just at 12 o'clock, who told them if they did not see Dr. Lush then, they would not be able to do so at all, and, therefore, without going down again to their colleagues, they had an interview with Dr. Lush. He said the Bill was not intended to affect chemists at all, and suggested that they should see Mr. Pridham, solicitor to the Medical Defence Association, who had drawn the Bill. They then pointed out to Dr. Lush how the wording of the clause would affect them, and that the Society thought it would be a good opportunity for inserting a clause which should define and protect the rights of chemists. Dr. Lush was willing to do anything in reason which they desired. It was also agreed that Dr. Lush should see Mr. Atkins at Salisbury on the following Saturday. The President and himself called on Mr. Pridham on the Thursday, but did not see him; an appointment was made, however, for the following morning at half-past 10 o'clock; Mr. Pridham not arriving until 11, the President had to leave in order to attend the adjourned meeting of the Society, and he, Mr. Sandford, was left alone to see Mr. Pridham. That gentleman at once admitted that the Bill as drawn would affect chemists. They had a long discussion over it, and he told Mr. Pridham distinctly they should oppose the Bill unless some clause were inserted which would protect them. He also drew his attention to certain clauses in the Apothecaries Act and Medical Act, 1858, saving the rights of chemists and druggists, and asked him whether, as this new Bill was to be read as part of the Medical Act of 1858, those clauses would still be operative. Mr. Pridham thought they would, but did not seem very certain about it. Mr. Flux was afterwards directed to put himself in communication with Mr. Pridham, but he did not know if anything had come of it. On the Monday following, when he was in the country, a letter reached him from Mr. Atkins, dated on the preceding Saturday, when he had seen Dr. Lush, who had informed him that, after conferring with Dr. Carpenter, he had resolved to cut out the words objected to: "or who shall practise medicine or surgery for gain." From some further expressions in the letter he regarded it as a private communication, and therefore did not publish it. Matters went on for some time until it appeared, in some of the daily papers that the Plymouth Association had communicated with Dr. Lush, and that in compliance with their suggestion he had withdrawn those words. Dr. Lush saw that in the paper and immediately wrote to Mr. Balkwill, saying that he had withdrawn the clause a fortnight before hearing from the Plymouth Society, and that he had done so in consequence of the representation of Mr. Sandford and Mr. Hills, who came to him as a deputation from the Pharmaceutical Society. He might also say that in another letter there was a very complimentary allusion to the Pharmaceutical Society by Dr. Lush, for he said he had no idea until he looked into the matter that the Pharmaceutical Society had such a capital examination, and that in fact the Board of Examiners more perfectly secured the practice of pharmacy than the practice of medicine was secured by the Medical Acts. Mr. Balkwill had also sent to Mr. Sandford a rough sketch of a clause protecting the rights of chemists and druggists, in case it was deemed necessary to insert it. However, when he went down to the House of Commons on the Friday, when the Bill was to be read a second time, he found three notices of motion that it be read that day six months, and Dr. Lush informed him that he had just obtained leave to withdraw it and reintroduce it in an amended form. This was the Bill which had been printed that morning, and as it now appeared unobjectionable he thought it would be a pity to oppose it.

Mr. Atkins said Mr. Sandford had given a very correct account of the matter, but he wished to repeat what he had already said on a former occasion, that he was sure Dr. Lush understood their position, and that they might expect from him fair and honourable treatment. At the annual meeting there appeared to be a little incredulity on that point in some quarters, and he regretted to hear that some gentlemen had thought fit to cherish their suspicions, and to exercise their independence in a way that he thought was objectionable, Dr, Lush had been charged with trades-unionism, and with being the catspaw of the profession. It was a great pity that men could not give one another credit for honour and uprightness. Dr. Lush had assured him in the most frank manner that he had not the least idea of interfering with chemists and druggists, and after conferring with Dr. Carpenter he withdrew the obnoxious words. He should be sorry to deprive the gentlemen at Plymouth, whom they would probably know better after next August, of any credit in respect to their action, but when the Council was charged more or less distinctly with inaction and neglect of duty, it was only right that the truth should be known, and he regretted that the public would be misled by the particulars which had appeared in the papers, some of which were very indiscreetly worded.

Mr. Hampson was gratified to find that there was no longer any need for opposition to the Bill for the Amendment of the Medical Act, the promoters having found it unadvisable to press it in its original form. He had only one remark to make with reference to Mr. Atkins's statement, and that was, that although those who knew Dr. Lush personally might feel assured of his honourable intentions, others who were not so favoured were obliged to be guided by the actual words of the Bill, and therefore he was convinced that the policy of opposition was the right one, especially as it had come to their knowledge that one of the objects of the real promoters of the Bill was to interfere with counter practice. This was a very large question, and inasmuch as it could not be known all over England what was being done by the Council, he rejoiced that general action had been taken, petitions sent up, and notices of opposition given by Members of Parliament. It was very important that the House of Commons should know that the chemists and druggists formed an organized body, alive to their own interests and prepared to defend them if needful.

Mr. Atkins could not agree with Mr. Hampson that the Bill was intended to put down counter practice. It was really directed against quite another class of persons.

Mr Hampson said he did not wish to make any unfair charge against the promoters of the Bill, but they knew from what source it emanated, and had been informed that what he had stated was one of the objects in view.

The PRESIDENT remarked that he did not see that any objection could be taken to the Bill in its present form.

Mr. CHURCHILL said that it was a great pity that Dr. Lush's communication to Mr. Atkins was not made public earlier.

Mr. ATKINS said he must take some blame to himself in the matter. Dr. Lush's main communication was not in any way private, but in writing to Mr. Sandford he had added some other points which might have led that gentleman to think it unwise to publish the letter.

Mr. BETTY thought they might all feel very gratified that all source of irritation was now over, and drew attention to an article in that day's *Standard*, which distinctly stated that counter practice, if somewhat irregular, was indispensable to the public.*

FINANCE.

Messrs. Cracknell, Greenish, and Robbins having acted *ad interim* as a Finance Committee presented certain accounts which they had examined and recommended for payment.

Their report and recommendations were adopted.

BENEVOLENT FUND.

It was resolved unanimously that six annuitants be elected in October next.

Mr. OWEN said he was not certain whether the election for the British Orphan Asylum, at Slough, would not take place before the Committee met again, and asked if he would be authorized to expend in connection with it the sum of twenty guineas, which had been placed in his hands on a former occasion for the purpose of getting a child into that institution, but which he had returned to the Secretary, not seeing his way to apply it successfully. He wished the sum could be increased to £50.

Mr. GREENISH thought the Committee ought to consider the matter before any additional sum were granted, but that there could be no objection to the sum formerly granted being used.

The SECRETARY then presented several applications which had been made for relief, and the following grants were made:—

£10 to the widow of a member, who had received a similar grant in 1875.

£10 to a registered chemist and druggist, a female, aged 51, now out of business, and in very reduced circumstances.

£15 to the widow of a member.

£10 to another widow of a member.

The SECRETARY reported that the amount of ordinary annual subscriptions received up to the present time was about £150 less than at the same date last year, which was equal to the sum required for five annuities.

THE INAUGURAL SESSIONAL ADDRESS.

It was resolved that Mr. William Southall be invited to deliver the address to the students in October next.

THE EXAMINATIONS.

The SECRETARY reported that he had received the following letter from the Privy Council enclosing the report of Dr. Maclagan on the Society's examinations, and an extract from that of Dr. Greenhow.

"[Copy.]

"Privy Council Office,
"4th June, 1877.

"Sir,—I am directed by the Lords of the Council to inform you that their lordships have received reports from Dr. Greenhow and Dr. Maclagan with reference to the examinations, during the year 1876, of candidates for admission into the pharmaceutical profession.

"Their lordships direct me to transmit to you, to be laid before the Pharmaceutical Society, an extract from Dr. Greenhow's report, and a copy of that by Dr. Maclagan.

"I am, sir,
"Your obedient servant,
"(Signed) C. L. Peel."

"The Secretary and Registrar,
"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, W.C."

"[Copy.]

"Extract from Report on the Examinations of the Pharmaceutical Society, conducted in London during the year 1876.

"It only, further, remains for me to add that from personal observation during my attendances at the examinations of the Pharmaceutical Society, held in London in the year 1876, I am satisfied that they were conducted in such a manner as to constitute an ample guarantee to the public of the practical competency of persons admitted to register as chemists and druggists under the Pharmacy Act of 1868.

"(Signed) E. Headlam Greenhow, M.D."

"[Copy.]

"Dr. Maclagan's Report on Examinations by the North British Branch of the Pharmaceutical Society of Great Britain.

"Edinburgh, 23rd May, 1877.

"Since the date of my last report I have been present at these examinations on the following occasions:

"11th, 12th, and 13th July, 1876;
"24th and 25th October, 1876;
"19th and 21st December, 1876;
"and 22nd February, 1877.

"There were examinations also on 11th April and 20th December, 1876, at which I could not be present:

"The total number of candidates who presented themselves for examination during this period was 99, viz.:

"Majors	2	of whom passed	1	failed	1
"Minors	84	"	47	"	37
"Modified	13	"	5	"	8
	99		53		46

"Compared with the experience of the preceding year these numbers show that the proportion of rejections is pretty nearly the same, at all events as regards the Minors, who constitute the most numerous, and in a general sense most important, category of candidates. The Majors especially in this last year are too few, and the "Modified" who are undergoing a process of gradual extinction too uncertain, to afford reliable data.

"The percentage of failures in all classes of candidates in the two years was:—

	1875-76	1876-77
"Majors	28	50
"Minors	41	44
"Modified	75	68

"These results certainly show that there is no marked improvement in the qualifications of the bulk of the candidates who present themselves, but if there is no satisfaction to be derived from the contemplation of this fact, there can at all events be seen in it evidence of what I am sure is the fact, that the examiners continue rigidly and impartially to discharge their duty in remitting candidates who are not up to the mark.

"I should be very sorry, however, that it should be thought that by these remarks I mean that the continuance of a strict system of examination has had no good effect on the candidates for admission into the pharmaceutical profession. To judge of this we must look at the successful as well as unsuccessful candidates,

* See p. 1000.

and I have no hesitation in saying that in those who do pass I observe a distinct beginning of that improvement to which we must look for the elevation of the pharmaceutical profession in Britain. I see the evidence of this not only in the greater correctness of answer to question but in the more scientific style of answer in the really good candidates. There is thus, I think, the strongest ground of encouragement to the Pharmaceutical Society for maintaining a high standard of examination, especially in the scientific branches, and in gradually increasing their demands for still higher knowledge in those who seek their diploma.

"As regards the special subjects in which candidates proved unsuccessful by having failed to obtain four-tenths of the available marks, I have to note the following facts, confining myself for reasons stated above to the Minors :—

"Failed in prescription reading		4
"	" practical dispensing	4
"	" Materia medica	4
"	" Pharmacy	12
"	" Chemistry	13
"	" Botany	17

Of these it must be remembered that some came short of the four-tenths of the marks in two departments, and that in addition to the above there were eight candidates who, though they got the four-tenths in each branch did not attain the total number of marks which entitles to a pass. In my last report, I observed that the present system of marks was too recent to enable me to form an opinion as to its real value. I do not think that one more year's experience entitles me to express any decided opinion on this, and I am in the meantime content with noting its effects on individual cases, in order to form an estimate of its working.

"Upon these various subjects of examination, I have to offer a few remarks.

"*Prescription reading.*—This is an important test of the qualification of candidates alike in showing their being accustomed to decipher the writing of physicians, which it must be owned is not always of the best, and to observe errors in prescriptions which may lead to the dispensing of dangerous doses of potent drugs, but as a further test of the candidate's latinity. I have observed that generally the deciphering of contracted or indistinctly written words, and the detection of mistakes as to doses, are well done, but I must say that much is yet to be desired in the way of improvement in the latinity of candidates. It is painful to observe in many of them, who otherwise show good knowledge, their uncertainty or ignorance as to the declinable Latin numerals which occur in every prescription. One would suppose that *unus, duo, tres* did not constitute a grammatical mechanism of such complexity as to make it difficult for candidates to understand its working; and yet a large proportion of them hesitate or make actual mistakes in connecting them with the *uncia, drachma,* or *granum* with which they are associated in prescriptions. This is, however, a matter for the consideration of those who conduct the Preliminary rather than of those who conduct the professional examinations.

Pharmacy.—It is not pleasant to observe the large proportion of candidates who failed in pharmacy. This involves the recognition of official preparations by their colour, smell, and taste, and the knowledge of how these are prepared according to the Pharmacopœia. It has appeared to me that it was in the latter respect that candidates most frequently failed in this department. To attempt to learn the British Pharmacopœia by committing it to memory is a hopeless and useless task, and I can account for the deficiencies I have observed only on the supposition that a number of young men do not avail themselves sufficiently of the opportunities which they do or ought to enjoy during their apprenticeship period of carefully observing and studying the preparation of such compounds as tinctures, compound powders, etc.

"*Chemistry and Botany.*—As usual the largest proportion of failures is in these strictly scientific departments. I have on former occasions adverted to these and have only to repeat my conviction that the decided aim of the examiners ought to continue to be as it is to insist on thorough knowledge of these branches as a means of raising the scientific character of the pharmaceutical profession. I have still to observe that in practical testing too little attention is paid to the physical properties of the specimens given for analysis. I saw a recent example of this in a candidate who had so simple an article as borax given him for analysis, and who proceeded to attack it by chemical tests without ever trying its reaction with test paper or its taste. As a matter of display of chemical skill such a method of working may elicit approbation, but as a question of practical operating it is better that pharmacists should learn to use all the means of diagnosis of a chemical compound which they can command.

"I have only to add that it gives me pleasure to report my conviction that the various examiners, including those who have been added to the Board since my last report, discharge their duties with a judicious combination of strictness, impartiality, and consideration for candidates.

"(Signed) Douglas Maclagan."

Mr. Greenish said the report by Dr. Maclagan was very valuable, as it showed the weak points of the candidates.

Mr. Shaw thought it should be matter for consideration, whether some suggestions could not be made to teachers to strengthen the weak points of their instruction.

Chemists' Assistants' Association.

The Secretary read a second application on behalf of chemists and druggists' assistants asking for the use of the Lecture Theatre for the purpose of a preliminary meeting for considering the advisability of forming such an association, and the best method for rendering the same useful to both assistants and employers, at any date which might be convenient.

Mr. Hampson moved that the application be acceded to, which was unanimously agreed to.

The Secretary read letters from the Hull and Plymouth Chemists' Associations with reference to the Medical Act Amendment Bill.

Election of Annuitants—Canvassing Cards.

Mr. Bottle said he should be glad to know what was the general opinion in regard to members of Council allowing their names to be used on canvassing cards. It would be desirable that some uniformity of action should be adopted; and though he saw no objection himself to the practice, if it were the general wish that it should not be done he should in deference to that feeling not allow his name to be used.

Mr. Greenish said he had on former occasions strongly objected to the names of members of Council, and particularly of members of the Benevolent Fund Committee, appearing on the canvassing cards.

Mr. Shaw agreed with Mr. Greenish.

Mr. Sandford said he should have been glad if the question had been discussed earlier, as several gentlemen had left, and if anything were agreed to now it would not bind those who were absent.

Mr. Hampson had conversed with a great many persons outside on this question, and found a unanimous opinion that it was undesirable for the names of members of the Council to appear on the cards.

The Vice-President felt with Mr. Bottle that there was no reason why a member of Council should not have the same liberty as any other gentleman to support any case in which he might take an interest. Still he thought whatever was done should be done generally.

After some further conversation,

Mr. Betty moved,

"That it is undesirable for any member of Council to place his name on the canvassing card of any candidate."

Mr. Hills seconded the motion which was carried.

DINNER IN AID OF THE

BENEVOLENT FUND.

The following donation was inadvertently omitted from the list published May 26th :—

Langton, Edden, Hicks, and Clark, 232, Upper Thames Street, E.C. (Amount received in an arbitration case decided in favour of the donors) 16 13 4

The following amounts have also been received since the publication of the list :—

	Donations.	Annual Subscriptions.
Cheverton, George, The Broadway, Tunbridge Wells	1 1 0	..
Crispe, James, 4, Cheapside, E.C.	2 2 0	..
Fitch, R. O., 200, Wells Street, South Hackney, E.	5 5 0	..
Henderson, Henry James, Chester Street, Newcastle-on-Tyne	..	0 5 0
Hodges, Wm., Eastgate Row, Chester	..	1 1 0
Odling, Professor, F.R.S., Oxford	1 1 0	..
Roscoe, Professor, F.R.S., The Owens College, Manchester	5 5 0	..
White, Thomas, Church Street, Launceston	0 10 6	..

BENEVOLENT FUND.

Subscriptions Received During February, March, April, and May, 1877.

(Exclusive of the amounts received at the Dinner.)

	£	s.	d.
A. R.	0	5	0
A. S.	0	2	6
Abernethy, John, 7, Corn Market, Belfast	0	2	6
Abraham, John, 87, Bold Street, Liverpool	1	1	0
Abram, Frederick William, East Dereham	0	10	6
Ackrill, George, Mona Court, Kingstone, near Hereford	0	10	6
Adams, Frank, Stoke-on-Trent	0	10	6
Adcock, J. D., Alcester	0	10	6
Airey, George, 24, Wallgate, Wigan	0	5	0
Aitken, Robert, 338, Oxford Street, W.	0	5	0
Alewood, Edwin, Castle Square, Swansea	1	1	0
Alexander, John, 81, Athol Street, Liverpool	0	10	6
Allchin, Alfred, England House, Primrose Hill Rd., N.W.	0	10	6
Allen and Willis, 55, High Street, King's Lynn	0	5	0
Allen, Adam U., High Street, Lymington	0	5	0
Allen, Charles B., Kilburn, N.W.	0	5	0
Allen, George, Ampthill	1	1	0
Allison, E. and H., 11, Blanket Row, Hull	1	1	0
Almgill, John, Dixon Square, Yeadon	0	5	0
Amos, Daniel, 1, Parade, Canterbury	0	10	6
Anderson, James L., Calcutta	0	9	6
Anholm, August, 11, Smeaton Street, Hull	0	10	6
Anness, Samuel R., 26, Westgate Street, Ipswich	0	10	6
Anstey, John U., 1, Walcot Buildings, Bath	0	5	0
Anthony, John L., High Street, Bedford	0	10	6
Applegate, Edwin, 5, Hercules Ter., Holloway Road, N.	0	10	6
Argue, James, Lower Marlowes, Hemel Hempstead	0	5	0
Armitage, Edmund H., Dartford	1	1	0
Arnold, Adolphus, Guernsey	0	10	6
Arnold, Spencer, 42, Mount Ephraim, Tunbridge Wells	0	10	6
Ashford, E. C., 24, Gold Street, Northampton	0	5	0
Ashton, William, 77, Lord Street, Southport	0	10	6
Asling, Brelsford, Bridge Street, Spalding	0	5	0
Astrop, Henry, 730, Old Kent Road, S.E.	1	1	0
Atherton, John H., Long Row, Nottingham	0	10	6
Atkins, Samuel R., Market Place, Salisbury	0	10	6
Atkinson and Hasselby, Doncaster	1	0	0
Atkinson, John G., 2, Albert Terrace, Kilburn, N.W.	0	5	0
Atmore, George, 48, High Street, King's Lynn	0	5	0
Attwood, Alfred, 147, Cannon Street, E.C.	1	1	0
Austin, H. F., 125, Bermondsey Street, S.E.	1	1	0
Averill, Henry Allcock, 10, Market Square, Stafford	1	1	0
Averill, John, 10, Market Square, Stafford	1	1	0
Babb, James, Sydenham	0	5	0
Badcock, Henry, 101, High Street, Lymington	0	10	0
Bagnall, William H., New Street, Lancaster	0	10	0
Bagshaw, William, 37, Yorkshire Street, Oldham	0	10	6
Baildon, H. B., 73, Princes Street, Edinburgh	2	2	0
Baily, John, 5, Upwood Road, Burnt Ash Lane, Lee, S.E.	0	5	0
Baker, Charles Patrick, High Street, Chelmsford	0	10	6
Baker, Frank, Harnet Street, Sandwich	0	10	6
Baker, Garrad, High Street, Chelmsford	0	10	6
Baker, William, Market Place, Retford	0	10	6
Baker, William R., Sidcup, Kent	0	5	0
Balch, Edwin, Queen Street, Ramsgate	0	5	0
Balcomb, John, Cheltenham	0	10	6
Balkwill and Eliott, Plymouth	0	10	6
Ball, The Chemists' (Committee of)	21	0	0
Ball, George Vincent, 23, Parsons Street, Banbury	0	10	6
Ballard, Arthur, Market Place, Faringdon	0	10	6
Bally, Edward Fossey, Baldock, Herts	0	5	0
Bainbridge, Robert R., 16, High Street, Stockton-on-Tees	0	2	6
Bamfield, John, Alma Gate, Clifton, Bristol	0	5	0
Barber, George, 27, Botanic Road, Liverpool	0	10	6
Bard, Mrs. J., 3, Exe-Bridge, Exeter	0	2	6
Barlow, Frederick, Stafford Street, Longton	0	10	6
Barlow, Joseph A., Westgate, Burnley	0	2	6
Barnard, John, 338, Oxford Street, W.	1	1	0
Barnes, Bryan, St. Peter's Street, Derby	0	5	0
Barnes and Son, 114, Fishergate, Preston	0	10	6
Barnes, James B., 1 Trevor Terrace, Knightsbridge, S.W.	1	1	0
Barnitt, John, 86, Upper Parade, Leamington	0	10	6
Barr, Robert, Gourock, Renfrewshire	0	5	0
Barratt, F. J., 122, High Street, Winchester	0	5	0
Barret, E. L., 53, Springfield Rd., St. John's Wood, N.W.	0	10	6
Barron, William, Cheltenham	0	2	6
Barry, Thomas S., Broadway, Ealing	0	10	6
Bartley, George A., Latchford, Warrington	0	5	0
Barton, Charles, 77, King's Road, Brighton	0	10	6
Barton, Henry, 77, King's Road, Brighton	0	10	6
Barton, W. H., 2, Woodside Terrace, Gipsy Hill, S.E.	0	10	6
Bass, James T., High Street, Hemel Hempstead	0	10	0
Bassett, Charles, Pontypridd	1	1	0
Batchelor, Alfred E., Fareham	0	5	0
Batchelor, Charles, Fareham	0	5	0
Bate, Henry, 44, Thorne Road, South Lambeth, S.W.	0	10	6
Bateman, John Montague, Cairo	9	16	10
Bates, Thomas, 6, Chrisp Street, Poplar, E.	0	10	6
Bates, Thomas William, High Street, Colchester	0	5	0
Bates, William I., Mill Street, Macclesfield	0	10	6
Bateson, Thomas, 23, Stricklandgate, Kendal	1	1	0
Battersby, Samuel, Cheapside, Lancaster	0	5	0
Baxter, George, Worksop	0	5	0
Baxter, Robert, Huntingdon	0	10	6
Baxter, W., Central Public Laboratory, Kennington Lane,	1	1	0
Baxter, William W., Bromley, Kent	0	10	0
Bayley, William, Earle Street, Crewe	0	10	0
Baynes, James, 24, Waterworks Street, Hull	0	10	6
Beach, James, East Street, Bridport	0	10	6
Beall, George, 25, Sidney Street, Cambridge	0	5	0
Beardsley, J., 20, Sneinton Street, Nottingham	0	5	0
Beaumont, Charles F. J. B., Chislehurst, Kent	0	10	6
Beckett, William, Market Place, Heywood	0	10	6
Beddard, John, 46, Churton Street, S.W.	1	1	0
Beeby, John, Booth Place, Falkirk	0	2	6
Beech, Joseph, jun., 273, Ickneild Street, Birmingham	0	2	0
Beetham, Michael, Cheltenham	0	10	6
Bell, Charles B. 6, Spring Bank, Hull	0	10	6
Bell, Edward Collinson, High Street, Berkeley	0	10	6
Bell, Francis, 36, Tyrrel Street, Bradford	0	10	6
Bell, Thomas, Ambleside	0	10	6
Bemrose, John, Long Bennington	0	10	6
Benger, F. Baden, 7, Exchange Street, Manchester	0	10	6
Bennett, John W., Leigh, Lancs	0	5	0
Bennett, William, 2, Castle Gate, Newark-on-Trent	0	5	0
Bentley, John N., 30, Bridge Street, Heywood	0	5	0
Bently, William James, High Road, Tottenham	0	10	6
Berridge, Alfred, 11, Cheapside, Leicester	0	10	6
Berry, Edward, The Cross, Gloucester	0	5	0
Berry, Willliam, Clifton, Bristol	0	10	6
Best, James, 333, Holloway Road, N	0	10	6
Bettesworth, Henry T., Horndean	0	2	6
Betts, William, Horncastle	0	5	0
Betts, William E., 134, St., James's Street, Liverpool	0	5	0
Bevan, Charles F., 62, Church Street, Harwich	0	10	6
Bevan, William, 161, Gower Street, W.C.	0	5	0
Bienvenu, John, 24, St. Mary's Street, Southampton	0	5	0
Biggleston, Edwin R., Canterbury	0	10	0
Bilbrough, J. B., Leeds	0	10	6
Billington, Frederick, 127, Wavertree Road, Liverpool	0	5	0
Bindloss, George Frederick, 97, Leighton Road, N.W.	0	10	6
Bing, Edwin, 41, St. George's Street, Canterbury,	0	10	6
Binge, Thomas, 23, Stockbridge Terrace, Pimlico, S.W.	0	10	6
Bingley, Frederick Beavis, 12, High Street, Guildford	0	10	6
Bingley, John, 91, Bailiff Street, Northampton	0	10	6
Bird and Storey, 42, Castle Street East, W.	1	1	0
Bird, Augustus, Wood Lane, Shepherd's Bush, W.	2	2	0
Bird, Robert, 103, High Holborn, W.C.	0	10	0
Birkett, Charles, Bowness-on-Windermere	0	9	0
Bishop, Mrs. Mary, 69, High Street, King's Lynn	0	5	0
Bishop, Robert, Eye	0	10	6
Bishop, S., 20, Bridge Street, Southampton	0	2	6
Bishop, Thomas, Twickenham	0	10	6
Blackburn, Bailey, Westgate, Bradford, Yorks	1	1	0
Blackshaw, Thomas, Market Place, Burslem	0	10	6
Blake, Charles A., 47, Piccadilly, W.	0	10	6
Blake, William F., High Street, Stroud	0	10	0
Bland, John, 57, Penton Street, N.	0	10	6
Blatchley, Thomas, Yeadon, Yorks	0	10	6
Blundell, John, Tithebarn Street, Liverpool	0	10	0
Blunt and Moses, Wyle Cop, Shrewsbury	1	1	0
Blyth, Utton, 172, New Bond Street, W.	0	5	0
Blyton, J., 43, Heywood Street, Cheetham, Mancheste	0	10	6

	£	s.	d.
Bolton, Charles A., 1, Goosegate, Nottingham	0	10	6
Bolton, Thomas, 2, Derwent Terrace, Rectory Road, N.	0	5	0
Bond, C. R., Richmond Road, Kingston-on-Thames	0	10	6
Boor, Frederick, Fallowfield, Manchester	0	5	0
Booth, George, Chesterfield	0	10	6
Booth, James, Elmfield, Castlemere, Rochdale	0	10	6
Booth, Wm. G., 30, Swan Street, Manchester	0	10	6
Borchert, Heinrich T. G., Royal Victoria Hospital, Netley	1	1	0
Borland, John, 7, King Street, Kilmarnock	0	10	6
Bostock, William, Ashton-under-Lyne	0	10	6
Bottle, Alexander, 37, Townwall Street, Dover	1	1	0
Bower, John, Macclesfield	0	5	0
Bowler, William S., Belper	0	5	0
Bowling, John H., 1, Dimond Street, Pembroke Dock	0	2	6
Bowring, John W., Ringwood	0	5	0
Boyce, George, Chertsey	0	5	0
Braddock, George, 33, Queen's Road, Oldham	1	1	0
Bradley, Charles, 30, Market Place, Reading	0	5	0
Bradley, Edwin S., Ashbourne	0	10	6
Bradley, Frederick, 17, Cross Street, Ashley Crescent, N.	0	5	0
Bradley, J., 42, Porter Street, Hull	0	5	0
Brailey, Charles, Heavitree, Exeter	0	5	0
Bray, William, Buntingford	0	5	0
Brayshay, Thomas, 38, High Street, Stockton-on-Tees	0	10	6
Brayshay, W. Bolam, 38, High Street, Stockton-on-Tees	1	1	0
Brearey, William A., Prospect Hill, Douglas, I. of Man	1	0	0
Brewster, William, Kingston-on-Thames	0	10	6
Briggs, James, 71, Owen Street, Tipton	0	5	0
Broad, John, Rise House, Hornsey Rise, N.	1	1	0
Broad, John Morris, Rise House, Hornsey Rise, N.	1	1	0
Bromfield, Charles, 2, Northernhay Street, Exeter	0	5	0
Bromley, Richard M., Denmark Hill, S.E.	0	10	6
Broof, Richard, 116, Sanvey Gate, Leicester	0	10	6
Brook, Robert, 11, Silver Street, Halifax	0	10	6
Brothers (F.) and Son, Ashford	1	1	0
Brown, A. H., Shanklin, I. of W.	0	10	0
Brown, Alfred James, 55, Trafalgar Road, Greenwich, S.E.	0	10	6
Brown, E., 1, Upper High Street, Winchester	0	2	6
Brown, Hedley O., Barrow-on-Humber	0	2	6
Brown, J. F., 4, Market Square, Dover	1	1	0
Brown, W. B., 100, Fishergate, Preston	0	5	0
Brown, William Scott, 113, Market Street, Manchester	1	1	0
Brunsden E., 2, London Street, Reading	0	2	6
Bryant, John F., High Street, Erith	0	5	0
Buck, Richard C., 192, Breck Road, Everton, Liverpool	0	5	0
Buck, Thomas, 9, East Street, Middlesborough	0	5	0
Buckle, C. F. 77, Gray's Inn Road, W C.	1	1	0
Bulgin, William, 22, New Road, Gravesend	1	1	0
Bull, Edward S., 133, Oxford Street, W.	0	5	0
Bulley, William H., 26, High Street, Exeter	0	2	6
Burdon, John, 14, Claypath, Durham	0	10	6
Bardwood, James, 30, Frankfort Street, Plymouth	0	5	0
Burgess, Willows and Francis, 101, High Holborn, W.C.	1	1	0
Burgess, William, Market Street, Stourbridge	0	5	0
Burn, David H., 109, High Street, Arbroath	0	5	0
Burn, James, Flintham	0	5	0
Burton, John, Ousegate, Selby	0	2	6
Burton, Joseph, 397, Cambridge Road, E.	0	2	6
Busby, H. H., 1, High St., Beckenham Rd., Penge, S.E.	0	5	6
Busby, James, Harpenden	0	10	6
Buss, Thomas Sargent, Ham Street, Kent	0	5	0
Butcher, Thomas, Cheltenham	1	1	0
Butland, Charles, 65, St. Sidwell's, Exeter	0	5	0
Butler, Charles, 130, High Street, Notting Hill	0	10	6
Butler, E. D. Barry, 4, Dartmouth Ter., Forest Hill, S.E.	0	10	6
Butler, Samuel, 18, Ashgrove Road, Redland, Bristol	0	10	6
Butt, Edward Northway, 13, Curzon Street, Mayfair, W.	2	2	0
Butterworth, H., 70, Tottenham Court Road, W.	0	5	0
C. H.	1	1	0
Cadman, Daniel C., 12, Rendezvous Street, Folkestone	0	10	6
Caley, Albert J., Bedford Street, Norwich	0	10	6
Cameron, W. A., 51, Well Street, Bedford	0	5	0
Campion, Robert, High Street, Harlow	0	10	6
Campkin, A. S., 11, Rose Crescent, Cambridge	0	5	0
Candler, Joseph Thomas, High Street, Margate	0	10	6
Cannell, William, Queen Square, Wolverhampton	0	10	6
Cannon, Charles, 85, Upper Street, N.	1	1	0
Cape, John Sweet, 224, High Street, Exeter	0	5	0
Carr, William G., Berwick-on-Tweed	0	10	6
Carruthers, Richard B., Dumfries	0	10	0
Carteighe, Michael, 172, New Bond Street, W.	1	1	0
Carter, William, Cheetham Hill, Manchester	0	10	6
Cartwright, William, Ironmarket, Newcastle-under-Lyne	0	10	6
Cartwright, William B., Stratford	0	10	0
Case, William, 17, Spencer Road, Stoke Newington, N.	0	5	0
Catterns, Heneage Parker, 59, Church St., Camberwell, S.E	0	10	6
Chamberlain, Arthur G., 3, Market Place, Rugby	0	5	0
Chamberlin, William, Downton	0	5	0
Chapman, Henry, Cornhill, Ipswich	0	10	6
Charity, William, 50, Lime Street, E.C.	0	10	6
Chaston, Mrs. Anna Maria, 82, High Street, Lowestoft	0	10	6
Chater, Edward M., High Street, Watford	1	1	0
Chater, Matthew T., High Street, Watford	1	1	0
Chave, William F., Broad Street, Hereford	0	10	6
Chubb, James C., 29, Old Street, E.C.	1	1	0
Childs, John L., Fortunes Well, Portland	0	5	0
Clark, John A., 11, Duncan Place, London Fields, E.	0	10	6
Clark, Thomas P., 151, High Street, Stourbridge	0	5	0
Clark, Walter B., 15, Belvoir Street, Leicester	0	10	0
Clark, William, 25, Charlotte Street, Landport	0	5	0
Clark, Willoughby, 23, High Street, Ilfracombe	0	10	6
Clarke, Cornelius J., Old Buttermarket, Ipswich	0	5	0
Clarke, Joseph A., 38, London Street, Glasgow	0	10	6
Clarke, Josiah, 20, George Street, Croydon	0	10	6
Clarke, Richard Feaver, 21, High Street, Gravesend	0	5	0
Clarke, Thos. Meadows, 50, George St., Richmond, Surrey	0	10	0
Clater, Francis, Market Place, Retford	0	10	6
Clayton, Thomas, 10, Vigo Street, W.	0	5	0
Clayton, William, The Wicker, Sheffield	0	10	6
Clift, Joseph, Dorking	0	5	0
Clift and Crow, Lee Bridge, Lewisham	1	1	0
Coates, Joseph, Craigie, Perth	0	5	0
Cocher, John A., St. James's End, Kings Lynn	0	5	0
Cocker (B.) and Son, 97, Newington Green Road, N.	0	10	6
Cocker, Justus J., 9, Bridge Street, Bradford	0	5	0
Cocking, George, Bull Ring, Ludlow	0	5	0
Cocking, Frederick J., 10, Wellington Street, Teignmouth	0	5	0
Cocks, John W., Torquay	0	5	0
Cocksedge, H. B., 29, Bucklesbury, E.C.	0	10	6
Coke, Richard S., 22, Albert Rd., Morice Town, Devonport	0	5	0
Coker, Owen C., 96, Old Town Street, Plymouth	0	10	0
Colchester, Wm. Markham, 2, Crown St., Hoxton, Sq., N.	0	5	0
Colchester, W. M., jun., 6, Marquess Rd., Canonbury, N.	0	5	0
Cole, Frederick, Congleton	0	5	0
Cole, Frederick A., St. Botolph Street, Colchester	0	5	0
Cole, John, Pier Street, Aberystwith	0	2	6
Cole, Walter Thomas, 17, St. Mary Street, Weymouth	0	5	0
Coleman, Edward, 5, Town Hall Buildings, Bournemouth	0	2	6
Coleman, William, Worcester Street, Wolverhampton	0	10	6
Coles, Alfred C., Commercial Road, Bournemouth	0	2	6
Coles, Ferdinand, 341, Amherst Road, Stoke Newington	0	10	6
Coley, Samuel J., 57, High Street, Stroud	0	10	0
Collett, Charles B., 19, South Street, Exeter	0	5	0
Colling, Robert, 2, High Street, Stockton-on-Tees	1	1	0
Collins, Henry G., 29, High Street, Windsor	0	5	0
Collinson, Frederick Wm., 86, The Parade, Leamington	0	5	0
Colton, Thomas, Ousegate, Selby	0	2	6
Connor, Thomas H., Alresford	0	5	0
Constance, Edward, 114, Leadenhall Street, E.C.	0	10	6
Cooke, John 126, Hoxton Street, N.	0	10	6
Cooke, William, 27, St. Giles Street, Norwich	0	5	0
Cooling, William John, Castle Gate, Newark	0	5	0
Cooper, Albert H., Bradford on Avon	0	5	0
Cooper, George, 101, Fore Street, Exeter	0	10	6
Cooper, George B., Brightlingsea	0	5	0
Cooper, Henry, 44, Market Place, Leicester	0	5	0
Cooper, John, 291, Kennington Road, S.E.	0	5	0
Cooper, Mark, Church	0	10	6
Cooper, Thomas, 44, Market Place, Leicester	0	10	6
Cooper, William H., 5, Andover Ter., Hornsey Road, N.	0	10	6
Corbyn and Co., 300, High Holborn, W.C.	1	1	0
Corder, Octavius, 2, London Street, Norwich	0	10	6
Corfield, Charles, Church Street, St. Day	0	10	6
Corfield, Thomas, J. T., St. Day	0	10	6
Cornelius, Joseph, Teignmouth	0	10	6
Cornell, William, Tavern Street, Ipswich	1	1	0
Corner, T. B., 1, Baxtergate, Whitby	0	10	6
Cornforth, Edwin, Birmingham	0	2	6
Cornish, William, 174, Western Road, Brighton	0	5	0
Corrie, Andrew A., 11, St. Mary's, Bedford	0	1	0
Cossey, James D., 19, Market Place, Gt. Yarmouth	0	5	0
Cossey, John, St. John's Maddermarket, Norwich	0	5	0
Cosway, Edwin Chas., 21, Salusbury Ter., Kilburn, N.W.	0	5	0
Cottle, Alfred J., St. Albans Road, Watford	0	5	0
Cottrill, Gilbert Jones, Shepton Mallett	0	5	0
Cottrill, John W., 24, Park Terrace, Regent's Park, N.W.	0	10	6
Couchman, Thomas, Wadhurst	0	10	6
Coupland, Joseph, 20, Regent Parade, Harrogate	0	10	6
Cousins, Thomas G., 17, Magdalen Street, Oxford	0	10	6
Cowgill, Brian H., 28, Manchester Road, Burnley	0	5	0
Cox, Mrs. J. J., Stoney Stratford	0	10	6
Cracknell, Charles, 217, Edgware Road, W.	2	2	0
Craft, James, London Street, Reading	0	2	6
Crang, Walter, 23, High Street, Ilfracombe	0	10	6
Crick, George E., High Street, Maldon	0	10	0
Crosby, J. B. 22, Fowler Street, South Shields	0	2	6
Crosby, James, New Wandsworth, S.W.	0	10	6
Crofts, Holmes Cheney, 194, High Street, Chatham	0	10	6
Cross, William G., Mardol, Shrewsbury	0	10	6
Cross, William G., jun., Mardol, Shrewsbury	0	10	6
Crowder, Charles H., Barton on Humber	0	10	6
Crowther, Thomas, Tickhill	0	10	6
Croyden, Charles, 45, Wigmore Street, W.	0	10	6
Cruse, Thomas H., Palmerston Road, Southsea	1	1	0
Cubley, George A., High Street, Sheffield	0	10	6
Cumber, Henry, 4, Fountain Street, Guernsey	0	2	6
Cupiss, Francis, The Wilderness, Diss	0	10	6
Currie, John, 479, Sauchiehall Street, Glasgow	0	5	0
Currie, John, 84, Eglinton Street, Glasgow	0	5	0
Curtis, Theophilus, 96, Campden Hill Road, W.	1	1	0
Cuthbert, John M., 19, High Street, Bedford	0	10	6
Cuthbert, S. A., 57, High Street, Tunbridge Wells	0	2	6
Cutting, Thomas J., Finkle Street, Selby	0	5	0
Cuttle, Arthur E., 145, Meadow Lane, Leeds	0	2	6

	£	s.	d.
Dadford, Thomas, 33, Gold Street, Northampton	0	10	0
Daines, Thomas, King William's Town, Kaffraria	0	10	6
Dakin, John P., Wantage	0	2	6
Dale, George, South Street, Chichester	0	10	6
Daniel, John, Rickergate, Carlisle	0	2	6
Darling, William, 126, Oxford Street, Manchester	1	1	0
D'Aubney, Thomas, 82, Shepherdess Walk, N.	1	1	0
Davenport, Horace, 33, Great Russell Street, W.C.	1	1	0
Davenport, John T., 33, Great Russell Street, W.C.	2	2	0
David, S. S., Laugharne, St. Clears	0	5	0
Davidson, Charles, 205, Union Street, Aberdeen	0	10	6
Davies, D. J., Aberystwith	0	5	0
Davies, Edward, Market Place, Bishop's Castle	0	10	6
Davies, John, 20, Moreton Street West, Pimlico, S.W.	0	5	0
Davies, John Lutwiche, Hay	0	5	0
Davies, William, 292, Gray's Inn Road, W.C.	0	5	0
Davis, Benjamin, 139, Warwick Street, Leamington	0	5	0
Davis, David F., 2, High Street, Leominster	1	1	0
Davis, Frank P., 36, Northbrook Street, Newbury	0	10	6
Davis, Henry, 19, Warwick Street, Leamington	0	10	6
Davis, H. S. E., 4, Stratford Road, Kensington, W.	0	10	6
Davis, Richard H., 26, Regent Parade, Harrogate	0	5	0
Davis, Robert S., 374, Old Kent Road, S.E.	0	10	6
Davison, Ralph, York	0	10	6
Davison, Thomas, 126, Buchanan Street, Glasgow	0	10	6
Davy, Humphrey, Bridgegate, Rotherham	0	5	0
Dawes, Herbert, Bull Ring, Ludlow	0	5	0
Dawson, Francis R., Quadrant, King Street, Wigan	0	5	0
Dawson, Oliver R., 63, Belle Vue Road, Southampton	0	10	6
Day, Thomas Sweeting, High Street, Beckenham	0	10	6
Daymond, Samuel, 8, Edgcumbe Street, Stonehouse	0	2	6
Deacon, Mrs. F. E., Fleckney, near Market Harborough.	0	5	0
Deck, Arthur, 9, King's Parade, Cambridge	0	10	6
Delves, George, 187, High Street, Exeter	0	10	6
Dennis, John L., 148, Alfreton Road, Nottingham	0	10	6
Dennis, J. W., Louth	0	10	6
Dennison, Matthew, Dudley	0	5	0
De Peare, John Thomas, 216, St. Paul's Road, N.	0	5	0
Dewar, Mrs. Mary A., 154, Upper Whitecross St., E.C.	0	10	6
Dickie, James, 19, Struan Terrace, Glasgow	0	5	0
Dickins, John, Bridlington Quay	0	5	0
Dingley, Richard L., Bridge Street, Evesham	0	5	0
Dinneford and Co., 172, New Bond Street, W.	2	2	0
Dixon, Henry, St. Botolph's, Ryde, I. of Wight	0	10	6
Dixon, Joseph, 30, Whitefriargate, Hull	0	5	0
Dixon, William, Ash, near Sandwich	0	5	0
Dobson, J. B., 47, Great Union Street, Hull	0	5	0
Dodman, Robert, Sussex Villa, Ranelagh Road, Ealing	0	2	6
Dowman, George, 160, High Street, Southampton	0	2	6
Down, Richard H., Torpoint	0	10	6
Downward, John, Market Street, Ulverston	0	10	6
Dowty, Robert, 175, Kentish Town Road, N.W.	0	2	6
Drage, William Frederick, St. Albans	0	5	0
Dudden, Richard M., Sutton Wick, Pensford	0	5	0
Duncalf, Thomas H., Macclesfield	0	10	6
Duncalfe, Richard, Urmston, near Manchester	0	5	0
Duncan, Alexander, Commercial Road, Bournemouth	1	1	0
Duncan, William, Grantown	0	5	0
Duncan, William, Rothesay	0	5	0
Duncan, Flockhart and Co., Edinburgh	1	1	0
Duncanson, William, Port Street, Stirling	0	10	6
Dunhill, Son, and Shaw, Doncaster	1	1	0
Dunkley, Edward, High Street, Tunbridge Wells	0	10	6
Dunn, Frederick E., Sudbury	0	5	0
Dunsford, Samuel, 56, Market Place, Wigan	0	5	0
Dunston, Alfred, 52, Borough, Farnham, Surrey	0	10	6
Dutton, John, King Street, Rock Ferry	1	1	0
Dyer, William, 1, Corn Market, Halifax	0	5	0
Dymott, Frank, 357, New Cross Road, S.E.	0	5	0
Dyson, George, 20, Myton Gate, Hull	0	5	0
Dyson, Wm. B., 21, Gloucester Rd., Sth. Kensington, S.W.	1	1	0
Eade, George, 72, Goswell Road, E.C.	1	1	0
Eade, James, 72, Goswell Road, E.C.	1	1	0
Earle, Francis, 22, Market Place, Hull	1	1	0
Eckersley, Moses, Wallgate, Wigan	0	5	0
Edden, John, 1, Bush Lane, E.C.	1	1	0
Edwards, William, Denbigh	0	5	0
Edwards, Wm. Staples, 14, Etham Pl., Old Kent Rd., S.E.	0	5	0
Ekins, John, 81, High Street, Bedford	0	5	0
Eliott, Samuel, Plymouth	0	5	0
Ellidge, J. W., 27, Union Street, Ryde, I. of Wight	0	5	0
Ellinor, George, 41, The Wicker, Sheffield	0	10	6
Elliot, Robert John, 69, Church Street, Liverpool	0	10	6
Elliott, George, 50, Park Street, Walsall	0	5	0
Elliott, Robert, High Street, Gateshead	0	10	6
Ellis, William, High Street, Burnham	0	5	0
Else, William, 52, King's Road, Brighton	0	10	6
Elvey, Thomas, 8, Halkin Street West, S.W.	1	1	0
Eminson, J. M. O., 79, Abbey Rd., St. John's Wood, N.W	0	5	0
Emson, William N., 32, Golden Square, W.	0	5	0
Endle, Fredk., 5, Town Hall Buildings, Bournemouth	0	5	0
Entwisle, John B., 17, Shaw Street, Liverpool	0	10	6
Ereaut, John, jun., 14, Bath Street, Jersey	1	1	0
Evans, Alfred E., Brynmawr	0	5	0
Evans, Daniel O., Market Street, Farnworth, Bolton	0	9	0
Evans, Henry Sugden, 60, Bartholomew Close, E.C.	1	1	0
Evans, Isaac H., Market Cross, Lymm	0	5	0
Evans, Joseph J. O., 1, Victoria Road, Teignmouth	0	5	0
Eve, Charles, Plough Court, 37, Lombard Street, E.C.	1	1	0
Exley, George, Leeds	0	5	0
Eyre, Jonathan Symes, Launceston	0	10	6
Fairburn, Joseph, Northallerton	0	10	6
Fairley, Thomas, 160, High Street, Sunderland	0	5	0
Fairlie, James M., 17, St. George's Road, Glasgow	0	10	6
Fairman, George P., Littlemill Distillery, Bowling, N.B.	0	10	6
Falkner, Richard, 12, Market Place, Banbury	1	1	0
Farmer, John, Putney	0	10	0
Farnworth, William, 49, King William Street, Blackburn	1	1	0
Farrage, Robert, Rothbury	0	10	6
Farrow, Charles H., 2, Upper Street, Islington, N.	0	10	6
Faulkner, Henry, 81, Commercial Road, Newport, Mon.	0	3	0
Fenn, John Thomas, 83, Regent St., Westminster, S.W.	0	10	6
Fenwick, John, 17, Bute Terrace, Glasgow	0	5	0
Fergusson, John, 6, Strand Street, Liverpool	1	1	0
Field, Ebenezer, 16, Hills Road, Cambridge	0	5	0
Field, Sam, 71, Scholes, Wigan	0	5	0
Field, William, 83, Brompton Road, S.W.	1	1	0
Fincham, Robert, 57, Baker Street, W.	1	1	0
Firman, Y., St. Peter's Road, Great Yarmouth	0	2	6
Fisher, J. R., North Bridge, Hull	0	5	0
Fisher, Miss C. H., 20, Bank Street, Carlisle	0	5	0
Fitt, Francis E., Barking	0	10	6
Fitzhugh, Richard, Nottingham	0	10	6
Fletcher, Samuel, 20, St. James's Street, Burnley	0	2	6
Fletcher, Thomas, Smallthorne, Stoke-on-Trent	0	10	6
Fletcher, William, 7, St. James's Street, Burnley	0	2	6
Fletcher and Palmer, Cheltenham	1	1	0
Flinders, M. T., 145, Upper Street, Islington, N.	0	5	0
Flint, John, Ranelagh Place, Liverpool	0	10	6
Flower, Thomas S., Pier Street, Ryde, Isle of Wight	0	5	0
Foggan, George, Bedlington, Northumberland	0	8	0
Foott, Richard R., 8, Stockbridge Terrace, S.W.	0	10	6
Foottit, Charles M., Great Marlow	0	5	0
Forrest, Richard Wm., Gainsborough	0	10	6
Forrest, Robert, Commercial Road, West, South Shields	0	10	6
Forster, Robert Henry, 53, Castle Street, Dover	0	10	6
Foster, Alfred H., Navigation Street, Birmingham	0	5	0
Foster, Frederick, 3, Buckingham Place, Brighton	0	10	6
Foster, George, Yorkshire Street, Burnley	0	2	6
Foster, James, 61, Scotch Street, Carlisle	0	5	0
Foster, James Alfred, Birmingham	0	5	0
Foulkes, William Henry, High Street, Rhyl	0	10	6
Foulkes, William Jas., 21, Grange Mount, Birkenhead	1	1	0
Fowler, W. R., 7, Market Place, Boston	0	10	6
Fowls, Jabez, 45, Kensington Road, Southport	1	1	0
Fox, William, 109, Bethnal Green Road, E.	1	1	0
Fox, (William) and Sons, 109, Bethnal Green Road, E.	2	2	0
France, Joseph, 18, Church Street, Rotherham	0	5	0
Francis, George, Market Place, Romsey, Hants	0	5	0
Francis, George B., 5, Coleman Street, E.C.	1	1	0
Francis, Matthew R., 9, East India Road, E.	0	5	0
Franklin, Alfred, 60, West Street, Fareham	0	10	6
Fraser, Charles, Greenock	0	5	0
Frazer, Daniel, 113, Buchanan Street, Glasgow	1	1	0
Freestone, Thomas M., 3, Bedminster Parade, Bristol	0	10	6
French, Benjamin, North Cross Street, Gosport	0	10	6
French, Mrs. S. H., 293, High Street, Chatham	0	10	6
Fresson, Lewis F., Stevenage, Herts	0	10	6
Froom, William Henry, 75, Aldersgate Street, E.C.	1	1	0
Frost, George, Derby	0	10	6
Fryer, Charles, 12, St. Nicholas Street, Scarborough	0	10	6
Fudgé, Charles William, Shepton Mallet	0	5	0
Fuller, Richard T. C., 233, Walworth Road, S.E.	0	10	6
Furness, Thomas, 71, New Square, Chesterfield	0	2	6
Furniss, Thomas, 6, Mount Vernon Road, Liverpool	0	2	6
Furze, Mrs. H., 6, Havelock Terrace, Forest Hill, S.E.	0	10	6
Gadd, Henry, 97, Fore Street, Exeter	0	10	6
Gaitskell, James, Gosforth via Carnforth	0	5	0
Gale, Henry, 3, Millbrook Place, Camden Town, N.W.	0	10	6
Gale, Samuel, 338, Oxford Street, W.	1	1	0
Galloway (G.) and Son, 13, Castle Street, Inverness	0	10	6
Gardner, Austin W., Canterbury	0	5	0
Gardner, Thomas, Morecambe	0	10	6
Garner, James, 119, High Street, Kensington, W.	0	10	6
Garner, Thomas, 75, Allen Road, Stoke Newington, N.	0	5	0
Garratt, John C., 3, Market Place, Rugby	0	5	0
Garratt, Samuel, 3, Market Place, Rugby	0	5	0
Garrett, James O., 171, Commercial St., Newport, Mon.	0	2	6
Gaunt, R. D. H., 221, Union Street, Southwark, S.E.	1	1	0
Gedge, William S., 90, St. John Street, E.C.	0	10	6
Geldard, John, St. Austell	0	5	0
George and Welch, Worcester	1	1	0
Gibb, William C., 31, High Street, Winchester	0	2	6
Gibbon, Daniel, Cheltenham	0	5	0
Gibbons, Thomas G., 41, Market Street, Manchester	1	1	0
Gibbs, William, Union Street, Ryde	0	10	6
Gibson, C. P. (Trustees of), 16, Whitefriargate, Hull	0	5	0
Gibson, Robert, Hulme, Manchester	1	1	0
Gilbert, William, Commercial Road, Bournemouth	0	2	6
Gilmour, Andrew, Burntisland	0	5	0
Gilmour, William, 11, Elm Row, Edinburgh	1	1	0
Gladding, W. B., 75, Brook Street, Ratcliffe, E.	0	2	6
Glaisyer, Thomas, 11, North Street, Brighton	0	10	6
Glasgow Apothecaries Co., 34, Virginia Street, Glasgow	1	1	0

	£	s.	d.
Glegg, John, 107, Eglinton Street, Glasgow	0	2	6
Glover, George, 19, Goodge Street, W.	1	1	0
Gloyne, Charles G., Market Place, Dewsbury	0	10	6
Goddard, H. E., Great Yarmouth	0	2	6
Goff, Richard, 90, St. John Street, E.C.	0	5	0
Goggs, Nathaniel W., Theale, Berks	0	5	0
Golding, William, 172, Albany Street, N.W.	0	5	0
Goldsmith, J. J., High Street, Abingdon	0	5	0
Goodall, Backhouse and Co., Leeds	2	2	0
Goode, Charles, Congleton	0	10	6
Goodliffe, George, 17, Rendezvous Street, Folkestone	0	10	6
Goodwin, John, Lower Clapton E.	1	1	0
Gordelier, William G., 39, High Street, Sittingbourne	1	1	0
Gorton and Sons, 144, Whitechapel High Street, E.	1	1	0
Goss, Samuel, 1, High Street, Barnstaple	0	10	6
Gostling, George James, Ipswich Street, Stowmarket	0	10	6
Goucher, John, 43, High Street, Shrewsbury	0	10	6
Goulden, Edward B., Uckfield	0	5	0
Gow, Alexander, Dudley Street, Wolverhampton	0	10	6
Gower, Alfred, High Street, Tonbridge	0	10	6
Gower, Alfred J., Falcon Road, Clapham Junction, S.W.	0	10	6
Graham, Alexander, Main Street, Lochgelly	0	2	6
Granger, Edwin J., Upper Clapton, E.	1	1	0
Grattan, Thomas, 39, King Street, Belfast (1877-78)	1	1	0
Greaves, Abraham W., Chesterfield	0	5	0
Greaves, Frederick William, St. John Street, Ashbourne	0	5	0
Green, John, 196, Lower Street, Deal	0	10	6
Green, Richard, Croft Cottage, Ashton-under-Lyne	0	2	6
Green, Samuel, 2, York Place, Nunhead, S.E.	0	5	0
Green, Thomas, 7 and 9, Corn Market, Belfast	0	5	0
Green, William G., Hoddesdon, Herts	0	5	0
Greenall, Alfred, 303, Breck Road, Liverpool	0	10	6
Greenwell, William C., 118, High Street, Gateshead	0	5	0
Greenwood, Charles, 20, Parliament Street, Harrogate	0	10	6
Greenwood, John, 20, Parliament Street, Harrogate	0	10	6
Gregory, George H., East Street, Taunton	0	5	0
Gregory, William, Weymouth	0	5	0
Grieves, Herbert, Old Street, Ludlow	0	5	0
Griffin, Alfred William, 4, Saville Row, Bath	0	5	0
Griffin, Thomas, 3, Wood Hill, Northampton	0	10	6
Griffith, Richard, High Street, Slough	0	10	6
Griffiths, Waldron, Market Place, Cirencester	0	10	6
Grindley, William, Northgate Street, Chester	0	10	6
Groves, Henry, Florence	1	1	0
Groves, T. B., 80, St. Mary Street, Weymouth	0	10	6
Guest, George C., St. John's Square, Burslem	0	2	6
Gulliver, William, 6, Lower Belgrave Street, S.W.	0	10	6
Gunn, John, Hambledon, Hants	0	5	0
Gutheridge, George F., Arweck Street, Falmouth	0	5	0
Hackforth, F., Leyland, Lancs.	0	10	6
Hackforth, M., Croston, Lancs.	0	5	0
Hackman, Leonard L., 1, St. Clair Terrace, Landport	0	10	6
Haddock, B., Greetes Green, West Bromwich	0	10	6
Haffenden, James, 59, Queen Street, Ramsgate	0	5	0
Haffenden, Thomas, 46, Dyke Road, Brighton	0	10	6
Hall, Frederick, 117, High Street, Stockton-on-Tees	0	10	6
Hall, Henry R. F., 1, Beverley Road, Hull	0	5	0
Hall, Robert, Camborne	0	5	0
Hall, Thomas, Grantham	0	10	6
Hall, Thomas, Breckfield Road, Liverpool	0	10	6
Hallaway, John, 52, Castle Street, Carlisle	0	5	0
Halstead, Halstead, 74, Trafalgar Street, Burnley	0	2	6
Hambly, Charles J., Sydney Terrace, Taunton	0	10	6
Hambrook, John B., 6, Strand Street, Dover	0	5	0
Hammerton, Edward, High Street, Colchester	0	5	0
Hammond, William H., 1, Caroline Street, Hull	0	5	0
Hamp, John, 47, Worcester Street, Wolverhampton	0	5	0
Handley, Charles, 41, High Street, Stoke Newington, N.	0	10	6
Hardman, J. W., Leeds	0	5	0
Hardy, George, Wheelgate, Malton	0	5	0
Hardy, Samuel C., 177, Regent Street, W.	1	1	0
Hardy, William, Victoria Terrace, Stockton-on-Tees	0	5	0
Hargraves, Henry L., 30, High Street, Oldham	0	10	6
Hargreaves, Mark, 108, Fylde Road, Preston	0	5	0
Harris, Edward R., 30, Richmond Place, Brighton	0	5	0
Harris, H., Infirmary, Tunbridge Wells	0	10	6
Harris, Henry William, 208, High Street, Rochester	0	10	6
Harrison, William, Kirkby, Lonsdale	0	10	0
Harrison and Parkinson, 7, Sunbridge, Bradford	2	2	0
Harrop, William H., Hagley Street, Halesowen	0	5	0
Harrower, Peter, 136, Cowcaddens Street, Glasgow	0	5	0
Hart, George William, 9, Scale Lane, Hull	0	10	6
Hart, James, 131, Embden Street, Hulme, Manchester	0	10	6
Harvey, Edward, 6, Giltspur Street, E.C.	1	1	0
Harvey, Thomas, Headingley Hill, Leeds	1	1	0
Harvey, William R., 98, Humberstone Road, Leicester	0	10	6
Harvey, William S., Margate	0	10	6
Harvie, John, Stirling Street, Airdrie	0	5	0
Harwood, Charles, Lower Addiscombe Road, Croydon	0	5	0
Hatch, R. M., Redland, Bristol	1	1	0
Hatfield, George B., 817, Commercial Road, E.	0	10	6
Havill, Paul, 15, Fore Street, Tiverton	0	5	0
Hawkins, Henry F., Rugeley	0	10	6
Haydon, Frederick W., Fordingbridge	0	5	0
Hayland, W. C., 20, High Ousegate, York	0	5	0
Hayles Brothers, Ealing	1	1	0
Hayward, William G., Bridge Street, Reading	0	5	0
Head, John, High Street, Lewes	0	10	6
Heanley, Marshall, Market Place, Peterborough	0	10	6
Heap, William, Fishergate, Preston	0	5	0
Hearder, Henry P., 24, Westwell Street, Plymouth	0	5	0
Hearn, John, 59, Hewlett Road, Old Ford, E.	0	5	0
Heath, Fred. D., 22, Hamilton Ter., Highbury Park, N.	0	5	0
Heathcote, T. S., Red Lion Sq., Newcastle-under-Lyne	0	10	6
Heaton, Martha, 15, Goodham Hill, Burnley	0	2	6
Henderson, John, 104, Cathedral Street, Glasgow	0	5	0
Henthorn, Joshua, 37, Lees Road, Oldham	0	10	6
Henty, H. M., 19, High Street, St. John's Wood, N.W.	0	5	0
Herbert, William, 137, Lewisham High Road, S.E.	0	5	0
Heslop, John, Hornsea	0	5	0
Hester, Charles, St. Loyes, Bedford	0	5	0
Hetherington, Martin L., Commercial Rd., Bournemouth	0	10	6
Hewitt, Joseph S., 97, Eastgate, Rochester	0	5	0
Hewlins, Edward, Leatherhead	0	10	6
Hey, David, Hebden Bridge	0	10	6
Hey, Thomas K., Hebden Bridge	0	10	6
Hibberd, John, 24, North Street, Exeter	0	5	0
Hick, Allan, Wath-upon-Dearne	0	10	6
Hick, George, 3, Broadstones, Bradford	0	10	6
Hick, Joseph, 3, Broadstones, Bradford	0	10	6
Hick, Matthew B., Wakefield	0	10	6
Hickey, Evan L., 199, King's Road, Chelsea, S.W.	0	10	6
Hickley, Thomas P., 297, Edgware Road, W.	0	10	6
Hicks, James S., Fore Street, Looe	0	5	0
Hifley, Richard James, 7, Cobourg Street, Plymouth	0	5	0
Higgins, James, 105A, Crawford Street, W.	0	10	0
Higgins, Tom Sellers, Huddersfield	0	10	6
Highley, William, Drake Street, Rochdale	0	5	0
Hill, Arthur B., 101, Southwark Street, S.E.	1	1	0
Hill, Arthur S., Atkins' Road, Clapham Park, S.W.	2	2	0
Hill, Henry, 4, St. Leonard's Terrace, Weymouth	0	5	0
Hill, Richard, Bruton	0	5	0
Hill, William, West Ham Lane, Stratford, E.	0	5	0
Hillier, Henry, 7, Bridge Street, Bath	0	10	0
Hills, Thomas Hyde, 338, Oxford Street, W.	5	5	0
Hills, Walter, 338, Oxford Street, W.	1	1	0
Hind, Thomas W. L., Kendal	1	1	0
Hinds, James, Jordan Well, Coventry	0	10	6
Hirst, Brooke and Hirst, Leeds	2	2	0
Hitchcock and Son, 108, High Street, Oxford	1	1	0
Hitchin, Robert, 42, St. James's Street, Burnley	0	5	0
Hocken, Joshua, 31, Old Hall Street, Liverpool	0	10	6
Hodder, Henry, Broad Street, Bristol	0	5	0
Hodgkinson, George A., 254, Goswell Road, E.C.	0	5	0
Hodgkinson, J. S., Matlock Bridge	0	10	6
Hodgkinson (T.), Prestons & King, 88, Leadenhall St., E.C.	2	2	0
Hodsoll, Thos. Wm. H., 17, Cross Street, Hoxton, N.	1	1	0
Holford, Thomas C., 342, High Street, Stratford	0	10	6
Holl, Edmund, 105A, Crawford Street, W.	0	5	0
Hollier, Elliott, Market Place, Dudley	0	10	6
Hollingsworth, James, 57, New George Street, Hull	0	5	0
Holloway, John, Finsbury Road, Wood Green, N.	0	10	6
Holmes, Walter M., 338, Oxford Street, W.	0	5	0
Holt, Richard W., Victoria Road, Seacombe	0	5	0
Hopkinson, Thomas, Grantham	0	5	0
Hopper, Charles, Market Place, Doncaster	0	5	0
Hopton, Edwin, Idle, Yorks	0	5	0
Hopwood, Thomas S., Richmond, Surrey	1	1	0
Hora, Henry W., 58, Minories, E.	1	1	0
Horncastle, John, 17, Craven Road, W.	1	1	0
Hornsby, George G., 38, Lewes Road, Brighton	0	10	6
Horsfield, John M., 1, College Street, Rotherham	0	5	0
Hothersall, John, 25, Standishgate, Wigan	0	10	6
Hough, William, Market Place, Doncaster	0	10	6
Houghton (T.) & Son, 53, High St., St. Clement's, Oxford	0	10	6
Hoult, Joseph E., Yoxall, Burton-on-Trent	0	10	6
Houlton, James, Wetherby	0	10	6
Howard, Richard, Rochester Place, Tunbridge Wells	0	10	6
Howorth, James, Doncaster	0	10	6
Howden, Robert, 78, Gracechurch Street, E.C.	1	1	0
Howell, Maurice, 61, High Street, Peckham, S.E.	0	10	6
Hucklebridge, J. M., 116, Ebury Street, S.W.	1	1	0
Hudson, Fretwell, West Bar, Sheffield	0	10	6
Hudson, James, 3, Henry Street, Rotherham	0	5	0
Hudson, Thomas, South Shields	0	10	6
Huggins, John, Alresford	0	5	0
Huggins, Henry, 210, High Street, Exeter	0	10	6
Hughes, Evan G., 86, Northgate Street, Gloucester	0	5	0
Hughes, James, 219, Pitt Street, Sydney, N.S.W.	1	1	0
Hughes, John E., Old Bond Street, Bath	0	10	0
Hughes, Samuel, High Street, Stourbridge	0	10	6
Hughes, Thomas, Red House, Llandilo	0	10	6
Hugill, John, 147, Cannon Street, E.C.	1	1	0
Hulley, John, 97, Manchester Rd., Heaton Norris, Stockport	0	10	6
Humpage, Benjamin, 3, Clifton Ter., Turnham Green, W.	0	10	6
Hunt, Arthur, 95, Fore Street, Exeter	0	10	6
Hunt, Thomas, Brownlow Hill, Liverpool	0	10	6
Hunter, John, High Street, Gosport	0	7	6
Hurst, John, Market Place, Louth	0	10	6
Hurst, John B., Market Place, Louth	0	10	6
Hutton, Henry, Bedford	0	2	6
Iliffe, George, Nuneaton	0	5	0
Iredale, George, 173, York Street, Leeds	0	5	0
Iredale, Thomas, 129, North Street, Leeds	0	5	0

	£	s.	d.
Ison, Francis, Ashby-de-la-Zouch	0	5	0
Ive, Wm., 115, Gloucester Road, South Kensington, S.W.	1	1	0
Izod, James, Upper Norwood	1	1	0
Jaap, John, 268, Buchanan Street, Glasgow	0	10	6
Jackson, Charles, 83, Brompton Road, S.W.	0	10	6
Jackson, Christopher, Church Road, Acton	0	10	6
Jackson, Henry, Post Office Place, Liverpool	0	10	0
Jackson, Joseph, 15, Talbot Road, Blackpool	0	5	0
Jackson, Roberts, Nottingham	0	5	0
Jackson, William, 10, High Street, Crediton	1	1	0
Jackson, William G., Hartlepool	1	1	0
James, James Thomas, 15, Princes Street, Hanover Sq., W.	0	10	6
James, Kirby, Beverley	0	10	6
Jarvis, A., Commercial Road, Bournemouth	0	2	6
Jarvis, John S., Manor Villa, Lee, S.E.	0	10	6
Jefferson, Peter, Meadow Lane, Leeds	0	10	6
Jenkins, H., 73, Red Lion Street, Holborn	1	1	0
Jenkins, Jabez, Llysyfran, Haverfordwest	0	5	0
Jenkins, John Thomas, New Radford, Notts	0	5	0
Jennings, Reginald, 36, High Town, Hereford	0	10	6
Jervis, William, Broomhill, Sheffield	1	1	0
Jobson, Robert, 125, Scotswood Road, Newcastle-on-Tyne	0	10	6
Johnson, Arthur, 1, Beech Cottages, Moorgate, Rotherham	0	5	0
Johnson, John B., Uttoxeter	0	10	6
Johnson, Joseph, 8, Brondesbury Terrace, Kilburn, N.W.	0	10	6
Johnson, Robert D., 59, Camberwell New Road, S.E.	0	10	6
Johnson, Thomas, 80, Wallgate, Wigan	0	5	0
Joint, R. J., Chulmleigh	0	6	0
Jones, Alfred M., King Street, Brynmawr	0	10	6
Jones, Charles W., 1, Bath Street, Ashby-de-la-Zouch	0	5	0
Jones, David W., 1, Commercial Place, Aberdare	0	5	0
Jones, E. Powell, 52, High Street, Rhyl	0	10	6
Jones, Frederick, 175, Kentish Town Road, N.W.	0	5	0
Jones, Frederick Wm., 11, Norton Folgate, E.	0	10	6
Jones, George M., 16, Burton Crescent, W.C.	0	5	0
Jones, George W., Worksop	0	5	0
Jones, Humphrey, Llangollen	0	5	0
Jones, John, 2, Commercial Place, Aberdare	0	5	0
Jones, John, Castle Square, Carnarvon	0	5	0
Jones, John H., Finsbury Place, E.C.	0	10	6
Jones, John P., Aberayron	0	2	6
Jones, Moses, 146, High Street, Swansea	0	10	6
Jones, Owen, Colwyn near Conway	0	10	0
Jones, Rees Thomas, Bute Street, Treherbert	0	5	0
Jones, Richard, Broad St., Chipping Sodbury	0	10	6
Jones, Rowland G., The Lye, Stourbridge	0	5	0
Jones, Samuel U., 4, Upper Parade, Leamington	1	1	0
Jones, Walter R., 16, Jamaica Row, Birmingham	1	1	0
Jones, William, Bridge Street, Corwen	0	10	6
Jones, William, 19, Berry Street, Liverpool	0	5	0
Jones, William, 172, New Bond Street, W.	0	5	0
Jones, William, 8, Richmond Terrace, Shepherd's Bush, W.	0	5	0
Jones, William, Winterbourne	0	10	6
Jones, William John, 3, Newland Terrace, Kensington, W.	0	10	6
Jones, William O., 135, Ladbroke Grove, W.	0	10	6
Jones, William W., Southwell Street, Kingsdown, Bristol	1	1	0
Kaye, Hamor, Berry Brow, Huddersfield	0	5	0
Keall, Frederick P., 199, High Street, Swansea	0	2	6
Kellett, Richard E., 44, Market Place, Wigan	0	10	6
Kellington, M. L., Brook Street, Hull	0	10	6
Kemp, John, 11, North Street, Brighton	0	10	6
Kemp, Robert, 205, Holloway Road, N.	0	10	6
Kendall, Charles F., 126, Clapham Road, S.W.	0	10	6
Kent, Thomas, 226, Blackfriars Road, S.E.	0	10	6
Kent, Thomas R., 103, Westminster Bridge Road, S.E.	0	10	6
Kershaw, William, Luddenden Foot, via Manchester	0	2	6
King, Henry, 1, Churton Street, Pimlico, S.W.	1	1	0
King, William, 4, Market Place, Huddersfield	0	10	6
Kingerlee, George, Buckingham	0	10	6
Kingsford, Frederick, 54, Piccadilly, W.	1	1	0
Kington, J. P., 59, West Street, Hull	0	2	6
Kinninmont, Alexander, 69, South Portland St., Glasgow	0	10	6
Kirby, Frederick, 114, Abington Street, Northampton	0	5	0
Kirk, Snowden, 89, Upper North Street, Poplar, E.	0	10	6
Kirkman, Charles J., Dedham, Essex	0	5	0
Kirkpatrick, Samuel, East Reach, Taunton	0	5	0
Kirton, Joseph B., 53, Saville Street, Hull	0	10	6
Knight, G. E. Moses, 45, High Street, Winchester	0	5	0
Knott, Samuel, 15, Norton Folgate, E.	0	5	0

[*The completion of the List will be published next week.*]

Provincial Transactions.

HULL CHEMISTS' ASSOCIATION.

A special meeting of the chemists of Hull and district, convened by the above Association, was held at the Cross Keys Hotel, on Wednesday evening May 30. Mr. C. B. Bell was elected chairman, and the following resolutions were unanimously agreed to.

Resolved:—"That this meeting pledges its strongest opposition to the latter part of clause I. of the Bill intituled 'A Bill to amend the Medical Act of 1858,' which if it became law would render every chemist who supplied the most simple medicine on his own recommendation, or performed the most trivial surgical operation and charged for it, liable, upon summary conviction, to a penalty of £20."

Resolved:—"That this meeting desires to express its hearty thanks to the Executive Committee of the Chemists and Druggists' Trade Association for the active opposition they have displayed against the objectionable part of the Bill, and hopes that their efforts will be crowned with success."

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

An Extraordinary General Meeting was held on May 31st; Dr. Gladstone, F.R.S., President, in the chair. More than 100 Fellows were present.

The President, after reading the letter in accordance with which the meeting was convened, said there were four subjects to be considered: the first was, "The status and functions of the Publication Committee, and the present condition of the Journal of the Society." He would be glad to hear any remarks on this question.

Mr. Kingzett rose to propose the following resolution:—"That in the opinion of this meeting the Publication Committee should be dissolved and be reconstituted." Up till 1871 the Committee had consisted of four members; the number then was increased to twenty-two; by bye-law fourteen, the only censorship was vested in the Council, and in his opinion the Committee should be more directly responsible to the general body of Fellows than at present. He proposed that any censorship henceforth should be exercised before the papers were read, and he would also suggest that a permanent committee of five be appointed. As to the Journal, he, after saying how much the Society was indebted to their indefatigable editor, Mr. Watts, would venture to point out that original papers read before the Society ought not to wait five to six months, whilst the space of the Journal was taken up by abstracts of doubtful value. In conclusion, he would call attention to the delay in the publication and distribution of the Journal. Last year, for instance, the average interval between the nominal date of publication and that of reception was forty days.

Prof. Odling rose to second Mr. Kingzett's resolution. In his opinion the complaints as to the delay in publication were well founded. He would mention, however, that the Council had already appointed a committee to promote a speedy and uniform appearance of the Journal. He did not think it would be advisable to exercise a censorship on papers before they were read; such a course must cause delay in publication.

Mr. Neison thought that if a paper were worth reading it was worth publishing. As to the delay, societies in which the plan of censorship before reading was adopted, published their papers more speedily than the Chemical Society.

Mr. Pearsall suggested that each author should send in an abstract with his paper, as was the custom in France.

After a few remarks from Mr. Howard and Mr. Friswell, the President put Mr. Kingzett's motion, which was carried by a large majority.

The second subject considered was "The proper steps to be taken to place the election of Fellows and Associates of the Society on such a footing as will remove the existing dissatisfaction, and especially with reference to the means of securing proper qualifications in the candidates."

Dr. Paul rose to propose the following resolution:—"That in the opinion of this meeting the principles on which the election of Fellows has hitherto been proceeded are unsatisfactory and necessitate revision." It was a matter of regret that during the past few months there had been a growing dissatisfaction as to the election of Fellows. He was not wedded to the idea that the title F.C.S. should give any idea as to the chemical ability of its owner, but there was the fact, that on the one hand, they had an executive body wanting the sinews of war wherewith to carry on the business of of the Society, and whose wishes, therefore, tended to a large accession of Fellows; while, on the other, many of the present Fellows were dissatisfied, and complained that admission into the Society had become too easy; as a result of this feeling several candidates had recently been blackballed. In his opinion the grade of Associate, if properly developed, would meet the requirements of the case. It gave access to the meetings, to the library, and option to purchase the Journal at an almost nominal price, and for his part he should like to see all future Fellows elected from those who had been Associates a certain time.

Mr. Friswell had much pleasure in seconding Dr. Paul's resolution. There could be no doubt that to the public the title F.C.S. did convey a certain amount of chemical competence. Taking this into consideration, he thought that admission to the Fellowship had been too indiscriminate, and that persons had obtained admission into the Society merely to use the letters F.C.S. for trade purposes in connection with the advertisement of spirits, building materials, etc., a practice which, though it might seem to some perfectly proper, was, in his opinion, not a desirable method of using the Fellowship of a learned society.

Mr. Tribe moved an amendment to the effect: "That this Society is of opinion that the present system of election to its Fellowship does not promote its interests or sustain its dignity, and that in place of this system, the Council of the Society should recommend to the Fellows annually not more than twenty of the more meritorious candidates for election to its Fellowship." Mr. Tribe concluded by proposing that the future Associates should take the place of the present Fellows, paying the same subscription, having the Journal, etc.

This was seconded by Mr. Herbert, who called attention to the fact that a somewhat similar plan had been proposed by a former committee in 1862.

Mr. Hartley thought that there was much looseness in the signing of certificates, but objected most strongly to limiting the number of Fellows.

Mr. De La Rue thought the plan of electing candidates as Associates and then passing them up was not feasible. He was afraid that it was impossible to prevent an improper use of the title F.C.S. He would therefore propose a second amendment: "That in the opinion of this meeting the election of Fellows should only take place on certain dates, to be fixed by the Council beforehand."

Dr. Roscoe seconded the amendment, and asserted the claims of science teachers as such to be considered worthy of being admitted to the Fellowship of the Society.

Dr. Williamson thought that a great deal of dissatisfaction had arisen from Fellows signing certificates too much out of their knowledge. From his point of view, personal knowledge should mean personal acquaintance and intercourse.

Mr. Kingzett suggested that Mr. De La Rue's proposal would be attended with practical difficulties as to time if fifty to sixty candidates had to be balloted for on one night.

Professor Odling objected to a spirit of exclusiveness, and thought that the charter was granted to the Society to advance chemical knowledge and not to found a caste of chemists. He did not at all agree with Mr. Tribe's resolution. Associates would, according to Mr. Tribe's proposition, have the privilege of riding in a second-class carriage paying first-class fare. Rather would he invite any one interested in chemistry to become a Fellow and take in the Journal; if there was any extra advantage in the letters F.C.S. let him have it and welcome.

Dr. Paul briefly replied.

Mr. De La Rue's amendment was then put, and carried by a large majority. It was then put as an original motion, and carried.

Dr. Thudichum rose to propose the following resolution: "That this meeting recommends to the Council that all contributions to the Research Fund which are not mortmained be applied directly in furtherance of original research."

The Treasurer (Dr. Russell) wished to make a short statement: The fund amounted to nearly £4000. One half was invested, in accordance with the wishes of the donors, the other was quite free, and the Council was ready to vote the whole of it at once should occasion arise.

Dr. Thudichum thanked Dr. Russell for his explanation and begged to withdraw the resolution.

The fourth subject was, the present condition of the Society in reference to its Executive and the Bye-Laws.

Mr. Kingzett proposed: "That in the opinion of this meeting it is desirable that henceforth the Council shall nominate twelve candidates to fill the annual vacancies in the Council." He thought that the Fellows should have some choice of names to fill up the six vacancies instead of having the exact number nominated by the Council.

Professor Odling explained at some length the way in which the Council proceeded to select the names, and concluded by stating his firm conviction that the names were selected after a minute inquiry and with every endeavour to obtain a fairly representative body.

Mr. Neison seconded Mr. Kingzett's motion.

Mr. Spratling proposed, as an amendment: "That this meeting thanks the Council for the frank explanations given on the points that have been discussed, and begs to express its confidence in the action of the Council."

Mr. Neison rose to protest against Mr. Spratling's amendment, as not being a true amendment to the original motion.

At the request of the President the amendment was withdrawn.

Mr. Kingzett's original motion was then put and lost.

Mr. Friswell proposed the adjournment of the meeting. The proposition was however lost.

Mr. Spratling's amendment was then put as an original motion, being seconded by Mr. Neison, and carried unanimously.

The meeting terminated with a hearty vote of thanks to Dr. Gladstone for presiding.

In the course of the meeting it was stated that the Council had under their consideration various proposed alterations in the Journal, election of Fellows, etc., and intended shortly to call a general meeting to consider them.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held at 17, Bloomsbury Square, on Thursday, May 17th, Mr. Harold Senier in the chair.

A paper on "Dispensing," by Mr. C. Shapley, was read. The author, after some introductory remarks, said that dispensing, taken by itself as a branch of pharmacy, might be stated to depend for its correct performance upon three points: (1) a correct reading of the prescription; (2) the detection of unusual doses when they occur; and (3) the accurate putting together of the ingredients ordered. In regard to the first condition, the author referred to the practice adopted by some prescribers of covering the names of drugs, and instanced the use of "vegetable calomel" and "resin. pelt." for podophyllin," "blue pill," and "pil. rubri" for "pil. hyd" subchlor. co." "podoph. min." for "calomel," "pil. cærulei" for The detection of unusual doses was then referred to, and the difficulty sometimes arising when large doses are intentionally prescribed. Under the last head the author remarked :—

"One great fault, which deserves the most severe reprimand, and which is sometimes carried to a most absurd extent, is the indiscriminate measuring of drugs into a bottle without any vehicle first added wherewith to mix them. Sometimes very peculiar results are seen. For instance, if a prescription containing mag. sulph., ℥j ; tr. ferri mur., ʒij. ; æth. chlor., ʒss., be dispensed, by first placing the necessary quantity of mag. sulph. solution in the bottle, and then adding the æth. chlor. and tr. ferri mur, a singular reaction takes place ; crystals first appear on the sides of the bottle where the liquids have been poured, and these extend, and with a kind of fibrous growth traverse the whole body of the liquid, till it becomes so solid as to allow of complete reversion of the bottle without loss ; on the addition of water, however, and some little shaking, the mixture becomes clear. Another fault which is sometimes adopted for the sake of expediency, but which should not be committed, is the measuring of tinctures, syrups, etc., into a bottle, on to a powder undissolved, and finishing with the water. In dispensing gallic or tannic acids, salicin, morphia for hypodermic use, boracic acid and other like drugs, hot water is often if not generally resorted to. The result at the time may be satisfactory and elegant, but it is preferable to use cold water to avoid the risk of having such solutions returned with the ingredients recrystallized. With gallic acid, so long as the quantity does not exceed ʒss. to ℥viij., hot water if used to the *full quantity* will produce a fairly permanent result, but if a certain quantity of hot be used and the remainder be made up with cold, it is likely to recrystallize again. The same remarks apply to salicin and the other bodies mentioned. Boracic acid is more easily managed, for being generally used as an external application it is enough to have the use of a cold saturated solution and to be used with agitation. The only difficulty in the dispensing of powders occurs in the weighing out of deliquescent substances, which is best provided for by finely pulverizing in a hot mortar, and then enclosing in tinfoil. Ointment and pills often require very careful and patient manipulation to produce good results. No question has raised so much discussion as that what is the best pill excipient. The author repudiated the idea of a general excipient, for one reason that it does not seem to be a desideratum. It is possible for the dispenser to help the prescriber in this work to a very great extent. In some cases the substance to be made into a pill indicates its own excipient. Thus, dec. aloes co., for p. ext. coloc. co. would be found to be a very good one. Secale cornute might be well rubbed with just a speck of mag. carb. levis. A prescription received some time since was written, ext. cannab. ind. gr. v. ft. pil. i. ter die. Mitte xij. The medical man was called upon but said it was quite usual for him to prescribe it and wished the pills made by adding 2½ parts p. sacchar. alb. for 1 of the ext., making into two pills and labelling accordingly ; the excipient answered well."

A meeting of the Association was held on May 24th, when a paper was read by Mr. J. F. Savory, on the "Different Methods of Flower Fertilization." We hope to have an opportunity of publishing this paper in a future number.

Parliamentary and Law Proceedings.

Important Prosecution under the Sale of Food and Drugs Act for Refusal to Sell.

On Thursday, May 30, at the Belfast Police Court, John Ussher, druggist, Castle Street, Belfast, was summoned at the instance of the sanitary officer, for refusing to sell to the officer sulphate of quinine the same being on sale by retail on his premises.

Mr. M'Lean said that the prosecution was brought under the 17th section of the Sale of Food and Drugs Act, 38 and 39 Victoria, which cited that "if any officer, inspector, or constable as described by the Act, shall apply to purchase any article of food or any drug exposed to sale, or on sale by retail, on any premises, or in any shop or stores, and shall tender the price for the quantity which he shall require for the purpose of analysis, not being more than shall be reasonably requisite, and the person exposing the same for sale shall refuse to sell the same to such officer, inspector, or constable, such person shall be liable to a penalty not exceeding £10." Anderson, the inspector, went into the defendant's shop, and asked for a drachm of sulphate of quinine ; and when the quinine was handed to him, he told the defendant that it was for the purpose of analysis. The defendant then snatched the quinine out of his hand, and threw the money—the amount that he had paid for it—back to him.

Wm. John Anderson deposed, that on the day in question he went into the defendant's shop and asked him for a drachm of sulphate of quinine. The sulphate was exposed for sale on the premises. In payment of the sulphate he gave a half-sovereign, but the defendant had no change, and witness went out to get it, and when he returned he gave the defendant 2*s.* 6*d.* for the drachm. When the defendant was handing the sulphate to him, witness informed him that it was for analysis. The defendant then snatched the quinine back, and told him to take the 2*s.* 6*d.*, and added, "You are done now." Witness replied that he was not, and that it was his duty now to inform him that he was liable to be summoned for refusing to sell him the article.

In reply to Mr. Sheals for the defence, the witness said he had the letters "S.S.O.," which were for sub-sanitary officer, on the collar of his coat, which the defendant could have seen.

Mr. Sheals said that there was no proof of a refusal on the part of the defendant to supply the complainant with the quinine as required by him. He contended that the officer did not intimate when he first went into the shop or establishment of the defendant that he was a sanitary inspector, or a person authorized or empowered to get from the defendant the quinine for the purposes of analysis. He maintained that when a person went into a druggist's house or shop in order to obtain articles for analysis, and, if necessary, afterwards to establish proceedings, he should announce his calling. He had asked the inspector how Mr. Ussher could recognize him as a sanitary inspector, or recognize him as a person authorized to get the drug, and the only answer he gave was that he had certain letters impressed or printed on the collar of his coat. Under all the circumstances he did not think that there was an absolute refusal. Mr. Ussher would tell the court that when this young men presented himself in the shop he took him as an ordinary individual ; but when the quinine was made up, and Anderson had informed him that he was about to have it analysed, he was suspicious, because he had not intimated to him that he was about to divide it into three parts.

The defendant was examined, and stated when the complainant came into his shop his collar was turned up, and the letters on it were not discernible. He asked witness for a drachm of quinine. Witness weighed it, and the complainant handed him half a sovereign in payment. He had to go out and get change. Up till the time he went out for the change he never intimated that he was a sanitary inspector authorized to get drugs for the purpose of analysis. When he put down the half-crown on the counter, and when witness was reaching the quinine over to him, the complainant make a remark that it was for analysis. Witness told him that he would not have it. Witness was under the impression that complainant was not a person authorized to get a drug for analysis. He was afraid that if he had got the quinine out of the shop the complainant might have tampered with it. If he had come in the proper way, and told witness that it was for analysis, he would not have hesitated to give it.

The defendant said, in reply to Mr. Sheals, that he bought his drugs from the best house he could find in Liverpool.

Mr. O'Donnell said the quality of the drugs was not before the court.

In giving the judgment of the court,

Mr. O'Donnell said that the observations of Mr. Shales in his defence were based entirely upon a wrong assumption. There was no necessity for the officer to announce himself as such, or to go in uniform, when he purchased the drug. It was the duty of the officer when he purchased a drug, to tell the vendor what it was for, and to divide it into three parts according to law. The officer, in his opinion, went in the proper discharge of his duty to buy a drug, and there was a distinct refusal to sell it. Having regard to the preceding section—section 14 of the same act—under it the mixer of a drug was dealt with very severely because if the drug was sold, and the quality or potency of it was injuriously affected, the party so adulterating it was liable to a penalty of £50. But as far as in this case, there was no evidence that the drug was adulterated. He thought the sale of adulterated drugs was about the worst offence any man could commit, although this was the first case brought under the act into this court. He would inflict the full penalty of £10 for refusal to sell.

Prosecution for Sale of Vermin Killer without Entry in Poison Book.

At Guisborough Petty Sessions on Tuesday, May 29, Mr. Peter Bamlett Ayton, a chemist and druggist, in business at Lingdale, was summoned for having neglected to enter in a certain book, as required by Act of Parliament for the purpose, the sale of a packet of poison.* The defendant pleaded that he was in London at the time, and that the mistake was made by his assistant.—It was stated by Superintendent Prest that the poison—a packet of Battle's Vermin Killer—was sold to a young woman named Mary Ann Lawrence, who, whilst in a low way, swallowed a considerable dose of it and poisoned herself.—The defendant said there was no evidence that the young woman poisoned herself, but Admiral Chaloner remarked that even if that were the case it did not alter the fact that the poison was sold and no entry had been of the sale. It was a serious offence, and the Bench felt it their duty to inflict the full penalty of £5 and costs.—*Northern Echo.*

Notes and Queries.

PREPARATION OF THIN PENCILS OF SILVER NITRATE.—Very thin pencils of caustic, such as are sometimes required for intra-uterine applications, may be prepared, according to A. Huber, in the following manner: Silver nitrate is fused in a capsule, and the liquid drawn up, by slow and cautious suction, into a glass tube, the calibre of which is a trifle larger than the required diameter of the pencil. Especial care is to be taken that no cavities filled with air-bubbles are produced in the contents of the tube. When entirely cold, the glass tube is warmed by turning over a spirit-lamp, until the outer surface of the stick has become soft, when it may be easily pushed out by means of a knitting-needle. With a little practice, very handsome pencils, of considerable length, may be obtained in this manner.—*New Remedies*, from *Schweiz. Woch. f. Pharm.*

* The fact that no such name appears on the Register of Chemists and Druggists for 1877 seems to indicate that a double offence against the Pharmacy Act has been committed by the defendant.—Ed. *Ph. J.*

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Cooperative Stores.

Sir,—In *Pharmaceutical Journal*, No. 362, 3rd series, I see correspondence applying to myself in which one of the correspondents allows himself to *wade* through the mire of two misrepresentations; in the first place he alludes to my being considered "a champion to fight underselling chemists." I deny that at the annual meeting I spoke of the rate of sale, well knowing that the Pharmaceutical Society is not a trade union for the purpose of regulating prices. In the second, he says, "accompanied by the handbills was a statement that all drugs are sold at equally low prices." That is absolutely untrue! and I am greatly surprised that any gentleman of common sense should be led away by a communication that is unattested by the writer's name; you, sir, and other journalists publish nothing unauthenticated, and not always that which is.

One gentleman on the Council had the honour and manliness to remit a similar communication to myself; I recognized the writing and found it emanated from an A.P.S. who resides not one hundred miles from my own dwelling. This part I conclude as I go in for principle and not personality.

The explanation your correspondents, Messrs. Walker and Wade, imply they require I now give.

The trading in medicines by unregistered cooperative store proprietors must be divided into two heads, viz., the lawful and the unlawful; the unlawful, viz., the dispensing, compounding, and retailing of poisons, is a matter for redress at the hands of the chemists, and for that purpose I addressed them at the annual meeting—this your correspondents seem to object to. The lawful (thanks to the Government having a share in the profit), I meet by competition at such a price that if they trade in them they shall have no profit. Why do not my brother chemists imitate myself so as to render the amount of business done by stores *nil*, and at the same time close all accounts with the wholesale patent medicine vendors that supply the stores.

My experience of the trade is that as a rule they have looked at their grains and scruples until their ideas are as small, and if they continue in this track we shall have large demands in future upon the grants of the Benevolent Fund, so I enclose by same post to Secretary a cheque for five guineas as a donation to that truly catholic charity that makes no distinction between the subscribers and the non-subscribers.

My apology is due to you, Mr. Editor, for having overlooked your acknowledgment to my letter of December, 1876, under the title M.P.S.G.B.

Robert Owen Fitch.

June 6, 1877.

The Benevolent Fund.

Sir,—Why should not some kind of arrangement be made in connection with the Benevolent Fund which would enable subscribers to claim immediate relief in times of sickness or distress?

Would not a chemists' benefit society meet the case of those among us who are anxious to make some slight provision against the day of adversity?

I am of opinion that the Pharmaceutical Society possesses unusual facilities for organizing an assurance fund for the relief of the more needy members of the trade, a fund which I venture to think would be of great benefit to the class of chemists who would subscribe to it. Many a chemist in a small business, and many a "Perpetual Chemists' Assistant," would feel his load of anxiety lightened if he could demand relief (when incapacitated by sickness or accident from attending to his business duties) from a fund to which he had subscribed when in health. I have made inquiries recently respecting a variety of benefit societies (most of them trade societies), but I can find none which exactly meet the requirements of members of our calling.

If gentlemen in the trade who understand financial matters would give their opinions as to the practicability of forming a chemists' benefit society they would confer a favour on

"ALBERTUS."

THE HISTORY OF PHARMACY.

Sir,—A reprint of the 'History of Pharmacy,' published in 1841, by the late Jacob Bell, and referred to at the annual meeting by Mr. Humpage, would at the present time possess special interest, and I have no doubt find a ready sale.

About four years ago the Council decided on having the work brought down to 1868, and I believe a sum of money was voted for the purpose. I am aware the work of compilation must necessarily be tedious. I hope, however, progress is being made and that we shall soon hear of the "copy" being in the printer's hands.

JAMES BAYNES.

Hull, June 5, 1877.

CHEMISTS' ASSISTANTS' ASSOCIATION.

Sir,—I notice the letter of "An Associate" in your impression of the 2nd instant, and I think with him, that there should be "something more sociable than the scientific meetings at the Square, to promote good fellowship among chemists' assistants," but in my opinion the want would be best supplied by a "Chemists' Assistants' Club," to be carried on without any reference to education or trade matters, merely for the social intercourse of chemists' assistants and their friends, provided that sufficient funds can be obtained, and the members have time to take advantage of the club. I certainly think that the association now being founded will make a fatal mistake in giving as your correspondent says it will, "the first and foremost place in the discussions to the subject of early closing," for I cannot see how employees can discuss such a subject without threatening coercion; and I hear a rumour that some of the bolder spirits, young and radical M.P.S.'s, not at present connected with the association, have stated it to be their intention, if they can obtain entrance into the committee of management, to keep a list of employers who refuse to close their establishments at an appointed hour, and prohibit any member, from giving his services to such persons. This spirit, as far as I can ascertain, is only possessed by a small minority, who seem to forget that it is more in the power of employers to declare a lock-out of all members of the association, than for the association to dictate terms. But fortunately chemists and their assistants are too far advanced to practise strikes and lock-outs.

Early closing is a subject which falls to principals to discuss and carry out. On the whole I am not at all surprised to hear that "An Associate," who is evidently a man of power among his fellows—observes "a tendency on the part of some members of the trade to throw cold water on the scheme, and to regard it in the light of a trade union;" for the language of the letters which I understand were sent to you, and very wisely refused insertion, in reference to the decision of the Council denying the loan of the Lecture Theatre, for the use of the embryo association, and the proposed attempt at coercion in early closing, would be quite sufficient, if true, to give it the character of a trades union. I am, however, pleased to learn that the majority of members who form the committee of management are actuated by right principles, and that M.P.S., and Ph.C., will not be the only qualification for office. No one wishes the association, if properly directed, success more sincerely than

"A PUBLIC SERVANT."

London, June, 4, 1877.

AVOIRDUPOIS WEIGHTS AND FLUID MEASURES.

Sir,—Your correspondent on p. 996 of this week's number takes exception to my mode of expressing formulæ in parts. It was adopted because, when the apothecaries' or troy weight was relinquished for the imperial or avoirdupois weight, I thought it safer to express the formulæ in parts, where practicable, and, after ten years' experience, I am of the same opinion. If dispensers, as your correspondent avers, weigh by the troy and measure by the imperial, that is not my fault. The weights of the British Pharmacopœia are, the pound, the ounce, and the grain. The ounce for solids and the fluid ounce weigh exactly the same, and if less division than the quarter of an ounce is required it must be expressed in grains. The grain is the same in all kinds of British weights.

P. SQUIRE.

277, Oxford Street, London,
June 4, 1877.

P.S.—If you have given his formula correctly (Ext. Opii 1; S.V.R. 16; Water 4) he has not copied my form correctly, my formula being Ext. Opii. 1; S.V.R. 4; Water 16.

Sir,—In reply to your correspondent who (under this heading in your last issue) comments upon the arrangement of formulæ in Squire's 'Companion,' I would direct attention to the fact that Squire, following the B. P., distinctly repudiates any division of the ounce other than in grains. I do not, therefore, think it fair to attribute to his misleading any tragical results contingent upon a retentive love of the drachm.

I think it equally unfair to Squire to misquote him as is done by your correspondent in the relative proportion of S. V. R. and water, and thus to exhibit him as a "companion" to be avoided by all pharmacists desirous of maintaining character for respectability.

ALEXANDER BOTTLE.

Dover, June 4, 1877.

CHLORAL HYDRATE.

Sir,—It may assist the Law and Parliamentary Committee of the English Pharmaceutical Society in arriving at a decision regarding "chloral hydrate" to know that last year it was added to part two of the schedule of the "Irish Poison Act."

Phosphorus and all preparations containing free phosphorus were also added to part two at the same time.

J. C. CHAS. PAYNE.

The Pharmacy, Oxford Buildings, Belfast.

T. Baker.—(1) *Equisetum arvense*; (2) *Corydalis claviculata*; (3) *Spergula arvensis.*

"*Associate.*"—*Tinct. Pruni Virginianæ.* Bruised wild cherry bark in proof spirit, one in ten.

"*Quærens.*"—You are recommended to address your question to the Inland Revenue authorities at Somerset House.

J. W. E.—The numbers on the specimens are to correspond with the numbers in the accompanying list.

"*Liber.*"—Bentham's 'Handbook of the British Flora' (L. Reeve).

Messrs. Gabriel and Trooke.—See before, p. 713: also vol. v., p. 770. Your question should have been addressed to the Editor.

Medicus.—For details as to the tayuya root and its preparations see the *Pharmaceutical Journal* for November 20, 1875, p. 401. You could probably obtain what you require through your wholesale druggist.

J. Llewellyn.—Church's 'Laboratory Guide for Students in Agricultural Chemistry' (Van Voorst).

F. Harrison.—The formula for Coca Wine recently adopted by the Paris Society of Pharmacy is—Bruised coca leaves, 30 grams; alcohol (60°), 60 grams; macerate for twenty-four hours and add vin de Lunél, 940 grams; digest for ten days with frequent stirring, and filter.

G. Wilson.—The plant is *Ononis Natrix*, DC.

"*Kare.*"—*Geum rivale.*

"*Patent Medicine.*"—(1) At the office for the Registration of Trade Marks, Quality Court, Chancery Lane; (2) The term is commonly applied to preparations bearing the duty stamp. (3) We believe not.

Apprentice.—(1) The formula has not been published; (2) Liquid dentifrice. Potash soap, 3 ozs.; cream of tartar, 1 drm.; proof spirit, 18 ozs.; distilled perfumed water, 6 ozs. Digest and filter.

T. Cragg.—Please send another specimen.

"*Sp. Gr.*"—(1) At the time of examination; (2) About twelve; (3) We think not.

"*Caryoph.*"—(1) *Veronica serpyllifolia*; (2 and 4) *Stellaria media*; (3) *Cerastium glomeratum*; (5) *Arenaria trinervis.*

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Luff, Mr. Wade, Messrs. Conquest and Clare, Albertus, Inquirer, W. N. G. L.

THE CULTIVATION OF MEDICINAL PLANTS AT BANBURY.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

The principal farmer of medicinal plants in the neighbourhood of Banbury is Mr. Usher, of Bodicote, a small village about two miles from the town. At present he has about sixty-five acres under cultivation, twenty of which are devoted to rhubarb, forty to henbane, and four or five only to the white poppy. He has also lately commenced the cultivation of *Rosa gallica*, L., on a small scale.

On a recent visit to Banbury much interesting information was kindly given me by Mr. Usher, and as it was the result of observations which had been made by that gentleman during the course of many years it seems very desirable that it should be placed upon record.

RHUBARB.

The history of the cultivation of this plant in this district has been briefly sketched by Hanbury in 'Pharmacographia.' In that work he attributes the plant cultivated at Banbury to *Rheum Rhaponticum*, L. It, however, more closely resembles *R. undulatum*, L., differing chiefly from the description of that plant, as given by Meisner, in the upper leaves being distinctly stalked. From *R. Rhaponticum* it differs in all the leaves being longer than broad and minutely ciliate at the margins, and in the petiole being distinctly channelled on its upper surface above the middle, although it becomes flat near the base.

The leaves have two or three somewhat triangular teeth near the point and the petioles and stem are slightly furrowed, and the ochreæ do not appear to be deciduous as in *R. undulatum*. It would thus appear to be a hybrid between the two, if indeed the two species are really distinct.

When in blossom the panicle is at first decidedly spreading, so much so as to present an appearance totally different to that it offers at a later stage, when its branches become quite erect. Indeed, had I not found the two stages proceeding from the same root, I could hardly have believed that there were not two species growing in the same field. On closer inspection, however, the character, leaves and leaf-stalks convinced me that only one species was present.

The soil on which the plant is chiefly cultivated is a rich red friable loam, which appears to suit it well, although in some spots where the soil is damp the root decays and the plants gradually disappear. Mr. Usher's experience with regard to this plant is as follows:—Up to three or four years of age the plants flower rather freely, but after that time they rarely produce inflorescence. Singularly enough, for many years past no fruit has been ripened, the little that is formed falling off soon after "setting," so that it would seem as if the plant had already acquired a tendency to become a root-producing rather than a fruit-yielding form.

The rhubarb plant does not appear to be much attacked by insects or by fungi. After about eight or nine years the soil becomes exhausted, and rotation of crops becomes necessary. The exhaustion of the soil is, however, in some degree counterbalanced by the matter returned to it by the leaves, which are allowed to decay on the ground, and even those which are taken up with the root are afterwards returned in the form of manure.

The young plants are not obtained from seed, but are always propagated from the lateral shoots of plants about four years old, at which period the shoots are more vigorous and produce finer plants than if obtained from older ones. The petioles are never gathered for food, because it has been found that so doing injures the size and quality of the root. The young plants are set at distances of three feet apart, and the root is not fit for collecting until the plants are about four years old. From that period up to nine or ten years of age the root improves in size and quality. Plants of different ages are of course cultivated in different fields so as to secure a succession of harvests each year. Plants of about four years old yield from one and a half to two tons of dried root per acre, but ten year old plants will yield about five tons per acre.

The drying is by no means an easy task. The roots are dug up in hot weather, at any time between July and October, and for the first fortnight are exposed to a current of air on wicker baskets in a covered shed. They are then removed to the drying-room, where they are dried gradually but thoroughly for about six weeks, by means of a current of heated air. This part of the process requires great care, lest the outer portion should be dried too rapidly, while the interior is still moist. The large central portion, or tap root, furnishes the pieces known in trade as "fine large flats" and "fine large rounds." The "small rounds" and the cuttings commonly known as English "stick" rhubarb are obtained from the side branches of the root. Some of the flat pieces, except for their shrunken exterior, are not unlike the East India rhubarb of commerce, and being more thoroughly dried right through and harder in the centre seem to meet with a greater demand than the rounds. The raspings obtained in trimming the pieces are ground into powder. The average yield of the dried root every year is from eight to ten tons.

Of the *Rheum officinale*, Mr. Usher has now under cultivation in his garden about forty large plants between two and three years old, as well as about 200 seedlings. These plants are truly magnificent, each plant occupying a space from eight to twelve feet square, and standing four or five feet high. Some of the leaves are nearly three feet broad, and longer than they are broad. It is just suitable as an ornamental plant for lawns, where it would have plenty of room to grow. Indeed it is already used in this way in some of the public gardens in Paris.

The root of only one plant has as yet been dried, and was obtained from a plant barely two years old. A piece of this root has been presented to the museum of the Pharmaceutical Society, the remainder having been almost all sent to the Philadelphia Exhibition, where it obtained a medal, and was purchased.

In colour, the dried root is paler, although the veins are darker, than in the East Indian rhubarb. Mr. Usher informs me that it nevertheless yields a bright yellow powder. The external markings do not exactly correspond with those of the East India rhubarb, the peculiar reticulated appearance characteristic of that sort not being visible on the two pieces that I have seen. This may, however, be due to the age of the root, which was less than two years old. It yet remains to be seen whether the root differs when older, or whether some portions present a different aspect to others. These points I hope to have an opportunity of investigating a little later on, when Mr. Usher will dig up some larger roots. Towards the close of the year he will probably have sufficient of the dried root of this species to be available for therapeutic purposes, and it will then only remain to ascertain whether its purgative properties are equal to those of the foreign rhubarb, which after all will be the test of its acceptance with the medical profession. A chemist at Banbury has prepared some simple tincture from the trimmings of the root, in the proportion of two ounces to the pint of proof spirit, and has found it an effectual purgative in ounce doses.

Henbane.

Doubtless many of the readers of this Journal have often wondered at the high price of biennial henbane. The information which Mr. Usher has kindly furnished will probably throw considerable light upon this point.

The biennial plant is the only one cultivated at Banbury, it being found that the presence of the annual plant tends to deteriorate the biennial variety. With regard to the difference between the two plants, Hanbury says there is scarcely any distinctive character, except that the one is annual and the other perennial. There is, however, something very distinctive in habit. The biennial plant grows to the height of two or three feet, and is abundantly branched, and the stem is often nearly an inch thick at the base. At a distance, a field of biennial henbane looks like a field full of thistles, so much so, that Mr. Usher has occasionally heard the remark from farmers passing by, "That is bad farming, look at those thistles." This curious appearance is owing to the leaves being deeply cut, in fact almost pinnatifid. The chief difference in the leaves of the two varieties is, that in the biennial plant the leaves are about twice as long as in the annual one, and deeply cut, and the terminal lobe of the leaf is long and rather narrow.

The leaves of the upper branches, however, resemble when young those of the annual variety, being shorter and having the top of the leaf much broader, and more triangular, not lanceolate as in the stem leaves.

The seed of the biennial plant is sown in May or June, and either appears in a few days or not for several years. Mr. Usher informed me that in one field sown with henbane none of the seed came up and the field was again sown with other crops, and it was not until nine years afterwards, during which period the field had been several times ploughed, that it yielded a good crop of henbane quite unexpectedly, and without any more henbane seed having been sown. This uncertainty seems to depend upon the weather being dry soon after the seed is sown. If the weather is damp immediately after sowing the seed, it usually comes up at once.

The cultivation of the plant is beset with difficulties. In the first place, it grows very slowly when young, and is soon hidden by weeds of more luxuriant growth, so that it has been found necessary to mix some rapidly growing plant, such as mustard, with it in order to indicate where it is sown. It also requires shelter when young, This difficulty Mr. Usher has obviated by sowing it in rows between beans so that it may be protected in its early stage. As soon as the young leaves are fully formed the turnip fly attacks them; when the autumn leaves of the first year have decayed a white slug eats away the central bud; and if it still manages to live a wire worm attacks the root during the winter. It will be easily understood, therefore, why the fields of henbane often present very large bare patches, and why the price of the drug is so high. The plants are collected for drying about the third week in June. The upper leaves are deprived of the midrib, and these as well as the flowering tops are dried, and form the best biennial henbane of commerce. The lower leaves and stems are used for preparing extract, for which purpose they are crushed under an edge runner, and the juice squeezed out by hydraulic pressure and then evaporated down to a proper consistence. It is obvious that an extract prepared in this way on the spot by the grower is likely to be better than when prepared from the herb sent to a distance by rail, for these plants become heated in twenty-four hours when packed closely. The leaves and flowering tops are dried in malt kilns, of which seven are in use at once. The leaves are spread thinly at first and are turned over about three times a day, and as they become somewhat dry are collected closer together into rows or heaps on the kiln floor. As one lot becomes partially dried it is removed to another kiln until quite dry, which usually happens in about three days, and a fresh lot takes its place.

There are one or two points with regard to the flower which are rather interesting. The flowers are proterogynous, the stigma becoming mature and viscid before the anthers open, and the stigma and nearly half the style are protruded beyond the unopened flower bud. The corolla is more deeply divided in its lower half than elsewhere, and the stamens and pistil are depressed towards this portion, so that insects visiting the flower for nectar must pitch upon the stamens and receive the pollen upon their legs or abdomens, and must thus almost of necessity convey it to the protruded stigma of the unopened flower. When the corolla is fully grown it exceeds the stigma, so that the style does not appear to grow in proportion to the corolla. The anthers are furnished with a curious connective of a narrowly triangular form into which the filament tapers. As soon as the anther bursts it becomes bent backwards away from the stigma and towards the ovary as if to prevent the pollen from falling on the stigma of the same flower. Mr. Usher informs me that the annual variety does not possess a long protruded style, but as he had no plants growing I was unable to verify this observation. It would be interesting to ascertain if the henbane is dimorphic, and if the annual plant is the second form. Another interesting point of inquiry is whether the plant possesses the power of digesting the multitude of minute insects which late in the season are caught by the clammy glandular hairs. The frequent occurrence of henbane on manure heaps or places in which insects are abundant seems almost to point to such a property.

White Poppy.

The culture of this plant is attended with so much trouble and expense that it scarcely repays the labour expended on it. The seed has to be selected very carefully, for singularly enough the poppy shows a constant tendency to "sport," and if left to itself, the flowers of the white poppy become coloured in a few generations; the size of the capsule decreases, and the colour of the seeds and of the flowers becomes darker in proportion, until at length the flowers become purplish black, and the seeds quite black. Mr. Usher accounts for this fact by supposing that insects carry the pollen from the wild red poppy (*Papaver Rhœas*, L.) to the white one.

In order to get large capsules, only the very whitest seeds are retained and sown. Those poppies which have dark flowers, he states, produce darker coloured somewhat oblong capsules. The German poppy seed produces a large capsule much flattened at the top and bottom, and with the carpels strongly convex and prominent so as to have much the appearance of a peeled orange, or of the capsule of *Papaver hybridum*, L. This variety is not, however, readily accepted in commerce.

The seeds of the white poppy are sown in rows about 20 inches apart. When young the plants require constant weeding. The capsule, when the flower has fallen, is about the size of a walnut, and is stated by Mr. Usher to grow to the size of an orange in the short space of ten days, although it takes nearly five weeks to ripen. Each plant bears about two or three capsules. The harvest is collected during the last week in August or the first in September. A waggon load of the capsules is placed on the floor of each of the kilns and forms a layer about a yard deep, the whole of which becomes dry in about twelve hours, and is then ready for sale.

THE CONSTITUENTS OF COTO BARK.*

BY JULIUS JOBST AND O. HESSE.

This bark has been further examined by the authors† and the results have been communicated to the Berlin Chemical Society. The powdered bark extracted with ether yielded a yellow brown solution which left, after evaporation of the ether, a brown resinous residue that showed after a time an abundant crystallization. The crystalline mass consisted principally of three bodies, to which the authors have given the names "paracotoin," "oxyleucotin," and "leucotin;" these were separated by fractional crystallization from hot alcohol.

Paracotoin ($C_{19}H_{12}O_6$) forms yellow scales, easily soluble in chloroform, ether and boiling alcohol; less soluble in cold alcohol, benzin, petroleum spirit and boiling water. From the solution in boiling water it is obtained on cooling in almost colourless scales. In alcoholic solution it has no reaction on litmus paper and is tasteless. In ammonia it is insoluble, and from hot ammoniacal alcoholic solution it crystallizes unaltered. In dilute potash or soda it dissolves with a yellow colour, but only in small proportion. In strong sulphuric acid it forms a yellow solution becoming darker when heated; in strong nitric acid also it forms a yellow solution, but this upon heating becomes lighter. Perchloride of iron presents no reaction with it. Paracotoin melts at 152° (uncorrected) to a yellow liquid which upon cooling takes a radiating crystallization. At a higher crystallization it sublimes in yellow shining scales.

By the action of baryta water paracotoin is converted into paracotoic acid, according to the equation—

$$C_{19}H_{12}O_6+H_2O=C_{19}H_{14}O_7$$

This acid forms a chrome yellow amorphous powder, readily soluble in ether and alcohol, but almost insoluble in hot benzine. The alcoholic solution has a decided acid reaction and upon evaporation leaves the acid amorphous. The same acid is formed when paracotoin is boiled with dilute potash solution or only heated to 80° C.; but then there is also formed a smaller quantity of another product which has been named "paracumarhydrin." When the solution is boiled it escapes with the steam. Paracumarhydrin, $C_9H_8O_3$, forms delicate white scales, melting at 85° C. (uncorrected), readily soluble in alcohol and ether, less so in hot water, from which upon cooling it is again deposited in scales. Its formation from paracotoin may probably be represented as follows:—

$$C_{19}H_{12}O_6+2H_2O=CO_2+2C_9H_8O_3.$$

Paracumarhydrin has a smell recalling that of cumarin; and when it is rapidly heated the odours of oil of wintergreen and oil of bitter almonds are noticeable. Upon attempting to redistil it with water vapour only a small portion passes over, the greater part remaining dissolved in the water in the retort. Upon shaking this aqueous solution with ether and evaporating the latter white crystalline scales are obtained, having an extremely pleasant taste, and melting at 81° to 82° C. The same substance results upon treating paracumarhydrin with zinc chloride. Apparently in both cases it loses water and forms the paracumarin corresponding to paraoxybenzoic acid.

Comparison of this substance with cumarin shows that it resembles it only in smell. Whilst cumarin is deposited from dilute alcohol in four-sided prisms, the supposed paracumarin forms shining scales. The fusing points also differ. Zwenger and Bodenbender found that for cumarin prepared from *Melilotus officinalis* it was 67°, and Perkins for that from aceto-salicyl aldehyd between 67° and 67·5° C. By treatment of paracotoin with caustic potash an acid was obtained crystallizing in small needles, and melting at 200°, or nearly the temperature given by Tiemann and Mendelsohn for paracumaric acid. The crystals however were yellow, and gave on combustion only 60·91 per cent. of carbon and 4·05 of hydrogen, paracumaric acid requiring 65·88 per cent. of carbon and 4·87 per cent. of hydrogen. When fused with potassium hydrate paracotoin gave off a faint smell of paracumarhydrin, but an acid was formed, with evolution of hydrogen, corresponding with protocatechuic acid in its behaviour towards ferric chloride, though differing in other respects. A volatile acid (apparently formic acid) was also formed and a brown resinic acid.

Oxyleucotin ($C_{21}H_{20}O_7$) can be separated from leucotin by crystallization from alcohol, in which the latter is very soluble. It forms thick heavy white rectangular obliquely truncated prisms, melting at 133°, and solidifying amorphous on cooling. It dissolves freely in hot alcohol, ether and chloroform, less so in cold alcohol, and is nearly insoluble in cold water and alkalies. It is tasteless, and neutral, and in chloroform solution does not affect polarized light. Strong sulphuric acid colours it dark yellow. Strong nitric acid dissolves it upon warming with a blue green colour, leaving a bluish-black resin that forms a blue green solution in alcohol. When fused with potassium hydrate oxyleucotin yields a crystallizable acid, giving a green colour with salts of iron, and also differing from pyrocatechuic acid.

Leucotin ($C_{21}H_{20}O_6$) resembles oxyleucotin in its behaviour to sulphuric and nitric acids, dissolves very freely in alcohol, benzin and ether, forms very slender white prisms, and melting at 97°. In chloroform solution it has no action on polarized light. It occurred in considerable quantity in the bark examined.

Hydrocotoin ($C_{22}H_{20}O_6$) remained dissolved in the mother liquor from which the foregoing substances were obtained. This liquor being evaporated left a brown resin, which was exhausted with very dilute caustic alkali, excess of hydrochloric acid added to the solution, and the resulting reddish yellow flocculent precipitate dissolved in a little hot alcohol, from which the hydrocotoin crystallized on cooling in shining pale yellow prisms; from boiling water slender white needles were obtained. Hydrocotoin is neutral, tasteless, and in chloroform solution without effect on polarized light. It dissolves in alkalies with a yellow colour, and is again precipitated by acids, even carbonic; strong sulphuric acid forms with it a yellow, and hot nitric acid a purple red solution,

* *Berichte d. deutschen chemischen Gesellschaft*, vol. x., p. 249.

† See before, vol. vi., p. 764, vol. vii., p. 495.

from which upon dilution with water a purple red precipitate soluble in cold alcohol separates. When heated with manganese and sulphuric acid, or upon combustion of one of its lead salts, hydrocotoin gives off an odour resembling hyacinthin.

Cotoin, the substance obtained from the coto bark first examined,* the authors now represent by the formula $C_{22}H_{18}O_6$, so that paracotoin would appear to be a homologue differing by C_3H_6. Hydrocotoin appears to differ from cotoin in containing two atoms more of hydrogen in the molecule.

The authors state that Dr. Burkart, of Stuttgart, is making experiments with paracotoin, oxyleucotoin and leucotoin, the results of which will be reported in a medical periodical. Meanwhile, paracotoin, notwithstanding its high price, which is probably temporary, is finding a daily increasing use as a remedy against all kinds of diarrhœa.

TIMBO, ITS PROPERTIES AND COMPOSITION.†

In 1846 M. Stanislas Martin first described, in the *Bulletin Général de Thérapeutique*, a substance called guarana, much used in Brazil, where it was obtained from a plant belonging to the family of *Sapindaceæ*. In 1817 Cadet de Gassicourt, and in 1822, Mérat mentioned this substance without indicating its origin. At the present time the *Guarana*, or *Paullinia sorbilis* of Linnæus, occupies a place in our materia medica owing to its richness in caffeine.

Plants belonging to the *Sapindaceæ* are very common in Brazil, and comprise both trees and climbing shrubs. Some have such poisonous properties that the natives use their juices as arrow-poisons, while others are innocuous or simply narcotic. The Timbo (*Paullinia pinnata*, Lin.) belongs to the latter class. The Timbo is a tree found in Brazil, Mexico, the Antilles, and in Guiana. The leaves are composed of five leaflets, oval, lanceolate and crenellated. The flowers are polygamous, diœcious, and have five, or rarely four parts; an imbricate calyx; four unequal petals furnished with scaly appendices; eight stamens situated around a disc with notched edges; ovary with three cells, surmounted with three styles, and containing three seeds, and commonly one which has aborted, which is provided with an arillus and contains under its envelope an embryo without albumen. The bark of the timbo root is the only part used in Brazil; it is of a yellowish-grey colour, and variable in length and thickness. In transverse section there is observed from outside inwards, 1st. An exterior layer of periderm, composed of numerous masses of corky or woody tissue. 2nd. On reaching the central parenchyma there are seen here and there small masses of hardened cells (that is to say, having early incrustations); this element is frequent in the bark and in this situation. 3rd. A very thick layer of cortical parenchyma, in which the cells are distended with starch. 4th. In the midst of this parenchyma cells containing a resinous material. 5th. Bundles of liber arranged in interrupted lines and mixed with rays of the medulla. This bark is with difficulty reduced to powder. Five grams of it will absorb, cold, fifteen grams of distilled water.

The bark of timbo root has an agreeable aromatic odour, slightly resembling musk. In Brazil it is only employed externally. Poultices are made from it with boiling water, which are applied to the side in affections of the liver. It often causes intense eruptions, in which case the application is discontinued.

M. Martin has isolated from the root-bark, starch, resin, an essential oil, chlorophyll, tannin, an organic acid, traces of glucose, and an alkaloid to which he gives the name of "timbonine."

By first treating the finely powdered bark by carbon disulphide, the extraction of the alkaloid and other principles is facilitated. The sulphate of timbonine crystallizes in white needles.

* See vol. vi., p. 764.

† *New Remedies*, from *Bulletin Gen. de. Therap.* See also *Pharm. Journ.*, [3], vol. v., p. 986.

SOME METHODS OF ESTIMATING TANNINS.*

BY H. R. PROCTOR, F.C.S.

There are few substances of equal importance to the tannins, of which the chemistry is in so unsettled a state. This is, no doubt, primarily due to their complexity and unstable character, which makes their investigation one of great difficulty; and, secondarily, to the indifference and ignorance of chemistry of those to whom the knowledge is of commercial importance. But tanners may be well excused for some distrust of chemical analyses when we consider the discordant results which are yielded by most of the processes in use. With a view to exhibit the relative merits of these processes, I have ventured to give the results of comparative experiments undertaken to test their accuracy, and to point out, if possible, those which merit confidence.

The process which has been brought most prominently before the public of late is that of Muntz and Ramspacher, which consists in forcing a tannin infusion through a piece of raw hide, taking the sp. gr. before and after, and calculating the tannin from the loss. In a paper which I communicated to this Society some little time since (Proceedings, III, 213), I pointed out that the raw hide not only absorbed the tannin, but also a large proportion of the free acids in the infusion, thus, in some cases, causing a notable error. To this I may now add that it is extremely difficult to absorb the whole of the tannin, that the first portion of liquor which passes is invariably lighter than succeeding portions, and that the sources of error are so large in proportion to the quantities to be measured, that the results are of little practical value. In proof of this, I may mention that a series of nine analyses of the same sumach, well mixed, and kept in a tightly-corked bottle, gave results varying from 18 to 28 per cent., and a mean error for each single experiment of 3·15 per cent. or upwards of 13 per cent. of the total tannin, while the mean value—23·9 per cent.—was probably itself too high. In these analyses the utmost care was taken and in each case the absence of tannin in the filtrate was proved by gelatin. If we assume that tannin is worth 20*s*. per ton per cent., which is not far from the truth, the chemical valuation of this sumach would vary from £18 to £28 per ton, with an average error of £3 3*s*., and obviously is far more erroneous than the merest guess. If any further proof of the inaccuracy of the method is needed, I may quote the results of a series of twelve analyses of a valonia by Mr. W. N. Evans, who, perhaps, has had more practice with the tan-tester than any other man in England. The average error exceeds 10 per cent. of the whole quantity of tannin, and the money values vary from, say, £17 5*s*. to £28 10*s*. per ton.

The older method of Hammer, in which absorption by hide raspings takes the place of the raw hide-filter, is in my experience still more inaccurate; and I cannot say that the slight modifications proposed by Nickerson are any improvement.

Another method which has long been in use is precipitation by volumetric solution of gelatin and alum. With a solution of 5 grms. of gelatin per litre I found it impossible to say whether tannin or gelatin was in excess, with less differences than about 4 per cent. of the total quantity employed, and then the reactions were somewhat doubtful. These experiments were made with pure tannin; with catechu or gambier the uncertainty would be far wider, and with used tan-liquors it would be worse still. Under favourable circumstances and with great patience it is possible to obtain rough estimates by this method; but this is all I can say.

Concerning Sir H. Davy's still older method of precipitating with gelatin, filtering, drying, and weighing, and reckoning four-tenths of the whole as pure tannin, Dr. J. Watts says (*Phar. Jour.* viii., 517) it has "been shown to be both tedious and incorrect, as the solution

* From the *Transactions of the Newcastle-upon-Tyne Chemical Society*, 1874–1877.

refuses to filter, and the first portions precipitated contain a far larger proportion of tannin than do those which fall towards the end." Other chemists make the same statements, so that I had not thought it necessary to repeat their experiments. Very recently, however, I have learnt that Mr. Stoddart, of Bristol, and Mr. Dearden, of Bury, are again employing the plan, using sufficient alum to make the precipitate coagulate, and washing by decantation with boiling water. Mr. Stoddart informs me that the results agree fairly with a modification of Allen's lead method, which he employs. I therefore purpose trying it at a future time; but the results can scarcely be very accurate, and it is improbable that all tannins combine with gelatin in the same proportions. This last objection is technically of less importance, however, since the power of precipitating gelatin is probably somewhat proportionate to that of making leather.

Some years ago Fleck announced a method depending on the fact that while tannin, gallic acid, and colouring matter are all precipitated by cupric acetate solution, the two latter are redissolved by ammonic carbonate. He proposed, therefore, to employ a standard copper solution, and to estimate the excess by potassic cyanide. Dr. Watts showed that this was impracticable (owing to the fact, as I found, that cupric ammonio-gallate is not blue but brown), but that gravimetrically some tannins might be estimated with considerable accuracy, while other gave precipitates more or less soluble in the ammonic carbonate. The precipitate is complicated and contains ammonia. Schiff gives its formula in the case of digallic acid, as $C_{14}H_4Cu_2 (NH_4)_2 O_9 + OH_2$ (*Ann. Ch.* and *Ph.* clxxvi. 171), which would give 1 gram of tannin (digallic acid) = 1·54 gram precipitate, and ·494 gram Cu O Watts, employing the number 1·489 (deduced from the assumption, now shown to be incorrect, that the salt was a simple cupric tannate), obtained analytical results fairly agreeing with those by gelatin for valonia, sumach, divi, oak bark, galls, and myrabolans; and also for mimosa, by employing the number ·2959 instead of ·489. All tannins giving green precipitates with iron gave copper precipitates more or less soluble in ammonia.

No doubt this method, reckoning the tannin as two-thirds the weight of precipitate, or twice that of cupric oxide left on ignition, would give fair technical results; but it is unlikely that all the various tannins actually combine with copper in the same proportions. In fact, as we shall see later on, the different tannins differ notably in their properties and reactions, only agreeing in their power of precipitating gelatin, and I fear tanners will have to give up all hope of measuring them by one common standard. Indeed, to a chemist, to do so seems about as reasonable as to compare the values of nitric and sulphuric acids by a standard solution of hydrochloric acid. Probably the differences between gallotannic, quercitannic, and catechutannic acids are quite as great as those of the mineral acids I have named. Chemists may fairly undertake to compare sumach with sumach, or bark with bark, but the relative values of the tannins of bark and sumach are commercial matters which no analysis can decide, though it doubtless might be done by carefully-conducted technical experiments.

The disadvantages of the copper method are that it is slow, troublesome, and difficult, and that the washing and drying must be rapidly and carefully done, as the precipitate is easily decomposed. This difficulty might be overcome by igniting, and weighing the Cu O, but this can only be done easily in oxygen, as otherwise the copper is so much reduced that it is apt to deflagrate with nitric acid or ammonic nitrate. I think the best way is to filter on a vacuum filter, and dry in an air-bath (with a thermostat) at 100°.

The mean error of such result in a series of eight analyses of commercially "*pure*" tannin, containing apparently about 85 per cent. digallic acid by the total employed, was only ± 4·2 per cent., a much better approximation than any of the foregoing. It is not likely that the results with tanning materials would be quite so good. Analyses of bark showed considerable divergence, and combustion of the precipitate proved that it was somewhat inconstant in composition, the Cu varying from 21·6 to 25·4 per cent. I fancy, too, that for oak bark tannin two-thirds of the weight of precipitate is decidedly too high an estimate. It must also be borne in mind that if lime be present, as is often the case with tanyard liquors, it will be precipitated as carbonate. This might be prevented by filtering off the precipitate before washing with ammonic carbonate; but the method is troublesome enough without this, besides being of rather questionable accuracy.

Another process which has been much recommended is Mr. A. H. Allen's volumetric one, with a standard solution of acetate of lead, using as an indicator a mixture of ammonia and potassic ferricyanide. This is described in the last edition of Sutton, but in its original form is quite inadmissible, since lead precipitates gallic acid as well as tannin, and both react equally on the indicator. In combination with some of the differential processes in which the tannin is removed by gelatin or hide raspings, it may no doubt give useful results, and as the lead compounds of the different tannins are better known than most others possibly factors might be calculated to give percentage results. I cannot insist too strongly that any calculation of percentages by comparison with "pure" tannin is utterly fallacious, both because the various tannins are of totally different constitution, and because really pure tannin is quite unattainable. That met with in commerce only contains 80 to 90 per cent., of really pure tannin, and is very variable.

Mr. Stoddart uses Mr. Allen's process in conjunction with absorption of tannin with hide raspings, when of course the loss is *proportional* to the tannin. He also employs Nelson's gelatin swollen in cold water as an absorbent in the same manner. Time and patience are necessary for the absorption of tannin thus, and it is seldom so complete that the results are not altered by prolonged digestion. In my experience the end-reaction of Allen's method is not very distinct, and it is necessary carefully to filter the drops tested, as the indicator is affected by the precipitate. This makes the process somewhat tedious.

The remaining methods which I shall describe are all based on the oxidation of tannin by various agents, and all involve double analyses after absorption of the tannin, as tannin and gallic acid are almost identical in their behaviour with oxidizers.

Mittenzwey, and afterwards Terreil, proposed to estimate it by the direct absorption of atmospheric oxygen in alkaline solution—a difficult and tedious proceeding, though doubtless capable of some accuracy in skilful hands.

Monnier proposed to determine with permanganate direct, but this proved quite impracticable, since the oxidation is rapid at first, and then slow and with *no* definite termination.

To Dr. Löwenthal is due the capital improvement, which, with his recent additions, constitutes to my mind the most practical method of tannin analysis yet discovered. He adds to the *very* dilute tannin infusion a considerable quantity of indigo, not only to act as an indicator, but to control the oxidation of the tannin. This reaction is both rapid and accurate, and, combined with his process of precipitation by gelatin, will give results strictly comparative for any single tanning material. As it is likely to be of great practical importance, I venture to give working details, referring for further particulars to Löwenthal's paper in the *Zeitschrift für Analytischen Chemie* (1877, p. 33), and to an excellent paper by Neubauer abstracted in the *C. S. Journal* (ix., 595).

Of solutions the following are required:—

1.—4 grams pure permanganate of potash in 3 litres of distilled water (or ½ decinormal answers well and saves calculation).

2.—5 grams of *pure* "precipitated indigo" in 1 litre of water (Woodroof Brothers, of Crutched Friars, supply a satisfactory article).

3.—Dilute sulphuric acid (1 to 3 of water).

4.—25 grams of good transparent glue well swollen in cold water, and then dissolved by the aid of heat. The solution is made up to a litre, and saturated with pure salt (table salt).

5.—A saturated solution of pure salt, containing 25 c.c. of sulphuric, or 50 c.c. of hydrochloric acid per litre.

To make an analysis, 10 grams of sumach or valonia, or 20–25 of bark, are exhausted by repeated boiling with portions of water, and the infusion, when cold, made up to 1 litre.

Of this infusion, 10 c.c. are mixed with, say three-quarter litre of good drinking water, 25 c.c. of the indigo solution, and 10 c.c. of the dilute sulphuric acid are added, and then the permanganate solution is run in drop by drop from the burette, with constant stirring, till the deep blue of the indigo changes to a clear yellow, and the moment this takes place we note the quantity of permanganate used. We will call this quantity A.

Next we repeat exactly the same process with the indigo and sulphuric acid alone, and will call the quantity B. Then, subtracting B from A, we obtain the amount of permanganate consumed by the total astringents of 10 c.c. of our tannin infusion. The permanganate acts, of course, as an oxidizing agent, oxidizing and consuming both the tannin and the indigo; but as the tannin is the most readily oxidized of the two, it is consumed first, and when the indigo is all bleached we may be sure that the tannin is destroyed also. In order, however, to obtain this satisfactorily, the proportion of indigo should be such as to require about twice the quantity of permanganate which would be consumed by the tannin alone. Thus, if the indigo alone requires 10 c.c. of permanganate to decolorize it, the indigo and tannin infusion together must not take more than about 15 c.c., and if it does so, the tannin infusion must be diluted accordingly, or a less quantity employed.

The next step is to ascertain the proportion of gallic acid and impurities in our sample. To this end we mix 100 c.c. with 50 c.c. of our salted gelatin solution, and then, after well stirring, add 100 c.c. of the salt and acid solution, and leave the mixture standing for some hours or all night, and then filter it through paper. The filtrate should be completely clear.

If we now test, say 50 c.c. of this filtrate with permanganate and indigo as before, we shall obtain the amount of permanganate required for the gallic acid and impurities alone, since the tannin has been entirely precipitated, and the gelatin has so trifling an action on the permanganate that it may be safely neglected. To make the working clearer, we will take an example from Dr. Löwenthal's paper:—

10 grams of sumach were boiled in three-quarter litre of water, and after cooling were made up to 1 litre.

(1) 10 c.c. sumach infusion 25 c.c. indigo solution	consumed	16·6 c.c. permanganate.
Ditto repeated		16·5 „
		33·1 „
50 c.c. indigo alone		13·2 „
Total permanganate for 20 c.c. sumach		19·9 „

(2) 50 c.c. filtrate from the gelatine 25 c.c. indigo solution	consumed	11·2 c.c. permang.
Ditto repeated		11·1 „
		22·3 „
50 c.c. indigo alone		13·2 „
Gallic acid and impurities		9·1 c.c.

Now deducting 9·1 c.c. from 19·9 c.c. we have 10·8 c.c. as the permanganate equivalent to the tannin of 20 c.c. of sumach infusion or 0·2 gram of dry sumach. If it be desired to compare two sumachs, these proportional numbers are all that is necessary, and indeed it will be quite safe to use them for comparing sumach with galls or pure tannin. In the same way bark may be compared with bark, and valonia with valonia, but it will not be safe to attempt by this means to compare bark with sumach or with valonia, because the different species of tannin consume different proportions of permanganate. Oser states that $1\frac{1}{2}$ gram of oak-bark tannin consumes only the same quantity as 1 gram of gall-nut tannin.

I may remark that where many analyses have to be performed, the constant stirring becomes very tedious, and a stream of air-bubbles forced through the liquid by an aspirator may be substituted with great advantage.

Neubauer reckons one litre of decinormal permanganate as equal to 4·157 grams of gallotannic acid, and consequently (according to Oser) to 6·235 of oak-bark tannin. Further research, however, is needed before percentages can be calculated with certainty, and chemists, in giving results, would do well to state the equivalent in permanganate, or to say that they use Neubauer's or Oser's equivalent. The first is applicable to sumach, galls, and myrabolans, the second probably to oak bark, valonia, and chestnut extract, at least approximately. It is a singular fact that gallic acid consumes not only a larger proportion of permanganate, weight for weight, than tannin, but even a larger proportion than the tannin from which it is derived, as I proved by digesting a solution of tannin with dilute sulphuric acid, when its reducing power was notably increased. Hence commercial tannin, which is largely contaminated with gallic acid, consumes more permanganate than the above-mentioned quantity.

As to accuracy, single tests should never differ by more than 0·1 c.c., or say $2\frac{1}{2}$ per cent. of the total quantity, but of course, in so rapid a process, no one would rely on single tests, and by repeating and taking the mean, any required accuracy may be attained. Separate portions of liquor precipitated by gelatin give identical results, at least within the limits named.

I should perhaps mention that Mr. Estcourt proposed some time since to precipitate with gelatin in conjunction with the permanganate method (*Chemical News*, xxiii, 110), but as he heated the solution, and tannate of gelatin is soluble in hot gelatin solution, the results were not satisfactory. Still he undoubtedly deserves the credit of the idea, while Löwenthal's cold gelatin solution, with the addition of salt and acid, completely overcomes the difficulty.

Several other oxidizing methods have been proposed. Carpeni precipitates the tannin with ammonio-acetate of zinc, redissolves and estimates with permanganate. M. Jean oxidizes with iodine in solution of sodic carbonate, and M. Pouchet with concentrated permanganate in a caustic potash solution. None of these methods seem to have any advantage over Löwenthal's, while the two latter are in my experience decidedly inferior. The end-reactions are much less distinct, and it is quite impossible to work them by artificial light, which is almost preferable with the indigo process, and is often a great convenience.

In speaking of the results I have obtained as a test of the accuracy of methods, I do not mean to convey that they are the best attainable, but simply such as would be likely to be obtained by a chemist of average skill and experience.

AN EASTER HOLIDAY IN LIGURIA.*

BY PROFESSOR FLUCKIGER.

(*Concluded from p.* 984.)

The gardens of this country also contain many noteworthy plants which have no claims to the citizenship of the Riviera. In this respect the public pleasure grounds and botanical gardens of Pisa, Genoa and Nice are worth notice. The garden at Pisa, one of the [illegible] university gardens, probably laid out about 1547 by Luca Ghini, *lector simplicium* in the university there, who also first founded a herbarium, is at the present time in exemplary condition and does credit to its director, Carnel, a distinguished Italian botanist. The camphor tree and the *Gingko biloba* of the garden will hardly be equalled again in Europe. The garden at Genoa is remarkable on account of its originally picturesque situation and its degeneracy, but it has still some old trees to speak of better times. The newer public gardens of Genoa, Monaco (Monte Carlo) and Nice show what considerable effects can be there obtained by the intelligent grouping of exotic plant forms, for which the climate is suited, with selected indigenous ones. The *aqua sola* grows with the elegant *Acacia Julibrissin*, Willd. (*Albizzia*, Boir.), which is well suited to give an idea of the great beauty of the tropical tamarind tree. In the grounds at Nice palms grow most charmingly with the oleander, eucalyptus, agave and araucaria, and similarly at Monte Carlo, Monaco.

Still further west, at Antibes, a prominent French botanist, Thuret, and a no less distinguished cultivator, Bornet, laid out a true botanic garden, which has been kept in unsurpassed cultivation until the present time, and now presents an incomparable collection of living trees and shrubs. Here stands, as before mentioned, the oldest eucalyptus in Europe, surrounded by a group of magnificent conifers, in the midst of green turf glistening with coloured anemones.

The gardens of the Marchese Pallavicini, in Pegli, is known in a much wider circle; a visit to it from Genoa is an obligation of the regular tourist, and usually yields considerable pleasure, notwithstanding that in it a taste for natural beauty reigns less supreme than showy magnificence and lavish expenditure, and of scientific judgment there is none. The charm of the landscape is, however, not injured thereby. The pines spread their crowns over the dark green cherry-laurel bushes. *Cinnamomum Camphora*, a magnificent specimen of which is met with here, is not remarkable, considering the by no means tropical climate of its native land; the Isola bella, in the Lago Maggiore, has in its gardens quite as handsome an example, and others are to be found in the gardens round Naples, as at Capodimonte. Evidently the camphor tree must have been introduced into Italy as early as the commencement of the present century, if not before. It succeeds everywhere very well, and has a much better appearance than many of the nearly allied Lauraceæ, its less rigid leaves being really mobile. When rubbed they give off a decided smell of camphor.

From the Ventimiglia road, planted with eucalyptus, the streets rise to the picturesquely and defiantly situated little town, and then fall again towards the sea; but not far from the village of Mortolo it reaches the highest point between San Remo and Monaco. Parallel with this modern road, in the lower ground not far from the coast, runs the old Roman road. Between the old and the modern highways, or rather intersected by both, extends the garden of the Palazzo Orengo, from the cliffs of Cape Orengo to the foot of the first hills. This beautifully situated estate, which will soon take its place in Murray and Bädeker, repays the visitor with an abundance of the most remarkable plants brought together with the finest judgment from the most diverse districts. The abundant warmth afforded by the Riviera sun fits the heavy marly and stony soil of these grounds for South African and Australian forms of vegetation, of which a good number thrive excellently, and together with indigenous or long naturalized plants present an extremely interesting picture of vegetation. In contrast to the other last mentioned garden, the far superior principle holds sway in the Palazzo Orengo of understanding, favouring, and assisting nature, instead of bringing her under the shears, and limiting her force with line and circle.

This garden presents an Australian character in a vigorously grown thicket of *Eucalyptus* and *Acacia*, several species of both being represented. Some of the eucalypti have already reached the pyramidal tops of the century-old cypresses, just now laden with fruit. In a few years that wonderful light shadeless wood, the Australian "bush," will be seen here in all its originality. Already the not very great diversity of the eucalyptus species has brought about some change, but much more has been wrought by the elegant acacias, many of which are now in full blossom. These trees and bushes, covered with a prodigal abundance of golden catkins of flowers, present an exceedingly exotic aspect. There is associated with some of the acacias—though not Australian species—as the *Acacia Cavenia*, Bertolani, from Chili, and the *A. Farnesiana*, Willd., from the West Indies, an extremely pleasant perfume, the flowers of the latter, under the name of "fleurs de cassie," being used in considerable quantity in Grasse and Cannes for perfumery purposes. Why should not these blossoms bear the name of cassia as well as many other extremely heterogeneous things? Both of these species have long been naturalized in South France and Italy, the *A. Farnesiana* first, it would appear, in the Farnesian Garden at Rome. The Australian *Acacia lophantha*, Willd., so far agrees with *A. Cavenia* and *A. Farnesiana* in a chemical aspect, that in all three of them there is evidently present some oil belonging to the oil of mustard or nitrile class. The seeds of these acacias, and probably their root-bark, when chewed, taste and smell execrably of garlic. According to some experiments carried out on a small scale, the quantity of oil appears not to be large, but certainly the preparation of some of it would be rewarded by the discovery of a noteworthy body, belonging to the class that includes the oils of mustard, horse-radish, tropæolum, nasturtium and lepidium.

In this respect it might be wished that a chemist would establish his residence here in the South, where he could carry out exact and important observations upon the ethereal oils. What a wonderful diversity of perfumes, for instance, are evolved by the numerous species of *Pelargonium*, the greater part of which are probably dependent upon ethers of pelargonic acid. And noteworthy is the closely allied *Pelargonium pulchellum*, with its large, thick, perfectly odourless leaves. An extremely disagreeable and very strong smell is given off by the leaves of three Cape Zygophyllaceous species—*Melianthus Trimenii*, *M. major*, L., and *M. minor*, L.; this will probably some day be referred to an ether or an aldehyd of cimicic acid, as the odorous matter of the tree-bug (*Rhaphigaster punctipennis*) already has been. To return to the acacias, the "*dornboom*," or scented thorn of the river banks of the Cape, rightly named *Acacia horrida* by Willdenow, may yet become prominent. The numberless bony thorns that stand out from the two examples here would probably in South Africa be much more menacing and attain several centimetres more of length. This thorn tree is there very common, and yields a considerable quantity of a serviceable gum. Probably the acacias from which gum acacia itself is derived would succeed in the neighbourhood of the Palazzo Orengo, for no doubt *A. horrida* may fairly represent the gum trees of the Nile and Senegambia districts. The appearance of the two very handsome bushes of this acacia that occur here testifies that the climate of the Riviera would be suitable to it and other acacias.

But this appears to be less the case with the Pernambuco tree, *Cæsalpinia echinata*, Lamck, which, however, is very intelligible, as the moist warm woods of middle and northern Brazil, in which this plant grows, are quite a different habitat to the dry Mediterrean coast with its glaring sunlight. Nevertheless, a couple of young trees, a metre high, already give sufficient evidence of the thorns to which this species owes its name.

Another notable African tree in these grounds, of which the success seems to be assured, but as yet represented only by two small specimens, is *Myrsine africana*, indigenous at the Cape and in Abyssinia. Under the name of "*tatse*" or "*zatse*," the spherical fruit, some millimetres in diameter, has for the last twenty years had a place in pharmaceutical literature as one of the numerous Abyssinian anthelmintics.

Equally insignificant for the time are the specimens of the Morocco oil tree, *Argania Sideroxylon*, Röm. et Schultes, of the Sapotaceous order, which replaces the olive tree in South Morocco, in the neighbourhood of the ocean, and also on the slopes of the Atlas mountains in the interior. The seeds contain an oil that appears to be very similar to olive oil, which can be obtained in large quantities, though not yet worked industrially. This evergreen thorny tree does not attain any considerable height, but the trunk is surprisingly thick; the wood is very hard. In the year 1220, the *Argania* attracted the attention of Ibn Beithar, the celebrated Arab writer on natural history.

The small-leaved, and, at any rate in young examples, not very striking-looking *Myrsine* and *Argania* will consequently only be numbered among the more remarkable plants of the Palazzo Orengo in the future, when multiplied and full grown. The contrary holds good in a high degree of the large leafless euphorbias and species of *Aloe*, which are now flourishing there quite successfully, and form so prominent a constituent in the flora of southern and eastern Africa. The candelabra-like euphorbias of the *E. antiquorum* and *E. canariensis* division stand out, 3 to 4 metres high, in full bloom from the prickly wood of the smaller cactuses and the herbage of mesembryanthemums. All abound equally in a very acrid milky juice, and the stems are 3, 4, or 5 angular, or cylindrical. It would be interesting to compare this milky juice and ascertain whether euphorbion, which is an important constituent of the official euphorbium, is always present in it. The mother plant of euphorbium (*E. resinifera*, Berg.) is also found in the Palazzo Orengo, though not yet quite sufficiently developed to allow of its characters being authentically determined, and which Berg, who only knew this species through the fragments occurring in commercial euphorbium, was not in a position to do. It appears probable that it will scarcely attain the magnitude of the species mentioned, or nearly that of the vigorous *Euphorbia abyssinica*, which here flowers upon a branching trunk as thick as a man's arm. It is interesting to contrast it with the delicate *Euphorbia dendroides*, and to note how the flowers and fruits of these perfectly dissimilar looking plants correspond.

Besides these cactus-like euphorbias there are not wanting cactuses of all forms, and equally plentifully represented are the South African species of *Aloe*, including *A. socrotina*, Lam., most of them being in blossom. Neither of those from which the official aloes is derived is absent. Succulent as the leaves are, however, they do not yield upon simple incision nearly so much juice as must be the case in their native country, or even in Barbadoes, where the official aloes exudes in sufficient quantity from the incised leaves without further trouble. In the time of the Salerno School of Medicine, in the twelfth century, the preparation of aloes was carried on in Apulia, but in the present day it is no longer carried on anywhere in Europe, although in the neighbourhood of Valencia and Granada *Aloe vulgaris*, Lk., and *A. purpurascens*, Han., and at Gibraltar *A. arborescens*, Mill., grow perfectly wild, as well as at the Palazzo Orengo.

Besides the great leafless euphorbias, the mesembryanthemums, and the species of aloe, there are three somewhat allied forms that appear prominently in the foreground. The first is the tree-like composite, *Kleinia neriifolia*, which, according to the testimony of an eye-witness, flourishes as luxuriantly at the Palazzo Orengo as upon the trachyte of its native habitat on the Pico de Teide at Tenerife. The second is the Indian fig, *Opuntia Ficus-Indica*, Haworth (*Cactus Opuntia*, L.), the stout stems of which, quite woody at the base, cling to the sunny rocks throughout the whole district; its fruit here appears to have no particular value. The third is the *Agave americana*, which flourishes surprisingly. Like the *Opuntia* it is a citizen of the New World, but together with the above-mentioned thick leaved or succulent-stemmed South African plants it forms a highly exotic looking but perfectly harmonious link in the flora of this district. Such a group, overshadowed by stately date palms, and especially the steep precipices in the neighbourhood of Monaco, might well transport the observer into quite another plant province. The agave presents the most charming aspect in September, when the flowering stalks, several metres high, make their appearance, like some at Sestra and Lavagna, in the Riviera di Levante, where the railway runs for a considerable distance between hedges of agave.

In its native country the *Agave americana* is one of the most important economic plants. The earliest information respecting it is referred to Petrus Martyr, of Anghiera, Lago Maggiore, who described it as "maguey," in 1516. By the middle of the same century it was introduced into Spain and Italy. The vigilant Nuremberger, Joachim Camerarius, who was probably the first possessor of a "botanic" garden in Germany, saw the agave in 1561 in Pavia, and figured it in flower in his 'Hortus Medicus et Philosophicus.' In Italy, the first flowering stalks appear to have been raised at Pisa, and to have excited surprise because the strong plants perished immediately after flowering.

Immediately before the development of the flower stem, the agave contains a saccharine juice which by fermentation yields an enormous quantity of the Mexican national drink, "pulque." In Italy this fact appears not to have attracted any attention, although it may be assumed that pulque could be obtained here also. The large older leaves certainly contain but little juice, and the loose spongy parenchyma is tasteless; but the plant would have to be treated as it is in Mexico, where, according to the most recent observers, as Humboldt and Boussingault, it takes a prominent place among the economic plants. From the account of the latter especially,* it appears that if the flower bud of the maguey, as the *Agave americana* is called in Mexico, be cut off, an abundant formation of sugar takes place after the expiration of some months. The right time for this mutilation is indicated by the appearance of the gigantic outspreading leaves; these, which previously appear so stiff and immovable that no organ could influence them, now bend upwards towards one another as if to protect the flower bud upon which the flower scape, 5 or 6 metres, is to be borne. The increased chemical activity of the plant, when once set up for the preparation of the necessary material for the flowering stem, is probably not increased by the removal of the flower bud, which has a diameter of 50 to 55 centimetres, but diverted into another direction. After the cicatrization of the wound from eight to twelve months are allowed to elapse, and then an excavation, 15 to 20 centimetres wide, is made with a large spoon in the inside of the maguey, where the flower bud was situated. In this the saccharine juice, "*agnamiel*," collects so plentifully that for six months an agave will yield 1 to 10 litres daily. The wound is kept continually open and the juice is exhausted by means of a calabash provided with a pipette. When fermented the juice is called "pulque," and it contains about as much alcohol as good cider. Boussingault found in a litre of it 74 c.c. = 58·1 grams of absolute alcohol, and 308 c.c. of carbonic acid, besides 1·90 gram of nitrogenous substances; the sugar was completely fermented. He calculated that in Mexico a hectare planted with agaves, which would contain about 4000 plants, would yield 25 to 56 hectolitres of absolute alcohol in the form of pulque, and this would place the plant in the first rank among those cultivated for alcohol. So much carbohydrate on the same surface

* *Annales de Chimie et de Physique*, vii. (1866), p. 429.

of soil is not produced by corn, the potato, the sugar cane, the beet, or the vine, as by the maguey. This enormous produce is of course in reality much diminished by the fact that the plant only forms sugar in such quantity immediately before the flowering, and that this does not take place until its fifth to its eighteenth year, after which the plant perishes. But the propagation of the agave by shoots from the root is easy both in Mexico and Italy. The later the plant is in flowering the more imposing dimensions does it attain, so that even in Italy agaves with leaves 1½ metres long are not unfrequent.

The pulque is turbid, and possesses an after-odour, not agreeable to everybody, which appears to have its origin in butyric and valerianic acids; the beverage resembles kumiss. It is, therefore, scarcely to be expected that this liquor would be relished by the Italian population in the presence of their capital wines. Nevertheless the experiment might be worth making, whether in Italy, where the agave grows so luxuriantly, it could be worked industrially for the production of sugar, alcohol, or vinegar. The agave stores up so readily the moisture it requires in its leaves, where it is exquisitely protected from evaporation, that the plant is fitted to flourish vigorously in the driest spots in the Riviera, as at Monaco, or even in the mountain regions of this district. In Mexico it sustains an elevation of 2500 metres above the sea. It may therefore be questioned whether this plant, which requires hardly any attention, could not here be made to yield a remunerative revenue. However, the frugal Ligurian population possesses in its olives and *agrumi*, its vines and potatoes, all that it requires, and does not take readily to novelties, not even to the eucalyptus, the value of which is so palpable.

Between the clumps of the maguey there remains a considerable space, which the Mexican utilizes in the cultivation of many of the smaller economic plants, such as corn and all kinds of vegetables. Many such spots in the Palazzo Orengo are covered with large-flowered species of *Mesembryanthemum*, the beautiful colours contrasting exquisitely with the succulent green of the close turf. There are also other species of agave besides the *Agave americana*.

Plants covered with an impermeable epidermis are suited in a high degree to this hot climate; but less so the succulent herbaceous forms, such as the bananas, one of which (*Musa Enseta*) shows by its mutilated leaves that it has suffered from occasional storms, though just now the gigantic blossoms bend towards the northern observer who has already made acquaintance with this Paradise or Adam's fig in the greenhouses. When at some future time a complete thicket of eucalyptus shall afford its shelter, and the wind shall break upon the closely planted stems of different species of *Bambusa*, already several metres high, the time for the full prosperity of these herbaceous plants will have arrived, provided that there is not too great a dearth of moisture.

Whilst plants from the most diverse districts and families have been transported into this garden, the careful efforts of the proprietor being to spread out over these sunny slopes and cliffs a truly vigorous vegetation, some shrubs and trees have found refuge here that did not receive attention elsewhere. As an instance, may be mentioned *Buxus balearica*, L., the stately broad leaved box-tree, which until 1852 formed extensive woods in the island of Majorca, and yielded as important an economic wood as the more slender *Buxus sempervirens*. The melancholy end which in 1852 the unreasonableness of the Balearic landowner brought upon this irreplacable tree by axe and by fire is exposed by Willkomm in the latest book of travels in these islands. At the present time a few isolated bushes of *Buxus balearica* occur in inaccessible places in the island, and possibly on the Spanish mainland, near Granada, but there are no trees. The specimens in the neighbourhood of the Palazzo Orengo, now 1 to 2 metres high, are meanwhile prospering very well, and notwithstanding the misfortune the plant met with in its native home it may yet attain considerable value.

There are still to be mentioned many economic plants in this garden to which pharmaceutical interest attaches. There is the *Ricinus communis*, L., which in four years has grown to a handsome young tree, with a woody stem 5 metres high and 4 centimetres in diameter, bearing flowers and fruit plentifully. In this plant also the southern producing power of the Riviera is confirmed, since even at Athens the *Ricinus* does not hold out with certainty. The leaves of the trees growing here are far less in circumference than in the summer plant of our gardens, which run so rankly into an herbaceous form, and scarcely find time and strength to ripen seed, though, in very favourable summers this take place in Christiana. As an ornamental plant, therefore, the annual form stands higher than the *Ricinus tree*, as seen here; though probably in the tropics, as a tree 10 metres high, this plant, or at least some of its numerous varieties, has a much more vigorous appearance. Here and there in Italy the *Ricinus* is cultivated for the sake of its oil, as at Naples, in Apulia, and at Florence, but not in the Riviera.

What success *Quercus Suber*, *Fraxinus Ornus*, *Callitris quadrivalvis* (the sandarac tree), *Persea* (*Laurus*) *indica*, and *Saccharum Maddeni*, will have here cannot be judged with certainty from the specimens of these plants cultivated in the grounds of the Palazzo Orengo. There are besides numerous beautifully luxuriant specimens of another little known Chinese shrub, *Gardenia florida*, L., belonging to the Rubiaceæ, the fruit of which, with that of *G. grandiflora*, under the name of "yellow shot" (Chinese, *wongschi*), is used in China as a pigment. The fleshy part of the fruit contains a beautiful reddish yellow colouring stuff, which corresponds with that from saffron; the smell and taste of the Chinese "yellow shot" also resemble those of saffron. This aromatic fruit appears to have been noticed by Marco Polo, the celebrated Asiatic traveller of the middle ages. In Panthier's edition, 'Le Livre de Marco Polo II.' (1865), p. 522, occurs the following passage, "Une manière de fruit qui semble saffran qui vaut autant en viandes comme saffran." Unfortunately the *Gardenia florida* is just now unprovided with either flowers or fruit.

Another well-known Chinese shrub, *Olea fragrans*, L. (*Osmanthus fragrans*, Loureiro) is on the point of unfolding its delicate white blossoms, which, on account of their fine perfume, are said to be used in China to aromatize tea. Although this may have been done formerly, at present, according to careful inquiries of well-known English tea merchants on the spot, it is no longer the case.

For the tea-plant itself there would be a deficiency of water in the grounds of the Palazzo Orengo; but the Arab-Abyssinian tea-plant, *Catha edulis*, Forskol, of the order Celastrineæ, is here in flower. Its leaves are used in Arabia like tea. The active principle of *Catha* has not yet been ascertained, so that the expectation that caffeine (theine) would be met with in it has not been justified.

In Thuret's gardens of Antibes, and also in those of the Palazzo Orengo, are respectable, but not properly tree-like specimens of the *Quillaja Saponaria*, a Chilian Rosaceous plant, the bast of which, as soap bark, or Panama wood, has been brought into prominent use in France and England for some years past. This bark is rich in saponin, which can be obtained from it purer and more plentiful than from any other material. It is to this substance that the bark owes its use in the washing of fine coloured stuffs. In its anatomical aspect the quillaja bark is extremely noteworthy through the plentiful delicate crystals of calcium oxalate, which in the sunlight can be detected by the naked eye. Further, this bark presents a very good instance of the *vasa cribrosa* generally diffused through the bast tissue. In Antibes the tree bears ripe fruit, the woody carpels of which do not recall the *Rosaceæ*. The plant seems to be one of very slow growth.

Thus these young grounds of the Palazzo Orengo show already a large number of extremely interesting plants, quite apart from the much larger number which do not present so much practical interest as remarkable forms that are full of instruction to the botanist. Still larger is the list of plants of which the cultivation is attempted, and which frequently afford most curious experience. Only in a very general way can it be anticipated which plants have a prospect of permanent success in this soil and climate, and frequently bitter disappointment is experienced. For a final result, however, as the names mentioned indicate, a very remarkable flora will have been gathered together on this beautiful spot in the Riviera.

MUSHROOM CULTURE IN JAPAN.*

The best of the edible species of mushrooms are known as "matsutaké" and "shu-take." The difficulties attendant on preserving the former kind almost exclude them from the market for export; for not only do they decompose very rapidly, but even when they are successfully dried they are nearly tasteless, and thus useless in cookery. The shu-take species, however, have this peculiar excellence, that though they are all but tasteless in their raw state, when they are dried they have an extremely fine flavour. The quantity that grows naturally on the decayed roots or on the stumps of the shu tree is not sufficient to meet the demand for them, consequently much skill has been brought to bear on their cultivation, notably by cutting off the trunks of the shu and other trees, and forcing the growth of the mushroom on them. The localities in which they are thus cultivated are Yamato, Isè, Mikawa, Yotonu, Suruga, Kai, Iclzu, Hitachi, Mutsu, and Dewa Serano and Hida, Ku and Sinvo. These provinces produce the largest quantities; indeed, the quantity produced elsewhere is insignificant. Small parcels are produced in Zezo. There seems to be no great difference between the wild and cultivated varieties of the shu-take mushroom, both being in taste and appearance very much the same, with this exception, that in the wild variety the upper surface is of a purplish brown colour, while the under surface and stalk are white; in the cultivated variety the shape is uneven and irregular.

Different varieties of oak appear to be the trees most in favour with the Japanese for the cultivation of mushrooms, the tree known to natives as "shu" giving the best results. This tree grows abundantly in warm places having a south-easterly aspect; it attains to a height of about eighteen or nineteen feet. It has a long, narrow, leaf, thin and stiff, the front surface of a deep green colour, the back of a brownish tint and glazed. The tree is an evergreen, the fruit (acorn) small, with a rough capsule. The acorns are steamed and eaten. The wood of the tree is used in the making of boats' oars; also for fuel and charcoal. Another oak, the kashinda, from which mushrooms are obtained, is also plentiful in warm localities, and attains to a height of thirty or forty feet. The leaves are used in cookery, and the wood is in great demand for divining sticks, for which it is considered the best. The donguri, another species, is to be found all over the country; it grows to about eighteen or nineteen feet, has very thick branches, and dense foliage; the leaf is slightly oval and slightly wrinkled. The fruit (acorn), after being pounded and steeped in water, is made into dumplings, and eaten in this form. The wood is much used in boat-making and also for carts.

Mushrooms are obtained from any of the above in the following manner:—About the beginning of autumn the trunk, about five or six inches in diameter, of any one of these trees, is selected and cut up into lengths of four or five feet, each piece is then split down lengthwise into four, and on the outer bark slight incisions are either made at once with a hatchet, or the cut logs are left till the following spring, and then deep wounds seven or eight inches long are incised on them. Assuming the first course to have been pursued, the logs, after having received several slight incisions, are placed in a wood or grove where they can get the full benefit of the air and heat. In about three years they will be tolerably rotten in parts. After the more rotten parts are removed, they are placed against a rack in a slanting position, and about the middle of the ensuing spring the mushrooms will come forth in abundance. They are then gathered. The logs are, however, still kept, and are submitted to the following process:—Every morning they are put in water, where they remain till afternoon, when they are taken out, laid lengthwise in the ground, and beaten with a mallet. They are then ranged on end in the same slanting position as before, and in two or three days mushrooms will again make their appearance. In Yueshin the custom is to beat the log so heavily that the wood swells, and this induces mushrooms of a more than ordinary large growth. If the logs are beaten gently, a great number of small-sized mushrooms grow up in succession. In places where there is a scarcity of water, rain-water should be kept for steeping the logs in. There is yet another plan. The cut logs are at once buried in the earth, and in a year's time are dug out and beaten in the manner above described.

The mushrooms thus grown are stored in a barn, on shelves, ranged along three sides, with braziers lighted under. Afterwards they are placed in small boxes, the bottoms of which are lined either with straw or bamboo mats. These boxes are then ranged on the shelves, and all approaches carefully closed. An even degree of warmth is thus diffused. The boxes ranged on the upper or lower tiers are constantly changed, so that the contents of each are thoroughly dried. Another mode of drying is to string the mushrooms on thin strips of bamboo, which are piled together near the brazier; the heat is well kept in by inverting a closely woven basket over them. Dried mushrooms are much esteemed in China, and they are largely consumed by Japanese, either as a dish by themselves, or as a condiment with other dishes. Dried mushrooms retain their flavour for a great length of time, and thus bear transport to any distance very well. Of other edible mushrooms in Japan, besides the shu-take, there is the kikurage, which grows in spring, summer, and autumn, on the mulberry, the willow, and other trees. It is a small, thin, soft mushroom, very much curled at the edge, and of a brownish tinge; when dried in the sun, the upper surface gets quite black, and the under surface a brownish grey. The flavour is somewhat insipid. The iwatake, which grows on rocks in thick masses. The so-take, a very delicately flavoured mushroom, to be found in precipitous crags, and consequently scarce, owing to the difficulties attendant on getting them. The kwa-take, to be found in shady spots on moorland; a funnel-shaped mushroom, with a long hollow stalk.

Consul Robertson, in addition to the above description, states the export of mushrooms from Kanayawa, amounted, for the year 1875, to 1461 piculs, valued at 55,024 dollars; in 1874 the export was 1603 piculs, valued at 61,656 dollars; and in 1873, 1218 piculs, valued at 34,170 dollars.

* From the *Journal of the Society of Arts*.

Melon Sugar.—It is stated that a company has been formed in California with the object of cultivating melons for the manufacture of sugar. Sugar is said to be made from them with far less trouble than from beetroot, and requires much less purification. The residues also can be turned to good account.

The Pharmaceutical Journal.

SATURDAY, JUNE 16, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE RELATIVE IMPORTANCE OF IMPURITIES IN DIFFERENT CHEMICALS.

To talk of the relative importance of impurities at a time when absolute purity is demanded from pharmacists as a *sine quâ non* by certain public officials, may sound like mockery, but for all that there is common sense and truth in the phrase. The subject is broached in a paper contributed to the *Practitioner* by Dr. LIEBREICH, the well-known Professor of Therapeutics in the University of Berlin, and some of the instances referred to are of considerable interest.

From a therapeutic point of view the presence of a small quantity of papaverine in morphine, or of one of the allied cinchona alkaloids in quinine, is probably of very little importance; they might affect in a very slight degree the activity of the compounds, but they would not destroy or counteract the medicinal action of the morphine or quinine. Other instances might be given in which this would hold good in varying degree. But there are also some cases in which the reverse is true, and especially among those bodies whose composition has been affected by chemical manipulation. Thus the removal of a molecule of water from morphia by treatment with hydrochloric acid yields apomorphine, a body not a soporific but remarkable for its emetic properties. Now it has been asserted that hypnotic effects have been observed to follow the use of so-called "apomorphia," and these were probably indications of the presence of untransformed morphia, which would not only weaken the therapeutic effect sought, but might exercise a directly antagonistic action.

There are also certain relatively important impurities that occur in chemical compounds of complex manufacture, which are not readily avoided, and frequently are not easily recognized. Dr. LIEBREICH states that he has had a sample of chloroform submitted to him, which, although it responded satisfactorily to all the tests of the German Pharmacopœia, produced such unsatisfactory—perhaps even fatal—narcosis, as to induce closer examination. Upon redistillation of the chloroform, a small oily residue, having a very disagreeable odour, was left, the nature of which could not be ascertained, but the chloroform thus purified was afterwards used with satisfactory effect.

The principal topic discussed by Dr. LIEBREICH, and that which presents the *raison d'être* of the memoir, is the impurities that occur in chloral hydrate, and considering the enormous quantities of this compound now used in medicine, the importance of the subject can hardly be overrated. Dr. LIEBREICH is of opinion that a large proportion of the chloral, both solid and liquid, now consumed, is not trustworthy in respect to its purity and that its impurities are calculated to have a directly and indirectly mischievous effect. In the first place, they may directly interfere with the simply hypnotic and anæsthetic powers of chloral, and confer upon it irritating and exciting properties. In the second, they may act indirectly, by rendering the chloral in certain cases feebly hypnotic, and so give rise to uncertainty as to the proper dose and sometimes involve serious consequences. Indeed Dr. LIEBREICH does not hesitate to say that the accidents that in this country have attended the administration of chloral have been largely due to this cause, the comparative inertness of a first dose having led to its reduplication at too frequent intervals, until suddenly a fatal result has been produced.

Great obscurity at present surrounds the nature of some of these impurities. Thus, Dr. LIEBREICH points out that sometimes impure chloral hydrate may be observed to become more acid; the acidity is generally due to the decomposition of an impurity (chloro-carbonic acid) which sets free hydrochloric acid, and when this occurs in the stomach it gives rise to great irritation. But it would not be safe to assume therefore that the irritation is due to this more obvious impurity, for hydrochloric acid administered in conjunction with pure chloral hydrate does not produce a similar result. Hence it would appear possible that the decomposition of one impurity is rather an indication of the presence of another that is more injurious.

It is now generally admitted that only crystalline chloral hydrate should be used in medicine, and the British and German Pharmacopœias require that the crystals shall be colourless and non-deliquescent. But some of our text-books on materia medica have enlarged upon this without sufficient warrant. Thus one says, "In colourless crystals (needles or rhom-" boidal plates)." A second says, "A mass of white "crystals, much like those of Epsom salts." Now Dr. LIEBREICH expresses most emphatically an opinion, and no one is better entitled to do so, that "chloral " hydrate in needles is quite unworthy of the confid-" ence of the practitioner, as it may very well be, and " is very likely to be, another chlorated substance or " a very impure chloral hydrate." In fact, there can be little doubt that the purest form of chloral hydrate is aptly described in the report on new medicines recently adopted by the Paris Society of Pharmacy as forming crystals of a saccharoid aspect. Of course the difficulty of ascertaining the purity of chloral in solution is much greater.

THE METRIC SYSTEM IN NEW YORK.

In a Bill which has already passed one branch of the New York State Legislature it is proposed to make it compulsory for every pharmacist in the city to have (1) a balance capable of carrying at least ten grams in each pan, and sensible to three milligrams when thus loaded; (2) a balance capable of carrying five hundred grams in each pan, and sensible to two centimetres when thus loaded: and (3) a set of metric weights, from two hundred grams to one centigram, which shall not vary from accuracy more than one per cent. in all weights under five grams, nor more than half per cent. for weights between five or fifty grams. It also provides that the only weights to be employed in compounding and dispensing of drugs and medicines shall be troy weights and metric weights.

In order to secure the object of this Bill it is proposed to appoint an "inspector of druggists' weights," the method of paying whom smacks more of novelty than does the office itself. The inspector is to be authorized to "collect" (a decided euphuism) the sum of ten dollars from every druggist or drug firm unprovided with the above-mentioned balances and weights, and from the "collections" he is to receive twelve hundred dollars yearly, if they amount to so much; if not, *tant pis pour lui!* As the inspector is to be appointed by the Mayor, a New York contemporary presumes that if the Bill passes in this form the merits of the successful candidate for the post will be rather political than pharmaceutical, and appears to anticipate frequent visits from an ignorant rough, having a strong pecuniary incentive to levy black mail.

THE TARIFF ON QUININE IN THE UNITED STATES.

Last year we referred to an attempt that was then being made in the United States to abolish the tariff on imported quinine, but which was opposed by the home manufacturers and other interested parties and defeated. The fight appears to have been renewed this year in a Bill before Congress, and the abolition of the tax is being supported by the medical profession, on the ground that "principles of justice and "humanity alike demand free quinine and an open "market."

Mr. R. H. Davies, Senior Demonstrator in the Laboratories of the School of Pharmacy, Bloomsbury Square, has been appointed Public Analyst for the district of Fulham and Hammersmith.

According to the *Gardener's Chronicle* it is proposed to erect, at Ootacamund, in the Neilgherry Hills, a statue of the late Mr. McIvor, the successful cultivator of the cinchona at that station.

Transactions of the Pharmaceutical Society.

BENEVOLENT FUND.

Subscriptions Received During February, March, April, and May, 1877.

(*Exclusive of the amounts received at the Dinner.*)

(*Concluded from page* 1012.)

	£	s.	d.
Lacy, Benjamin W., 4, The Terrace, Stamford Hill, N.	1	1	0
Laing, James, 45, Main Street, Wishaw	0	3	0
Lake, John H., 41, High Street, Exeter	0	5	0
Lake, Richard, 63, Lupus Street, S.W.	1	1	0
Lamb, Thomas C., 137, High Street, Chatham	0	5	0
Lamble, J. A., 23, Pembroke Street, Devonport	0	2	6
Lander, Henry, 3, High Street, Rugby	0	5	0
Lang, William, Kirkdale, Upper Sydenham	0	10	6
Langford, John B., Wellington	0	10	6
Large, John Hood, 65, New North Road, N.	0	10	6
Lasham, John W., High Street, Romford	0	10	6
Lavers and Son, 5, Montpellier Vale, Blackheath	1	1	0
Lawrence, Frederick, 383, Kentish Town Road, N.W.	0	10	6
Laycock, Robert, 46, High Street, Rotherham	0	2	6
Lea, John, Harbour Street, Folkestone	0	10	6
Learoyd, E. R., Sheffield	0	5	0
Lee, Charles H., Westbury-on-Trim, near Bristol	0	5	0
Lee, William, Castle, Northwich	0	5	0
Leicester, Thomas, Market Place, Burslem	0	10	6
Leigh, John, High Street, Windsor	0	10	0
Lemmon, R. A., Hythe, Kent	0	10	6
Lescher, Joseph S., 60, Bartholomew Close, E.C.	1	1	0
Lester, Henry, 1, Bridge Street, Nuneaton	0	5	0
Lett, Arthur J., 12, Myrtle Street, Liverpool	0	5	0
Lewin, Edward C., Market Place, Boston, Lincs	0	5	0
Lewinton, Alexander B., 14, Cleveland Street, W.	1	1	0
Lewis, Thomas C., 24, Sheep Street, Rugby	0	10	6
Lewis and Son, High Street, Eton	0	10	6
Lindsay, George W., 338, Oxford Street, W.	0	5	0
Lines, George, Market Place, Hertford	0	10	6
Litherland, Henry, 134, Wallgate, Wigan	0	5	0
Little, Robert, Morton Street, Carlisle	0	2	6
Litchfield, John, Longton, Staffs.	0	10	6
Lloyd, John, Dunraven Place, Bridgend	0	5	0
Lloyd, John Walters, 90, Oxford Street, Swansea	0	5	0
Lockyer, George, 208, High Street, Deptford, S.E.	0	10	6
Long, Alfred T., Bognor	0	10	6
Long, Henry, Brighton	0	10	6
Long, Henry, 90, High Street, Croydon	0	10	6
Long, Henry, 48, High Street, Notting Hill, W.	1	1	0
Long, William E., East Street, Chichester	0	10	6
Longbotham, Joseph, Chester-le-Street	0	5	0
Longley, John William, 73, North Street, Leeds	0	10	6
Lord, Ellis, Yorkshire Street, Rochdale	0	5	0
Loveridge, T. P., Belvedere	0	5	0
Lowe, A., Chesterfield	0	5	6
Lowe, Walter, 21, Rosamond Street, Manchester	0	10	6
Lowndes, Hervey, 7, Hall Street, Stockport	0	5	6
Lowther, M. K., 70, Osborne Street, Hull	0	2	0
Lucas, Joseph, 1, Colmore Row, Birmingham	0	10	0
Macfarlan and Co., 17, North Bridge, Edinburgh	2	2	0
Macfarlane, Andrew Y., 255, Canongate, Edinburgh	0	5	6
MacGeorge, William, 346, Essex Road, N.	0	10	0
Machin, Frederick J., Huyton Road, Liverpool	0	10	6
Mackay, John, 119, George Street, Edinburgh	1	1	0
MacRitchie, David, 41, High Street, Inverness	0	5	0
Madeley, Edward S., 4, Bridge Terrace, Castlenau, Barnes	0	10	6
Madge, James C., Holmwood Cottage, Lymington	0	10	6
Makinson, Thomas, 26, Chapel Street, Southport	0	10	6
Malden and Co., 195, Brompton Road, S.W.	1	1	0
Manfield, John W., 78, Bury Street, Manchester	0	5	0
Manifold, John J., Weaverham, Cheshire	0	10	6
Mann, Robert, Newcastle-on-Tyne	0	10	6
Manning, Richard J., Wells, Somerset	0	10	6
Manthorp, Frederick W., High Street, Colchester	0	5	0
Maries, H. D., Watford	0	10	0
Marsh, John H., 6, Milsom Street, Bath	0	10	0
Marshall, Gervas, 33, Blackburn Street, Accrington	0	10	6
Marshall, James A., Waltham Abbey	0	10	6
Marshall, J. F., Lord Street, Gainsborough	0	10	6
Marston, Alfred, Bull Ring, Ludlow	0	5	0
Marston, John T., 105, London Wall, E.C.	0	10	6
Martin, Edward W., 68, High Street, Guildford	0	10	6
Martin, Henry G., St. Albans	0	10	6
Martin, Thomas, High Street, Cliffe, Lewes	0	10	6
Martindale, William, 10, New Cavendish Street, W.	1	1	0
Mason, Frederick, Church Street, Rotherham	0	5	0
Mason, Michael, 1, Lansdowne Crescent, Bournemouth	0	5	0
Mason, Philip H., 25, High Street, Gosport	0	5	0
Masters, Hy. J., 111, Commercial Road, Newport, Mon.	0	2	6
Mather, Mrs. Ellen, Haddington	0	5	0
Mather, James, 31, Cross Street, Bolton	0	10	6
Mather, John, 108, Scholes Street, Wigan	0	5	0

	£	s.	d.
Mathew, William Ham, 35, Fore Street, Saltash	0	5	0
Mathias, Thomas, Saundersfoot, Pembrokeshire	0	10	6
Matthews, Ernest, Royston	0	10	6
Maunder, Robert, 714, Rochdale Road, Manchester	0	10	6
May, John, Old Battersea, S.W.	0	10	6
Mayger, William D., Regent Square, Northampton	0	10	6
Mays, Robert J. J., 3, Market Place, South Shields	0	10	6
McCheyne, James, Berwick-on-Tweed	0	5	0
McIntyre, Peter S., Bridge End, Tweedmouth	0	7	6
McLean, John, 11, Clifton Road, Maida Vale, W.	1	1	0
McLean, Kenneth, Loftus, Yorks	0	10	6
McMillan, John, 17, Great Western Road, Glasgow	0	5	0
Medcalf, Benjamin, Ware	0	10	6
Medcalf, B. P., Ware	0	10	6
Mellin, C. J., 88, High Street, Eltham	0	5	0
Meredith, John, High Street, Brecon	0	5	0
Merrell, James, 1, Queen's Ter., Camden Road, N.W.	1	1	0
Merrick, Thomas J., 33, Drapery, Northampton	0	10	6
Merrikin, John B., Beaufort Buildings West, Bath	0	10	6
Metcalfe, Edmund H., Great Malvern	0	10	6
Metcalfe, Wilson, High Street, Chelmsford	1	1	0
Middleton, Francis, 338, Oxford Street, W.	1	1	0
Mill, P. W., Cheltenham	0	10	6
Miller, C. B., Plough Court, 37, Lombard Street, E.C.	0	5	0
Miller, Charles S., 105, High Street, Ryde, I. of Wight	0	5	0
Miller, Kenneth, 16, Lower Dunbar St., Pulteney Wick	0	5	0
Miller, Nathaniel, 9, London Road, Preston	0	5	0
Millidge, W. H., Newport, Isle of Wight	0	5	0
Millington, Edward, 98, Queen's Road, Dalston, E.	0	10	0
Mills, John, Eastgate Row, Chester	0	5	0
Millward, S., 10, Crown Terr., Upper Holloway Rd., N.	0	10	6
Milner, J. G., 13, Bridge Street, Hull	0	5	0
Milton, Thomas, South Parade, Chew Magna	0	5	0
Milton, T. C., 246, High Street, Exeter	0	5	0
Mitchell, John, 151, Oxford Street, Manchester	0	10	6
Mole, William T., Market Square, St. Neots	0	2	6
Moore, Edward, Cheltenham	0	2	6
Moore, F. S., Castle Cary	0	5	0
Moore, William J., 26, King Street, Stirling	0	5	0
Morgan, Mrs. E., 111, Commercial Rd., Newport, Mon.	0	2	6
Morgan, Richard, The Cross, Newtown	0	10	6
Mornement, H. J., 157, King Street, Great Yarmouth	0	5	0
Morrell, F. K., 306, Kennington Park Road, S.E.	0	10	0
Morrell, Thomas, 1, South Street, New North Road, N.	0	5	0
Morris, Alfred P., 136, High Street, Stourbridge	0	10	6
Mortiboy, John, 60, Railton Road, Herne Hill, S.E.	1	1	0
Morton, Henry, The Elms, Ramsgate	0	5	0
Mould, Samuel, 39, Moorgate Street, E.C.	0	10	6
Moverly, Robert, 82, High Street, Lowestoft	0	10	6
Mullock, Richard, Charing Cross, Birkenhead	0	10	0
Mumbray, Henry G., 215, Gt. Cheetham St., Manchester	0	10	6
Mumby, Charles, High Street, Gosport	0	10	6
Mumford, Alfred, Sussex Ho., Albion Pl. Southampton	0	10	6
Mundy, Alfred O., 11, Norton Folgate, E.	0	10	6
Murdoch Brothers, 249, Sauchiehall Street, Glasgow	0	10	6
Murdoch, David, Falkirk	0	10	0
Murdoch, John McGill, 225, Sauchiehall Street, Glasgow	0	5	0
Muskett, A. C., 64, Park Street, Southwark, S.E.	0	10	6
Muskett, James, Harleston	0	10	6
Muter, Dr. J., Central Public Laboratory, Kennington Lane	3	3	0
Myers, L., St. Albans	0	5	0
Myers and Saunders, 68, High Street, Hull	0	10	6
Naftel, H., 45, High Street, Winchester	0	2	6
Napier, Alexander, 69, South Clerk Street, Edinburgh	0	10	6
Napier, George L., 56, South Street, Exeter	0	5	0
Neville, James, Wallgate, Wigan	0	5	0
Newby, Richard I., Castlenau, Barnes	1	1	0
New, Walter W., 238, Essex Road, N.	0	10	6
Newbigin, James L., Narrowgate Street, Alnwick	0	10	6
Newby, Charles A., Leamington	1	1	0
Newman, Robert, Bewdley	0	10	6
Newman, Walter F., 8, Market Street, Falmouth	0	5	0
Neve, Francis C., St. Leonards	0	10	6
Nicholls, Theophilus, 99, Wick Road, South Hackney, E.	1	1	0
Nicholson, John J., 226, High Street West, Sunderland	0	10	6
Nicholson, Frederick, 216, St. Paul's Road, N.	1	1	0
Nicholson, Henry, 38, Argyle Street, Birkenhead	0	10	6
Nickson, James, Broad Street, Ludlow	0	5	0
Nind, George, Wandsworth, S.W.	0	10	6
Noble, Alexander, 24, Circus Place, Edinburgh	1	1	0
Noble, John, 63, King Street, South Shields	0	5	0
Norburn, A. H., 92, St. John's Road, N.	0	10	6
Norman, Edward, 4, Howard Street, Rotherham	0	2	6
Norman, Henry, 1, Parade, Canterbury	0	5	0
Norman, Joseph S., Bedford	0	5	0
Northway, John, 27, Great Tower Street, E.C.	1	1	0
North, George T., 86, Amherst Road, Hackney, E.	0	10	6
Nosworthy, Robert, 236, Clapham Road, S.W.	0	10	6
Oldham, William, 38, Waterloo Road, Burslem	0	10	6
Oldfield, Henry, 86, Villa St., Boyson Rd., Camberwell, S.E.	0	10	6
Olive, William T., 1, Charles Street, Briton Ferry	0	5	0
Orpe, Thomas M., 329, Old Kent Road, S.E.	0	10	6
Osborne, James, St. John's Street, Ashbourne	0	5	0
Overbury, Henry, High Street, Alcester	0	5	0
Owen, G. C. R., 27, High Street, Carnarvon	0	5	0
Owen, John, 51, Holloway Road, N.	1	1	0
Padley, William, 22, Market Place, Hull	0	2	6

	£	s.	d.
Padwick, John, 5, Preston Street, Brighton	0	10	6
Page, Charles, High Street, Barnstaple	0	5	0
Page, John, 47, Blackfriars Road, S.E.	0	10	6
Paine, Charles, 3, Commercial Street, Newport, Mon.	0	10	6
Paine, Standen, 7, Exchange Street, Manchester	0	10	6
Palmer, Charles F., 100, Islington, Birmingham	0	10	6
Palmer, Francis, 7, Brunswick Parade, Upper Norwood	0	10	6
Palmer, Frederick W., Ramsey	0	5	0
Palmer, Henry B., Wingham, Kent	0	5	0
Palmer, William J., 92, Norfolk Street, King's Lynn	0	5	0
Paramore, R., 18, Hunter Street, W.C.	0	5	0
Parker, Edward, 6, Botchergate, Carlisle	0	5	0
Parker, R. H., 91, High Holborn, W.C.	0	5	0
Parker, William, Cheapside, Lancaster	0	5	0
Parkes, J. P., Leyton Ho., Albion Rd., Stoke Newington, N.	1	1	0
Parkinson, Isaiah, Hammerton Street, Burnley	0	2	6
Parkinson, Richard, Hammerton Street, Burnley	0	2	6
Parkinson, Richard, 1, William Henry Street, Liverpool	0	10	6
Parkinson, William, Hammerton Street, Burnley	0	2	6
Parry, Robert, Bettws-y-Coed	0	5	0
Parry, William, 345, Scotland Road, Liverpool	0	5	0
Parr, Samuel, Long Row, Nottingham	0	10	6
Pars, Robert C., Thrapston	0	10	6
Partridge, James, High Street, Barnstaple	0	5	0
Pasmore, George, 1, Southernhay, Exeter	0	5	0
Pass, Horatio, 245, Wandsworth Road, S.W.	0	10	6
Pate, Henry T., High Street, Ely	0	10	6
Patterson, Douglas J., Mansfield	0	10	6
Pattinson, R. J., 9, English Street, Carlisle	0	5	0
Pattison, George, 139, St. John Street Road, E.C.	1	1	0
Pattison, Thomas, 418, High Street, Cheltenham	0	5	0
Payne, John, Elmwood Street, Leeds	0	5	0
Payne, John B., 63, Piccadily, Manchester	0	5	0
Peake, A. Earlestown	0	5	0
Peake, Henry, New Bridge, Dover	0	5	0
Peake, Henry F., Twickenham	0	5	0
Pearce, Joseph, Crewkerne	0	5	0
Pearman, Henry, 11, Commercial Street, Newport, Mon.	0	10	6
Pearse, John, 4, Petty Cury, Cambridge	0	5	0
Pearson, Charles James, 4, Russell Street, Swansea	1	1	0
Pearson, Edward, 9, Market Place, Nottingham	1	1	0
Pearson, F. M., 301, Park Road, Liverpool	0	10	0
Pegg, Herbert, Birmingham	0	10	6
Penrose, Arthur W., 5, Amwell Street, E.C.	0	10	6
Percy, Thomas B., Victoria Place, Truro	0	10	6
Perfect, George, 151, Commercial Road, Landport	0	5	0
Perry, William H., 52, Ryland Street, Birmingham	0	5	0
Pertwee, Edward, Romford	0	10	6
Petrie, J. J., Aboyne	0	5	0
Pettigrew, John Wesley, 145, St. George's Road, Glasgow	0	5	0
Pheysey, Richard, Waterloo, Liverpool	0	10	6
Phillipps, W., 357, New Cross Road, S.E.	0	10	6
Phillips, James P., Bideford	0	2	6
Phillips, John, 92, Commercial Street, Newport, Mon.	0	10	6
Phillips, Jonathan, Clarence Chambers, Wallgate, Wigan	0	10	6
Philpot, Henry, 84, Praed Street, W.	1	1	0
Pickard, William, 338, Oxford Street, W.	0	5	0
Pidd, Arthur J., 221, Chester Road, Hulme, Manchester	0	10	6
Pike, Chistopher, Bovey Tracey	0	10	0
Picnot, Charles, 24, High Street, Strood	1	1	0
Pidduck, John W., 11, Bridge Terrace, Harrow Road, W.	0	10	6
Pierson, Clement, 174, North Street, Leeds		5	0
Pinkerton, John S., 248, London Road, Glasgow	0	10	0
Plaister & Hillen, 13, Gledhow Ter., So. Kensington, S.W.	1	1	0
Plomley, James F., High Street, Rye	0	5	0
Poad, John, Looe, Cornwall	0	5	0
Pocklington, James, Sydenham	0	10	6
Poll, William S., Yarmouth	0	2	6
Polding, Peter, Market Place, Wigan	0	10	6
Pollard, Henry H., 140, High Street, Ryde, I.-of-Wight	0	10	6
Pond, George Peter, 68, Fleet Street, E.C.	0	5	0
Pooley, John C., 8, George Street, Bath	0	5	0
Potts, Robert Alfred, 26, South Audley Street, W.	1	1	0
Potts, Thomas, 5, Granger Street, Newcastle-on-Tyne	0	10	6
Potts, Walter, 139, King Street, Oldham	0	10	6
Pound, Matthew, 60, Leather Lane, E.C.	1	1	0
Perry, William H., 52, Ryland Street North, Birmingham	0	5	0
Powell, Edw. Foley, Five Ways, Edgbaston, Birmingham	0	10	6
Powell, J., St. Mary's Butts, Reading	0	5	0
Powell, John, Shaftesbury	1	1	0
Power, J. H., Cheltenham	0	5	0
Pratt, Edmund, 12, Connaught Street, W.	1	1	0
Pratt, Edward, High Street, Barnstaple	0	5	0
Pratt, Edward J., 185, King Street, Great Yarmouth	0	5	0
Pratt, George W., 47, Cavendish Street, Manchester	0	10	6
Pratt, Thomas H., 154, Bartholomew Street, Newbury	0	5	0
Preston, Job, 4, High Street, Sheffield	0	10	6
Price, Charles Wm., 197, Camberwell New Road, S.E.	0	10	6
Price, George, 127, Commercial Street, Newport, Mon.	0	5	0
Price, John M., 290, Brixton Road, S.W.	0	10	6
Price, Robert J., 217, Edgware Road, W.	0	2	6
Pridgeon, W. J., Hawkhurst	0	5	0
Priest, Edward R., Cromer	0	10	6
Priestley, Henry, Norfolk Street, Sheffield	0	10	6
Prime, Thomas R., Upper Norwood, S.E.	0	10	6
Prince, Arthur G., Longton	0	10	6
Prince, Henry, 5, Fore Street, Taunton	0	10	6

	£	s.	d.
Prior, George T., 32, Broad Street, Oxford	0	10	6
Proctor, Barnard S., 11, Grey Street, Newcastle-on-Tyne	1	1	0
Prust, Richard, Meteor Street, Splotland, Cardiff	0	5	0
Pryer, William S., Axminster	0	5	0
Pullan, Thomas, 174, Lumb Lane, Bradford	0	10	0
Pullin, Willam H., York Terrace, Leamington	0	10	6
Pumphrey, John, Port Street, Bengeworth, Evesham	0	5	0
Quinlan, Joseph, 457, New Cross Road, S.E.	0	10	6
Radermacher, Charles J., 17, Albion Road, Islington	1	1	0
Radley, William V., 74, Market Place, Sheffield	0	10	6
Raffle, William, Green Street, South Shields	0	10	6
Ragg, William, Edmonton Green	1	1	0
Raimes, Blanshard and Co.. Smith's Place, Edinburgh	1	1	0
Rainey, Edward, Spilsby	0	10	6
Rait, Robert C., Partick	0	5	0
Randall, William B., 146, High Street, Southampton	1	1	0
Rankin, William, 7, King Street, Kilmarnock	1	1	0
Ransom, William, Hitchin	2	2	0
Rastrick and Son, King's Road, Southsea	0	10	6
Rawdin, Joseph, Jedburgh	0	5	0
Redman, Sidney, East Street, Taunton	0	5	0
Reed, George, Yarm, Yorks.	0	10	6
Rees, Edward, Machynlleth	0	5	0
Rees, W. H., Dartmouth	0	10	6
Reid, A. D., South Shields	0	5	0
Reynolds, Freshfield, Commercial Street, Leeds	0	10	6
Reynolds, Richard, 13, Briggate, Leeds	1	1	0
Rhodes, Samuel, 196, Union Street, Oldham	0	5	0
Richards, William R., 152, Camberwell Road, S.E.	0	5	0
Richardson, George, 12, Norland Place, Notting Hill, W.	0	10	6
Richardson, Richard T., 39, Smithdown Road, Liverpool	0	10	6
Richardson, Thomas J. 23, London Road, Carlisle	0	2	6
Riches, Thomas, Torquay	0	5	0
Riddle, William R., Haining Croft, Hexham	0	5	0
Ridley, Charles H., 34, Week Street, Maidstone	0	15	0
Rieveley, Charles, 31, Cleveland Street, Birkenhead	0	5	0
Rimmington and Sons, 9, Bridge Street, Bradford	1	1	0
Ritson, John, 160, City Road, Hulme, Manchester	0	5	0
Roach, Herbert William, 8, St. James's Street, S.W.	0	10	6
Roach, Pope, 8, St. James's Street, S.W.	1	1	0
Robbins (John) and Co., 372, Oxford Street, W.	2	2	0
Roberts, Meshach, High Street, Bangor	1	1	0
Roberts, W. C., Llansilin	0	2	6
Robertson, James, 73, George Street, Edinburgh	1	1	0
Robinson, Benjamin, 1, Broad St., Pendleton, Manchester	0	5	0
Robinson, Charles J., Streatham	0	10	6
Robinson, James, 2, Orford Hill, Norwich	0	5	0
Robinson, Joseph Spencer, Alfreton	0	10	6
Robinson, Ralph, 58, Yorkshire Street, Rochdale	0	10	6
Robinson, William H., High Street, Stony Stratford	0	10	6
Robson, John, 26, Scotch Street, Carlisle	0	5	0
Robson, John B.. New Filey	0	5	0
Rodger, John, Inverary	0	5	0
Rogers, William, 38, High Street, Maidstone	0	10	6
Rollin, John George, 3, South Street, Durham	0	10	6
Romans, Thomas W., Wrotham	0	10	6
Rook, Edward, Sittingbourne	0	10	6
Rossiter, Frederick, George Street, Hastings	0	5	0
Rossiter, John, Royal Melville Hospital, Chatham	1	1	0
Rossiter, W. H., 101, Southwark Street, S.E.	0	5	0
Rowe, Robert, 40, Alfred Place West, South Kensington, S.W.	1	1	0
Rowell, John C., Duke Street, Reading	0	5	0
Rowell, Robert, Green Street, South Shields	0	5	0
Rowell, Robert H., Palmerston Road, Southsea	0	10	6
Rowntree, Thomas, 1, Westbourne Road, Barnsbury, N.	0	10	6
Rowson, Hy., 2, Chichester St., Upper Westbourne Ter., W	1	1	0
Russell, Charles John L., Windsor	0	10	6
Rutter, John, 21, Salusbury Terrace, Kilburn, N. W.	0	2	6
Ryder, John L., 23, Deepdale Terrace, Preston	0	5	0
Ryder, W. H., 57, Newhall Street, Birmingham	0	5	0
Saffery, John, 56, High Street, Hile Town, Sheerness	0	10	6
Sadler, William, 15, Norton Folgate, E.	0	10	6
Sagar, Henry, Leeds	0	5	0
Sale, Thomas John, 59, High Street, Lowestoft	0	5	0
Salisbury, William B., 3, Market Street, Leicester	0	10	6
Salmon, William, Stockton-on-Tees	0	5	0
Salter, Joseph B., Castle Street, Shrewsbury	0	10	6
Sampson, George, Chesterfield	0	2	6
Sanderson, Robert, Watford	0	2	6
Sandy, Frederick W., 390, Walworth Road, S.E.	0	10	6
Sangster, Arthur, 66, High Street, St. John's Wood, N.W.	1	1	0
Sangster, William, Dufftown	0	5	0
Sansom, Henry, 47, The Parade, Leamington	0	10	6
Sapp, Arkas, Market Place, Basingstoke	0	10	6
Sargent, John C., London Road, Sevenoaks	0	10	6
Sarsfield, William, 7, Market Place, Durham	0	10	6
Saul, William B., 2, Parade, Northampton	0	5	0
Saunders, C. J. H., 119, Fore Street, Exeter	0	2	6
Saunders, Charles P., Bridge Street, Haverfordwest	0	5	0
Saunders, David P., Bridge Street, Haverfordwest	0	10	6
Saville, John, 4, Goodramgate, York	1	1	0
Scawin and Burn, 19, Market Place, Durham	0	10	6
Schacht, William, 6, Finsbury Place South, E.C.	0	10	6
Schoon, George, Gildersber, Addingham via Leeds	0	1	0
Schweitzer, Julius, 79, Pavilion Road, S.W.	1	1	0
Scoley, Thomas E., 114, Lambeth Walk, S.E.	0	5	0
Scott, John G., Church Place, Dumfries	0	10	0
Scott, T. B., Crescent Road, Bournemouth	0	10	0
Scott, Walter, 46, Mary Street, Dublin	0	5	0
Scrase, Richard, 161, New Cross Road, S.E.	0	5	0
Seath, Alexander, 18, Bridge Street, Dunfermline	0	10	6
Selleck, Edward, Apothecaries Hall, E.C.	0	10	6
Sells, Robert James, Grosvenor Road, Tunbridge Wells	0	10	6
Serpell, Samuel, 10, Lemon Street, Truro	0	10	6
Severs, Joseph, 23, Stricklandgate, Kendal	1	1	0
Seys, James A., 1, Stow Hill, Newport, Mon.	0	2	6
Shakerley, Benjamin, 27, Market Place, Penzance	0	5	0
Shapley, Charles, 11, Strand, Torquay	0	5	0
Sharp, E. K., 44, Market Place, Leicester	0	5	0
Sharples, George, Fishergate, Preston	0	5	0
Shaw, Alfred, Riddings, Derby	0	5	0
Shaw, Ralph H., 24, Brighton St., Seacombe, Cheshire	0	5	0
Shaw, Ward, 5, Charles Street, Hull	0	5	0
Shelley, Henry, Twickenham	0	10	6
Shemmonds, John, Wootton Place, Bournemouth	0	5	0
Shenstone, James B. B., High Street, Colchester	0	5	0
Shephard, Thomas F., All Saints Road, W.	0	10	6
Shepherd, James, 144, Huddersfield Road, Oldham	0	5	0
Shepherd, George P., High Street, Guildford	1	1	0
Shepherdson, Welburn, 23, Lowgate, Hull	0	10	6
Sheppard, —, Essex House, Bournemouth	0	5	0
Shields, Robert J., 104, High Street, Mexborough	0	10	6
Shillcock, Joseph B., Bromley, Kent	0	10	6
Shipman, John J., Bridge Street, Northampton	0	10	6
Short, E. C., Bushey Heath	0	10	6
Sibary, George, Market Street, Longton	0	10	6
Sidley, Thomas I., 9, Brunswick Terrace, Stafford	0	10	6
Silverlock, H., 92, Blackfriars Road, S.E.	1	1	0
Silvers, Francis T., 19, Church Street, Camberwell, S.E.	0	10	6
Sims, Joseph, Hirwain	0	10	6
Simpson, Hales, St. Botolph Street, Colchester	0	5	0
Simpson, Henry, 85, Lambeth Road, S.E.	0	10	6
Simpson, Henry D., Louth	0	10	6
Simpson, John, South Lambeth Dispensary, S.E.	0	5	0
Simpson, Thomas, 6, Havelock Terrace, Forest Hill	0	5	0
Sindall, John W., High Street, Knaresborough	0	5	0
Singer, Robert, The Square, Kelso	0	2	6
Sircom, Richard, Old Market Street, Bristol	0	10	6
Sirett, George, Buckingham	0	10	6
Sirett, George B., Buckingham	0	10	6
Sirett, Henry, Market Square, Brackley	0	10	0
Skipper, Edward, 4, Dalston Lane, E.	0	5	0
Skoulding, George S. F., Church Plain, Great Yarmouth	0	10	6
Slack, Joseph, Scotch Street, Carlisle	0	5	0
Slater, Arthur, Auburn Street, New Whittington	0	5	0
Slater, Jonathan, Sadler Street, Wells, Somerset	0	5	0
Slater, Thomas, Stone	0	10	6
Slater, Thomas, jun., Stone	0	5	0
Slipper, James, 86, Leather Lane, E.C.	0	10	6
Sloggett, Thomas C., 5, Drake Street, Plymouth	0	5	0
Sloman, Richard, Torquay	0	5	0
Smeeton, William, Leeds	0	10	6
Smith, Alfred William, 93, High Street, Rye	0	5	0
Smith, Allen, School Lane, Sale	0	5	0
Smith, Anthony, 69, Queen Street, Hull	0	10	6
Smith, Arthur H., Broad Street, Hanley	0	10	6
Smith, Charles S., Cirencester	1	1	0
Smith, Christopher S., Middlesborough	0	5	0
Smith, Edgar R., Eccleshall	0	5	0
Smith, Edward, 8, Strand, Torquay	0	5	0
Smith, John, High Street, Bridlington	0	2	6
Smith, John Francis, 46, Prospect Street, Hull	0	5	0
Smith, John J., 9, James's Street, Burnley	0	2	6
Smith, John J., Walton-on-the-Hill	0	10	6
Smith, Percy John, 2, Archer Terrace, Balham	1	1	0
Smith, Samuel Allen, 102, The Parade, Leamington	1	1	0
Smith, Thomas, Heriot Hill House, Edinburgh	1	0	0
Smith, Walter Henry, 36, St. George's Road, Brighton	0	10	6
Smith, William, 2, Alfred Terrace, South Hackney, E	0	10	6
Smith, William, 10, Station Road, Spa Road, S.E.	0	10	6
Smith, William, Beast Market Hill, Nottingham	0	5	0
Smith, William, High Street, Egham	0	10	6
Smith, William, Sutton Coldfield	0	10	6
Smith, William F., High Street, Abingdon	0	5	0
Smith, William Frederick, 280, Walworth Road, S.E.	1	1	0
Southall Brothers and Barclay, Birmingham	1	1	0
Do. Do. per H. Nicholson, Birkenhead	0	10	6
Soutter, James S., Hedon, Hull	0	10	6
Spearing, James, 53, Above Bar, Southampton	0	10	6
Speechly, George, Bishop Stortford	0	10	6
"Spectrum Analysis"	0	5	0
Spencer, Thomas, Wokingham	0	10	6
Spencer, W. H., Burnham Market	0	5	0
Spill, Thomas, 2, Steven's Crescent, Totterdown, Bristol	0	10	6
Spilsbury, James, 35, Bath Street, Leamington	0	5	0
Spinney, Frank, Commercial Road, Bournemouth	0	10	6
Sprake, David L., 20, Whalley Road, Accrington	0	10	6
Sprent, C., Broad Street, Reading	0	2	6
Spyer, Newton, Watlington	0	5	0
Stafford, William, 10, Northgate Street, Gloucester	0	10	0
Stagg, James Henry, Broad Row, Gt. Yarmouth	0	2	6
Stainer, John, 59, Sandgate Road, Folkestone	1	1	0
Stanley, Herbert, 72, The Parade, Leamington	0	10	6
Stanley, Thomas, Sparkbrook, Birmingham	0	2	6

	£	s.	d.
Stansfield, Richard, 85, Haverstock Hill, N.W.	0	5	0
Stanway, Edward T., Horseley Fields, Wolverhampton	0	10	6
Starke, George, Oxford Street, Reading	0	5	0
Starkie, Richard S., 441, Strand, W.C.	1	1	0
Stedman, Richard, B., West Malling	0	5	0
Steel, Thomas, Duke Street, Barrow-in-Furness	0	5	0
Steer, Philip R., 25, Atlantic Road, Brixton, S.W.	0	10	6
Stenson, Joseph, 116, High Street, Camden Town, N.W.	0	5	0
Stevens, Felix, 51, Judd Street, W.C.	0	5	0
Stevens, John, High Street, Broseley	0	10	6
Stevenson, John, 1, Baxtergate, Whitby	0	10	6
Stevenson, R. W., Tutbury	0	5	0
Stevenson, William L., 165, Edgware Road, W.	0	10	6
Steward, Alfred, Market Place, Great Yarmouth	0	5	0
Steward, William, 42, High Street, Bridgnorth	0	10	6
Stoakes, Benjamin M., 6, Whitefriargate, Hull	0	5	0
Stoddart, W. W., 1, Park Street, Bristol	0	10	6
Stone, Frederick W., 116, Fore Street, Exeter	0	10	6
Stone, John, 166, Fore Street, Exeter	0	5	0
Stones, William, 113, Market Street, Manchester	1	1	0
Stott, William, Sowerby Bridge	0	10	6
Strachan, Alexander, 111, George Street, Aberdeen	0	5	0
Straughton and Brown, 54, Main Street, Cockermouth	1	1	0
Strickett, John, 161, St. George's Road, Peckham, S.E.	0	10	6
Stringer, Alfred, Homend Street, Ledbury	0	5	0
Strongitharm, Wm. G., 1, Alma Ter., Upper Norwood, S.E	0	5	0
Summers, Frank, 12, Abbeygate St., Bury St. Edmunds	0	5	0
Summers, James B., 86, Curtain Road, E.C.	0	10	6
Sumner, Robert, 50A, Lord Street, Liverpool	1	1	0
Sumners, Michael C., Heckington	0	5	0
Sutherland, Daniel D., Totnes	0	10	6
Sutterby, Jonathan N., Long Sutton	1	1	0
Sutton, Francis, Bank Plain, Norwich	0	10	6
Swain, James, High Street, Roehampton	0	5	0
Sweetman, J. M., Wigan	0	2	6
Swenden, James, Darlington	0	10	6
Swift, Francis, Spalding	0	10	6
Swingburn, Richard H., South Molton	0	10	6
Swire, Jabez, King Cross, Halifax	0	5	0
Sykes, Thomas H., 201, Lord Street, Southport	0	10	6
Sylvester, Paul, Rusholme	0	5	0
Symington, Thomas, 4, Dundas Street, Edinburgh	0	5	0
Symons, William, 26, Joy Street, Barnstaple	0	5	0
Symons, Wm. H., 2, Queen's Ter., St. John's Wood, N.W.	1	1	0
Tanner, Alfred E., 134, Prescot Road, Fairfield, Liverpool	1	1	0
Taplin, William George, 75, Hampstead Road, N.W.	1	1	0
Targett, Charles G., Weymouth	0	5	0
Taylor and Fletcher, 160, Briggate, Leeds	1	1	0
Taylor, Edward, 24, Yorkshire Street, Rochdale	0	10	6
Taylor, Henry H., Linthorpe Road, Middlesborough	0	5	0
Taylor, James, 65, Shadwell Street, South Shields	0	5	0
Taylor, John, 13, Baker Street, W.	0	10	6
Taylor, John, Lucius Street, Torquay	0	5	0
Taylor, John U., 19, High Street, Bedford	0	10	6
Taylor, Joseph H., James Street, Harrogate	0	10	6
Taylor, Richard, Simeon Street, Ryde	0	10	6
Taylor, Samuel, 70, Great George Street, Leeds	1	1	0
Taylor, Thomas, 81, High Street, Peckham, S.E.	1	1	0
Taylor, Thomas C., Aylesbury	0	10	6
Taylor, William, Saltburn-by-the-Sea	0	5	0
Taylor, William R., Linthorpe Road, Middlesborough	0	5	0
Teat, Thomas, Waltham, Melton Mowbray	0	5	0
Tench, Richard, 30, Walbrook, E.C.	1	1	0
Terry, Thomas, Withington, Manchester	0	5	0
Thacker, William, 4, Foxton Terrace, Richmond, S.W.	0	10	6
Thomas, Henry, 7, Upper St. Martin's Lane, W.C.	1	1	0
Thomas, Horace, 14, South Colonnade, St. Leonard's	1	1	0
Thomas, James, Bridge, Kent	0	5	0
Thomas, M., Corris, Merioneth	0	5	0
Thomas, Rees, High Street, Merthyr Tydvil	0	10	6
Thomas, Richard, 7, Manchester Road, Burnley	0	10	6
Thomas, Robert, 2, Mill Street, Liverpool	0	5	0
Thomas, Watkin J., 10, Commercial Place, Aberdare	0	10	6
Thomas, William, Bridge Street, Aberystwith	0	2	6
Thompson, Andrew, 33, English Street, Carlisle	0	10	6
Thompson, Edward, 1, King Street, Dover	0	5	0
Thompson, Henry, 101, Southwark Street, S.E.	0	10	6
Thompson, Henry Ayscough, 22, Worship Street, E.C.	1	1	0
Thompson, John, Thirsk	0	10	6
Thompson, John T., Market Place, Richmond, Yorks.	0	5	0
Thompson, Thomas, 23, High Street, Guildford	0	5	0
Thompson, Thomas, Market Place, Richmond, Yorks.	0	10	6
Thompson, William, 133, Summer Lane, Birmingham	0	2	6
Thorn, John James, 338, Oxford Street, W.	0	10	6
Thorne, John, Wellingborough	0	10	6
Thornton, Edward, 133, Warwick Street, Leamington	0	5	0
Throssel, John, 116, Fitzroy Street, Cambridge	0	2	6
Thurland, Henry, 41, St. Giles' Road, Oxford	0	10	6
Thursfield, John F., Kettering	0	5	0
Tighe, Henry W., 4, High Street, Exeter	0	5	0
Tijou, Tom, 10, Francis Terrace, Rotherhithe, S.E.	0	5	0
Tippett, Benjamin M., 3, Sloane St., Knightsbridge, S.W.	0	10	6
Todd, Joe, English Street, Carlisle	0	10	0
Tomlin, A. R., Shambles Street, Barnsley	0	10	6
Tomlinson, C. K., Lincoln	0	10	6
Tomlinson, James, Tindal Square, Chelmsford	0	10	6
Tomlinson, Thomas, 2, Lower Seymour Street, W.	1	1	0

	£	s.	d.
Toone, Joseph Vidler, 14, New Bond Street, Bath	0	10	6
Tottenham, Mrs. Mary A., Brill, Bucks	0	5	0
Townend, Thomas F., Bishop Auckland	0	5	0
Townley, Thomas William, Market Place, Keswick	0	10	6
Tribe, John, 137, High Street, Chatham	0	10	6
Trick, William B., Stoke Newington, N.	0	5	0
Trim, Edmund, 9, Wellington Terrace, Bournemouth	1	1	0
Trist, Richard, High Street, Pinner	0	5	0
Troake, —, Oxford Street, Southampton	0	2	6
Trollope, William T., Landport	0	5	0
Troughton, Christopher, 72, Old Hall Street, Liverpool	0	5	0
Tubbs, Thomas K., Windsor Road, King's Lynn	0	2	6
Tuck, William H., 630, Mile End Road, E.	0	10	6
Tucker, Charles, South Street, Bridport	0	10	6
Tugwell, William H., 3, Lewisham Road, S.E.	0	10	6
Tunbridge, Frederick, Castle Street, Reading	0	5	0
Tunley, John, High Street, West Bromwich	0	5	0
Turner, Charles E., 63, Great Russell Street, W.C.	0	10	6
Turner, Edward A., 118, Balls Pond Road, N.	0	10	6
Turner, Robert, Oundle	0	10	6
Turner, Thomas, Longton	0	5	0
Twaddle, Robert, 34, Maitland Street, Glasgow	0	7	6
Usher, John, 114, Westgate Road, Newcastle-on-Tyne	0	10	6
Uppleby, Henry, Leamington	0	10	6
Vaughan, David, The Cross, Oswestry	0	10	6
Vaughan, William, Market Square, Fishguard	0	2	6
Verity, William, 51, Gt. George Street, Liverpool	0	5	0
Vigis, Joseph Lewis, 12, Chapel Row, Bath	0	10	6
Vince, James, Cheapside, Lancaster	0	5	0
Vincent, Lacey A., High Street, Watton	0	5	0
Vincent, Philip, Frederick Place, Walham Green	0	10	6
Virgo, Charles, The Foregate, Worcester	1	1	0
W. T. C.	0	10	6
Wakefield, Cecil Henry, Malvern Wells	1	1	0
Wakeham, Charles, Helston	0	5	0
Walker, Charles, 8, Cannon Street Road, E.	0	5	0
Walker, Henry, 94, Brompton Road, S.W.	0	5	0
Walker, Robert, Maidenhead	0	10	6
Walker, Thomas D., Dresden, Staffs.	1	1	0
Walker, William H., 167, Lord Street, Southport	0	10	6
Wallis, G., 4, Albert Villas, Birchanger Rd., South Norwood	0	5	0
Wallworth, David, High Street, Maldon	0	5	0
Walmsley, Samuel, Kingston-on-Thames	0	5	0
Walpole, William, Great Yarmouth	0	10	6
Walsh, Edward, 209A, York Street, Cheetham, Machester	0	10	6
Walton, George C., Sandgate, Kent	0	10	6
Walton, John, 300, High Street West, Sunderland	0	10	6
Walton, Ralph, 87, High Street, Maidenhead	0	10	6
Warburton, Thomas, Atherton, Lancs.	0	5	0
Ward, Francis, 1, Lower Grosvenor Place, S.W.	0	10	6
Ward, Francis Ebenezer, Witham	0	5	0
Ward, Henry, S., 89, Poulton Street, Kirkham	0	5	0
Ward, William, Berwick-on-Tweed	0	5	0
Wardley, Samuel F., High Street, Tunbridge	0	2	6
Warrior, Charles, Northallerton	0	5	0
Warrior, Henry, Northallerton	0	5	0
Warrior, William, Northallerton	0	10	6
Wastie, Francis, 183, Lower Kennington Lane, S.E.	0	10	6
Waterhouse, J., Stamford Buildings., Ashton-under-Lyne	0	10	6
Waters, William A., High Street, Rye	0	5	0
Waterworth, Alfred, 5, Avenham Terrace, Preston	0	10	6
Watson, William, 37, Roman Road, E.	0	5	0
Watts, John, Dudley Hill, Bradford	0	10	6
Wavell, John, Union Street, Ryde, Isle of Wight	0	10	6
Weaver, A. C. 46, Dudley Road, Wolverhampton	0	5	0
Webb, Edward A., 60, Bartholomew Close, E.C.	1	1	0
Wearing, John, Market Place, St. Just	0	2	6
Weatherley, Richard J., 133, Oxford Street, W.	0	5	0
Webster, John H., 96, Westborough, Scarborough	0	5	0
Webster, Thomas, 296, High Street, Bangor	0	2	6
Weddell, Arthur, 27, Haymarket, S.W.	0	5	0
Weller, George, Queen's Terrace, Windsor	0	10	6
Wellington, F. G. N., South Petherton	0	5	0
Wellington, H. A., Freshwater, Isle of Wight	0	5	0
Wellington, James, Oakham	0	10	6
West, Thomas, Stretford, Manchester	0	5	0
Westlake, Bernard, 58, Peascod Street, Windsor	0	10	6
Weston, Samuel J., 151, Westbourne Terrace, W.	1	1	0
Westrup, Joseph B., 76, Kensington Park Road, W.	0	10	6
While, William J., London Street, Reading	0	5	0
Whincup, William, 404, Essex Road, N.	0	10	6
Whitfield and Son, Worcester	1	1	0
White, Frank, 8, London Road, Nottingham	0	10	6
White, Thomas, Church Street, Launceston	0	10	6
Whitehead, John, Drake Street, Rochdale	0	5	0
Whitfield, John, 113, Westborough, Scarborough	1	1	0
Whittaker, Ellis, Regent Road, Salford	0	10	6
Whittaker, William, 7, High Street, Runcorn	0	10	6
Whittle, E. C. C., 6, Townshend Rd., St John's Wood, N.W.	0	5	0
Whyte, William, 110, Trongate, Glasgow	0	5	0
Wibmer, Lewis M., High Street, Tunbridge	0	5	0
Wickham, W., 509, New Cross Road, S.E.	0	10	6
Widdowson, E., Bulwell	0	10	6
Wigg, William C., 17, High Street, King's Lynn	0	5	0
Wilford, Josiah, 104, Snargate Street, Dover	0	2	6
Wilks, Maurice, 70, St. James' Street, Burnley	0	5	0
Wilkes, Doctor T. Upton-on-Severn	0	2	6

	£	s.	d.
Wilkinson, George, 267, Waterloo Road, Manchester	0	10	6
Wilkinson, William, 263, Cheetham Hill, Manchester	1	1	0
Willan, William, 3, Friargate, Preston	0	5	0
Williams, Hugh, 2, Cosmo Place, W.C.	0	5	0
Williams, Jabez V., St. Alban's House, Weymouth	0	5	0
Williams, James, Victoria Road, Aldershot	0	5	0
Williams, Joel D., Bodmin	1	1	0
Williams, John T., 19, Nelson Street, Swansea	0	10	6
Williams, Philip, 21, West Street, Horsham	1	1	0
Williams, Rich. P., 79, Spencer St., Everton, Liverpool	0	2	6
Williams, Thomas, Bute Street, Cardiff	0	10	6
Williams, Thomas, Northgate Street, Chester	0	5	0
Williams, Thomas Howell, 45, Tollington Park, N.	0	5	0
Williams, William, Tenby	0	5	0
Williams, William, 7, Richmond Row, Liverpool	0	5	0
Williams, William J., 137, Cannon Street, E.C.	0	10	6
Williams, William R., Maesteg, Bridgend	0	2	6
Williams, W. and H., Bridge Street, Hereford	0	10	6
Williamson, B., Market Place, South Shields	0	10	6
Wills, George S. V., 62, Lambeth Road, S.E.	1	1	0
Wilson and Kitchin, 27, King Street, Whitehaven	1	1	0
Wilson, Charles A., 72, The Parade, Leamington	0	5	0
Wilson, Edward, London Road, Sheffield	1	1	0
Wilson, J. P., London Street, Reading	0	2	6
Wilson, Joseph, 11, George Street, Bath	0	5	0
Wilson, Thomas, Thornton in Craven	1	1	0
Wilson, W., 55, Albert Rd., Morice Town, Devonport	0	5	0
Wing, Lewis, Chislehurst	0	5	0
Wing, Samuel W., Colsterworth	0	5	0
Winter, William, 30, Loder Street, Peckham, S.E.	0	5	0
Wise, Walter, 43, Duke Street, Manchester Square, W.	0	10	6
Wood, Charles, 15 Market Place, Wigan	0	5	0
Wood, Edward, 20, Sussex Street, Warwick Square, S.W.	0	10	6
Wood, Jacob, 186, Highbury New Park, N.	1	1	0
Wood, —, Cheltenham	0	2	6
Wood, Richard, Mill Street, Macclesfield	0	10	6
Woodcock, Page D., St. Faith's, Norwich	0	10	6
Woodhouse, George, Shrewsbury	0	5	0
Woodliffe, Alfred, High Street, Bridlington	0	2	6
Woods, Charles, Thoroughfare, Harleston	0	5	0
Woodyatt, Richard, Macclesfield	0	5	0
Wooldridge, John, 290, Euston Road, N.W.	0	10	6
Woolley (James), Sons & Co., 69, Market St., Manchester	2	2	0
Woolrich, Charles B., Uttoxeter	0	10	6
Wootton, William, 33, Liverpool Road, N.	0	10	6
Worth, Edwin, 5, Town Hall Buildings, Bournemouth	1	1	0
Wortley, John, 1, Old Elvet, Durham	0	10	6
Worts, Augustine, Church Street, Harwich	0	5	0
Woollatt, Richard, Fore Street, Taunton	0	5	0
Wretts, John R., 42, Old Market Street, Bristol	0	10	6
Wright, H., 344, Gt. Horton Road, Bradford	0	5	0
Wright, Joseph, 165, King Street, Great Yarmouth	0	5	0
Wright, John W., 9, Cheapside, Burnley	0	2	6
Wright, William F., 30, Regent Street, Leamington	1	1	0
Wright, William, 21, Myrtle Street, Liverpool	0	10	0
Wright and Barnaby, 223, Oxford Street, Manchester	1	1	0
Wright, Layman and Umney, 37, Southwark Street, S.E.	2	2	0
Wyatt, Francis J., 43, Norland Road, W.	0	5	0
Wylde, George, 53, King's Road, Chelsea, S.W.	0	10	6
Wyles, William, 338, Oxford Street, W.	0	5	0
Wyleys and Co., Coventry	1	1	0
Wynne, Edward P., 3, Pier Street, Aberystwith	1	3	6
X. Y. Z.	0	2	6
Yates, Samuel P., Plough Court, 37, Lombard Street, E.C.	0	5	0
Yeomans, George, Desborough	0	5	0
Yewdall, Edwin, 56, Wade Lane, Leeds	0	10	6
Young, George, 73, West Ferry Road, Millwall, E.	0	5	0
Young, John, 20, High Street, Newport, Mon.	0	10	6
Young, Richard, Parade, Liskeard	0	5	0
Youngman, Edward, 19, Meat Market, Bury St. Edmunds	0	2	6

DONATIONS.

A Friend	0	5	0
Allis, Francis, Tewkesbury	0	5	0
Arrowsmith, G. W. T., Clifton Terrace, Nightingale Lane, Clapham, S.W.	0	10	6
Bailey, Richard, 125, Holloway Road, N.	0	2	6
Betts and Son, Woodbridge	0	10	6
Cranwell, W. B., 2, Tower Royal, Cannon Street, E.C.	3	3	0
Fairgrieve, Thomas, 46, Clerk Street, Edinburgh	0	10	6
Garlick, John, Hollinwood, Lancashire	1	1	0
Gillett, J., Southport	1	1	0
Grisbrook, E., 17, High Street, Windsor	0	5	0
Hazard, James D., Highbridge, Somerset	1	0	0
Postans, A. W., 35, Baker Street, W.	0	7	6
Robinson, John T., Compstall, Cheshire	0	2	6
xby, H. and R., 57, High Street, Lewes	0	10	0

LEGACY.

Williams, Joseph Bower (Executor—Mr. Bower, 20, Waterloo Street, Birmingham.)	10	0	0

SECRETARY'S CASUAL FUND.

Bailey, J. B., Reading	1	1	0
Barnaby, H., Rochester	0	10	6
Lills, Thomas Hyde, 338, Oxford Street, W.	2	2	0
J. B.	1	0	0
Kay Brothers, Stockport	2	2	0
Williams, John, 16, Cross Street, Hatton Garden, E.C.	2	2	0

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

An ordinary meeting of this Society was held on Thursday, June 7, Dr. Gladstone, F.R.S., President, in the chair. After the announcement of visitors the minutes of the last ordinary meeting and of the extraordinary general meeting were read and confirmed. The list of presents to the library was then announced and the certificates of the following candidates were read for the first time: W. H. Martin and C. B. Fox, M.D. The President then gave notice that at the next meeting of the Society a ballot for the election of candidates would take place.

The following papers were read:

(1). *On the Gases Enclosed in Lignite Coal and Mineral Resin from Bovey Heathfield, Devonshire.* By J. W. THOMAS.—Four samples were examined. No. 1 Lignite consisted of the leaves and stems of plants in a closely compressed condition, and is known locally as "leafy coal." No. 2 Lignite, dense, compact, of a distinctly woody character, and dark brown. No. 3 Lignite was very dense but earthy, and wet in appearance, the cleavages being much incrusted with hydrated oxide of iron; in colour it was nearly black. No. 4. Mineral resin. Retinasphaltum, soft brown, powdery, lighter than water.

No. 1. Leafy Coal from Bovey Heathfield.—100 grm. after heating to 50° for twelve days, gave 56·1 c.c. of gas containing CO_2 87·25, O 0·24, CO 3·59, OH_3 8·92 per cent.; after heating to 50° 100 grm. were heated to 100° for eighteen days, and yielded 59·9 c.c. of gas: CO_2 89·53, C_nH_{2n} gases 0·33, CO 5·11, N 5·03 per cent. On raising the temperature to 150° decomposition set in and the pellets of mercury in the Sprengel became blackened by the formation of sulphide of mercury, the gas given off had at first an aromatic odour but afterwards became exceedingly disagreeable from the presence of organo sulphur bodies, mercaptan, sulphide of allyl, etc. At 200° more than 18 c.c. of gas was collected, the last portions of which contained CO_2 82·06, H_2 2·82, CO 14·00, C_2H_4 0·49, C_3H_6 0·48, N 0·27 per cent. Above 250° it was impossible to collect any gas, the action of the sulphur compounds on the mercury being so energetic as to block the Sprengel.

No. 2. Lignite 100 grm. at 50° evolved 48·5 c.c. of gas, consisting of CO_2 96·23 per cent., O 0·11, CO 2·42, C_nH_{2n} gases a trace, nitrogen 1·24 (the first portion of gas which came off contained 16·23 per cent. N.). At 100° sulphur sublimed in small yellow crystals; the lignite began to decompose at 185°. At 200° the gas consisted of CO_2 86·30, CO 7·41, C_nH_{2n} gases 2·08, marsh gas 3·34, hydride of propyl 0·53, nitrogen 0·34 per cent.

No. 3. Lignite began to decompose at 180°; the gas evolved at 200° consisted of SH_2 0·41, CO_2 91·68, C_nH_{2n} 0·41, CO 7·12, H traces, NO 38 per cent.

No. 4, Mineral resin from Bovey Heathfield.—At 50° a very small quantity of gas was given off; at 100° 21·4 c.c. of gas from 100 grm. came over: CO_2 88·24, O 0·23, C_nH_{2n} 0·47, CO 7·90, N 3·16 per cent. At 110–120° it began to melt and decompose, the sulphur compounds coming off so rapidly as to block the pump. When the temperature was raised to 160° about 180 c.c. came over, consisting of SH_2 0·41, CO_2 78·88, C_nH_{2n} gases 2·67, CO 7·82, marsh gas 8·05, hydride of propyl 1·86, nitrogen 0·31. When compared with the coals of the carboniferous period, it is seen that as far as the occluded gas is concerned these lignites resemble most cannel coal, but contain C_nH_{2n} gases and oily matters of the aromatic series, instead of gases and compounds of the paraffin series. The lignites are far less stable in vacuo, decomposing below 200°, whilst the true coals usually resist a temperature of 300°. The existence in Nos. 1 and 3 of organo-sulphur compounds in the presence of hydrated oxide of iron suggests that the iron pyrites of true coal may have derived their sulphur from that existing in organic combination in the plants from which coal is produced, and not from the reduction of sulphates. The author concluded by pointing out the extremely hygroscopic nature of the Bovey lignites.

Mr. Thomas also exhibited two mechanical appliances, driven by water or steam, for shaking a beaker containing a precipitate so as to promote its settling or for hastening the solution of a substances. He mentioned that with the aid of the apparatus the magnesia precipitate came down from a dilute solution in fifteen to twenty minutes.

After the thanks of the meeting had been given to the author, the President called on Dr. FRANKLAND to read a paper—

On Apparatus for Gas Analysis.—After giving a short description of the original apparatus introduced by himself and the late Mr. Ward, the author proceeded to point out the various modifications the apparatus had met with at the hands of Mr. Duppa and Professor M'Leod, notwithstanding all improvements there were still some disadvantages connected with the apparatus. In the first place the bottom of the water cylinder was closed by an indiarubber cork through which the two tubes passed; this cork after a time was liable to stick, and so on removal a risk of breakage was incurred; moreover, it was not rigid, so that when the measuring tube was filled with mercury, the weight depressed the indiarubber cork to a slight extent. This defect the author proposes to remedy by substituting a cast-iron plate through which the glass tubes pass water-tight by means of suitable collars and are clamped by a strong wooden clamp screwed to the cast iron bottom; a stopcock is inserted into the cast iron base for the introduction of water instead of passing it down a glass tube. Another defect of the old apparatus was the use of steel caps to unite the laboratory tube with the measuring tube; they are liable to rust, are expensive, form a rigid joint, are always liable to break away from the cement and unless very carefully ground, are difficult to make absolutely tight. The author therefore proposes to do away with the steel caps by the following contrivance. The upper end of the measuring tube terminates in a small cup like a small funnel with a very acute angle. The tube from the laboratory tube is bent twice at right angles, and then drawn out at its end so as to fit into the neck of the above cup (without grinding). It is then covered with a piece of thin sheet unvulcanized indiarubber, the edges of which are cut off, warmed, and joined so that a conical stopper of indiarubber is formed; this, when moistened, pressed down into the cup by an indiarubber band, and covered with mercury, forms a perfectly air-tight joint which is nevertheless flexible.

Mr. Warrington said the joint had been most severely tried not only with regard to its tightness, but as regards the possibility of any air space being left between the capillary tube and the cup, but no perceptible error could be detected.

Dr. Frankland said there was another point which he had forgotten to mention. The rack and pinion of Regnault's apparatus was replaced by a long screw, the shelf for the mercury trough sliding on a V-shaped guide, and having a nut to fit the screw. In answer to Dr. Wright, who asked if the indiarubber cone was greased or not to secure the tightness of the joint, Dr. Frankland said that the joint was only moistened with water.

Dr. Russell bore testimony to the necessity of wetting indiarubber and glass joints to secure the tightness. With regard to the improvements brought forward by Dr. Frankland, he would say that only those who had worked with the old apparatus could properly appreciate them.

Mr. Greenaway pointed out the great ease with which the laboratory tube could be cleaned by reagents now that the steel caps had been got rid of.

Dr. WRIGHT then read a paper *On Narcotin, Cotarnin, and Hydrocotarnin*, Part V.—A large number of experiments made with a view of breaking up cotarnin into simpler bodies, and so to elucidate its structure, were as fruitless as were attempts made to synthesise narcotin from mixtures of hydrocotarnin and opianic acid. By acting on hydrocotarnin hydrobromide with bromine, the following actions take place.

1. $C_{12}H_{15}NO_3,HBr + Br_2 = \underbrace{HBr + C_{12}H_{14}BrNO_3,HBr}_{\text{Bromhydrocotarnin hydrobromide.}}$.

2. $C_{12}H_{14}BrNO_3,HBr_2 + Br_2 = \underbrace{2HBr + C_{12}H_{12}BrNO_3,HBr}_{\text{Bromocotarnin hydrobromide.}}$.

3. $C_{12}H_{12}BrNO_3,HBr + Br_2 = \underbrace{C_{12}H_{12}Br_3NO_3,HBr}_{\text{Tribromhydrocotarnin hydrobromide.}}$.

The formation of the first two bodies is preceded by the production of the unstable addition products

$$C_{12}H_{15}BrN_2O_3HBr \text{ and } C_{12}H_{14}Br_3NO_3HBr$$

respectively; the third addition product, tribromhydrocotarnin hydrobromide, is a well defined crystalline stable substance. Bromhydrocotarnin and bromocotarnin resemble in general properties hydrocotarnin and cotarnin respectively. The first crystallizes anhydrous, and melts at 76°. The second is $C_{12}H_{12}BrNO_3,H_2O$, and loses water at 100° with decomposition. Their hydrobromides crystallize well, that of the first being sparingly soluble in H_2O and anhydrous, while that of the second is easily soluble, and contains $C_{12}H_{12}BrNO_3HBrH_2O$. When heated to about 200°, bromocotarnin hydrobromide fuses, gives off HBr, and combustible vapours (apparently CH_3Br), and forms a small quantity of the hydrobromide of a new base, termed "tarconin" (anagram on cotarnin and narcotin), $C_{11}H_9NO_3$, and a larger amount of an indigo blue substance, the hydrobromide of a base $C_{20}H_{14}N_2O_6$; this base and its salts are all but insoluble in water, ether, alcohol, benzene, CS_2, petroleum, etc. Boiling anilin and glacial acetic acid dissolve a minute quantity, forming a deep blue fluid; strong H_2SO_4 dissolves it, forming a sulphate $(C_{20}H_{14}N_2O_6)_2H_2SO_4$. The solution has a tint rivalling magenta in beauty, and intense colouring power. Tribromhydrocotarnin hydrobromide fuses at 200°, and decomposes in accordance with the reaction,

$$C_{12}H_{12}Br_3NO_3,HBr = HBr + CH_3Br + C_{11}H_8BrNO_3HBr,$$

forming bromotarconin hydrobromide. Bromotarconin forms fine scarlet crystals, $C_{11}H_8BrNO_32H_2O$, which become crimson when dried at 100°; the crimson anhydrous mass, when dissolved in hot absolute alcohol, perfectly free from water, separates on cooling in crimson crystals; but if the least trace of moisture be present the scarlet hydrated crystals appear. The salts are pale yellow, well crystallized, and sparingly soluble in cold water; the hydrochloride and hydrobromide contain $2H_2O$. Cotarnin hydrobromide, $C_{12}H_{13}NO_3HBr_2H_2O$, is very soluble; with bromine it forms the addition compound dibromhydrocotarnin hydrobromide, $C_{12}H_{13}Br_2NO_3HBr$, which, by further action of Br produces tribromhydrocotarnin hydrobromine, identical with that from hydrocotarnin. By the action of water dibromhydrocotarnin hydrobromide splits up into HBr and bromocotarnin hydrobromide. By the action of zinc and hydrochloric acid, bromocotarnin takes up H_2, and forms bromhydrocotarnin, identical with that obtained by brominating hydrocotarnin. By acting on opianic acid with a large excess of HI almost the theoretical yield of CH_3I is obtained for the reaction $C_{10}H_{10}O_5 + 2HI = 2CH_3I + C_8H_6O_5$ (noropianic acid). The noropianic acid thus produced crystallizes with $2H_2O$, and is not identical with the body recently described by Tiemann as isonoropianic acid.

The next paper was *On Otto of Limes*. By C. H. PIESSE and Dr. WRIGHT.—The otto from the rind of the fruit of the *Citrus limetta* had a sp. gr. 0·90516 at 15·5° C., when distilled about two-thirds passed over below 186°. After purification by fractional distillation and finally over sodium this yielded a terpene body boiling at 176°. On treating with bromine an unstable dibromide was formed, unlike the dibromide of the hydrocarbon from orange peel (hesperidene), this yielded but little cymene by simple heating, the greater portion being transformed into resinous non-volatile bodies. The cymene thus produced boiled at 176°, and yielded terephthalic and acetic acids by oxidation with chromic acid; hence it would seem that the terpene of the lime is not identical with that of the orange, notwithstanding the nearness of their boiling points, but that it is more like the terpene of the lemon (boils about 173°), which, as Oppenheim has shown, yields a dibromide, from which but small quantities of cymene are formed by simple heating. The residue not volatile at 186° was further heated, and gave a few drops of distillate between 186 and 250°. The residue in the retort was a semi-solid resin; on standing two or three months a quantity of crystals formed in this soft mass; these were extracted by the pump filter, well washed with the terpene and with alcohol, and crystalized successively from strong and dilute alcohol. They formed white micaceous plates, scentless, neutral, not volatile without charring, giving numbers agreeing with the formula $C_{24}H_{28}O_5$, melting at 162°, not forming protocatechuic acid on fusing with potash, and therefore not identical or even allied to hesperidin.

Mr. Grosjean said that in Sicily the otto was collected by squeezing the rind of the lime against a clean sponge; he objected to the formation of new names for chemical substances by the anagrammatic method.

The Secretary, Mr. Perkin, then read a paper by Mr. C. F. Cross, *On Primary Normal Heptyl Alcohol and Some of its Derivatives.*—Pure œnanthol was prepared by a rapid dry distillation of castor oil and fractional distillation; its sp. gr. was 0·823 at 16° C.; at 748·6 mm. it boiled at 152°. Heptyl alcohol was prepared by acting on 15 grm. of œnanthol dissolved in 150 grm. of 65 per cent. acetic acid with 10 grm. of sodium in 1000 grm. of mercury for ten days, the alcohol was drawn off, washed, etc., and purified by fractional distillation. From 300 grm. of impure aldehyde 120 grm. of pure alcohol boiling at 170–187° were obtained. Some of the alcohol was specially purified by rectification over metallic sodium. It is colourless, has an agreeable pear-like odour, sp. gr. at 0 0·833, at 16° 0·830, at 27° 0·824; at 764·1 mm. it boiled 175·5. The following substances were also prepared.

Heptyl	chloride	sp. gr. at 16°	0·881	boils	754·0	mm. at	159·2°
,,	bromide	,, ,,	1·133	,,	750·6	,,	178·5
,,	iodide	,, ,,	1·346	,,	754·8	,,	201·0
,,	acetate	,, ,,	0·874	,,	758·5	,,	191·5
,,	œnanthylate	,, ,,	0·870	,,	760	,,	270-272
,,	ethyl ether	,, ,,	0·790	,,	748·8	,,	165

In conclusion the author drew attention to the coincidence of the boiling points of the above compounds with those calculated by Schorlemmer, viz., chloride 158, bromide 179, iodide 202, acetate 191·5.

A short note was then read by the Secretary, from Messrs. Dale and Schorlemmer *On the Transformation of Aurin into Rosanilin.*—Since their last communication to the Society (May 24th) on this subject the authors have compared the spectra of the hydrochlorides of their base and of rosanilin and find them quite identical. They have transformed their base into Hofmann's violet, anilin blue, and anilin green, obtaining at the same time with the latter the violet. If aurin be treated with alcoholic ammonia for several days to 150° the rosanilin first formed is converted into leucanilin; a similar action does not take place in the formation of rosanilin from aurin because rosanilin is readily formed by heating aurin with aqueous ammonia to 120°, for 20 hours, if the temperature be raised to 180–200° other colourless bodies are formed.

The Society then adjourned to June 21st, when the following papers will be read:—1. "On Diamyl," by H. Grimshaw. 2. "On Dinaphthyls," by Watson Smith. 3. "On Certain Reactions between the Oxalates and Carbonates of the Alkalies and Alkaline Earths," by Watson Smith. 4. "Note on Thallious Platinocyanide," by R. J. Friswell and A. J. Greenaway. 5. "On Crystallized Barium Silicate," by E. W. Prevost. 6. "Note on Anethol and its Homologues," by W. H. Perkin.

Parliamentary and Law Proceedings.

A Child Poisoned by Misadventure at Leeds.

An inquiry into the circumstances attending the death of Frederick Stansfield, aged nearly three years, the son of a foreman furnaceman, has been held at the Potter's Inn, Hunslet.

Eliza Stansfield, the mother of the deceased, said that one of her boys was suffering from sore eyes, for which she had procured a bottle of "drops" from Mr. Taylor, surgeon. She knew the liquid was for outward application only, and, believing it to be poison, placed it upon a cupboard out of the reach of her children. On Monday evening she placed the bottle on the table, and went to fetch the ailing boy from his play in the street. Returning in about two minutes she found the bottle had been emptied. She asked the deceased, who had been left with the baby in the house, whether he had drunk any of what was in the bottle, and he said he had not. She noticed that his pinafore was wet, and thought he must have spilled the drops upon it. The deceased ate bread and meat, seemed all right, and went to bed soon afterwards. When his father returned at ten o'clock he screamed, and showed symptoms of poisoning, and Mr. Taylor was called in.

Mr. George S. Taylor, surgeon, Meadow Lane, said that on Monday morning he supplied the mother of the deceased with a small bottle of sulphate of atropia—probably about one and a half drachm—for applying to the eyes of the deceased's brother. He found the deceased suffering from what appeared to be atropine poisoning at eleven o'clock on Monday night, and death followed on Tuesday morning at nine o'clock. Had he been fetched immediately the child had taken the poison, an antidote might have been successful.

A Juryman: Is it customary to send out liquids that are poisonous without a label "poison" upon them?

Witness: It is customary for medical men. I have inquired. There is a label on the bottle (produced) which states that the contents consist of drops to be applied externally.

The Coroner: Druggists are compelled to label bottles "poison" in these cases, but not medical men.

Verdict of "Death by misadventure."

Poisoning by Strychnine.

On Tuesday the coroner for Christchurch resumed an inquest on Quartermaster-sergeant Hammerton, of the Royal Horse Artillery, who was found on Monday, June 4, in a cellar at Christchurch Barracks, apparently suffering from some irritant poison. Emetics were administered, but deceased died soon afterwards without accounting for his symptoms. Medical evidence attributed death to strychnine, and it was proved that deceased last April bought some vermin killer containing such poison. Major Ruck Keene said deceased's battery was ordered to India, which preyed on deceased's mind. The jury found, "That deceased died from strychnine, but how administered there was not sufficient evidence."

Attempted Poisoning by Arsenic.

Mr. J. J. Farquharson, county magistrate of Dorset, has remanded to Dorchester Gaol for a week Lucy Tizzard, the wife of a shepherd, charged with attempting to poison by arsenic her two daughters. Fortunately she had given them an overdose, and the result was that retching occurred, and a doctor being at once sent for, he succeeded, by applying the stomach-pump, in removing the poison, and they are progressing favourably. The woman, who is said to be very fond of her children, gives as the reason for her conduct, that she believes she is going blind, and as she feared she would not be able to see her children she thought it would be better for them to be in heaven. The husband had secreted the arsenic in a place where he had thought no one would find it, and had not used it for his sheep for the last two years.

Review.

TEXT-BOOK OF STRUCTURAL AND PHYSIOLOGICAL BOTANY. By OTTO W. THOMÉ. Translated and Edited by ALFRED W. BENNETT, M.A., B.Sc., etc. London: Longmans, Green and Co. 1877.

This volume forms one of a series of text-books of science, and consists mainly of a translation of a work which is largely used in the technical schools in Germany. The editor, whose labours in connection with the translation of Sachs' classical work on botany are so well known, has translated the present volume with his usual ability. The object of its publication at the present time has been to supply a work which, while of a size and price to bring it within the means of every student, shall embrace the whole range of elementary botany, and include the most recent additions to our knowledge of the subject. Special pains have been taken to render it useful to candidates preparing for science examinations in connection with the Educational Department at South Kensington, as well as for the different examinations at the London University, and it is believed by the translator, who is well qualified to judge, that it will furnish all the information necessary for any examination which does not exceed in severity that of the Second Bachelor of Science Pass.

Although professedly only a translation, it is really considerably more. Numerous explanatory notes added by the translator render the morphological part much clearer to the tyro than they would otherwise be. These are distinguished from the original text by being inserted between brackets, Many footnotes testify that the editor has been careful to notice any facts that have been brought to light since the last edition of the German work was published. The whole of the chapter on classification has been rewritten so as to bring it into accord with the system of Bentham and Hooker, which is the one followed by most of the leading botanists of this country. The usual plan of treatment of the subject is adopted. The individual cell is first treated of, then tissues or groups of cells, and then general morphology. The life of the plant is, however, treated of before classification, and special morphology is combined with systematic botany, which is perhaps the best way of treating it. The chapters at the end, on fossil botany, and on the distribution of plants throughout the globe, give a general outline of those subjects, the latter of which is made more useful by the addition of a coloured map. The book has illustrations on almost every page, and although some of them relating to microscopical structure will be recognized by those familiar with the use of the microscope as not representing the objects very naturally, yet they are sufficiently good to be useful as a guide to the practical study of the objects which they represent. Indeed, the use of the microscope and a knowledge obtained by work with the dissecting needle and section cutter can scarcely be dispensed with by those who wish to do do well in the science examinations of the present day.

Those who find Sachs' magnificent work to contain rather more than they require, but who wish to be abreast of the information of the present day will find just what they require in this little book. The index is good, and refers not only to the subject-matter, but also to the figures which illustrate the terms used. The type is clear, and the definitions are brief and to the point. We can confidently recommend it to all who have already obtained a bird's-eye view of elementary botany from some of the shilling treatises on the subject, and who wish to dip more thoroughly into the study of botany.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

COUNTER PRACTICE.

Sir,—"The committees appointed by the Medical Council also suggested that endeavours to strengthen the Medical Acts in their penal relation to medical imposture would probably be best postponed until those Acts shall have received all essential amendments in relation to the profession itself."—*Pharmaceutical Journal*, June 2, page 985.

This "suggestion," sir, will I am sure be heartily applauded by every chemist in the kingdom, and it will be quite time when the medical profession has set its own house in order to begin to interfere with the internal arrangement of the chemist's. I for one have no fear of any restriction being placed upon counter practice, granted by the Act of 1815, through the desire of any local or central council. Firstly, because I believe that the general body of practitioners, as well as the higher faculty, would, for the sake of greed only, scorn to covet the work now carried on by the chemist "over the counter." I am sure they look upon the chemist as an important factor in medicating for the poor and middle class, and would regret to see the good faith now existing between the majority of us disturbed; for who is there of us can declare that, as a rule, a proper understanding and good feeling does not exist between the practitioners and the chemists? My experience leads me to opine that, as a rule, the apothecaries have the respect and cooperation of the chemists, and that this feeling is reciprocated. The surgeon is aware that many of the public who, either from being in debt to their medical attendant or from some other cause, prefer to ask the chemist for advice to increasing their indebtedness, well knowing that if there was cause the chemist would direct the applicants to consult a higher authority. More especially is this so when the practitioner does not supply his own medicines, but the chemist is sure of a prescription in return. Even if this were not the case, supposing "the doctors" were determined to use their combined strength to put a stop to counter prescribing they would have to apply to a legislature which, in these days of free trading, would never permit the public to be restricted in their choice of an adviser, unless they could show some grievous injury was likely to arise therefrom.

They would not listen to the injury inflicted upon the medical pocket, but would ask, "Where for the public good is the necessity for this restriction? Where the mal-practice they complain of?" The people are not deluded, so long as a chemist professes to be nothing more than a dispensing chemist, and then the public take upon themselves the responsibility in seeking such advice, instead of applying to a qualified practitioner. Any chemist who, either through ignorance or inadvertence, injures his customer, has to confront the law; as also would a medical man, with this difference, the chemist would have no protection. No injury has resulted to the public from counter practice, but the contrary, and the "greatest good to the greatest number" will in this case, as in all others of national importance, sway the legislature where medical monopoly is attempted.

Although, sir, I have no fear, especially when I know we have such energetic and combative sentinels in our Parliamentary Committee and on the Trade Society's executive, I am not blind to the good that might be effected by an alteration in the dispensing of medicine, and the treatment of disease. But the change should be brought about by combined effort, in an amicable manner, and not as antagonists. A chemist is certainly not by his tuition made competent to prescribe or to perform acts of surgery; but he is prepared for, and expects by the expense of his education, to have the medicines ordered by doctors to dispense; and a surgeon, with the responsibilities of life and death in his hand, is less qualified to prepare his medicines than the dispenser who has received a pharmaceutical education. If a change could be brought about, whereby the public could have advice from the surgeon, and their medicine from the pharmacist, at the same cost, a great boon would be allotted to the community, and all cause for jealousies and dissension among us removed. As in many places abroad, so it might be arranged here, for the pharmacies to be the places where patients might consult their medical advisers.

Then might the chemist permit free trade to the grocer and huckster, in the sale of common drugs and drysaltery; and to me it has always appeared illogical that whilst we assert the right of acting as semi-medical men over our counters, we should deny to others the right to retail common drugs and sundries; but if the arrangement I have suggested could be established, it would be for the general good. We should no longer suffer with stores upon the brain, and the doctors would be spared the anguish of seeing the public suffering from our illegal counter practice. If we take it for granted that the medical intentions are solely to protect the public from incompetent advisers, let us not be behind in showing that if the chemist is unfit to perform such service, so also are the majority of assistants in the employ of practitioners. And, I would suggest, a short Act to regulate the dispensing of medicine, and to amend the Apothecaries Act of 1815:—

"Whereas it is expedient for the safety of the public that all practitioners of medicine should employ only assistants who are qualified under the Medical Act, and that no one shall prescribe, visit, or perform any act of surgery for gain, for any medical practitioner, who has not himself become qualified to act as a medical practitioner; and whereas an Act was passed in the 31st and 32nd years of the reign of her present Majesty, entitled 'An Act to regulate the Sale of Poison and alter and amend the Pharmacy Act of 1852," compelling all who were not in business as chemists and druggists to pass an examination as to their practical knowledge of dispensing and other branches of pharmacy; and whereas it is expedient for the safety of the public that a record should be kept of all medicines prescribed by authorized medical practitioners, and dispensed by legally qualified chemists. Be it enacted, etc.,—as follows:

"From and after the 31st day of December, 1877, it shall be unlawful for any medical practitioner in any part of Great Britain to employ as his assistant, to prescribe, visit, or perform any act of surgery, either in his absence, or under his direction, any person who shall not have become qualified to act as a surgeon or an apothecary within the meaning of the act of 1815, and any person failing to comply with this regulation shall pay a penalty, etc., etc.

"2nd. From the aforesaid date it shall be unlawful for any medical practitioner, or his assistant, to dispense any medicine for any person that he may have prescribed for, in any city, or town, or village where there is situated any druggist and chemist, duly registered under the Pharmacy Act of 1868, and any practitioner dispensing or supplying medicine shall for every such offence pay, etc., etc.

"Nothing hereinbefore mentioned shall prevent medical practitioners in such parts where there is not a registered chemist situated within half a mile of his patients, or his own residence, supplying medicines or dispensing such drugs from his own surgery. Provided always in such cases, the said practitioner or his qualified assistant shall dispense the same; but it shall be unlawful for him to employ any unregistered person under either the Medical or Pharmacy Acts, and failing to observe the provisions of the law for each offence he shall pay, etc.

"3rd. And for the convenience and better safety of the public, be it further enacted that it be unlawful for any medical practitioner to write prescriptions in cipher, or secret symbols, unintelligible to the registered chemists and druggists of Great Britain under a penalty, etc.

"4th. And be it also enacted that every prescription dispensed by a legally qualified chemist shall be carefully copied in a book kept for that purpose, or the original prescription retained, and it shall be unlawful for any chemist to repeat the same prescription, either with or without alteration, unless under the sanction and by the express authority of the writer of the same; every chemist so offending shall pay a penalty, etc.

"5th. And whereas there are certain institutions and private dispensaries established by one or several medical men, where people are tempted to seek advice or purchase medicines, be it enacted that by this same Act, none but legally registered chemists shall be allowed to dispense, or vend poisons, either for medicine or other purposes, or failing to comply with this provision of the Act, every person or persons shall be liable, etc., etc."

I think with such an arrangement as this the medical men would have no reason to complain. The public would be protected, which is their chief object; and the chemist would have his legitimate duties assigned to him. There would be no need for Trade Protection Societies, no monopoly by pharmaceutical chemists; the two guinea entrance fee for membership could be abolished; every chemist would join the Society; one third of the Council would be returned from among the non-pharmaceutical chemists.

Every one would subscribe to the Benevolent Fund and all would feel a pride in elevating their business, and take a place in society befitting their education. I have not thought it necessary to insert any clause making it penal for chemists to prescribe, as there would not be any occasion for them to do so.

JOHN WADE.

174, *Warwick Street, Pimlico.*
June 4, 1877.

CHEMISTS' ASSISTANTS' ASSOCIATION.

Sir,—In the issues of the 2nd and 9th inst., I find letters on the subject of the proposed Chemists' Assistants' Association, and trust you will afford me space to say a few words to your correspondents and assistants and employers generally. Being closely connected with the movement, I am able to say something of what the committee, who have hitherto done all the work, purpose.

The Chemists' Assistants' Association is not intended to be in any way antagonistic to the Pharmaceutical Society, for pharmacy must ever look to Bloomsbury Square as its head quarters; neither is it intended to admit the "spirit of coercive trade unionism," which some members of the Council perceived in the petition submitted to them a few weeks ago.

Your correspondent, "An Associate," suggests that the foremost place in discussion should be given to the subject of "early closing;" in this, I think, he errs somewhat, for assistants are certainly not at present, and I think never will be, in a position to dictate to employers at what hour their shops should be opened and closed. Furthermore, the interests of employers and employees are so nearly identical that this subject may safely be left in the hands of our masters, who, I doubt not, will endeavour to shorten, as much as is consistent with the trade in their respective districts, the hours of labour.

The rooms of this association will be open to members every evening, and will be supplied with books and periodicals for their instruction and amusement. Meetings will be held at stated intervals for the reading and discussion of papers.

I, for one, think that, if properly conducted, this association will prove a boon to the trade, and be productive of good to both employers and employees.

AN ASSISTANT.

June 12, 1877.

A. P. Luff.—Our available information is insufficient to justify our entering upon any discussion of the subject at present, but we may refer our correspondent to the discussion reported in our last number at page 1004.

"*Specimen*" (Bangor).—No. 1 is a Californian plant, *Bœria platycarpa*, Gray. The Curator would be glad of two or three well-preserved specimens and a few notes as to locality, etc., in which it grew. (2) *Arrhenatherum elatius.* (3) *Festuca sciuroides.*

"*Vincere.*"—(1) *Euphorbia amygdaloides*; (2) *Sisymbrium officinale*; (3) *Alliaria officinalis*; (4) *Ranunculus parviflora*; (5) *Polygala vulgaris*; (6) *Valerianella olitorea*; (7) *Vicia hirsuta*; (8) *Stellaria uliginosa.*

F. Gall.—*Fumaria officinalis.*

G. Taylor.—Probably you would get what you require from an ordinary nurseryman.

"*Olim.*"—We have no other means of estimating the present population of London than such as are afforded in the returns of the last census.

"*Ignoramus.*"—The indenture of apprenticeship is not accepted, but a form of application, which may be had on application, must be filled up. A second would not be required in the event of a failure to pass.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Kitchen, Mr. Yeats, Mr. Luff, Mr. Reynolds, Mr. Grey, Equality, Young Dispenser, H. L.

NOTES ON SOME OF THE PHARMACEUTICAL PRODUCTS EXHIBITED IN THE PHILADELPHIA EXHIBITION OF 1876.

BY JOHN R. JACKSON.

(*Concluded from page* 998.)

LEGUMINOSÆ.

Dalea citriodora, Willd. "Limoncillo." Valley of Mexico. The whole plant is antispasmodic.

Tamarindus occidentalis, DC. "Tamarinds." Warm damp regions of Mexico. Fruit laxative.

Eysenhardtia amorphoides, DC. "Palo dulce." Central table land; decoction of wood diuretic.

Myroxylon Pereiræ, Klotzsch. "Balsamo," State of Morelos and other warm and damp places. This is the well-known balsam of Peru. The balsam is employed as a stimulant and from the fruit and bark a dye is prepared.

Cæsalpinia Cacalaco, H. B. K. "Cascalote." Warm and damp regions. Fruits very rich in tannin and gallic acid, used as an astringent, and for tanning purposes.

Prosopis dulcis, Kth. "Mezquite." Central table land and other places. The gum produced by it is very similar to gums Senegal or Arabic, and it is used for the same purposes. The name mezquit seems to be a name generally applied to several species of *Prosopis*, and mezquit gum, probably from *Prosopis pubescens* (*P. juliflora*), has of late years attracted some attention in Texas both for medicinal and technical purposes. The plants have been proposed for extensive cultivation in warm countries as fodder plants for cattle, the pods together with the enclosed seeds being very nutritious and containing much saccharine matter. These pods ripen at different seasons of the year, and many bushels it is said can be obtained from each tree.

Acacia albicans. "Huisache." Table land. Fruits used as an astringent.

ROSACEÆ.

Cerasus Capollin, Zucc. "Capulin." Cultivated in orchards. Bark antiperiodic; used in dysentery; the leaves contain prussic acid and are used instead of those of the cherry laurel.

Cratægus mexicana. "Tejocote." Cultivated in orchards; decoction of the fruits as a pectoral; that of the roots as diuretic.

RHIZOPHORACEÆ.

Rhizophora Mangle, L. "Mangle." On the coast of the Mexican Gulf. Gum used a pectoral.

MYRTACEÆ.

Myrtus Arayan, Kth. "Arrayan." Temperate regions. Leaves used both as a tonic and an astringent.

LYTHRARIEÆ.

Cuphea lanceolata, H. B. K. "Atlanchana." Valley of Mexico. The whole plant is used as a corroborant after childbirth.

Heimia salicifolia, Link. "Hanchinol." State of Mexico. It is diuretic, diaphoretic, and antisyphillitic.

PASSIFLOREÆ.

Passiflora Dictamo, Sesse. "Dictamo real." Warm regions. A decoction of the plant is commonly used for diseases of the respiratory organs.

CACTACEÆ.

Opuntia Nopallilo, Kar. "Nopalillo." Temperate regions. A decoction of the root is commonly used in dysentery, diarrhœa, etc.

CAPRIFOLIACEÆ.

Sambucus mexicana, Priestl. "Sanco." Temperate regions. Flowers used as a stimulant and diaphoretic.

VALERIANACEÆ.

Valeriana mexicana, DC. "Yerba del gato." Valley of Mexico; roots used as an antispasmodic. Valerianic acid is obtained from them, also resins, starch, etc.

COMPOSITÆ.

Solidago montana. "Calancapatle." Valley of Mexico. Leaves used as a vulnerary.

Gnaphalium canescens, DC. "Gordolobo." Abundant in the Mexican plateau. Flowers used as an astringent.

Artemisia mexicana, DC. "Estafiate." Valley of Mexico. Leaves have tonic, stimulant, emmenagogue and anthelmintic properties.

Aplopappus discoideus, DC. "Damiana." Valley of Mexico. The whole plant used in baths against rheumatism. This plant is now well known in this country, and a full account of its uses has appeared in this Journal.

Sanvitalia procumbens, DC. "Ojo de Gallo." Abundant in the central plateau. "The decoction of the whole plant is used as a peptic."

Montagnea tomentosa, DC. "Zoapatle." Valley of Mexico. The juice and a decoction of the plant is used to "provoke the contraction of the womb."

Eupatorium collinum, DC. "Yerba del Angel." Guadalupe range, north of the capital. A decoction of the leaves used in atonic diarrhœa.

Erigeron affine, DC. "Peritre." Valley of Mexico. Roots used as a sialogogue.

Echinacea heterophylla, Don. "Raiz del Manso." Valley of Mexico. The plant is commonly used for healing wounds, the decoction in dysentery and the juice in fractures.

Senecio canicida. "Yerba de la Puebla." State of Puebla. Used as an antiperiodic and diaphoretic. A volatile acid has been extracted from the plant which has been used in tetanus. We do not know what species is here referred to as we find no trace of such a name in any book to which we have access.

Athanasia amara, Cerv. "Prodigiosa." Temperate regions. Leaves have tonic and vermifuge properties.

ERICACEÆ.

Arctostaphylos pungens, Kunth. "Pingüica." Temperate regions. Fruits and leaves used as a diuretic.

SAPOTACEÆ.

Sapota achras, Mill. "Chicozapote." Abundant in the warm and damp regions of the Republic. Bark used as an antiperiodic. The seeds deprived of their hard shell are used as a diuretic, from six to twelve seeds being considered a dose; in larger quantities they are said to have a poisonous effect. A gummy resinous substance somewhat resembling caoutchouc is found around the seed and is known as "chicle." It is of a whitish colour and like caoutchouc becomes plastic on the application of heat, on this account it is used for modelling and likewise as a masticatory, being imported into New York for this purpose. We recently drew attention to this substance at p. 409 of the present volume, in which from the similarity of the common names, and from this alone, it was conjectured that it might be identical with the plant yielding monesia resin. This latter, however, is a product of Brazil while the chicle gum is known to be derived only from Mexico.

Lucuma salicifolia, Kunth. "Zapote borracho." Warm regions. Bark used as an antiperiodic. The pericarp is edible, and it is said to "exercise a wonderful action on the brain."

APOCYNACEÆ.

Thevetia iccotli, DC. "Yoyote or Joyote." Very abundant on the western side of the great Mexican Cordillera. The plant contains an active principle which has been called *Tevetosin*. The seeds contain 40 per cent. of oil which with sulphuric acid takes a yellow colour becoming afterwards rosy and finally orange red. This plant and its properties have been recently fully described at p. 854 of the present volume of the *Pharmaceutical Journal*.

ASCLEPIADACEÆ.

Asclepias setosa, Bth. "Contrayerba de Julimes." Temperate regions; used as a tonic and diaphoretic, antiperiodic properties are also attributed to it.

A. linearis, L. "Romerillo." Very abundant in the central plateau. The milky juice and the leaves are used as a powerful emetico-cathartic. The pappus or down which crowns the seeds is used for the same purpose as eider down.

LOGANIACEÆ.

Buddleia verticillata, H. B. K. "Mispatle." Temperate regions. Leaves said to be used as a vulnerary.

Buddleia globosa, Lam. "Salvia real de Mexico." Temperate regions. Used as a general stimulant.

GENTIANACEÆ.

Erythrea stricta, Scheide. "Canchalagua." Warm regions. Used as a bitter tonic.

POLEMONIACEÆ.

Hoitzia coccinea, Gav. "Espinosilla." Temperate regions. An infusion of the plant is used as a diaphoretic, and in large doses as an emetic and cathartic.

BORAGINACEÆ.

Tournefortia mexicana, Cerv. "Tlachichinoa." Warm regions. Employed in cases of itch and ulcers of the mouth.

CONVOLVULACEÆ.

Ipomœa murucoides, R. S. "Palo del muerto." Warm regions. A decoction of the wood is used as a bath for paralytical patients.

Exogonium purga, Bth. "Jalapa." This, the well known jalap grows on the eastern side of the Mexican Cordillera. It is used as a cathartic.

SOLANACEÆ.

Nicotiana glauca, Grah. "Tabaquillo." Abundant in the temperate regions. Properties same as ordinary tobacco.

BIGNONIACEÆ.

Crescentia alata, H. B. K. "Cuautecomate." Warm and damp regions. Fruits are considered eminently pectoral, they contain a large quantity of sugar, gum, tannin, cellulose, and salts.

ACANTHACEÆ.

Sericographis mohintli, Nees. "Muitle." Grows in Xalapa and similar regions. The leaves contain an amorphous, dark blue colouring matter.

VERBENACEÆ.

Lippia graveolens, H. B. K. "Yerba dulce." Orizaba, Cordoba, and similar places of the great Mexicana Cordillera. The infusion of the plant is used as a pectoral and emmenagogue. It is said to contain a peculiar saccharine principle and a volatile oil.

L. citriodora, Kurst. "Cedron." Cultivated in gardens. An infusion of the leaves antispasmodic.

L. callicarpæfolia, H. B. K. "Salvia real de Puebla." Grows in Puebla. Inflorescence and leaves used as stimulants.

LABIATEÆ.

Cedronella mexicana, Bth. "Toroujil." Temperate regions. Flowers stimulant and antispasmodic.

PLUMBAGINACEÆ.

Plumbago scandens, L. "Tlachichinolli." Warm and damp regions. The leaves for external application are used as caustics and internally as emetics.

CHENOPODIACEÆ.

Chenopodium ambrosioides, L. "Epazote." Cultivated in orchards. Used as a spice, and in medicine as an anthelmintic and emmenagogue.

LAURACEÆ.

Persea gratissima, Gærtn. "Aguacates." This is the well known Avocado pear, and is largely cultivated in orchards for the sake of the fruit, which is edible. Both the leaves and fruits are used as emmenagogues; the latter is said to have the power of increasing the spermatic secretion and the suppuration of wounds. The fruit is also considered anthelmintic.

THYMELACEÆ.

Daphnopsis salicifolia, Meis. "Hojas de San Pedro." Grows in Cuernavaca in a region 3,000 ft. above the sea level. The leaves are the part used in medicine.

ARISTOLOCHIACEÆ.

Aristolochia grandiflora, Sw. "Guaco." Warm and damp regions. The roots are the only part used, and contain volatile oil, resin, tannin, gum, starch, etc. They are used as an antidote against the poison of serpents and other venomous animals, and also as a diaphoretic and emmenagogue.

A. fœtida, H. B. "Yerba del Indio." Grows in Ario. A decoction of the leaves is used to consolidate wounds, and the root as a stimulant.

A. mexicana. "Tla-copatle." State of Guerrero and other warm places. The root is said to possess antispasmodic properties.

EUPHORBIACEÆ.

Hura crepitans, L. "Quautlatlatzin." The common Sand box tree. Warm and damp regions. Seeds are commonly called *Habillas de San Ignacio*, and are used as a drastic. They contain 50 per cent. of fixed oil.

Euphorbia maculata, L. "Yerba de la golondrina." Temperate regions. The juice is employed to take out stains of the cornea, and the decoction in scabies and other skin diseases.

E. pulcherrima, L. Flor de noche Buena." Warm and damp regions; cultivated in gardens. Bracts used to increase the secretion of milk.

Acalypha prunifolia, H. B. K. "Yerba del pastor." Temperate regions. Used as a vulnerary.

Croton dioicum, Cav. "Yerba del zorillo." Abundant in the valley of Mexico and similar regions. An emulsion made with twenty or thirty seeds acts as a drastic. The powdered root also has a similar effect.

CANNABINACEÆ.

Cannabis indica, L. "Mariguana," Temperate regions. The narcotic properties of the hemp are well known.

URTICACEÆ.

Urtica mexicana. "Yesgos." Temperate regions. Roots used as a diaphoretic.

CONIFERÆ.

Taxodium mucronatum, Parlatore. "Ahuehuete." Valley of Mexico and similar places of the country. Bark used as emmenagogue and diuretic. Leaves act topically against the itch and as a resolutive. From the wood a liquid pitch is prepared which is used in the treatment of skin diseases.

Pinus teocote, Schiede. "Ocote." Abundant in the mountains that surround the valley of Mexico, and in some other localities in the country. The turpentine produced by this tree resembles that of Bordeaux. It produces 17 per cent. of essential oil.

Pinus religiosa, H. B. K. "Oyametl." Produces a turpentine of similar properties to Venice turpentine.

DIOSCOREACEÆ.

Rajania subsamarata? "Cuanchalala." Warm regions. Bark used as astringent.

COMMELYNACEÆ.

Commelyna tuberosa, H. B. K., "Yerba del pollo." Abundant in the temperate regions. The pharmaceutical properties of this plant have been studied by several eminent chemists in Mexico, who have confirmed its hæmostatic properties. Its fleshy rhizomes contain a large quantity of starch and mucilage, so that when cooked they are edible.

MELANTHACEÆ.

Veratrum frigidum, Schlech. "Cebadilla." Xochimilco mountains. Both the fruit and bulb contain veratrum, and are used to kill insects.

ORCHIDACEÆ.

Bletia campanulata, Llave. "Chaucle." Temperate regions. A decoction of the pseudo bulbs is used in dysentery.

CYPERACEÆ.

Cyperus rotundus, L. "Peonia del pais." Temperate regions. Stomachic properties are attributed to this plant.

GRAMINACEÆ.

Andropogon citratus, DC. "Te limon." Warm places in the Republic. Used as an antispasmodic and also as a tea.

LYCOPODIACEÆ.

Lycopodium nidiformis. "Doradilla." Mountains surrounding the valley of Mexico and in other parts of the country having a similar climate. The whole plant is used in inflammatory affections of the liver.

FILICES.

Polypodium lanceolatum, L. "Lengua de ciervo." Abundant in the same localities as the above. Twigs and leaves used as pectorals and for wounds.

P. Calaguala, Schaf. "Calaguala." Found in large quantities in "El Pedregæ de San Angel" and other places in the valley of Mexico. The rhizome is used as a diaphoretic and pectoral.

P. pseudo-filix-mas, Schaf. "Palmitas." Mountains surrounding the valley of Mexico and other parts of the country with similar climate. It is used against tænia.

From this list it will be seen that the medicinal plants of Mexico were very fairly represented at Philadelphia, and that many of them are not without real interest, though we must own to a difficulty in the identification of several of the species.

From Jamaica was exhibited a collection of medicinal products numbering only twenty-three specimens in all. Small as this collection was it was the most valuable from any British Colony. Besides Jalap, Bitter wood, Gum Guaiacum, Cassia pods, Pomegranate bark, Baobab fruits and Kola nuts, were shown some very fine samples of Cinchona barks; indeed the Jamaica barks are described as the best samples exhibited by any British dependency. The best samples, however, of any country exhibiting were those from Java, which also made a fine display of the different cinchona alkaloids. As a proof that the climate of Jamaica is suited to the growth of the cinchonas, it may be mentioned that a stem seven years old measured 22 feet in length.

FORMULÆ FOR NEW MEDICAMENTS ADOPTED BY THE PARIS PHARMACEUTICAL SOCIETY.

Ten years having elapsed since the publication of the last edition of the Codex, a large number of new substances and preparations have been introduced into French therapeutics during that time, for which there were no authoritative formulæ. The inconvenience resulting from want of uniformity was such that the Paris Société de Pharmacie was induced to refer the subject to a commission consisting of Messrs. Baudrimont, Gobley, Marais, Schaeuffèle and Petit. The Commission drew up a number of formulæ, which were embodied in a Report, M. Petit being the reporter, and after discussion at several meetings of the Society the Report was adopted and ordered to be printed. As these formulæ will probably be generally adopted as the standard for French prescriptions, and moreover as some of the substances and preparations are not included either in the British Pharmacopœia or the Additions, their reproduction in this Journal will be of interest to some readers.

CARBOLIC ACID (*Acide phénique*; *Phénol*) $C_6H_6O_2$.

Carbolized Water (Eau phéniquée à 1 p. 100).—Carbolic Acid, 1 gram; Distilled Water, 99.

Solution of Carbolate of Soda (solution de phénate de soude or phénol sodique).—Carbolic Acid, 70 grams; Caustic Soda, 30 grams; Water to complete a litre.

SALICYLIC ACID (*Acide salicylique*) $C_7H_6O_3$.

In a solution of commercial caustic soda dissolve a quantity of crystallized carbolic acid exactly equivalent to the soda employed, and evaporate the liquid in an iron capsule until by means of a pestle it can be obtained in a pulverulent form. The product is carbolate of soda; it is very hygrometric and should be kept in well-closed bottles.

To prepare salicylic acid, heat the carbolate of soda gently in a tubulated glass retort placed in an oil-bath. Pass in a current of dry carbonic gas and then raise the temperature to 100° C. The temperature should now be allowed to rise gradually during three or four hours until it reaches 180°. After a time carbolic acid commences to distil over, and soon becomes more abundant. Finally the temperature is raised to 220° and then to 250°. The operation is terminated when the current of carbonic acid gas no longer carries over with it any phenol vapour. Nothing then remains in the retort but anhydrous salicylic acid of a brown colour.

In order to obtain the salicylic acid crystalline and colourless the basic salicylate is dissolved in water and pure hydrochloric acid added in slight excess. The precipitated salicylic acid is drained on a filter and purified by one or two recrystallizations from water. It can be obtained very pure by sublimation. It melts at 200° and sublimes in slender shining needles.

Salicylic acid is only slightly soluble in ordinary water (1 in 300 at the ordinary temperature); it is very soluble in alcohol and in ether, the spontaneous evaporation of which yields crystals in the form of large and very regular prisms.

The aqueous solution of this acid gives with ferric salts a very intense violet colour. Theoretically 1000 grams of carbolic acid should give 734 grams of salicylic acid.

Solution (Solution d'acide salicylique à 1 p. 100).—Salicylic Acid, 1 gram; Alcohol (95°) 33 grams; Water, 66 grams. Dissolve the acid in the alcohol, add the water, and filter.

THYMOL (*Acide thymique or Thymol*) $C_{10}H_{14}O$.

Treat essential oil of thyme with an equal volume of an aqueous solution of potash or soda (1 in 5), and shake several times to facilitate combination. The thymol dissolves, forming a soluble compound, whilst the thymene, a carbide of hydrogen that accompanies it in the essence, does not combine with the alkali and separates. Filter the solution obtained and treat with an acid, hydrochloric acid for example, which sets free the thymol. The product should be purified by washing, dried and distilled.

Thymol thus prepared is liquid; it can be obtained crystallized by submitting essential oil of thyme to a low temperature for a time. Its odour is feeble, resembling that of thyme. It is slightly soluble in water and very soluble in alcohol.

Thymol is a powerful caustic.

Solution (Solution d'acide thymique au millième).—Thymol, 1 gram; Alcohol (90°) 4 grams. Dissolve and add Distilled Water, 995 grams. Mix.

This solution is employed for lotions, injections, inhalations, etc.

CRYSTALLIZED ACONITE (*Aconitine cristallisée*) $C_{27}H_{40}NO_{10}$.

Exhaust the root of wild aconite, carefully picked and powdered, with very strong alcohol, to which 1 per cent. of tartaric acid has been added. Distil at a gentle heat, and sheltered from the air, to recover the alcohol. Treat the extract with water to separate all the fatty and resinous matters. The solution, which contains the aconitine in the state of acid tartrate, is first shaken with ether to remove colouring matters, and then the alkaloid is set free by the addition of alkaline bicarbonate until the cessation of effervescence. A fresh treatment with ether of this alkaline solution removes the alkaloid, which crystallizes upon the concentration of the ethereal liquid, with an addition of petroleum spirit. The crystals are colourless tables, rhombic or hexagonal according to the modifications produced principally in the acute angles.

Crystallized aconitine is soluble in alcohol, ether, benzine and chloroform; insoluble in petroleum oils and glycerine.

Each granule prepared according to the Codex should contain ¼ of a milligram of crystallized aconitine.

Crystallized Nitrate of Aconitine (Nitrate d'Aconitine cristalisée).—Crystallized aconitine, q. s.; Nitric Acid, sp. gr. 1·422, q. s. Saturate the nitric acid with the aconitine and evaporate. Voluminous crystals are easily obtained.

AMMONIUM BROMIDE (*Bromhydrate d'Ammoniaque*). NH_4Br.

Add bromine very slowly to solution of ammonia, with continual stirring, until the liquid remains faintly and persistently coloured by a slight excess of bromine. Add a few drops more ammonia to decolourize the solution and evaporate to crystallization.

Ammonium bromide crystallizes in long colourless prisms, volatile without fusion or decomposition, and very soluble in water. In solution it ought not to be coloured by the addition of a few drops of concentrated hydrochloric acid. No blue or violet colour should be produced upon adding to the solution some drops of starch paste and of slightly nitrous nitric acid. 1 gram of pure dry ammonium bromide is entirely precipitated by 1·75 gram of silver nitrate.

AMMONIUM IODIDE (*Iodhydrate d'Ammoniaque*). NH_4I.

Add ammonium carbonate gradually to a solution of iodide of iron (1 in 5) until the iodide of iron is entirely decomposed, filter and wash the precipitate; evaporate to crystallization, taking care to maintain continually a slight excess of ammonia to prevent decomposition of the salt.

Ammonium iodide is white when pure; it crystallizes in anhydrous deliquescent cubes, very soluble in water and in alcohol, and sublimes without decomposition if sheltered from the air. Exposed to the air it decomposes, a portion of the iodine being disengaged. 1 gram of pure dry ammonium iodide is entirely precipitated by 1·17 gram of silver nitrate.

APOMORPHINE. $C_{17}H_{17}NO_2$.

Introduce into a strong glass tube, closed at one end, 1 part of pure morphia and 20 parts of pure hydrochloric acid; these should not occupy more than one fifteenth of the tube. Seal the open end and place the glass tube in another of cast iron, closed with a screw, and heat the whole in an oil bath at a temperature between 140° and 150° during three hours. After cooling, the morphine has been converted into apomorphine which can be purified as follows:—

The tube may be opened without fear of any disengagement of gas. The liquid it contains is diluted with water and neutralized by sodium bicarbonate; then an excess of this salt is added which precipitates the apomorphine with any morphine that may remain. The liquid is decanted and the precipitate is exhausted with ether or chloroform, which dissolves the apomorphine without acting on the morphine. To the ethereal or chloroformic liquor are afterwards added a few drops of hydrochloric acid to saturate the base. Crystallized hydrochlorate of apomorphine then separates spontaneously and is deposited on the sides of the vessel. These crystals are washed rapidly with cold water and purified by crystallization from boiling water. The apomorphine can be obtained by precipitating a concentrated solution of this hydrochlorate by sodium bicarbonate; the precipitate is white, but oxidizes and turns green rapidly in the air. It should be washed with a little cold water and dried promptly to avoid this alteration.

Apomorphine is an amorphous greyish powder, rather soluble in water, where it turns green rapidly by contact with air. Its solution in sugar syrup, kept in well-closed bottles does not undergo this modification. Apomorphine is distinguished from morphine by its complete solubility in ether, chloroform and benzine. Like morphine, apomorphine is reddened by nitric acid and coloured brown by iodic acid; but ferric chloride produces with it a rose colour, whilst it colours morphine blue.

CADMIUM IODIDE (*Iodure de Cadmium*). CdI.

Place in a flask 1 part of cadmium granules and 10 parts of water; add 2 parts of iodine in successive portions and apply heat to terminate the reaction.

The salt is pearly white, very lustrous, permanent in the air, and very soluble in water and in alcohol. 1 gram of pure dry cadmium iodide is entirely precipitated by 0·929 of silver nitrate.

CAFEINE or THEINE. $C_8H_{10}N_4O_2, H_2O$.

Pour upon green or black tea of good quality, reduced to a coarse powder, twice its weight of boiling water, and allow it to macerate for a few moments at the heat of a water-bath. Introduce the moist powder into a displacement apparatus and exhaust with chloroform. Treat the residue from the distillation of the chloroform with boiling water, filter, add a small quantity of animal charcoal, filter and crystallize.

Cafeine can be prepared from Guarana in the same manner.

Upon treating cafeine with concentrated nitric acid, and evaporating, a red brown residue is obtained, the colour of which is changed to a red violet upon the addition of ammonia.

BIBASIC CALCIUM PHOSPHATE (*Phosphate bibasique de chaux.*)

Dissolve 608 grams of crystallized calcium chloride in 1000 grams of distilled water and add gradually to this solution 1000 grams of sodium phosphate dissolved in 10,000 grams of water. Allow the precipitate to deposit, and wash it five or six times with 10 litres of water each time; drain the precipitate upon a moistened cloth. As soon as its consistence permits detach from it irregular pieces and place them to dry in the open air upon filtering paper; the spontaneous desiccation is sufficiently rapid.

The product obtained is very white, very light, and very fine, and corresponds to the formula $Ca_2H_2P_2O_8+3H_2O$, containing 20 per cent. of water.

CHLORHYDROPHOSPHATE OF LIME (*Solution chlorhydrique de phosphate de chaux* or *Chlorhydrophosphate de chaux*).

This product ought only to be prepared in the form of a solution in water, syrup, or wine, as the pasty or solid form cannot have a definite composition.

Syrup (Sirop de chlorhydrophosphate de chaux).—Bibasic calcium phosphate, 12·5 grams; Hydrochloric Acid, as little as possible, about 8 grams; Distilled Water, 340 grams; White Sugar, 630 grams; Alcoholate of Lemon, 10 grams. Suspend the calcium phosphate carefully in the water; add hydrochloric acid in quantity sufficient to dissolve this salt, but without excess. When the solution is complete add the sugar, coarsely powdered, and dissolve it cold or with a very gentle heat. Filter and add the alcoholate to the cooled syrup.

20 grams of this syrup represent 0·25 gram of bibasic calcium phosphate.

Solution (Solution de chlorhydrophosphate de chaux).—Bibasic calcium phosphate, 17 grams; Hydrochloric Acid, as little as possible, about 10 grams; Distilled Water, 973 grams. Suspend the calcium phosphate carefully in the distilled water, add the hydrochloric acid, allow the solution to go on for some minutes and filter.

15 grams of this solution will represent 0·25 gram of bicalcic phosphate.

GLYCERATE OF SUCRATE OF LIME.

Quick Lime, 80 grams; Powdered Sugar, 160 grams; Glycerine, 160 grams Water to complete a litre. Mix the lime and the sugar, adding in small quantities 700 grams of water. After remaining in contact for twenty-four hours, filter, add the glycerine and sufficient water to make a litre.

Saccharo-Calcic Liniment (Liniment saccharo-calcaire).—Olive Oil, 200 grams; Glycerate of Sucrate of Lime, 100 grams.

CALCIUM HYPOPHOSPHITE (Hypophosphite de chaux). $CaP_2H_4O_4$.

Mix milk of lime (1 in 5) in a porcelain capsule placed in a sand-bath with half its weight of phosphorus in small pieces and heat it to ebullition, operating in the open air or under a chimney with a good draught. Spontaneously inflammable phosphoretted hydrogen is given off, the vapour of which should be avoided. Add from time to time a little warm water, to replace that which has evaporated. Discontinue the heat when the phosphorus has disappeared, that is when inflammable bubbles cease to be produced. If the phosphorus remain in excess add more milk of lime and continue the heat until the complete disappearance of the metalloid. Allow the liquor to cool and then filter; then saturate it with a current of carbonic acid gas to eliminate any excess of lime remaining uncombined. Filter again and concentrate the liquor in a water-bath to dryness, keeping the temperature below 100° to avoid detonations. Preserve the salt from the air in well-closed bottles.

Calcium hypophosphite is solid, white, pulverulent, or in small shining crystals. It is deliquescent, freely and entirely soluble in water and soluble in boiling alcohol. It reduces salts of silver, and is precipitated by ammonium oxalate. Heated dry in a test tube it gives off spontaneously inflammable phosphoretted hydrogen.

Syrup (Sirop d'hypophosphite de chaux).—Calcium Hypophosphite, 5 grams; Simple Syrup, 445 grams; Syrup of Orange Flower, 50 grams: make a syrup by simple solution. It will contain in 20 grams 0·20 gram of calcium hypophosphite.

CALCIUM LACTOPHOSPHATE (*Lactophosphate de chaux*).

This product ought not to be employed except in the state of solution in water or in syrup. In the pasty or solid state its solubility varies and it is always an indefinite compound.

Solution (Solution de lactophosphate de chaux).—Bibasic Phosphate of Lime, 17 grams; Concentrated Lactic Acid as little as possible, about 19 grams; Distilled Water, 964 grams. Suspend the phosphate carefully in the distilled water, add the lactic acid, allow solution to go on for some minutes and filter.

15 grams represent 0·25 of bicalcic phosphate.

Syrup (Sirop de Lactophosphate de Chaux).—Bibasic Calcium Phosphate, 12·5 grams; Concentrated Lactic Acid, as little as possible, about 14 grams; Distilled Water, 335 grams; White Sugar, 630 grams; Alcoholate of Lemon, 10 grams. Suspend the calcium phosphate carefully in distilled water; add lactic acid sufficient to dissolve the salt, but no excess. When solution is complete, add the sugar coarsely powdered, and let it dissolve in the cold or with a very gentle heat. Filter and add the alcoholate to the cooled syrup.

20 grams of this syrup represent 0·25 gram of bibasic calcium phosphate. (*To be continued.*)

HISTORICAL NOTES ON OPIUM.*

Confidence in the doctrines of Galenus had already been undermined to such a degree among the successors of Paracelsus, that they began to reckon opium among the *calida* (warming remedies), instead of placing it among the *frigida* (cooling remedies), with Galen. This

* From *New Remedies*, May, 1877. Second portion of an abstract from a paper by Dr. Otto Billinger, of Munich; the first portion will be found in the *Pharmaceutical Journal*, before p. 452. The notes are by the Editor of *New Remedies*.

was done by Felix Plater,* Bauhinius,† Libavius,‡ Quercetanus,§ and others. Plater placed such a reliance upon opium, that he pretended to be able to retain or restore the life even of those who had been broken upon the wheel. His trochees, composed of opium, sugar, cinnamon, musk, tragacanth, and wine, were very famous in his time as a remedy against cough and hæmoptysis. According to Quercetanus, who was himself one of the most zealous chemists and followers of Paracelsus, the "sulphurous and oily constituents of opium produce its narcotic effects; the sulphur is dissolved in the body, its vapours mingle with the blood and are carried to the brain, where they fill up the ventricles and thereby produce narcosis." Similar views were entertained by the philosopher Cartesius;|| according to him the soporific effect is produced by the accumulation in the pores of the brain of the vapours of opium itself. Helmont,¶ on the other hand, denies the correctness of this explanation, because "the sulphur is in combination and not free." According to him, opium contains a bitter oil having soporific properties, and a sharp-tasting salt possessing sudorific effects. Between the contradictory statements of the old and new schools, respecting the heat or cold producing effects of opium, he seeks to make a compromise by acknowledging it to be a *calidum*, having, however, *occasionally* the qualities of a *frigidum*, since it is capable of overpowering or entirely driving away the *archeus*.** His principal antidote for poisoning by opium is caustic lye. "Opium should not be administered without corrigents. Happy the patient whose physician knows how to remove the deadly principles from the poppy, and to retain the salubrious ones; else the noxious ingredients are taken with the useful ones, and the effect of the latter is neutralized." His favourite solvent for opium was quince-juice, which he considered equal to alkahest, the imaginary universal solvent.

Helmont's contemporary, De le Boë Sylvius,†† the founder of the chemiatric school, proposed a new theory to explain the effects of opium. He considered the "spirit of life to resemble spirits of wine, and to circulate in the nerve-tubes. The former are coagulated by opium in the same manner as the latter by volatile alkali." Among his followers opium became very fashionable. One of these, Cornelius von Bontekoë,* appears to have used it very indiscriminately, for he recommends as the surest way to prolong life, "incessant smoking of tobacco, constant drinking of tea, and frequent doses of opium." A similar curious recipe for prolonging life had previously been given by Bacon of Verulam,† who maintained that life is prolonged by moderation in mental or corporeal work, moderate use of opium, nitrum, and the aurum potabile (drinkable gold), whenever it should be discovered.

Werner Rolfink,‡ the celebrated chemist and anatomist, gave important directions on the use of opium in phthisis; he says: "It is indicated in all cases where an acrid mucus flows down into the chest; but it is fatal in ulcerous conditions of the lungs, as it interferes with expectoration, and thereby causes suffocation."

The surgeons of the sixteenth century appear to have made considerable use of opium in the external treatment of wounds; but this practice was severely censured by the more observant members of the profession, as for instance, by Felix Würtz, of Basle, who particularly condemns its employment in gunshot wounds. Opium was likewise used, as in our times chloroform, to deaden the pain during operations; this was also disapproved by many, who contended that no sleep short of death itself could cause total insensibility to the pain of an operation.

Fallopia§ relates a case of poisoning by opium, such as occurred not unfrequently at that time. He received a condemned criminal, whom he was permitted to kill in any way he pleased, and to retain for dissection. For this purpose he gave him two drachms of opium, the effect of which was neutralized by an attack of quartan fever. The dose was repeated on a day during the intervals, and the patient died.

THE FIXED OIL OF STAVESACRE.||

BY BALMANNO SQUIRE, M.B.

Surgeon to the British Hospital for Diseases of the Skin.

In the prosecution of an investigation as to the pathology of prurigo senilis, some years since I had occasion to employ an ointment of stavesacre-seeds, as a means of therapeutically testing the accuracy of my conclusions as to the pathology of that disease. This remedy, as is well known, is a parasiticide, in the sense that it is fatal to all of those animal parasites, properly so called, with which the human skin is wont to be infested in this country; that is to say, the pediculus capitis, the pediculus corporis, the pediculus pubis, and the acarus scabiei. However, I have found that an ointment of stavesacre-seeds is a very coarse and unsightly preparation. On inquiring of those wholesale firms who undertake the business of "drug-grinding" for the general body of pharmacists, I ascer-

* Born in 1537, died 1614. Author of an anatomical work entitled '*De partium corporis humani structura et usu.*' Basle, 1583.

† Johann Bauhin, 1541-1613, born at Basle, died at Mümpelgard. His work entitled '*Plantarum historia universalis nova et absolutissima*,' the fruit of nearly fifty years' study, was published after his death. His younger brother, Kaspar Bauhin (1560-1624), was professor of botany at Basle, and author of the celebrated botanical work: Πίναξ *Theatri botanica*, being an index to all previous botanical works, with synonyms.

‡ Andreas Libau or Libavius, 1540-1616, born at Halle, died at Coburg. He was the first to banish from his writings the mysterious language of the alchemists, and to describe the processes in an intelligible manner. His '*Alchemia*' may be termed the first real treatise on chemistry.

§ Joseph Duchesne, surnamed Quercetanus, Lord of La Violette and physician to Henry IV. of France; born at Armagnac, in Gascogne, in 1521, died at Paris, 1609. Wrote: '*L'Antidotaire spagyrique, pour préparer et conserver les médicaments*,' '*Pharmacopœa dogmaticorum restituta*,' '*Recueil des plus rares secrets touchant la médecine métallique et minérale*;' and many others.

|| Réné Descartes, or Renatus Cartesius, born 1596, at La Haye, in Touraine, died 1650, at Stockholm. Founder of a new system of philosophy and of analytical geometry.

¶ Johannes Baptista van Helmont, born 1577, at Brussels, died 1644. He was the first to recognize the properties of gases, which word he invented for the purpose, according to his own statement, in imitation of the Greek word chaos. His works were published by his son, under the title of *Ortus medicinæ*.

** This is, according to Paracelsus and Helmont's theory, the all-pervading primum mobile, or fundamental principle of life, which penetrates all parts of the living body, and on the condition of which depends sickness or health—on its presence life, on its absence death. The word is formed in imitation of the term ἀρχαλη φῦσις, "fundamental principle of nature," used by Hippocrates.

†† Franz De le Boë Sylvius, 1614-1672, born at Hanau, died at Leyden. His efforts to explain the processes of life and the action of remedies upon the body, by means of chemical theories, were made abortive by the insufficient progress of chemistry at this time. He was very fond of using preparations of antimony.

* His real name was Dekker, and he was surnamed Bontekoe from the tavern-sign of his father, representing a piebald cow (Bunte Kuh). Born at Alkmaer in 1647, died 1685 at Frankfort. See Sprengel's *Gesch. d. Med.*, xiii., 6.

† Francis, Viscount of St. Albans and Lord of Verulam, born 1561 at London, died 1626.

‡ Born at Hamburg, 1599, died at Jena, 1673. Introduced at Jena the dissection of human bodies, which was nicknamed "rolfinking." He established also a botanical garden and a chemical laboratory.

§ Gabriel Fallopia, born 1523, at Modena, died 1562. Celebrated anatomist, author of many anatomical treatises, and of a pharmaceutical work entitled '*De compositione medicamentorum*.'

|| From the *British Medical Journal*, for June 1, 187J.

tained that it was impossible to grind the seeds to any finer condition than that of a coarse meal, on account of their excessively oily nature. It then occurred to me that I could obtain a much more finely pulverized condition of the seeds by first removing their oil from them. This, for the purpose of my experiment, was accomplished by percolating the bruised seeds with ether—a process which completely abstracted the oil. The seeds could then, as I found, be readily ground to a very fine powder, and a very smooth and excellent looking ointment was thus obtained; but, on making trial of it, I found that my ointment thus prepared had lost all its virtue as a parasiticide. It therefore became probable that the virtue of stavesacre seeds was contained in their fixed oil. On making trial of ointment made with this oil, I found that such indeed was the case. Now this oil may be obtained much more cheaply than by the method I employed; namely, by simply expressing it from the seeds in the same manner that linseed oil is commonly obtained from linseed. The fixed oil of stavesacre is quite colourless. It is also odourless, and so is a very unexceptionable remedy. Ointment of stavesacre-seeds has been obtained by digesting the bruised seeds in hot lard, and then straining the admixture; but this produces a strongly coloured brown ointment, whereas an ointment prepared with the fixed oil is perfectly colourless. The absence of smell and colour in an ointment so prepared gives it considerable advantages over sulphur-ointment in the treatment of scabies, if only its efficacy be the same; and I find it to be quite equally efficacious, but it possesses also another considerable advantage. It is well known that in the treatment of scabies by sulphur it is necessary to beware of the remedy as much as of the disease. The strongly stimulating action of sulphur-ointment sets up in many persons a persistent dermatitis of a very irritating kind, which is remarkably slow to subside, and which constitutes a condition rendering it very difficult for many practitioners to determine how far the persistent itching is due to the natural disease and how much to the artificial one. Now an ointment of the fixed oil of stavesacre, besides being colourless and odourless, is also non-irritant. By this I do not mean that it will not serve as an irritant to exceptionally sensitive skins, but that its irritating effects are vastly less in degree than those of sulphur-ointment, and that in the majority of cases it does not irritate in the least.

THE "LANCET" ON THE DISSOCIATION OF PRESCRIBING AND DISPENSING.

The *Lancet* of the 16th inst. contains the following editorial upon the above subject:—

"There are many cogent reasons why prescribing and dispensing must be considered as distinct and in practice generally dissociated. The division of labour dates from the earliest ages, when the search for simples and the concoction of compounds occupied more time than the professor of medicine could spare from his abstruse speculations. In this way the apothecary sprang into existence, and took rank as "the physician's cook." The practical man progressed steadily, and more rapidly than the philosopher, who was too much engrossed with his alchemy and star-gazing to press forward in the path of discovery by rational experiment. Meanwhile, having distanced his master, the collector and compounder of drugs began to perceive their uses, and a new development of the remedial art arose out of this contingency. The apothecary became a practitioner on his own account, appropriating the knowledge acquired by the healer of wounds and the investigator of morbid actions and causes. During a long epoch the prescribing druggist continued to be the general practitioner, and under the fostering care of a London city company, which honourably and usefully discharged an important public duty, the apothecary became a skilled and technically educated exerciser of the art and mystery of medicine. The obligation which this service, rendered to the community by the Company of Apothecaries, has created cannot be overstated. It not only bridged over a fault in the history of scientific medicine, but contributed not a little to the consolidation of a profession which at the outset gave scant promise of rising above the level of a school of philosophy. The enterprise of a commercial corporation supplied the energy needed to rescue medicine from this peril, stimulated research as to the nature and uses of the drugs in which it traded, and in a large and practical way contributed to the supply of that information on medical subjects which the legitimate professors of medicine so tardily accumulated. The Company of Barber Surgeons did a like service for surgery. Nevertheless, it is to this accidental association of scientific pursuits with what is in fact a branch of trade, we owe much of the difficulty that besets the task of defining the practical boundaries of medicine and pharmacy. It would be better for both departments of industry and enterprise if the limits of each could be sharply laid down. Viewing the problem in the light of history, it must be obvious that it can never be solved, except in the separation, by mutual agreement, of interests that have grown up together, and to which the profession of medicine at least, owes a lasting obligation.

"The formation of a Pharmaceutical Society, with the view of reconstituting the craft of the druggist on a solid basis, was a necessity. The Company of Apothecaries, carried away by the success of its enterprise, aspired to the permanent position of a medical corporation, and neglected its proper duties as the protective guild of a trade. Shops for the sale of drugs were kept with impunity by persons having no qualification for the business, while the civic company was engaged in the fruitless struggle to impose the obligation of apprenticeship to the pestle and mortar upon medical practitioners. The company was misled, and, proud of the service it had rendered the cause of science, had not the wit to retire within its own province as soon as the profession of medicine began to assume its proper functions. If the Apothecaries' Company had been well-advised in this particular, the progress of medicine would have been accelerated, and its professors spared many perplexities, and saved from a position seemingly ungracious. Having usurped the authority of a medical corporation, and most worthily discharged exceptional functions during a period of pressing need, this trading company should have resumed its legitimate responsibilities as soon as the emergency was past. The opportunity was lost. The Pharmaceutical Society was called into existence, and has efficiently occupied the sphere deserted by the Apothecaries' Company. It is too late to retrieve the mistake. The company may be again successful as a purely commercial speculation, but its *raison d'être* as a body granting medical licences is extinct; and the time cannot be far distant when, like the fossil which fixes the relative position of some deposit in the earth's crust, the posthumous interest of this honourable company will be embodied in a conjoint scheme, and Macaulay's New Zealander will cudgel his brains to discern how, in the chequered course of progress, an old civic guild came to possess the strange privilege of nominating a certain number of representatives on a board of medical examiners!

"The argument for a sound basis of agreement as to the boundary lines of medicine and pharmacy must be addressed to the Pharmaceutical Society. The practical question at issue takes a shape which may be briefly indicated as follows: It is admitted on all hands that the two departments of work are distinct, and would be better kept wholly apart. In large cities, where druggists' shops are numerous, a little concession on both sides would render the separation practicable. On the part of the druggists there must be a revision of tariff, so as to place the supply of medicines within the reach of the class who cannot pay a fair fee for prescription and then defray the charge for dispensing as at present formulated. This is one of the most serious obstacles to the abandonment of medical dispensing. Again, if practitioners are asked not to provide their patients with drugs, it must be guaranteed that their prescriptions shall be uniformly and accurately dispensed. This is far from being an unnecessary stipulation. The most dissimilar results are produced by sending the same prescription to different establishments, even at the West End of London and among the *élite* of the trade. The effect of discrepancies observed is to weaken the confidence of patients and prescribers. Next, and by no means of minor importance, is the question of convenience. The delay caused in urgent cases by the difficulty of getting a prescription made up and delivered at the residence of a patient out of what are called "business hours" induces not a few practitioners to cling to the custom of dispensing their own medicines, a mode of procedure they would be only too glad to relinquish if it were possible to do so without imposing additional cost on their patients and involving them in great inconvenience. Such are a few of the surface obstacles to the total surrender of this undoubtedly trade industry to the druggists. There are, however, even more formidable difficulties behind. The medical practitioner starts with the presumption that he has a right to fair recompense for his professional skill, acquired at the cost of much time, pains and pecuniary outlay. The dispenser of drugs has the power of preventing this requital, and unless the retail trade in medicines can be conducted with due regard to the interests of the allied profession, it will remain impossible for general practitioners among the lower middle and necessitous classes to discontinue dispensing. The consideration we are about to urge applies only in a limited degree to physicians' prescriptions; but even in regard to these it has a substantial application. The written directions for a remedy are given with the intent that it shall be used only for the case under treatment and at the time specified. It would be convenient if these formulæ could be dealt with as drafts on a banker, and cancelled when their immediate purpose has been fulfilled. In the case of prescriptions written by general practitioners engaged among the classes which cannot adequately remunerate their professional adviser, the principle ought to be recognized. Under no circumstance is the druggist justified in using the advice given by the practitioner for his own purposes. As the trade in drugs is at present conducted in many populous districts, it is impossible for medical men engaged in general practice to abandon dispensing. In fact, apart from the injury inflicted on the profession by counter practice and the assumption of obviously medical functions by druggists, there is a continuous war of interests waged against the general practitioner, which the vigilance of a body such as the Pharmaceutical Society, supposing that authority willing to assume the control of the trade, alone can bring to an end. If the druggists are sincere in their expression of a desire to co-operate with the profession in the adjustment of difficult and delicate points of variance and conflict, the matters to which we have now directed attention deserve a consideration they have not yet received.

"A timely solution of these difficulties may pave the way for measures of reciprocity with regard to the final separation of branches of industry which ought never to have been confounded. It will probably not be possible to put an end to medical dispensing in districts exclusively rural, and where druggists, able and willing to conduct the trade in medicines efficiently and fairly, do not exist. The question in such localities is simply one of supply and demand, and it must be determined by the force of circumstances to the end of the chapter. In the meantime and everywhere, the profession has a right to enforce the rational and legal requirement that those whose business it is to trade in drugs will not overstep the obvious boundary and prescribe. They have no moral or scientific competence to exercise medical functions; and their interest lies in a strict adherence to the limits laid down by common sense and political expediency. The practice of medical dispensing is, we think, undesirable, and should be abandoned where its avoidance is possible; but there can be no objection to the procedure on the score of competency. Medical training includes the acquisition of a sufficient knowledge of drugs and pharmacy, and the practitioner is fully capable of performing the duty from which he seeks to relieve himself. This is not the case with regard to the information a druggist may obtain as to the uses of drugs, which it is his sole business to prepare under medical direction. The maker of a surgical instrument may, in the course of his trade, pick up many scraps of knowledge as to the mode of applying the implement he has produced, but it would be madness or audacity on his part, in the face of an entire ignorance of anatomy and the nature of morbid growths, to undertake the performance of surgical operations. The druggist who prescribes is equally culpable. He presumes, in spite of his non-acquaintance with the science of therapeutics, physiology, and disease, to introduce an agent into the system over which he has no control, and of whose working he has no knowledge. The experiment is not less reckless or perilous because he *intends* to operate only in minor cases. It is out of his power to determine whether the malady for which he prescribes is really trivial, or the insidious commencement of serious disease. It is necessary, in the interests of the public, to put an end to "counter practice" and the unqualified performance of medical functions by druggists. To what extent further legislation on the subject may be necessary must, in great measure, depend upon the action taken by the Pharmaceutical Society. The Apothecaries' Company at the present moment enjoys the right of interdicting the practice of unqualified persons, and it has done good service by putting the law in force against offenders. We confess, however, it would be more satisfactory to find the matter taken up by the Pharmaceutical Society, which might assert its authority in this matter with great propriety, and in a manner equally advantageous to the public, the profession, and the trade."

NOTTING HILL AND BAYSWATER CHEMISTS' EARLY CLOSING ASSOCIATION.

At a Committee Meeting, held at the Mall Hall, The Mall, Notting Hill, on the 24th April, 1877, a resolution was passed to canvass the district to ascertain the feeling of the chemists in regard to the second and third resolutions passed at the General Meeting at Bloomsbury Square. The following agreed to adopt them:—

Foster D. Downs.	J. Horncastle.
Edward Butterfield.	Abeland Co.
James Barrett.	S. Lynn.
Alfred Baker.	C. S. Williams.
William Hickman.	Arthur Tangstre.
G. W. Passingham.	J. Maitland.
J. J. Rees.	W. C. Jones.
C. H. Russell.	W. J. Hudson.
J. Westrup.	Henry Long.
H. Taylor.	G. W. Sargeant.
Robert A. Johnson.	F. Wright.
J. G. Shirley.	C. Harvey.
S. J. Weston.	G. Godolphin.
D. Gunn.	Harsley Thomas Wood.
J. Skidmore.	Squire Thomas.
J. H. Mathews.	Robert Samuel Bathe.
P. Stoneham.	E. B. Starkey.
A. W. Hitchcock.	Walter Snape.
Robert Hogg.	George Richardson.
Al. Trotman.	W. Shirtliff.
F. Anderson.	H. C. Edwards.
J. Beattie.	Charles Butler.
W. Halknet.	Sydney Drury.
George Cawdell.	C. Grosvenor and Co.
Miss Isabella S. Clarke.	W. Smith.
Frederick Andrews.	

The Pharmaceutical Journal.

SATURDAY, JUNE 23, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE DISSOCIATION OF PRESCRIBING AND DISPENSING.

ONE of the principal aspirants to the leadership of medical opinion, *The Lancet*, commences an article in the number for Saturday last, which is reproduced on p. 1043, by stating that "There are many "cogent reasons why prescribing and dispensing must "be considered distinct and in practice generally dis-"sociated." But notwithstanding the alleged necessity, it is difficult at present to consider prescribing and dispensing as being "in practice dissociated," and probably the writer hardly intended to say they were. Still there was in what appeared to be the spirit of the statement sufficient indication of accord with a desire frequently expressed in these columns, to induce a closer examination of this the latest contribution to the literature of the subject. We regret to say, however, that a perusal of the rather fatuous paper has left the impression that however correctly it may recount the history of the past it fails to grapple with the difficulties of the present.

Our contemporary appears to consider the Apothecaries' Company to have been a prime agent in producing the present confusion between medicine and pharmacy, and to look towards the Pharmaceutical Society as the *Deus ex machinâ* by which it is to be dispelled. "The Company of Apothecaries, carried "away by the success of its enterprise, aspired to the "permanent position of a medical corporation, and "neglected its proper duties as the protective guild "of a trade. . . The opportunity was lost. The Phar-"maceutical Society was called into existence, and "has efficiently occupied the sphere deserted by the "Apothecaries' Company. It is too late to retrieve "the mistake. . . The argument for a sound basis of "agreement as to the boundary lines of medicine "and pharmacy must be addressed to the Pharma-"ceutical Society."

This may appear to some rather curt behaviour towards a Company upon whose Act the Medical Defence Association depends as a means of coercion; but it is not a subject for more than passing comment here. It will be more pertinent to examine the "sound basis of agreement."

In the first place there is to be a revision of tariff —on the part of the *druggists*—so as to place the supply of medicine within the reach of those who cannot afford to pay a fair fee for a prescription as well as defray the cost of dispensing it at the present rates. With respect to this we may remark that we see no way to the artificial creation of a low tariff, or reason to doubt that the ordinary influence of competition will be inoperative in this case, when the eventuality contemplated arises.

Secondly, our contemporary thinks the uniform and accurate dispensing of prescriptions must be guaranteed. We confess we thought that this was already done. If it be true that "medical training "includes the acquisition of a sufficient knowledge "of drugs and pharmacy" to render the practitioner "fully capable of performing the duty," although it would not help him much in passing the Minor, it may be safely asserted that the man who has passed the ordeal of the Pharmaceutical Society's examinations will acquit himself of the task satisfactorily. Moreover, at present the medical man's patients do not always reap the benefit even of the pharmacy involved in a medical training, and the employment of unqualified assistants by medical men is probably also a circumstance by no means unimportant in promoting counter prescribing. Another "surface "obstacle" to medical men abandoning dispensing is said to be the delay involved in urgent cases in getting prescriptions made up and delivered at times falling beyond what are called business hours. Probably a delay may happen now and then, but certainly there has been almost an over-anxiety to meet the difficulty and there has been no disposition on the part of pharmacists to shirk the responsibility. So far, therefore, as the pharmacist can contribute towards the attainment of the conditions requisite for a "sound basis of agreement" they appear to be already existent, though they are to a great extent ineffective in bringing about the separation of prescribing and dispensing.

But more formidable difficulties remain behind. A prescription once dispensed is to be considered cancelled; the meaning of this is obvious, but it is not very evident that even if pharmacists were to assist in attempting to educate the public into the view that the prescription paid for remains the property of the prescriber the public would take kindly to the teaching. This introduces into the consideration of the subject another factor which does not appear to have been much regarded by that section of the medical profession which holds extreme views respecting "counter practice."

Last, but not least, counter practice is to be put an end to; and this in a most thorough way; the intention to confine it to minor cases being denounced as reckless and perilous. Judging from probabilities it may be assumed that simultaneously with the accomplishment of that feat, or prior to it, there will be an arrival of the Greek Kalends, and, according to Dr. WOOD, the proper regulation of the medical profession. And then it is gravely announced that "a timely solution of these difficulties "*may pave the way* for measures of reciprocity with "regard to the final separation of branches of industry "which ought never to have been confounded!" If the last two stipulations are indispensable constituents of the "sound basis of agreement," we are afraid the argument addressed to the Pharmaceutical Society will not be followed by very startling results. We agree, however, with our contemporary that further legislation on the subject must depend on the action taken by the Pharmaceutical Society.

Perhaps if the "sound basis of agreement" were less one-sided and chimerical it might be worth while to inquire whether the *Lancet* is expressing more than its own opinion on the matter. We should like to know, too, where it got the idea that the Pharmaceutical Society could, if it were willing, assume the control not only of the trade but also of a large portion of the medical profession, and bring the war of interests to an end, apparently by giving up all that is asked for. However flattering it may be for the Society to be placed in such vivid contrast with a witless "commercial speculation" which presumes to nominate representatives on a board of medical examiners, it is useless to call on it to "exercise its authority" in interdicting the practice of persons without a medical qualification, for the simple reason that it has no such authority. No doubt, as an important section of the trade, the Society can and will exercise a considerable influence in the direction of a clearer distinction between medicine and pharmacy. But the Pharmaceutical Society has no more authority, even if it had the desire, to interfere with the supply of simple remedies across the druggist's counter than the Medical Council has to order a medical practitioner not to retail salts or senna.

The course consistently advocated in this Journal should exonerate us from suspicion of wishing to impede so desirable a movement as the separation of medicine and pharmacy. But the fact is, a numerous class of educated and trained dispensers is now in existence, created for the special purpose of relieving professional gentlemen of "this undoubt- "edly trade industry," and this they have not been allowed to do to the extent that might fairly be expected. Instead of facilitating this transfer, impossible stipulations, which nobody can enforce against the will of the public, are put forward as indispensable preliminaries. In our opinion this is a reversal of the proper order of procedure. The natural result is that the would-be dispenser, tired of waiting for absent prescriptions, and frequently having a medical competitor in the retail branch, sometimes finds himself compelled to cultivate a business, which although it may be strictly within his right, is less congenial to him and more disagreeable to some members of the medical profession.

DISPENSING MEMORANDA.

We are constantly in receipt of requests for aid in overcoming difficulties met with at the dispensing counter, and so far as lies in our power such assistance is always rendered. But it has been suggested that instead of a reply being given among the Answers to Correspondents, where frequently it stands as an individual opinion, intelligible to only one person, it would be more widely advantageous were such questions published, with an invitation for suggestions as to their solution. We therefore propose as an experiment, commencing with the present number, to devote a certain amount of space every week specially to these and other "Dispensing Memoranda." In order to assist our younger brethren as much as possible, considerable latitude will be given to the definition of what may be considered to be a difficulty, but it is evident some discretion will have to be exercised in excluding trivial matter. Each note will bear a number, which it is requested may be quoted in all correspondence respecting it. Opportunity will be taken occasionally of calling attention to the more important points brought out in the various discussions.

EARLIER CLOSING.

Three months have elapsed since the meeting to consider the subject of Earlier Closing was held in the Theatre at 17, Bloomsbury Square, and it is rather disappointing, after the unanimous agreement as to the desirability of local effort towards carrying out the resolutions then passed, that so little appears to have been done. The first and almost the only sign of movement that has reached us has come from Notting Hill, the district where that meeting had its origin. The Early Closing Association there met at once and decided to canvass the district in favour of the second and third resolutions. The favourable result is shown on p. 1044, where will be found the names of about fifty chemists and druggists, residing in Notting Hill and Bayswater, who have agreed to put up their window shutters at 8 p.m. and close entirely at 8·30 p.m. every evening except Saturday, and to keep their establishments closed throughout Sunday. In order to prevent inconvenience to their customers a small handbill has been circulated announcing their intention, and in order to facilitate uniformity in the movement we reproduce it here.

NOTICE TO THE PUBLIC.

Earlier Closing of Chemists' Shops.

The Chemists and Druggists of this District respectfully inform the Public that on and after the 1st of August, 1877, their SHOPS will be

CLOSED AT 8·30 EVERY NIGHT,

EXCEPT SATURDAYS, and they earnestly appeal to the Public to assist them to shorten the present excessively late hours of business, by applying for Medicines, whenever practicable, before Eight o'clock.

The Establishments will be closed throughout the day on Sundays.

N.B.—In cases of emergency, Prescriptions and Medicines may be obtained at any hour.

We plead no excuse for referring to the subject again, our sole object being to rekindle, if we can, the enthusiasm which appears to have so soon become dormant. We need hardly say that we shall be glad to assist, with such publicity as we can give, any local efforts that may be put forth to extend this arrangement throughout London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of the above Association will be held at 17, Bloomsbury Square, on Thursday evening next, June 28th, at eight o'clock, when a paper will be read by Mr. CHARLES H. HUTCHINSON, on "The Atomic Theory."

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

June 20th, 1877.

Present—Mr. Williams, President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Southall, Taylor and Umney. Dr. Greenhow was also present, on behalf of the Privy Council.

MAJOR EXAMINATION.

Eight Candidates were examined. *Two* failed. The following *six* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Bullen, George William ....Newark.
Francis, Rawson Parke ....Diss.
Greenish, Henry George... .....London.
Gutheridge, George Frederick .Falmouth.
Parker, Robert Henry...........Barnstaple.
Radford, Charles ....Nottingham.

MINOR EXAMINATION.

Fifteen Candidates were examined. *Four* failed. The following *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Baker, George ....London.
Brearey, Arthur William ......Douglas.
Goldstraw, Charles ....Bilston.
Hill, Arthur ....Cheltenham.
Lambert, Frederick Ernest......Hull.
Newth, Francis Henry ....Southampton.
Phillips, Evan ... .St. Clears.
Savory, Arthur Ledsam ....London.
Stubbs, Edwin ....Hull.
Williams, William ....St. Clears.
Wright, George ....Park, Sheffield.

June 21st, 1877.

Present:—Mr. Savage, Vice-President; Messrs. Allchin, Barnes, Benger, Carteighe, Corder, Gale, Haselden, Linford, Martindale, Moss, Southall, Taylor, and Umney. Dr. Greenhow was also present.

MINOR EXAMINATION.

Twenty Candidates were examined. *Fifteen* failed. The following *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Alcock, Joseph Pitman ....Worcester.
Bell, Henry ....Newcastle-on-Tyne.
Blunt, Thomas Porter ....Shrewsbury.
Lunn, Alfred.........................Spalding.
Troughton, Henry....... . ...Lancaster.

MODIFIED EXAMINATION.

Three Candidates were examined. *Two* failed. The undermentioned passed, and was declared qualified to be registered as a Chemist and Druggist:—

Davis, Joseph Burnard ....Tunbridge Wells.

PRELIMINARY EXAMINATION.

The under-mentioned certificates were received in lieu of the Society's Examination:—

Certificate of the College of Preceptors.

Roberts, William Rowe ....Manchester.

Certificates of the University of Cambridge.

Bunting, Frank Alexander......Witney.
Coslett, Thomas .... Bilston.
Gulliver, Walter Frederick......London.
Smart, William Pechey ....Thetford.
Waldron, John Henry...... .....Chertsey.

Proceedings of Scientific Societies.

ROYAL SOCIETY.

FURTHER RESEARCHES ON THE DEPORTMENT AND VITAL RESISTANCE OF PUTREFACTIVE AND INFECTIVE ORGANISMS, FROM A PHYSICAL POINT OF VIEW.*

BY JOHN TYNDALL, LL.D., F.R.S.,

Professor of Natural Philosophy in the Royal Institution.

The investigation embodied in the memoir now submitted to the Society was opened in the summer of 1876 by a series of tentative experiments on turnip-infusions, to which were added varying quantities of bruised or pounded cheese. I was soon, however, drawn away from them to other experiments on infusions of hay. With this substance no difficulty was encountered in my first inquiry. Boiled for five minutes, and exposed to air purified spontaneously or freed from its floating matter by calcination or filtration, hay infusion, though employed in multiplied experiments at various times, never showed the least competence to kindle into life. After months of transparency, I have, in a great number of cases, inoculated this infusion with the smallest specks of animal and vegetable liquids containing *Bacteria*, and observed twenty-four hours afterwards its colour lightened and its mass rendered opaque by the multiplication of these organisms.

But in the autumn of 1876, the substance with which I had experimented so easily and successfully a year previously appeared to have changed its nature. The infusions extracted from it bore in some cases not only five minutes' but fifteen minutes' boiling with impunity. But on changing the hay a different result was often obtained. Many of the infusions extracted from samples of hay purchased in the autumn of 1876, behaved exactly like those extracted from the hay of 1875, being completely sterilized by five minutes' boiling.

To solve these discrepancies, numerous and laborious experiments were executed with hay derived from different localities, and by this means in the earlier days of the inquiry, it was revealed that the infusions which manifested this previously unobserved resistance to sterilization were, one and all, extracted from old hay, while the readily sterilized infusions were extracted from new hay, the germs adhering to which had not been subjected to long-continued desiccation.

I then fell back upon infusions whose deportment had been previously familiar to me, and in the sterilization of which I had never experienced any difficulty. Fish, flesh, and vegetables were re-subjected to trial. Though the precautions taken to avoid contamination were far more stringent than those observed in my first inquiry, and though the interval of boiling was sometimes tripled in duration, these infusions, in almost every instance, broke down. Spontaneously purified air, filtered air, and calcined air,—calcined, I may add, with far greater severity than was found necessary a year previously,—failed, in almost all cases, to protect the infusions from putrefaction.

I had the most implicit confidence in the correctness of my earlier experiments; indeed, incorrectness would have led to consequences exactly opposite to those arrived at. Errors of manipulation would have filled my tubes and flasks with organisms instead of leaving them transparent and void of life. By the unsuccessful experiments above referred to a clear issue was therefore raised: Either the infusions of fish, flesh, and vegetable had become endowed in 1876 with an inherent generative energy which they did not possess in 1875, or some new contagium external to the infusions, and of a far more obstinate character than that of 1875, had been brought to bear upon them. The scientific mind will not halt in its decision between these two alternatives.

* Abstract. Reprinted from *Nature*, June 14, 1877.

For my own part the gradual but irresistible interaction of thought and experiment rendered it at first probable, and at last certain that the atmosphere in which I worked had become so virulently infective as to render utterly impotent precautions against contamination, and modes of sterilization, which had been found uniformly successful in a less contagious air. I therefore removed from the laboratory, first to the top, and afterwards to the basement of the Royal Institution, but found that even here, in a multitude of cases, failure was predominant, if not uniform. This hard discipline of defeat was needed to render me acquainted with all the possibilities of infection involved in the construction of my chambers and the treatment of my infusions.

I finally resolved to break away from the Royal Institution, and to seek at a distance from it a less infective atmosphere. In Kew Gardens, thanks to our President, the requisite conditions were found. I chose for exposure in the Jodrell laboratory the special infusions which had proved most intractable in the laboratory of the Royal Institution. The result was that liquids which in Albemarle Street resisted two hundred minutes boiling, becoming fruitful afterwards, were utterly sterilized by five minutes' boiling at Kew.

A second clear issue is thus placed before the Royal Society :—Either the infusions had lost in Kew Gardens an inherent generative energy which they possessed in our laboratory, or the remarkable instances of life development, after long-continued boiling, observed in the laboratory are to be referred to the contagium of its air.

With a view to making nearer home experiments similar to those executed at Kew, I had a shed erected on the roof of the Royal Institution. In this shed infusions were prepared and introduced into new chambers of burnished tin, which had never been permitted to enter our laboratory. After their introduction the liquids were boiled for five minutes in an oil-bath.

The first experiment in this shed resulted in complete failure, the air of the shed proving to be sensibly as infective as the air of the laboratory.

Either of two causes, or both of them combined, might, from my point of view, have produced this result. First, a flue from the laboratory was in free communication with the atmosphere not far from the shed; secondly, and this was the real cause of the infection, my assistants in preparing the infusions, had freely passed from the laboratory to the shed. They had thus carried the contagium by a mode of transfer known to every physician.

The infected shed was disinfected; the infusions were again prepared, and care was taken, by the use of proper clothes, to avoid the former causes of contamination. The result was similar to that obtained at Kew, viz., organic liquids which in the laboratory withstood two hundred minutes' boiling, were rendered permanently barren by five minutes' boiling in the shed.

A third clear issue is thus placed before us, which I should hardly think of formulating before the Royal Society, were it not for the incredible confusion which apparently besets this subject in the public mind. A rod thirty feet in length would stretch from the infusions in the shed to the same infusions in the laboratory. At one end of this rod the infusions were sterilized by five minutes' boiling, at the other end they withstood two hundred minutes' boiling. As before, the choice rests between two inferences :—Either we infer that at one end of the rod animal and vegetable infusions possess a generative power, which at the other end they do not possess; or we are driven to the conclusion that at the one end of the rod we have infected, and at the other end disinfected air.

The second inference is that which will be accepted by the scientific mind. To what, then, is the inferred difference at the two ends of the rod to be ascribed? In one obvious particular the laboratory this year differed from that in which my first experiments were made. On its floor were various bundles of old and desiccated hay, from which, when stirred, clouds of fine dust ascended into the atmosphere. This dust proved to be both fruitful and in the highest degree resistant. Prior to the introduction of the hay which produced the dust, no difficulty as regards sterilization had ever been experienced; subsequent to its introduction my difficulties and defeats began.

In these and numerous other experiments a method was followed which had been substantially employed by Spallanzani and Needham; and more recently by Wyman and Roberts, the method having been greatly refined by the philosopher last named. The flasks containing the infusions were only partially filled, the portions unoccupied by the liquids being taken up with ordinary unfiltered air. Now as regards the death-point of contagia, we know that in air it is higher than in water, the self-same temperature being fatal in the latter and sensibly harmless in the former. Hence my doubt whether, in my recent experiments, the resistance of the contagium did not arise from the fact that it was surrounded, not by water but by air.

I changed the method, and made a long series of experiments with filtered air. They were almost as unsuccessful as those made with ordinary air.

One source of discomfort clung persistently to my mind throughout these experiments. I was by no means certain that the observed development of life was not due to germs entangled in the film of liquid adherent to the necks and higher interior surfaces of the bulbs. This film might have dried, and its germs, surrounded by air and vapour, instead of by water, might on this account have been able to withstand an ordeal to which they would have succumbed if submerged.

A plan was, therefore, resorted to by which the infusions were driven by atmospheric pressure through lateral channels issuing from the centres of the bulbs. As before, each bulb was filled with one-third of an atmosphere of filtered air, and afterwards heated nearly to redness. When fully charged, the infusion rose higher than the central orifice, and no portion of the internal surface was wetted save that against which the liquid permanently rested. The lateral channel was then closed with a lamp without an instant's contact being permitted to occur between any part of the infusion and the external air. It was thus rendered absolutely certain that the contagia exposed subsequently to the action of heat were to be sought, neither in the superjacent air nor on the interior surfaces of the flasks, but in the body of the infusions themselves.

By this method I tested in the first place the substance which, at an early stage of the inquiry, had excited my suspicion—without reference to which the discrepancy between the behaviour of infusions examined in the winter of 1875-76 and those examined in the winter of 1876-77 is inexplicable, but by reference to which the explanation of the observed discrepancy is complete—I mean the old hay which cumbered our laboratory floor.

Four hours' continuous boiling failed to sterilize bulbs charged with infusions of this old hay. In special cases, moreover, germs were found so indurated and resistant, that five, six, and in one case even eight hours' boiling failed to deprive them of life. All the difficulties encountered in this long and laborious inquiry were traced to the germs which exhibited the extraordinary powers of resistance here described. They introduced a plague into our atmosphere—the other infusions, like a smitten population, becoming the victims of a contagium foreign to themselves.*

It is a question of obvious interest to the scientific surgeon whether those powerfully resistant germs are amenable to the ordinary processess of disinfection. It is perfectly certain that they resist to an extraordinary extent the action of heat. They have been proved competent to cause infusions, both animal and vegetable, to

* A hard and wiry hay from Guildford, which I have no reason to consider old, was found very difficult to sterilize.

putrefy. How would they behave in the wards of a hospital? There are, moreover, establishments devoted to the preserving of meats and vegetables. Do they ever experience inexplicable reverses? I think it certain that the mere shaking of a bunch of desiccated hay in the air of an establishment of this character might render the ordinary process of boiling for a few minutes utterly nugatory, thus possibly entailing serious loss. They have, as will subsequently appear, one great safeguard in the complete purgation of their sealed tins of air.

Keeping these germs and the phases through which they pass to reach the developed organism clearly in view, I have been able to sterilize the most obstinate infusions encountered in this inquiry by heating them for a minute fraction of the time above referred to as *insufficient* to sterilize them. The fully developed Bacterium is demonstrably killed by a temperature of 140° F. Fixing the mind's eye upon the germ during its passage from the hard and resistant to the plastic and sensitive state, it will appear in the highest degree probable that the plastic stage will be reached by different germs in different times. Some are more indurated than others and require a longer immersion to soften and germinate. For all known germs there exists a period of incubation during which they prepare themselves for emergence as the finished organisms which have been proved so sensitive to heat. If during this period, and well within it, the infusion be boiled for even the fraction of a minute, the softened germs which are then approaching their phase of final development will be destroyed. Repeating the process of heating every ten or twelve hours, and before the least *sensible* change has occurred in the infusions, each successive heating will destroy the germs then softened and ready for destruction, until after a sufficient number of heatings the last living germ will disappear.

Guided by the principle here laid down, and applying the heat discontinuously, infusions have been sterilized by an aggregate period of heating, which, fifty times multiplied, would fail to sterilize them if applied continuously. Four minutes in the one case can accomplish what four hours fail to accomplish in the other.

If properly followed out the method of sterilization here described is infallible. A temperature, moreover, far below the boiling point suffices for sterilization.

Another mode of sterilization equally certain, and perhaps still more remarkable, was forced upon me, so to speak, in the following way:—In a multitude of cases a thick and folded layer of fatty scum, made up of matted *Bacteria*, gathered upon the surfaces of the infusions, the liquid underneath becoming sometimes cloudy throughout, but frequently maintaining a transparency equal to that of distilled water. The living scum-layer, as Pasteur has shown in other cases, appeared to possess the power of completely intercepting the atmospheric oxygen, appropriating the gas and depriving the germs in the liquid underneath of an element necessary to their development. Above the scum, moreover, the interior surfaces of the bulbs used in my experiments were commonly moistened by the water of condensation. Into it the *Bacteria* sometimes rose, forming a kind of gauzy film to a height of an inch or more above the liquid. In fact, wherever air was to be found, the *Bacteria* followed it. It seemed a necessity of their existence. Hence the question, What will occur when the infusions are deprived of air?

I was by no means entitled to rest satisfied with an inference as an answer to this question; for Pasteur, in his masterly researches, has abundantly demonstrated that the process of alcoholic fermentation depends on the continuance of life without air—other organisms than *Torula* being also shown competent to live without oxygen. Experiment alone could determine the effect of exhaustion upon the particular organisms here under review. Air-pump vacua were first employed, and with a considerable measure of success. Life was demonstrably enfeebled in such vacua.

Sprengel pumps were afterwards used to remove more effectually both the air dissolved in the infusions and that diffused in the spaces above them. The periods of exhaustion varied from one to eight hours, and the results of the experiments may be thus summed up:—Could the air be completely removed from the infusions, there is every reason to believe that sterilization *without boiling* would in most, if not in all cases, be the result. But, passing from probabilities to certainties, it is a proved fact, that in numerous cases unboiled infusions deprived of air by five or six hours' action of the Sprengel pump are reduced to permanent barrenness. In a great number of cases, moreover, where the unboiled infusion would have become cloudy, exposure to the boiling temperature for a single minute sufficed completely to destroy the life already on the point of being extinguished through defect of air. With a single exception, I am not sure that any infusion escaped sterilization by five minutes' boiling after it had been deprived of air by the Sprengel pump. These five minutes accomplished what five hours often failed to accomplish in the presence of air.

The inertness of the germs in liquid deprived of air is not due to a mere *suspension* of their powers. They are *killed* by being deprived of oxygen. For when the air which has been removed by the Sprengel pump is, after some time, carefully restored to the infusion, unaccompanied by germs from without, there is no revival of life. By removing the air we stifle the life which the returning air is incompetent to restore.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The Different Methods of Flower Fertilization.*

BY J. F. SAVORY.

If a complete flower be examined it will be found that the pistil is normally surrounded by a row of stamens, and it would seem at first sight a very simple matter that the pollen of the latter should fall on the former. This in fact does happen in many instances, and flowers which thus fertilize themselves have evidently one great advantage,—few remain sterile for want of pollen.

In a flower which is capable of self-fertilization we find that at the proper time the anthers dehisce or burst open, and the pollen is discharged on to the stigma, which is at that time covered with a viscid secretion. This secretion, besides containing the pollen, acts on it in such a way, that, after a short time numerous small tubes are developed. These latter pierce the stigmatic tissue and convey the fovilla through the canal of the style (if present) to the ovule, which is then fertilized.

The emission of these tubes sometimes commences half a minute after the pollen has been applied to the stigma. In other cases, as in the *Mirabilis Jalapa* or spurious jalap, it does not take place until from twenty-four to thirty-six hours. Geleznoff says, that in the larch, these tubes do not emerge for thirty-five days.

Although these pollen tubes are frequently several inches long, they are also very minute, the diameter varying from $\frac{1}{7000}$ to $\frac{1}{7000}$ of an inch. Amici estimated the number of pollen tubes formed from the pollen masses of *Orchis Morio* to be no less than 120,000 in number.

Experiments have been made, however, which show that, under favourable circumstances, very few pollen grains suffice even for a many-ovuled ovary. Kölreuter found that when twenty-five pollen grains were placed on the stigma of *Hibiscus trionum*, from ten to sixteen ovules were developed; with fifty or sixty pollen grains, above thirty ovules, whilst one, two, or three at most sufficed the single ovules of *Mirabilis Jalapa*, and *M. Longiflora*.

Having made these few cursory remarks, let us now proceed. The cases of self-fertilization are much less frequent than might at first be supposed, and there are

* Read before the School of Pharmacy Students' Association, Thursday, May 24th, 1877.

three principal modes by which it is prevented. Firstly, in many species, the stamens and pistil are situated on different flowers; such species are called "diclinous"; when the male and female flowers are on the same plant, they are "monœcious"; when on different plants "diœcious."

Secondly, in other cases, as was first discovered by Sprengel, though the stamens and pistil are both situated on one flower, they are not mature at the same time, and the pollen, therefore, cannot fertilize the pistil. These plants are called "dichogamous." Sometimes, as in the arum, the pistil matures before the anther, and these plants are termed "proterogynous"; but much more frequently the anther matures before the pistil, and then the plant is said to be "proterandrous."

Thirdly, there are some plants in which, as was first discovered by Mr. Darwin, the same object is secured by the existence, within the limits of the same species, of two or more kinds of flowers, differing in the relative position of the stamens and pistil, which are so placed as to favour the transference by insects of the pollen from the anther of one form to the pistil of the other. These plants are termed "heteromorphous;" some of them have two kinds of flowers, and are called "dimorphous," while others have three forms, and are called "trimorphous."

But even in plants which belong to none of the categories, we find minor modifications which tend to prevent self-fertilization; and Mr. Darwin is probably right in his opinion that no plant invariably fertilizes itself. Thus in some species where the stamens surround the pistil, and which might therefore be supposed to be arranged in such a manner as to insure self-fertilization, the anthers do not open towards the pistil, but on the sides, and, by no means, therefore, in a favourable position with reference to the transference of the pollen.

In most, if not all the cruciferæ, the anthers in young flowers have the side which opens turned towards the pistil; but before the anthers come to maturity, they twist themselves round, so as to turn their backs to the stigma.

Again, in pendent flowers, where the pistil hangs below the anthers, the stigmatic surface is never the upper one which would catch any falling pollen, but on the contrary, the lower one which could hardly be touched by the pollen of the same flower, but which is so placed as to come in contact with any insect or other body approaching the flower from below.

It is also probable that many cases will be found to exist in which, though the pollen necessarily comes in contact with the pistil of the same plant, fertilization does not take place. This is said to be the case in *Verbascum nigrum*, *Lobelia fulgens*, and *Primula verticillata*.

Other cases are recorded in which plants are more or less insusceptible of fertilization by their own pollen. Moreover, even where plants *are* capable of self-fertilization, the pollen from another flower is often more effective than their own, whence it follows that if a supply of pollen from another plant be secured, it is comparatively unimportant to exclude the pollen of the plant itself; for in such cases the latter is neutralized by the more powerful effects of the former.

In some few cases the pistil ripens before the stamens, in which case the species is "proterogynous," as above stated. Thus Aristolochia has a flower which consists of a long tube with a narrow opening closed by stiff hairs which point backwards, so that it much resembles an ordinary eel trap. Small flies enter the tube in search of honey, which, from the direction of the hairs, they can easily do, though, on the other hand, it is impossible for them to return. Thus, they are imprisoned in the flower; gradually, however, the pistil passes maturity, and the stigma ceases to be capable of fertilization, while the stamens ripen, and shed their pollen, by which the flies get thoroughly dusted. Then the hairs of the tube shrivel up and release the prisoners, which carry the pollen to another flower, and thus fertilize it.

Again, in the common arum, we find a similar kind of fertilization. The well-known green leaf encloses a central pillar, which supports a number of stigmas near the base, and of anthers somewhat higher. Now, in this case, nothing would at first sight seem easier or more natural than that the pollen from the anthers should fall on and fertilize the pistil. This, however, is not what occurs. The stigmas mature before the anthers, and by the time the pollen is shed, have become incapable of fertilization. It is impossible, therefore, that the plant should fertilize itself. Nor can the pollen be carried by the wind. When it is shed, it drops to the bottom of the tube, where it is so effectually sheltered that nothing short of a hurricane could dislodge it, and although arum is common enough, still the chances against any of the pollen so dislodged being blown into the tube of another plant would be immense.

As, however, in Aristolochia, so also in Arum, small insects which, attracted by the showy central spadix, the prospects of shelter or honey, enter the tube while the stigmas are mature, find themselves imprisoned by a fringe of hairs, similar to those in the Aristolochia, which, while permitting their entrance, prevent them from returning.

After a while, however, the period of maturity of the stigmas is over, and each secretes a drop of honey, thus repaying the insects for their captivity. The anthers then ripen and shed their pollen, which falls on and adheres to the insects. Then the hairs gradually shrivel up and set the insects free, which carry the pollen with them, so that those which then visit another plant can hardly fail to deposit some of it on the stigmas. Sometimes more than one hundred small flies will be found in a single Arum. In these two cases, there is obviously a great advantage in the fact that the stigmas arrive at maturity before the anthers.

On the other hand "proterandrous" flowers are much more numerous. To this category belong some species of Thyme, Pinks, Epilobium, Geranium, Malva, Gentians, many of the Labiatæ, Umbelliferæ, most of the Compositæ, Lobeliaceæ and Campanulaceæ. In fact, the greater number of flowers which contain both stamens and pistil are more or less "proterandrous." Here we have a pink in the first or male condition. The stamens are mature, and project above the disk of the flower, while the pistil is still concealed within the tube. On the other hand, we have here another flower in a more advanced condition, viz., the second or female condition. The stamens have shrivelled up, while the pistil now occupies their place.

Here it is at once obvious that insects alighting on the younger or male flowers, would dust themselves with pollen, some of which, if they subsequently alighted on an older flower, they could not fail to deposit on the stigma. In some cases, flowers which are first male and then female, are male on the first day of opening, female on the second. In others the period is longer. Thus Nigella, according to Sprengel, is male for six days, after which the stigma comes to maturity, and lasts three or four.

I now pass to the third of the principal modes by which self-fertilization is prevented, viz., heteromorphous flowers; and in this class I will more especially draw your attention to the genus Primulaceæ. If a number of specimens of primroses or of cowslips be examined, we shall find that about half of them have the pistil at the top of the tube and the stamens half way down, while the other half, on the contrary, have the stamens at the top of the tube and the pistil half way down. In Lythrum, the existence of different forms had been observed by Vaucher in 1841, and in the genus Oxalis by Jacquin, who regarded them as indicative of different species; but it was reserved for the genius and perseverance of Mr. Darwin to explain the significance of this curious phenomenon and the important part it plays in the economy of a flower. Now that Mr. Darwin has pointed this out, it is sufficiently obvious. An insect thrusting its proboscis down a primrose of the long-styled form, would dust its proboscis at a part, which, when it visited a short-styled flower would come just opposite the head of the pistil, and could not fail to deposit some of the pollen on the stigma. Conversely, an insect visiting a short-styled plant would dust its proboscis at a part further from the tip, which, when the insect visited a long-styled flower would again come just opposite to the head of the pistil. Hence we see that by this beautiful arrangement insects must carry the pollen of the long-styled form to the short-styled, and *vice versâ*.

There are other points in which the two forms differ from one another: for instance, the stigma of the long-styled form is globular and rough, while that of the short-styled is smoother and somewhat depressed. The pollen of the two forms is also dissimilar, that of the long-styled being considerably smaller than the other,—$\frac{7}{7000}$ of an inch in diameter against $\frac{10 \cdot 1}{7000}$, or nearly in the proportion of three to two; a difference, the importance of which is probably due to the fact that each grain has to give rise to a tube which penetrates the whole length of the style, from the stigma to the base of the flower, and the tube which penetrates the long-styled pistil must therefore be nearly twice as long as in the other.

Another point of great interest is the spontaneous movement of the stamens and pistil in dichogamous plants, first observed by Kolreuter in *Ruta graveolens*. He, however, supposed that the object was to bring the stamens in contact with the pistil, whereas, the real advantage, as Sprengel pointed out, is that in consequence the stamens and pistil successively occupy the same spot in the flower and thus come in contact with the same part of the insect. For instance, in the *Geranium pratense*, when the flower first opens, the stamens lie on the petals, at right angles with the upright pistils. As, however, they come to maturity, they raise themselves parallel and close to the pistil, which, however, is not as yet capable of fertilization. After they have shed their pollen they return to their original position, and the stigmas unfurl themselves. More or less similar movements have been observed in various other flowers. Thus the anthers of *Digitalis purpurea*, which are at first transverse, become longitudinal as they ripen.

In aquatic plants the blossoms habitually come to the surface. In *Valisneria spiralis* the female flower has a long spiral stalk, which enables it to rise to the top of the water. The male flowers, which are small, very numerous, and attached lower down, separate themselves altogether from the plant, rise to the surface, and fertilize the female flowers among which they float. When this is effected, the spiral stalk of the female flower again contracts, and draws it down below the surface.

The pollen is transferred from the stamens to the pistil in different ways. In some species, it is carried by the action of the wind, in a few cases by birds, but in the majority of instances this important object is secured by the visits of insects, and the whole organization of such flowers is adapted to this purpose.

Sprengel, Darwin and Müller have shown that the form and colours of wild flowers are mainly owing to the unconscious selection exercised by insects, although, no doubt, the existence of a certain amount of colouring matter is, as we see in autumn tints in various fungi, and seaweeds, due to other causes.

As I have mentioned above, the transference of the pollen from one flower to another is principally effected either by the wind or by insects. In the former case, the flower is anemophilous, in the latter entomophilous.

In anemophilous plants the flower is rarely conspicuous and to use the words of Mr. Darwin, he finds that "it is an invariable rule that when a flower is fertilized by the wind it never has a gaily coloured corolla." Conifers, grasses, birches, poplars etc., belong to this category.

In such plants, a much larger quantity of pollen is required than where fertilization is effected by insects. You have all observed the showers of yellow pollen produced by the Scotch fir. Here it is an advantage that the tree should flower before the leaves are out, because the latter would greatly interfere with the access of the pollen to the female flower. Hence as a rule, such plants flower early in the spring.

Again, in such flowers, the filaments of the stamens are usually long, and the pollen less adherent, so that it can easily be detached by the wind, which would manifestly be a disadvantage in the case of those flowers which are fertilized by insects. On the other hand it is an advantage to most seeds to be somewhat tightly attached, because they are then only removed by a high wind, which is capable of removing them to some distance. The above does not apply to such seeds as the dandelion, which are specially adapted to be carried by the wind.

According to Sprengel, the pollen of wind-fertilized flowers is dried, and therefore more easily carried by the wind, than that of most insect-fertilized flowers. Mr. Bennett also states that the pollen of wind-fertilized flowers is generally spherical; while that of insect fertilized flowers is usually furrowed, the furrows running along the longer axis of the grain.

Wind-fertilized flowers, moreover, generally have the stigma more or less branched or hairy, which evidently tends to increase its chance of catching the pollen. Take for example, the stigmas of the alder, hop, and wheat, all of which are anemophilous, and compare them with those of the willow, flax and nuphar, which are entomophilous.

Mr. Darwin has pointed out that irregular flowers appear to be always fertilized by insects. The Orchidaceæ may be taken as the most characteristic order of entomophilous plants.

There are some plants, of which we have a few in this country, whose normal time of flowering is almost the depth of winter, such as the hazel nut, butcher's brown, and the gorse.

There is also a more numerous class, which flowers and fructifies all through the year, almost regardless of season and temperature, among which may be mentioned the white and purple dead-nettle, daisy, dandelion, groundsel, common spurge, shepherd's purse, and some others.

During the winter of 1868-9, numerous observations were made on this class by Mr. Bennett, and he found, that as a general rule, fertilization or, at all events, the discharge of the pollen by the anthers, takes place in the bud, before the flower is opened, thus insuring self-fertilization under the most favourable circumstances, with complete protection from the weather, assisted, no doubt, by that rise of temperature which is known to take place in certain plants at their time of flowering. The dissection of a flower of the white dead-nettle, gathered the last week in December, showed the stamens completely curved down, and brought almost in contact with the bifid stigma, the pollen being at that time freely discharged from the anthers. A more complete contrivance for self-fertilivation than is here presented would be impossible.

The same phenomena were observed in *Veronica buxbaumi*, where the anthers are almost in contact with the stigma, before the opening of the flower (a circumstance which occurs but seldom). In *Veronica agrestis* and polita, the larger periwinkle, gorse, dandelion, groundsel, daisy, and shepherd's purse. In the latter case, the four longer stamens appear to discharge their pollen in the bud, the two longer not until a later period. Also in the purple dead-nettle, *Cardamine hirsuta*, and chickweed, in which the flowers open only under the influence of bright sunshine.

In contrast with these, a large number of wild plants, which had been tempted by the mild January to put forth a few wretched flowers at a very abnormal season, were also examined. Among these were the charlock, wild thyme, and fumitory, in all of which instances was there not only no pollen discharged before the opening of the flower, but also no seed was observed to be formed. An untimely specimen of the common garden bean, presented altogether different phenomena from its relative the gorse, the anthers not discharging their pollen till after the opening of the flower: and the same was observed in the *Lamium galeobdolon*, or yellow archangel gathered in April, notwithstanding its consanguinuity to the dead-nettle.

The description detailed above cannot of course apply to those winter flowering plants in which the male and female organs are produced on different plants; but here we commonly find another provision for insuring fertilization. In the case of the hazel nut, the female flowers number from two to eight or ten in a bunch, each flower containing only one ovule destined to ripen. To each bunch of female flowers, belongs at least one catkin (often two or three) of male flowers, consisting of from 90 to 120 flowers, and each flower containing from three to eight anthers. The pollen is not discharged till the stigmas are fully developed, and the number of pollen grains must be many thousand times in excess of what would be required were each grain to take effect. The arrangement in catkins also favours the scattering of the pollen by the least breath of wind, the reason probably why so many timber trees in temperate climes, many of them flowering very early in the season, have their male inflorescence in this form.

The euphorbias or spurges have flowers structurally unisexual, but which for physiological purposes may be regarded as bisexual, a single female flower being enclosed along with a number of male flowers in a common envelope of involucral glands. Two species are commonly found flowering in the winter, and producing abundance of capsules, viz., *Euphorbia Peplus*, and *E. Helioscopia*. In both the species, the pistil makes its appearance above the involucral glands, considerably earlier than the bulk of the stamens. A single one, however, of these latter, was observed to protrude beyond the involucral glands, simultaneously, or nearly so, with the pistil, and to discharge its pollen freely on the stigma, thus illustrating a kind of quasi-self-fertilization. The remaining stamens do not discharge their pollen until a considerably later period after the capsule belonging to the same set has acquired a considerable size.

In *Euphorbia Helioscopia* the capsules are almost entirely included within the cup-shaped bracts, and the stigmas are turned up at the extremity so as to freely receive the pollen from their own stamens.

We now come to a case of complete cross-fertilization without the aid of insects. Take the *Euphorbia Amygdaloides*, which does not flower before April. In this plant, the heads of the flowers which first open are entirely male, containing no female flower; in the hermaphrodite heads which open subsequently, the stigmas are completely exposed beyond the involucral glands, long before any stamens protude from the same glands. The pollen from the first opened male flowers no doubt fertilizing the stigma of the next opened hermaphrodite heads and so on. In this species, the bracts are not cup-shaped, but nearly flat; the stamens hang out very much farther than in *Euphorbia Helioscopia*, and the styles are perfectly flat.

As a rule, we find that in different species of the same genus, the more conspicuous flowers are adapted to cross-fertilization, and the less conspicuous ones to self-fertilization.

The *Malva sylvestris* and *Malva rotundifolia* are very good examples of this class. In both the species, whenever insects visit these flowers, cross-fertilization is largely effected, owing to the structure of the plant, whereas self-fertilization can scarcely take place, neither spontaneously, nor by means of insects, nearly all the pollen grains having been removed before the unfolding of the stigmatic branches. Since, however, both these plants grow for the most part in the same locality, and flower during several months at the same time, insects flying about and seeking for honey are much more likely to find out and visit the highly conspicuous flowers of *Malva sylvestris*, than the far less ones of *Malva rotundifolia*; the former, when fully opened, presenting bright rose-coloured bells of from 40 to 50 mm. in diameter, the latter, on the contrary, light coloured bells, of only 20 to 25 mm.

Direct observation, indeed, fully confirms this supposition; the flowers of *M. sylvestris* being always found in sunny weather, visited by a variety of insects, whereas those of *M. rotundifolia*, especially when growing intermixed with *M. sylvestris*, are commonly overlooked by them all. It is evident from these facts that wherever our two species of *Malva* grow together in the same locality, *Malva rotundifolia* would be rapidly extinguished unless it were able to produce seed by self-fertilization; *M. sylvestris*, on the other hand, is so commonly visited and cross-fertilized by insects that self-fertilization, if it were possible, would never be effected, or only exceptionally. Thus, in the flowers of *M. sylvestris* when precluded from the visits of insects by covering them with a gauze net, the anthers remain filled with pollen, and never, or only exceptionally, come spontaneously into contact with the stigmatic branches, the free ends of their filaments at a later period bending downwards, and the branches of the styles remaining considerably above them. Conversely in the flowers of *M. rotundifolia*, when the visits of insects are prevented, the anthers filled with pollen grains remain in so high a position and the stigmatic branches bend so far downwards as to come abundantly into contact with the pollen grains, self-fertilization being thus inevitable.

(*To be continued*).

Parliamentary and Law Proceedings.

Death from Chloral.

Mr. W. S. Donaldson, deputy coroner for East Middlesex, held an inquest, at the Talbot Arms, Kingsland, respecting the death of Mr. John Tuer Hepworth, aged 27 years, a solicitor, carrying on business at Regent Circus, and residing at Kingsland.—Marian Hepworth stated that deceased was her husband. He had latterly been unwell, but able to attend to business. On Saturday last he returned home, and shortly afterwards went upstairs to lie down. On her retiring to bed, at 11·30, she found him lying dead on the bed. She knew that he was in the habit of taking chloral to procure sleep. Dr. Horton, on making a *post-mortem* examination, found the heart and other organs diseased. On the table was an empty bottle, which had contained chloral, and a glass. The cause of death was due to an overdose of chloral, acting on a diseased constitution.—A surgeon, of Leeds, a brother of the deceased, stated that he had often cautioned him against taking chloral. The jury returned a verdict in accordance with the medical evidence.

Death from an Overdose of Paregoric in Newcastle.

On Thursday, June, 14, an inquest was held by Mr. J. T. Hoyle, coroner, at the Durham Ox Inn, Cattle Market, on the body of David Pearson, eighteen months old, son of David Maxwell Pearson, 121, Elswick East Terrace, lamp maker. On Tuesday night the deceased boy was not very well, and his mother bought some paregoric at a hosier's shop in Elswick East Terrace, and gave him a portion of it in a tea cup. She then put him to bed, and he slept soundly. The next morning she observed that there was something wrong with him, and she went for Dr. Ellis, of Rye Hill, who came and found the deceased suffering from the effects of a narcotic poison, and in a dying state. He applied the usual remedies, and, having told the mother what to do, he left. About half an hour afterwards the father of the deceased came and told him the child was dead. The doctor produced a bottle containing about two and a half spoonfuls, or three drachms, of paregoric, and the mother said she had given the deceased about the quantity left in the bottle. The verdict of the jury was, that "The deceased died from an overdose of paregoric administered to him by his mother, and that his mother was wrong in administering it without medical advice."—*Newcastle Daily Chronicle.*

Alleged Attempt to Poison.

At Winterborne (Dorsetshire) Divisional Petty Sessions, Lucy Tizzard, wife of a farm servant, has been examined on the charge of administering poison to her two daughters, one a married woman, and the other a domestic. On Monday week prisoner invited her daughters to visit her, and after drinking some cocoa they became ill. It transpired that the prisoner had mixed a quantity of arsenic with the drink, but the poison was brought away by the stomach pump. Since the prisoner has been in goal she has behaved strangely, and has stated that she also intended poisoning her husband, her son, and afterwards herself, as she wished them all to be together in heaven. The magistrates had decided to commit the prisoner for trial, but ultimately a warrant was issued for her removal to an asylum.

Attempted Poisoning by Laudanum.

At Marlborough Street Police Court, on Friday, June 15, Henry Hall, bootmaker, was finally examined before Mr. Newton on a charge of having administered laudanum to Jane Hall, aged 8, Frank Hall, aged 6, Anne Hall, aged 4, and Louisa Hall, aged 2, his four children, with intent to murder them. Mr. H. Kisch, barrister, defended the prisoner. The evidence was to the effect that the mother, finding the children lying on the bed ill, took first one and then another to Dr. Clarke, who, perceiving they were labouring under the effects of narcotic poison, applied remedies, and kept them at the surgery until they were sufficiently recovered to be removed—two to the hospital and the others home. Inspector Turpin said that he found two bottles which had contained laudanum, one marked to that effect, in an open box containing shoemaking tools, placed by the side of a bench in the prisoner's room. Dr. Clarke produced two other bottles, which he received from a Mrs. Tice, who said she saw the prisoner's wife pick them up from a corner of the room occupied by the prisoner. Both bottles had contained laudanum.

Mr. Arrowsmith, of Bonner Road, chemist, stated that the prisoner purchased two pennyworth of laudanum at the shop of Dr. Cooper, Moor Street, where he was employed as assistant, on Wednesday week. The prisoner, on being told that the drug was poison, replied it was either for faceache or toothache. Witness supplied the drug, and labelled the bottle "Laudanum; poison," with the name of the vendor He had sold laudanum since to several persons, but was certain the prisoner was the purchaser of the laudanum on the day in question.

Mr. Frederick Paine, clerk to the executors of Mr. Hartnell, chemist, 9, Tichborne Street, stated that on Wednesday or Thursday week a man—he believed the prisoner—brought a small phial and asked for two pennyworth of laudanum. Asked him if it was for the toothache, he either said "Yes" or nodded. The bottle produced bore the label of the house.

Mr. Newton inquired if an entry was made at the time.

Witness said a poison book was kept and everything necessary to be entered was entered in it, but he did not think an entry was made of the sale in question.

Mr. Steedman, resident medical officer of the Charing Cross Hospital, stated that on the evening of the 8th inst., two children were brought to him. The girl had suffered more than the other child. Both children had contracted pupils, vomiting, and were suffering from sleepiness. He had them put into a ward and kept them there until Thursday. After he examined them he came to the conclusion that they were suffering from narcotic poisoning. Laudanum would cause the effects he perceived in the children Replying to Mr. Kisch, witness said he did not give the children the medicine until he had first examined them. One child fell asleep while standing. The child could not be affected in that way by merely smelling the laudanum in the bottle. The children were not all of them out of danger.

Jane Hall, an intelligent child about eight years of age, said she lived with her father and mother, and had a brother and two sisters. That day week her father gave her some stuff out of the bottle produced telling her she was to drink it. Her father then gave some to her brother and sisters, but not all out of the same bottle. Her father did not say why they were to take it. Her mother was out at the time at work. After taking the stuff she felt ill. Witness also saw her father give some of the stuff to the other children, but could not say whether he gave any to the baby Anne.

Mr. Newton fully committed the prisoner for trial to the Old Bailey.

"Condy's Fluid."

In the High Court of Justice, Chancery Division, on June 15, before Vice-Chancellor Sir James Bacon, a suit was brought by Mr. H. B. Condy, the inventor and patentee of "Condy's Fluid," to restrain the defendants from selling Condy's Fluid, and, by adopting the name or style of "Condy's Fluid Company," inducing the public to believe that what they sold as Condy's Fluid was actually manufactured by the plaintiff. The plaintiff and the defendant, Dr. Mitchell, had been in partnership from March, 1870, to October, 1873, and it was not disputed that upon the dissolution of the partnership the defendant had a right to manufacture and sell "Condy's Fluid," but the plaintiff complained that the name was not used honestly, but that the style of "Condy's Fluid Company" was adopted by the defendant for no other purpose than to induce the public to believe that Mr. Condy, the plaintiff, was the manufacturer of what the defendants sold. It was also suggested that the defendants sold as Condy's Fluid an inferior article. But the Vice-Chancellor said that there was no jurisdiction for the Court to restrain persons who had a right to sell their articles under the name of Condy's Fluid, from selling any compound they liked to sell under that name.

Vice-Chancellor Bacon said that no case of fraud had been made out. The defendants had done nothing to mislead the public. They did not pretend that they were selling articles actually made by Mr. Condy; they were only exercising their right, which could not be denied, of selling an article called "Condy's Fluid." The plaintiff's bill must be dismissed with costs.

Dispensing Memoranda.

(*See the Note respecting this Column on p.* 1046).

[1]. DISPENSING QUERY.—The following prescription was sent me to dispense:—

℞	Tr. Ferri Mur.	℥iss.
	Liq. Ammon. Acet.	℥iss.
	Tr. Guaiaci	℥vj.
	Aquæ . . . . ad	℥viij.

I sent it out with the usual appearance of a guaiacum mixture, when it was brought back as made up wrongly. The customer has since had it made up in a West-end establishment, when it was sent out perfectly clear. Could you inform how it is to be done?— Radix.

[2]. DISPENSING QUERY.—Is it possible to make an attractive mixture with the following recipe, and if so in what order should the ingredients be mixed:—

℞ Vin. Ipecac. . . . . ʒss.
Tr. Tolu. Bals. . . . . ʒj.
Chlorodyne . . . . ʒj.
Tr. Opii Am. . . . . ʒiij.
Glycerini . . . . ʒij.

J. KITCHEN, *Glasgow.*

---

[3]. EXPLOSIVE MIXTURE.—As a contribution to the literature of "pharmaceutical torpedoes," I enclose a copy of a prescription dispensed by me with a result equally alarming to the patient and annoying to the dispenser.

(Copy).

℞ Bismuthi Subnit. . . . . ʒiiss.
Sodæ Bicarb. . . . . ʒiss.
Aq. Menth. Pip. ad . . . . . ℥viij.
Coch. mag. ii. omne mane.

This mixture was made up as ordered, and sent home. Within an hour of its delivery the bottle burst. Another was prepared, but the precaution was taken to allow the mixture to stand before being finished off. Shortly after it had been made the cork was blown out with great violence, the mixture presenting the appearance of a freshly opened bottle of soda-water. Had the mixture been sent home as soon as prepared it would most certainly have gone the way of its predecessor. On testing the bismuth subnit. it was found to be slightly acid; this may account for the whole phenomena. But the real cause is possibly a decomposition which takes place between the two salts. I have not been able to find an explanation in any work on chemistry. Probably the following equation would represent the decomposition which takes place.

$$4\,BiONO_3 + 4\,NaHCO_3 = 2\,Bi_2O_2CO_3 + 4\,NaNO_3 + 2\,H_2O + 2\,CO_2.$$

Perhaps some of your readers will acquaint me if they have had occasion to dispense the prescription. The medical man possibly meant the subcarbonate, but in these times of strictly pharmaceutical relations between physician and dispenser, I submit that there is no alternative but to follow to the letter these chemical incompatibilities as ordered, even at the risk of converting the harmless-looking, neatly wrapped up bottle of medicine into an aggressive torpedo, which may damage or possibly kill instead of curing the patient. JOHN W. YEATS.

Review.

BUTTER, ITS ANALYSIS AND ADULTERATIONS, specially treating on the Detection and Determinations of Foreign Fats. By OTTO HEHNER, F.C.S., and ARTHUR ANGELL, F.R.M.S. Second edition. J. and A. Churchill. London. 1877.

This small book of eighty-six pages calls for notice chiefly by virtue of its doubtful value, a matter which becomes the more serious when we read that the treatise has been entirely re-written, improved, and augmented. It is impossible to read this book and to avoid the impression that not only is it pretentious beyond reason, and very badly written, but worse than all it is full of lamentable errors—errors of a kind that a national school boy would be ashamed to commit. That our judgment is neither of unmerited severity nor partakes of prejudice we hope to substantiate by pointing out some of the gross blunders to which we have above referred.

Speaking of what they call their process of butter analysis, but to which they have no virtual claim, the authors write as follows in their preface: "Butter analysis has, in fact, now been placed upon as sound a basis as any branch of food analysis, and the most difficult of problems is considered to be solved by every one who has a voice in the matter."

Let us now inquire upon what grounds this conclusion, so laudatory of themselves, is based.

In the first edition of their book the authors claimed to have demonstrated on the data therein contained, that butter fat yields from 85 to 86 per cent. of fixed insoluble fatty acids, or about 9·5 per cent. less than any other fat. On repeating the calculations based upon their own mathematical data, it is seen, however, that they have blundered at all points in their arithmetic (see pp. 46–49, first edition), and hence, instead of obtaining the above figures representing the insoluble fatty acids in butter fat we obtain figures varying from 85·5 per cent. to 93 per cent.

The following instances which we quote from the first edition of the book in question will serve to illustrate our criticism, and the authors' errors.

"Experiment II.—3·159 grams of genuine farm butter-fat yielded 2·922 grams, or 86·16 per cent. of fixed acids."

Now the quantity of solid fatty acids obtained really indicates 92·49 per cent. Again,

"Experiment VI.—3·302 grams of fat from best Normandy butter yielded 3·076 grams, or 85·40 per cent."

The true percentage = 93·15.

We forbear mention of further arithmetical blunders, but it is desirable to point out once more that it is upon these results and similar ones that the authors base their conclusions.

Remarking upon their results they write on p. 48, of the first edition of their book: "It is remarkable to notice that the composition of butter fat is exactly as constant as the amount of 'solids not fat' in milk, upon which Mr. Wanklyn has based his method for the analysis of that article." After what we have shown we can only hope this is not true.

Since the publication of the first edition of the book we are examining, Dr. Muter and others have pointed out that Messrs. Hehner and Angell's standard of fixed fatty acids in butter fat (85–86 per cent.) is too low, judging by their personal experience. In the present edition the authors admit the truth of this criticism, and curiously enough throw the error upon the faulty methods of manipulation, as in fact being occasioned by a loss experienced by spirting during the act of saponification of the butter! After this ingenuous confession Messrs. Hehner and Angell proceed to describe a modification they have introduced into the proceeding, due to the suggestion of Dr. Turner, which consists in the use of an alcoholic solution of potash. These new determinations lead the authors to fix the percentage of solid fatty acids in butter fat at 86–88 instead of at 85–86 as originally. All butters, therefore, containing more than 88 per cent. insoluble fatty acids in the butter fat are viewed and condemned by the authors of this work as adulterated with foreign fat.

These facts will suffice to demonstrate the utter worthlessness of their results and the value of that method which they regard as scientific, accurate, and accepted. We leave our readers to judge of the truth of their assertion, which is as follows: "Practically, it is impossible to evade detection of adulteration!"

Let us, however, pass from this matter to consider a few other points presented by this remarkable book. Even if we for the moment accept their standard of 88 per cent. solid fatty acids in butter fat, then, according to their own confession, 12 per cent. of foreign fat may be added to certain low class butters before the extreme of 88 per cent. is reached.

It is almost a difficulty to decide upon the points best illustrative of the imperfect and loose analytical method described in this book; they are so numerous and faulty. The use of an alcoholic solution of potash for saponification of butter fat is now extended, among public analysts at least, and no care seems taken of the danger to be expected from this source, viz., the formation of ethers. It is true that Messrs. Hehner and Angell have observed the smell of butyric ether (whatever that may be worth), but it seems never to have occurred to them or others that other ethers may be similarly produced from the higher fatty acids obtained from butter. No chemist of any repute at all, can read the book before us and not receive a moral shock at the loud boast made in it, and the amount of loose work therein described.

Notwithstanding the attempts that have been made by Dr. Dupré, Mr. Bell, and Dr. Muter, to improve known methods of butter analysis, it cannot be said that this is a subject at all well understood by chemists, and, in fact, much more remains to be done than has yet been accomplished. In the meantime we may express our conviction that desirable results can only be reached by observing mathematical principles in chemical researches. Empirical results are often useful; but they are never absolute.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Clinical Lectures on the Curability of Attacks of Tubercular Perotinitis and Acute Phthisis (Galloping Consumption). By Dr. McCall Anderson. Glasgow: J. Maclehose. 1877. From the Author.

Principles of Theoretical Chemistry, with Special Reference to the Constitution of Chemical Compounds. By Ira Remsen, M.D., Ph.D., etc. London: Baillière, Tindall, and Cox. 1877. From the Publishers.

Rapport sur les Médicaments Nouveaux, par une Commission composée de MM. Baudrimont, Gobley, Marais, Schaeuffele, et A. Petit, Rapporteur. Paris: G. Masson. 1877. From the Reporter.

Chemical Composition of Foods, Waters, Soils, Minerals, Manures, and Miscellaneous Substances. Compiled by E. T. Kensington, F.C.S. London: J. and A. Churchill. 1877. From the Publishers.

Conservation et Dosage de l'Acide Cyanhydrique-Chlorhydrate de Narceine. Recherche de Petites Quantités d'Albumine dans l'Urine. Par A. Petit. Paris. From the Author.

De la Trimethylamine, au point de vue chemique et pharmaceutique. Par A. Petit. Paris. From the Author.

Obituary.

Notice has been received of the death of the following:—

On the 30th of May, 1877, Mr. John Hopper Pain, Chemist and Druggist, Hadleigh, Suffolk. Aged 45 years.

On the 2nd of June, 1877, Mr. James G. F. Alexander, Chemist and Druggist, Greenock. Aged 60 years.

On the 5th of June, 1877, Mr. Hamerton Peacock, Chemist and Druggist, High Street, Poplar. Aged 40 years.

On the 8th of June, 1877, Mr. Robert Sanderson, Chemist and Druggist, High Street, Watford. Aged 42 years. Mr. Sanderson had been a member of the Pharmaceutical Society since 1869.

On the 10th of June, 1877, Mr. Harry Grove, Chemist and Druggist, Park Street, Walsall. Aged 46 years.

Notes and Queries.

LIME JUICE AND GLYCERINE :—

Lime or Lemon Juice . . .	1 pint.
Rose Water	4 ounces.
Elder Flower Water . . .	4 ,,
Alcohol	4 ,,
Glycerine	5 ,,
Oil of Lemon	1 drachm.

Heat the lemon juice in a porcelain capsule to near the boiling point. To the liquid add gradually the rose water, the elder flower water and the alcohol. Mix well together, and, after twenty-four hours' repose, filter the liquor through paper and add to it the glycerine; and lastly, the oil of lemon dissolved in a small quantity of alcohol. The liquid should be somewhat milky, but free from sediment or coarse floating particles.

HUNTER'S TOOTH POWDER ;—

Powdered Cream of Tartar .	3 ounces.
Powdered Alum.	4½ drachms.
Powdered Cochineal . . .	4 ,,
Powdered Cinnamon . . .	½ drachm.
Powdered Sugar.	1 ounce.

Druggists' Circular.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Estimation of Tannin.

Sir,—In your issue of 16th inst. you publish a paper, by Mr. H. A. Proctor, F.C.S., on "Some Methods of Estimating Tannins." The author is exceedingly liberal in his strictures upon the processes which have been proposed by other chemists for the estimation of the various vegetable astringent substances grouped, for convenience sake, under the generic name of "Tannin;" but beyond reproducing Dr. Löwenthal's method, I am unable to discover that he has contributed anything either positive or original to the history of the subject upon which he discourses.

Amongst other processes which come in for a share of his adverse criticism is a method which I proposed some three years since for the estimation of the astringent matter in tea, and which has since become known as the "lead-tannin process." If Mr. Proctor had taken the trouble to refer to Mr. Allen's papers in the *Chemical News*,* or had read with ordinary care the description of my process in the last edition of Sutton's 'Volumetric Analysis' (p. 236), he would have learnt that neither Mr. Allen nor myself ever proposed to extend this particular method to any substance other than tea. We were perfectly aware of the fact, which Mr. Proctor seems to think a discovery of his own, viz., that gallic acid (so called), is precipitated from its solutions by plumbic acetate as well as is "tannin," but in the examination of teas for adulteration it is quite needless to attempt a separation of the two (?) acids—a determination of the total astringency being all that is required.

How Mr. Proctor has been able to come to the conclusion that commercial tannic acid only contains eighty to ninety per cent. of "really pure tannin," when in the sentence immediately preceding he has informed us that "really pure tannin is quite unattainable," and *ergo* undeterminable, is a question which I leave more expert chemists to decide.

Fred. W. Fletcher, F.C.S.

North London Chemical Works, Holloway, N., June 19, 1877.

* Vol. xxix., pp. 169 and 189.

Sir,—In the last number of the *Pharmaceutical Journal* (page 1020), there is an interesting paper, by Mr. H. R. Proctor, on "Some Methods of Estimating Tannins." In the course of his remarks the author makes several references to my method of determining tannin in tea by acetate of lead, using ammoniacal ferricyanide as an indicator. Mr. Proctor says that the method "in its original form is quite inadmissible, since lead precipitates gallic acid as well as tannic, and both react equally on the indicator." Of course this is perfectly true, but so far from the process being inadmissible on that account, in my original paper I claimed it as one of the advantages of the method. It must be remembered that the process was originally applied to the estimation of the astringency of tea, and if chemists have since sought to use it for purposes for which it was manifestly unsuited, it is not the process which is to blame.

That I never regarded the method as adopted for the determination of actual tannin is evident from the following extract from my original article, in the *Chemical News*, of April 17, 1874:—

"It seems to me that the separate determination of the tannic and gallic acids is a needless trouble and a complication of the methods of detecting tea adulteration. It also seems probable that a portion of the tannic acid may be converted into gallic acid by the prolonged boiling in water necessary for the thorough exhaustion of the tea, and on this account a method which will estimate the total amount of astringent matter, without distinction of its nature, is preferable to a process that gives merely the amount of tannin while ignoring the gallic acid."

These remarks were followed by a description of the lead process with the use of ammoniacal ferricyanide as an indicator, the precipitator being referred to as "mixed tannate and gallate of lead."

I may take this opportunity of reminding your readers that the process referred to was really originated and worked out by Mr. F. W. Fletcher, who was at that time my assistant, and that I merely contributed the colour test which indicates the end of the reaction. As the process was first published in the article above referred to, it has got connected with my name, though in the original paper Mr. Fletcher's claims were fully recognized.

I can quite indorse all that Mr. Proctor says respecting the variable quality of commercial tannin, some of the samples I examined when interested in the subject containing 30 and 40 per cent. of inert matter as indicated by the lead process.

Sheffield. ALFRED H. ALLEN.

CHEMISTS' ASSISTANTS' ASSOCIATION.

Sir,—I have read with great interest the letters of three of your correspondents respecting the new Chemists' Assistants' Association, and beg you will allow me a small portion of your valuable space to express my views on the subject.

I must say that I agree with "An Associate" that the first and foremost place in the discussions ought to be given to early closing. In this, I think, sir, you will entirely agree with me, if I understand aright your excellent article on earlier closing in the Journal for November 14th, 1874.

It is argued by some that it is not a question in which assistants ought to interfere at all, but that they should wait until their employers choose to take action in the matter. Now my opinion is that action may, and ought to be, taken by those who are most interested. It would be as reasonable to say that masters must wait until their masters (the public) call upon them to close earlier. Early closing is not such a difficult question as many appear to think; it is for the younger members of our calling to decide whether the future pharmacists shall resemble the majority of those of the present day in knowing nothing of the world beyond the four walls of their shops, and the view of the street in front, and mixing in no society but that of their assistants and porters, or whether they shall by mixing with the outside world diffuse their scientific knowledge and take the position in society which their education entitles them to.

I am no advocate of "Coercive trades unionism" or "strikes" in this case, as the question, being of a less complex nature than the Eastern question, may be easily settled by a Conference without recourse to arms; in proof of which I will give you my experience. I have lived in two provincial towns in which assistants' associations existed and flourished. It was felt by the members in each town that the late hour of closing (in one case 8 p.m.) did not allow the assistants and apprentices sufficient time for study and outdoor recreation. Accordingly the employers were respectfully asked to take the matter into consideration and, if practicable, to close earlier. The result was a considerable curtailment of the hours of labour, and a better feeling, if possible, between employers and employees than before. Now what is there to prevent something of the kind being done in London, where assistants are more numerous and more unjustly treated than in any other place?

I think also that the new society should devote considerable attention to the advancement of education by encouraging young men to come forward and read papers on pharmaceutical subjects and the sciences on which the art of pharmacy is based.

If the hours of labour could be shortened, doubtless many valuable papers would be forthcoming, and the Pharmaceutical Society would have less cause to complain of lack of interest in the evening meetings.

A MEMBER OF THE PHARMACEUTICAL SOCIETY.

"NO DISSENTER NEED APPLY."

Sir,—I have been speculating upon the meaning of an advertisement in a recent number, offering a business for disposal with this condition annexed, that the "purchaser must be a pharmaceutical chemist and a Churchman." Some employers require that their assistants shall be of the same religious denomination as themselves, for which it is possible to conceive some little excuse, though not much. But why should any one impose such a condition upon his successor? Is he anxious to preserve the "healthy agricultural district" from an inundation of Nonconformist or Roman Catholic poison?

In Roumania certain trades are still forbidden to Jews; in the United States similar restrictions were formerly placed on the negro race; but surely it is rather late in the day to play this game in England.

EQUALITY.

GLYCERINE OF PEPSINE.

[*** At page 928 of the Journal we published a letter from Mr. Elliott of Gateshead, in which he stated that half a drachm of his liquid pepsine would dissolve 250 grains of hard boiled white of egg. We have since learned that this result was not obtained at the ordinary temperature, but at a temperature of 100° to 104° F. Mr. Elliott would appear not to have been cognizant of the fact that the difference between that result and the one with which it was compared is wholly due to the different conditions under which the several results were obtained.]

"*Syrupus*."—(1) *Ranunculus peltatus*; (2) *Linum catharticum*; (3) *Habenaria chlorantha*; (4) *Brachythecium rutabulum*; (5) *Eurhynchium prælongum*; (6) *Amblipleqium riparium*.

D. Jenkins.—*Parietaria diffusa*.

G. S.—(1) *Corydalis claviculata*; (2) *Trifolium minus*; (3) Probably *Veronica serpyllifolia*, no leaves sent; (4) *Arenaria serpyllifolia*; (5) *Lathyrus macrorrhizus*; (7) *Chærophyllum temulum*.

"*Nu*."— We have no qualification for giving legal opinions. Consult your solicitor.

"*Amateur*."—Lime juice is the expressed juice of limes. If you mean the preparation known as lime juice and glycerine, see p. 1055, and various recipes given in previous numbers.

"*Williams*."—We cannot understand our correspondent's object in sending leaves only for identification; it is impossible to name plants with certainty from the leaf alone. The following can only be guessed at:—(8, 12, 13.) *Heracleum sphondylium*; (11) *Nepeta glechoma*; (4) *Potentilla anserina*; (17) *Pteris aquilina*. We must refer our correspondent to our rule concerning the number to be sent in one week.

W. P.—*Phlomis fruticosa*, commonly called Jerusalem Sage.

J. Robinson.—The "Tic Powders" label would certainly require a stamp. The other had better be submitted to the Inland Revenue Authorities.

COMMUNICATIONS, LETTERS, etc., have been received from Mr. Dott, Professor Dymock, Mr. Vertue, Dr. Pavy, Mr. Greig, C. W. C., Acetum, Fair Custom, Cardamoms, Auld Reekie.

"THE MONTH."

The fine sunshiny weather of the last few weeks has brought forth such a profusion of flowers that our list this month will be an unusually long one.

In the country hedges the elder is now white with its handsome cymes of white flowers. The cymes are sometimes umbellate, but are often more or less corymbose. In the West of England the poor use these flowers largely in the form of tea for colds, etc., and prefer to have the flowers with the stalks. There is some difficulty in drying the flowers of a good colour. If the bunches are formed into small heaps they heat in a few hours and turn black in drying, so that it is necessary either to suspend them separately on lines of string or to scatter them loosely over network, in a current of dry air. Those who wish to separate the flowers from the stalks take advantage of the rapidity with which they become heated to allow the bunches to remain together just long enough to loosen the flowers, when the latter are shaken off through a cane sieve upon a drying apparatus heated by steam.

By the side of ditches and in marshy places the tall valerian, with its coarsely serrated pinnate leaves and pretty corymbose cymes of small pink flowers, may be found in abundance. The small corolla is somewhat funnel-shaped and has a minute projection at the base (gibbous); the stamens are three in number and are attached to the corolla. The style is furnished with three stigmas, which do not appear to expand until after the pollen has been shed. The tube of the calyx is united to the ovary, and instead of teeth there will be seen at the top of the ovary a projecting rim which afterwards unrolls in a most curious way, and is seen to consist of feathery pappus. Although valerian is cultivated in this country yet a considerable quantity of the root is also imported from France and Germany. This plant must not be confounded with American valerian, which is an orchidaceous plant (*Cypripedium pubescens*).

In cornfields, especially on a chalky soil, the white mustard may now be seen in blossom, and is often confounded with the charlock (*Sinapis arvensis*, L.), which frequently grows mixed with it. Both plants have hairy spreading fruits, but the siliqua of the white mustard ends in a long flat sword-shaped beak, while that of the charlock has a short narrow beak. The black mustard grows generally in waste spots near rivers or in damp places, and the fruits are erect and pressed to the stem, and have only a short cylindrical beak.

One of the handsomest of our wild flowers, the foxglove, is now beginning to adorn dry hedge banks, heathy places and woodlands with its lovely raceme of drooping flowers. Although a common plant in many districts, it is yet so rare in some parts of Lincolnshire as to be cultivated in gardens, an honour which it well deserves. Although it is not possible to mistake the plant when in flower for any other, yet several plants have leaves so similar in shape as to be easily mistaken for those of digitalis. The ploughman's spikenard, *Inula Conyza*, DC., is one of these, but by carefully observing the base of the leaf it may easily be distinguished. In the digitalis the smaller veins form a network running down the tapering base of the leaves, while in Inula there are no small veins running parallel with the stalk, the lowest passing direct to the midrib. It has been said that the leaves of *Verbascum Thapsus*, L., have been gathered for digitalis, but it can hardly be believed that the most ignorant herb gatherer could possibly mistake the thick woolly leaf of that plant for digitalis. The leaves of *Verbascum nigrum*, L., do indeed much resemble those of digitalis at first sight, but are easily distinguished by their cordate base.

Another common wild flower which often gives a bright colouring to the landscape is the red poppy, *Papaver Rhœas*, L. There are several species of red poppy having blossoms of a similar colour although differing in size; they are chiefly distinguished by the shape of the fruit, and by the presence or absence of bristles upon it. The flower is very difficult to preserve for the herbarium, and should be brought home in bud. The petals turn very dark in drying, owing apparently to the development of some alkaline body, since the colour may be in great measure restored by hydrochloric acid.

The woody nightshade (*Solanum Dulcamara*) now decks hedgebanks and woods with its pretty lilac blue blossoms. This plant is very commonly mistaken for the deadly nightshade (*Atropa Belladonna*), a much rarer plant. The leaves are very variable, although they are usually furnished with two lobes at the base (auriculate), there are sometimes three or more, or when growing in dry places there are sometimes no lobes at all, and the leaves then resemble those of the common nightshade (*Solanum nigrum*, L.), which may, however, be distinguished easily by its white flowers and black berries. The corolla of the Dulcamara is rotate and furnished with green spots at the base. The stamens are united into a tube around the style (syngenesious) and open by pores at the apex. The berries are red, but a curious variety is found in Jersey which has yellow berries. Although very common about London it is comparatively scarce in Scotland. *Belladonna*, or deadly nightshade, is nowhere very common, but may be found scattered here and there in woods on a chalky or limestone soil. It has an erect bushy habit, caused by the repeated forking of its succulent stems. The leaves are ovate and quite entire at the margin and are given off in pairs (geminate), one leaf in each pair being smaller than the other, a leaf bud occupying the axil of the larger leaf and a flower bud that of the smaller one, so that if the smaller leaf be regarded as a bract, the inflorescence, although apparently axillary, is really extra-axillary. Any one who has once seen its pendulous brown-purple lurid bell-shaped flowers could never confound Belladonna with the woody nightshade. The fruit is baccate and has the size and colour of a black cherry, presenting a very tempting appearance.

The *Matricaria Chamomilla*, L., sometimes called the German chamomile to distinguish it from the true or Roman chamomile (*Anthemis nobilis*, L.), is now in blossom everywhere about London, in waste places and on railway cuttings. The odour of the bruised leaves and flowers is similar to that of the true chamomile but fainter. The flowers may be readily distinguished from those of the true chamomile by the absence of chaffy bracts (paleæ) between the florets; in all species of *Matricaria* these are absent, while they are present in the genus *Anthemis*. Another difference lies in the fact that the true chamomile has a solid conical receptacle and the German chamomile a hollow one. But however much the flowers outwardly resemble one another, it is scarcely possible to confound the plants, since the true chamomile does not commence flowering until the end of July, when the other has usually withered away. *Matricaria Chamomilla* has also an erect branching habit without procumbent stems, while the true chamomile is a prostrate creeping plant, only the flowering stalk being erect. The true chamomile also grows in damp grassy places or commons, not on rubble heaps like the other.

The horseradish (*Cochlearia Armoracia*, L.) is a semiwild plant, which may often be met with in a botanical ramble. Like most of the Cruciferæ the flowers are without bracts, although there is a bract at each branch of the inflorescence. The petals are white, and twice as long as the calyx.* The fruit does not ripen in this country, indicating that the plant is not a native.

Rhamnus catharticus, L., and *R. Frangula*, L., have been in blossom since the end of May, and are now forming young fruit. In the former the flowers are diœcious, although there are rudimentary stamens in the pistillate flower, and a rudimentary pistil in the staminate flower. The calyx is four-cleft, and the corolla consists of four minute green petals, which, especially in the pistillate flower, are not readily seen without the aid of a lens. The thorns are not very conspicuous, but may be seen here and there terminating the branches. In the fruit there are four carpels, and although these are externally united to form a fruit of a baccate appearance, yet the endocarps are distinct, and form four little stones inside the fruit, each stone containing one seed. The structure of them is well shown in Part 2 of Bentley and Trimen's 'Medicinal Plants.' *Rhamnus catharticus* is found chiefly in chalky or oolite soil, and is rather local, being abundant in some districts and rarely seen in others.

Rhamnus Frangula, on the other hand, is much more widely distributed, and may be found in damp woods, especially in hilly districts, very frequently, although rare in Scotland. It is very easily distinguished from *R. catharticus* by the leaves, flowers, and fruit. In *Rhamnus Frangula* the leaves are quite entire at the margin, and the lateral veins are directed toward the sides of the leaf. In *Rhamnus catharticus* the leaves are minutely but distinctly serrated, and the lateral veins are directed towards the apex of the leaf. In *R. Frangula* the flowers have a *five*-parted calyx, and five petals and five stamens. Although the stones in the fruit are usually only two in number, or rarely three, their number will not serve to distinguish the fruit from that of *R. catharticus*, because in the latter some of the stones are often undeveloped. The shape of the stones will, however, readily distinguish between them, those of *R. catharticus* being somewhat triangular in section, the inner face having a sharp angle, and the outer face being convex, while those of *R. Frangula* are flat on one side, and slightly convex on the other, and are broader in proportion. They are also of yellow not brown colour, as in the other species.

The bark of *Rhamnus Frangula* may be easily known from all other official barks by presenting a deep red colour when the epidermis is scratched off with the nail. It is chiefly imported into this country from Holland. Under the name of Dogwood the wood is largely used for making gunpowder. It is not a little singular that emodin, a crystalline principle found in rhubarb, should also occur in this bark. The fact of its producing sickness when fresh, although only acting as a purgative after it has been kept about a year, is one the reason of which requires investigation.

The young fruit of the juniper is now in a capital state for examination, and the shrub may be looked for on chalky downs. *Linum catharticum*, L., or purging flax, which is still used, we believe, in some parts of Scotland as well as by herbalists in this country, may now be found abundantly in heathy places and among short grass in dry hilly fields. But for its small white flowers it would scarcely be noticed. It differs from all the other British species in having opposite leaves and very small flowers; indeed were it not for the fruit it might almost pass for a caryophyllaceous plant.

In the various botanical gardens a large number of interesting plants may now be seen in blossom, so many, indeed, that it will be necessary to reserve a description of some of them until another year. The aconite (*Aconitum Napellus*, L.), has a very singular flower. Immediately beneath the blossom are two minute bracts; the calyx is petaloid and consists of the hood or helmet (galea), (whence its name of Monkshood,) two large lateral sepals and two smaller ones at the base. When all these are pulled off it will be found that there are two hammer-shaped petals hidden under the hood, the rounded apex of each petal forming a nectary containing a honey-like liquid; besides the two singular petals there will be found five or six or sometimes more slender petals no larger than the filaments of the stamens, but readily distinguished from them by their blue colour. The stamens are numerous and the filaments are white and petaloid, the carpels are usually three in number and form follicles when ripe. The varieties of aconite are very numerous, no less than twenty-nine forms of *A. Napellus* being described by De Candolle, so that it is by no means easy to find a typical plant. It is, perhaps, most easily distinguished from other species by the semicircular shape of the helmet, the loosely divided appearance of the leaf, and the time at which it flowers, *A. Napellus* flowering earlier than almost all the other species cultivated in this country, most of which flower at the end of June or beginning of July, while it commences to blossom at the end of May. The tendency to form varieties seems to indicate that the plant might be improved by cultivation, and there cannot be much doubt that a better article than that at present in the market would command a better price and lead to more satisfactory results, both in the hands of the physician and of the manufacturing chemist.

The linseed plant (*Linum usitatissimum*, L.) is now in full blossom, and is conspicuous by reason of its large deep blue flowers. The petals are remarkably fugacious, and the stamens are united together at the base, and have the rudiments of another row of stamens alternating with each perfect one. The styles are five in number, and terminate in stigmas which look just like anthers, and would be mistaken for them by a careless observer.

The hemlock (*Conium maculatum*, L.) will be in perfection in a week or two, and is already being gathered for making extract. This plant is very similar in appearance to many other umbelliferæ, but is easily distinguished by certain characters. Although the smooth spotted stem is very characteristic, yet the spots are often present only on the

* Bentham in 'Genera Plantarum' states that this species has no petals.

lower portion of the stem. The plant which most closely resembles it in appearance is fool's parsley (*Æthusa Cynapium*, L.), which may be distinguished as follows:—Underneath each partial umbel there are three long pendent bracts, but there is no general involucre. The fruit has vittæ, two of which form very distinct lines on the flat surface of the half fruits, and the ridges on the fruit are not crenated. The leaves also have *brownish* points to every segment, and are minutely serrated below each point. The serrated character is easily seen with a lens.

In conium each partial umbel has three, or rarely four, short bracts, which do not surround the stalk, but are placed on the outer side of it. The fruit has no vittæ whatever, and the ridges of the fruit are minutely crenate, and the leaves have minute *white* points to every segment, which are quite entire below the points. The only fruit with which that of conium could be well confounded is the Russian aniseed, which is very similar in shape, size, and colour, but is seen by the aid of a lens to be covered with minute white hairs. Two other plants are known in this country under the name of water hemlock, which must not be confounded with the true hemlock. One of these, *Œnanthe crocata*, L., is not uncommon in ditches and damp places in woods. It may be recognized by the somewhat cylindrical fruit, which has two long erect styles, by the wedge-shaped segments of the leaves, and by the root consisting of five large fusiform tubercles. It is properly called hemlock water dropwort, but is often confounded with the true water hemlock, *Cicuta virosa*, L., a much rarer plant, found here and there in the midland counties, but rarely seen in the south of England. The leaves have narrowly lanceolate, serrate segments, and the fruit is spherical, like that of coriander, but rather smaller. Both plants are extremely poisonous, and fatal accidents have frequently happened through persons eating the root of *Œnanthe crocata*, which has a not unpleasant taste, death usually resulting in two hours after partaking of it, and sometimes even in so short a space as half-an-hour. Most cases of poisoning reported as owing to water hemlock are probably caused by the hemlock water dropwort, the *Cicuta virosa* having a simple root without tubercles, which is not very likely to be eaten, and being a comparatively rare plant.

At the Chelsea gardens several interesting plants may now be seen in blossom.

Masterwort (*Imperatoria Ostruthium*, L.), occasionally found wild in Scotland, and used as a tonic on the conntient, has large handsome leaves and is a very conspicuous plant; *Veratrum album*, L., has large ribbed leaves very closely resembling those of *Gentiana lutea*, L., in shape and general appearance, and dense panicles of green flowers with a disagreeable cheesy odour; Fenugreek (*Trigonella Fœnum-græcum*, L.), a small plant with white flowers about the size of melilot or clover; Lentil (*Ervum lens*, L.); one or two species of *Astragalus*; Wild Indigo (*Baptisia tinctoria*), a plant used in the United States as an antiseptic in ulcerated sore throat, etc.; Motherwort (*Leonurus Cardiaca*, L.), a labiate plant with curiously shaped trifid upper leaves, used by herbalists for diseases affecting the heart, but probably possessing only tonic properties; *Coriaria myrtifolia*, L., a small shrub with leaves having three veins arranged like those of the myrtle, and possessing poisonous properties. The leaves were at one time detected in senna leaves in France. The two lateral veins near the margin of the leaf at once distinguish them from senna leaves. Hedge hyssop (*Gratiola officinalis*, L.), a scrophulariaceous plant, possesses purgative and emetic, and, in large doses, poisonous properties. This must not be confounded with the common hyssop (*Hyssopus officinalis*, L.) a plant with much narrower leaves, belonging to the Labiatæ. The hyssop of Scripture is supposed by some to have been the caper plant (*Capparis spinosa*, L.).

Ferula Tingitana, L., the African ammoniacum plant, is now in full blossom both at Chelsea and at Kew and forms a conspicious feature in the garden. The leaves are finely cut and very handsome, and the tall flowerstalk, more than six feet high, with its numerous large umbels of yellow flowers, can be seen at a considerable distance. Although another species, *Ferula orientalis*, L., has been received by Dr. Leared as the source of African ammoniacum, Pereira is probably right in thinking that the former is more likely to be the plant yielding it, or at all events the chief proportion of it, since it agrees with the drug both in taste and smell, which *F. orientalis* does not.*

At Kew, in the economic house, there are only two or three plants at present in blossom. *Cissampelos Pareira*, Lam., a slender climbing plant with cordate hairy leaves and minute green flowers, might easily escape notice, and like most of the climbing plants must be looked for overhead, as it is allowed to climb over the sides of the hothouse. The Pharmacopœia is utterly wrong in attributing *Pareira brava* to this plant, since its stem and root have no concentric rings but only a single zone composed of wedge-shaped woody bundles. It is rather singular that most of the recent works on materia medica persist in perpetuating the error, although it has so clearly been pointed out by Hanbury.

Asclepias curassavica, L., the root of which possesses emetic properties and is used in the West Indies like ipecacuanha, occasionally finding its way to this country, is a very handsome plant, with umbels of bright orange coloured flowers, which have a very singular structure, an explanation of which we must defer to a future period. The citronelle grass (*Andropogon nardus*, L.) and the castor oil plant are also in blossom, and the cocoa tree, although only a diminutive plant about three feet high, is putting forth its small rose coloured flowers from various parts of the trunk and branches. The flowers occupy a very curious position, for instead of appearing in the axils of the leaves they arise from the bare trunk or branches. The structure of the flower is curious, and well explained in Bentley and Trimen's 'Medicinal Plants,' part 2, No. 38.

In the open ground the first plant to strike the eye is the *Sarracenia purpurea*, L., or side-saddle flower, which derives its name from the large umbrella-shaped disk into which the style is expanded, and which quite hides the stamens from view. The pendulous flower terminates a stalk more than a foot long, which arises directly from the ground. The calyx is externally of a purplish-red colour, and in shape and size resembles the yellow water lily. The five petals are oblong, of a deep red colour, and overlap the large disk-like style. The structure of this style is very remarkable. It has five projecting notched angles, and underneath the notch at each angle may be seen a small stigma not larger than a

* See *Pharm. Journ.* [3], vol. vi., p. 142.

pin's head. As the angles occupy the space between each petal, the only openings to the centre of the flower are between the petals and the angles of the style, so that it is almost impossible for insects visiting the flower to avoid touching the stigma. The leaves are hollow and usually contain a little water in their base, the interior of the leaves being lined with hairs pointing downwards, so that wingless insects entering the leaves in search of the water cannot return, and are therefore drowned. *Matricaria Parthenium*, L., may also be seen in flower. This species is easily distinguished from *M. Chamomilla*, L., by the flattened or slightly convex receptacle of the flower heads and by the disagreeable odour of the leaves. A variety of this plant with pale yellow foliage is now a favourite plant for edging borders, etc. Under the name of featherfoil or feverfew the plant is used in domestic medicine in the West of England. *Pyrethrum roseum*, Bbrst., one of the plants yielding Persian insect powder, may also be seen in full flower. Except for the pink tinge of the florets and the more divided leaves, it might almost be passed by for the ox-eye or moon-daisy. Most of the plants alluded to as occurring in the Chelsea Gardens may also be seen in blossom here. One plant, however, remarkable for its elegant appearance, we have only noticed at Kew. This is the *Gillenia trifoliata*, Moench, a North American plant, belonging to the Rosaceæ, the root of which is sometimes found accidentally mixed with that of senega, but with which it could not possibly be confounded since it is of a deep brown colour and much branched. The flowers are white with a faint rose tint, and are somewhat like those of cyclamen in shape and size, but grow in a light spreading panicle. The leaves are trifoliate and the leafy portion of the plant has the habit of the meadowsweet. It is an exceedingly pretty plant and well worth cultivating in gardens for ornamental purposes. Several species of aconite are now coming into blossom; indeed the coming month will be the best time for studying the intricacies of this genus.

At the Botanical Gardens at Regent's Park, there may be seen in blossom in the Economic House, the *Quassia amara*, L., with handsome racemes of tubular scarlet flowers, very like those of the socotrine aloe in shape and size; the leaves resemble those of the ash tree. The cinnamon plant is just beginning to open its panicled cymes of small white flowers. The foliage of this plant, always very handsome, is now remarkably beautiful; the young leaves being of a delicate reddish tint, which contrasts well with the green glossy appearance of the older ones. Each leaf has about three distinct veins running from base to apex of the leaf and this gives it a very distinguished appearance. The stamens have the curious four-celled anthers opening by four valves, and the glandular appendages at the base of the stamens, which are so often found in the Lauraceæ.

The ordeal plant of Madagascar (*Tanghinia venenifera*, Poir), belonging to the natural order Apocynaceæ, is now in bud both here and at Kew, and will probably be in blossom in a week or two. One of the pimento plants, *Pimenta acris*, is also in blossom. It is a tall plant, reaching nearly to the top of the greenhouse, and flowering only on the upper branches. The flowers are very similar to those of the myrtle, but smaller, and are arranged in panicled cymes. The plant cultivated both here and at Kew, although labelled *Pimenta officinalis*, appears to be *Pimenta acris*. It is distinguished from the *P. officinalis* by having shorter, oval, instead of oblong-lanceolate leaves, by the flower stalks being almost at right angles with the rachis, and by the calyx having five instead of four sepals. The flower stalks are jointed a short distance below the calyx, and soon fall off after being gathered.

The fruits of *Pimenta acris* may sometimes be found mixed with the allspice of commerce. They are very similar in taste, but may be distinguished by the five teeth of the calyx; and they are also rather larger than the fruits of *P. officinalis*. The leaves of *P. acris*, when distilled with rum, yield the Bay rum of the U. S. Pharmacopœia, in which work the plant is named *Myrcia acris*, Swartz. The stems are imported into this country for walking sticks and umbrella handles.

In the open ground may be seen *Ptelea trifoliata*, L., a small tree with leaves like the ash tree, and abundant corymbs of sweet scented rather small green flowers. This plant is called in America the wafer ash, from the curious fruit, which is furnished, like the fruit of the elm, with a membranous wing which gives it the shape of a wafer.

The sweet flag, *Acorus Calamus*, L., is also worth notice and may be seen growing by the margin of the pond mixed with the yellow iris (*I. Pseudacorus*), which it so closely resembles in habit that it can only be distinguished at a distance by its paler green colour and the wrinkled margins of the leaves. The delicious fragrance of the leaves when rubbed at once distinguishes them from those of the iris. The inflorescence consists of a fleshy tapering spike or spadix, which apparently arises from the side of the leaf, but is considered to be terminal, the flower-stalk being continued beyond the spadix in the form of a leaf-like bract. The ovaries, which are closely packed together, are surrounded by a minute perianth of six membraneous leaves, within which are six stamens furnished with two-celled anthers. The arrangement of the flowers is best seen by breaking the spadix transversely. Although a common plant in several of the Eastern countries it is rare in the West of England and in Scotland. Another singular looking plant is now in blossom, the birthwort (*Aristolochia clematitis*, L.). The yellowish-looking irregular flower consists of a calyx only, which is lined with hairs pointing inwards. The anthers are sessile on the sides of the radiate stigma and the ovary is inferior. The hairs lining the calyx tube permit the entrance of small insects but do not permit their egress until the pollen has been shed, when the hairs become flaccid and pressed against the calyx and thus allow the insects to escape. The angelica, lovage, alkanet (*Anchusa tinctoria*, L.), borage, white and black bryony, Spanish broom (*Spartium junceum*, L.), distinguished from common broom by its smooth cylindrical stem, and many other interesting plants are also now coming into blossom, but want of space forbids their description.

One flower, however, *Nigella damascena*, L., can scarcely be passed on account of its abnormal structure. It is sometimes called "love in a mist," or "the devil in a bush." The leaves are as finely divided as those of fennel, whence the plant is sometimes called fennel flower. The blossom consists of five coloured sepals surrounded by an involucre of leafy bracts, which are often mistaken for a calyx, while the true calyx is confounded with the corolla. The petals, however, are very small and are hidden under the stamens, each one being hollow and containing nectar, which is protected from the rain by a little lid covering the short tube of the petal. The ovary consists of several carpels, of which the portions containing the seed are united into a kind of capsule, the styles being free. The inner portion (endocarp) of the carpels is very loosely attached to the mesocarp and separates during the ripening of the fruit. In its capsular fruit it differs greatly from the rest of the Ranunculaceæ.

A closely allied species, *Nigella sativa*, yields a seed which is supposed to have been the fitches mentioned by Isaiah, xxviii., 25, 27. The seeds are used in the east for keeping away insects from clothes and as flavouring for cakes, in the same way that caraways are used in this country, and also as a carminative.

In the last number of 'Medicinal Plants' the following are figured: *Sambucus canadensis*, L., a plant very similar in appearance to the common elder, but with leaves somewhat bipinnate, and a less arborescent habit. This is the only figure of the plant extant, as it has not been previously figured. Boneset (*Eupatorium perfoliatum*, L.), a powerful sudorific, diaphoretic and diuretic, and acting also as an emetic in large doses. It is used in America for colds, influenza, etc., and is recommended by the authors for trial in the latter complaint in this country. *Hedeoma pulegioides*, Pers., from which the American oil of pennyroyal is made, somewhat resembles the true pennyroyal in appearance, but grows in dry places. *Monarda punctata*, L., the American horsemint, which yields an oil possessing powerful rubefacient properties and contains thymol. *Plantago Ispaghula*, Roxb., an Indian plant, also has not been previously figured. The seeds are small and curiously boat-shaped and are extremely mucilaginous. They are used in India in cases where mucilaginous or demulcent drinks are requisite. They possess the great advantage of being tasteless and yielding gradually twenty times their weight of gelatinous mucilage. They are well worthy of trial in this country. *Chenopodium anthelminticum*, L., yields the oil of wormseed of the U. S. Pharmacopœia, a most nauseous remedy, which is used for the round worm in children. The authors point out that *C. ambrosioides*, L., is often confounded with it. This is very true; in fact the latter is the plant usually grown under the name of *C. anthelminticum* in botanical gardens. The other two plants figured are the *Areca Catechu*, L., and the Sago Palm (*Arenga Saccharifera*, Lab.).

In the present number, therefore, there are described and figured five American and three Indian plants. The colouring is rather above the average, the bracts of *Monarda punctata*, and the areca nut being particularly true to nature.

In the drug market we have noticed during the past month, among other things, quantities of China galls; considering the frequency with which these appear, they must be of some value in trade. Large quantities of Kowrie gum have also met with a ready sale. We believe this resin forms an excellent varnish when treated with proper solvents. Carnauba wax, used in candle making, might probably be turned to other useful purposes. Japanese peppermint oil is another article which is frequently met with at the sales now, and probably finds its way into the inferior class of peppermint lozenges. Mangalore cardamoms have of late been several times offered; they do not appear to have been noticed in 'Pharmacographia.' In shape and size they resemble the Malabar cardamoms, but are rather warty outside; the flavour is equal to that of the best kinds. Persian insect powder and the flowers from which it is prepared begin also to appear on the market, intimating that the time for insecticides and fly papers is approaching. About 250 packages of "mother cloves" have been offered during the past month. It will be remembered that Hanbury has pointed out that the presence of these fruits may be detected in powdered cloves by the presence of starch granules. There is no reason, however, why they should not form an ingredient in mixed spice, which is their probable destination. Ceylon cardamoms, salep, purree, gum acroides, pistachio nuts, and Chinese insect wax have also lately been offered. The insect wax is a very beautiful substance resembling spermaceti in appearance, but much harder. Japanese aconite, coca leaves, and jaborandi, still put in an appearance, and even condurango is offered but is scarcely likely to find many purchasers. It is rather singular that Nepaul aconite, *Aconitum ferox*, Wal., so seldom appears at the drug sales, since if of good quality it would probably meet with a ready sale on account of the quantity of alkaloid it contains, an alkaloid which is probably more powerful than that obtained from *A. napellus*; and since the root, from its large size, is less likely to be mixed with other species, it would probably be more uniform in quality.

Timbo, the root of some species of *Paullinia*, probably of *P. pinnata*, L., a native of South America, and noticed at p. 1020 in the last issue, appears to have lately attracted attention in France and in the United States. It possesses poisonous properties, and if thoroughly investigated will very probably yield another powerful therapeutic agent for use by skilful hands. Tayuya seems to have made some stir in Italy and has been lauded as a specific in syphilis; the amount of subcutaneous injection recommended to be used appears, however, to be very large.

Chrysophanic acid in the form of ointment has lately been recommended as a cure for *acne rosacea*, and the fixed oil of stavesacre as a substitute for sulphur ointment in destroying animal parasites, by Mr. Balmanno Squire. Dr. E. Woakes has found hydrobromic acid successful in certain forms of *tinnitus aurium*. An inhalation of the fumes from camomile flowers has recently been recommended in the treatment of hay fever.

The drug known as Jaborandi, which excited so much attention some short time since, is now but rarely heard of in its medical aspects, although the alkaloid pilocarpine is manufactured in Germany and elsewhere. But the drug itself seems to have suddenly dropped into disuse. Nevertheless, Dr. Bruen, physician to the Philadelphia Hospital, advocates its employment in Bright's disease, and relates some good results he has obtained with it. One or two drachms of jaborandi are made into an infusion with two ounces of water, and the entire quantity taken in one or two hours. In this way profuse prespiration is induced; the dose causing it may be repeated daily or otherwise as required. Certainly some time ago, Dr. Laycock gave an account of the successful treatment of some cases of diabetes, in the *Edinburgh Medical Journal*, but we should be inclined to question the virtues of jabo-

* The *Philadelphia Medical Times*, April 14, 1877.

randi for diseases of such serious organic nature as diabetes and Bright's disease. At least, we are convinced its properties cannot be considered to be curative, but merely of an allaying nature through some nervous interference.

Writing to the *American Journal of Pharmacy*, for June, Mr. Theodore G. Davis describes his examination of "Giles's Liniment of Iodide of Ammonium," from which he concludes that a very similar preparation may be obtained as follows:

Take of	Iodide of Ammonium . . .	grs. ii
	Camphor	
	Oil of Lavender	āā ʒi
	Water of Ammonia	℥iv
	Alcohol sufficient to make . .	Oi

and mix well.

A prize of £100 has been awarded to M. Melsens, by the Paris Academy of Sciences, for his method of curing and preventing lead and mercurial poisoning. It is now thirty years since M. Melsens advocated the use of iodide of potassium for these purposes, and further experiments, conducted conjointly with Professor Guillot confirmed M. Melsens' original view. M. Melsens considers these saturnine and mercurial affections to be due to the presence of the metals in the organs of the body in a state of combination with albuminous principles, from which the potassic iodide removes them as soluble iodides that are then carried away in the urine.

These views have of late years received singular proof, for not only has the presence of the said metals in such cases of poisoning been incontestably proved, but it has quite lately been shown that they are in actual chemical combination with definite principles such as albumin, or the phosphorized substances entering into the constitution of the brain.

The curative and preventive properties of iodide of potassium, have been abundantly substantiated during the past thirty years, by the successful treatment of large numbers of cases arising in the working of lead and mercury ores, etc.

A. Poehl, in a recent contribution,* states that he has found 0·25 per cent. of cholesterine in the urine of an epileptic patient, to whom large quantities of potassic bromide had been administered. The cholesterine which was extracted by means of ether was accompanied by glycocholic acid. These results would undoubtedly indicate a disturbance in the biliary function, for both the substances named occur in bile, and, excepting the existence of cholesterine in the brain and nerves, are indeed confined to it in health.

The *Archiv der Pharmacie* for March contains a paper by F. A. Flückiger, on the rotatory power of the volatile oils, in which the author arrives at the following conclusions:

1. There are in volatile oils both rotating and non-rotating constituents.

2. The total rotatory power is the expression of the combined powers of the individual rotating constituents.

3. As the proportions in which these constituents are present are changeable, the same kind of oil does not invariably give the same rotating power.

4. Moreover, as oils of the formula, for instance, $C_{10}H_{16}$ undergo spontaneous changes on keeping, by absorbing oxygen, or assimilating water, the optical qualities are also thereby affected.

5. Bodies which may be present in the oils and which have no effect themselves on the plane of polarization, influence the rotation nevertheless both by their quantity and quality.

6. A similar disturbance is to be expected in mixtures containing several optically active substances.

7. The dangers pointed out in (4) prevent us from viewing the total rotating power as the result of different co-operating ones, unchangeable.

In short the author is of opinion that the rotation power of volatile oils is of no real practical value of the pharmacist.

In the course of two lectures delivered before the King and Queen's College of Physicians in Ireland during last January, Dr. J. Emerson Reynolds made some observations on the influence of chemical constitution on physiological activity. The substance of these remarks has been embodied in an article printed in the *Dublin Journal of Medical Science* for May and June, 1877, and an abstract of this paper will be reproduced in a future number of this Journal.

During the past month a great deal has been heard regarding the establishment of coffee taverns with the view of promoting habits of sobriety among the people. In the appeal which the promoters of this movement make to the public, the matter is put forward, wisely enough, not in any philanthropic manner, but in a commercial spirit. This is fortunate, for the people are not to be cajoled into sobriety by overtures of patronage; if, however, they can be persuaded or weaned from the use of one principle which exercises such an intoxicating influence, to that of another free from these objections, so much the better for them. Alcohol is a food, and a pleasant food, and one which every man is justified in partaking of, so long as he does this in moderation—so long as his imbibitions do not prevail upon him to outstep the boundary of his moral relations to the world. Certain members of the medical profession have of late years lectured and acted in favour of teetotalism; and Dr. B. W. Richardson has carried the matter to such an extent, that it might be wondered why his denunciation of the use of alcohol did not include that polyatomic and potent one—sugar. It must be remembered, however, that in spite of these facts, and the recent formation of a Medical Abstinence Association, nearly two thousand physicians and the British Medical Association have (on grounds best known to themselves) recommended the use of a sherry with qualities distinctly different from those of coffee.

In calling attention once more to the contamination of green articles of clothes and furniture with arsenic, Dr. Owen Rees, of Guy's Hospital, has but confirmed what has been exposed dozens of times. It is well known that arsenical pigments have a brightness of colour which is much esteemed, and unfortunately for the public it does not care to remember that this luxury can only be had at a price—often that of health. Dr. Debus has found in a piece of green muslin which he bought—for analysis—as much as sixty grains of Scheele's green in every square yard, just as Dr. A. W. Hofmann did years ago, and it has often been pointed out that the green of venetian blinds and of wall paper is also frequently and highly charged with arsenic. Whether it is a matter calling for Government interference or not, it is certainly one that should be made widely known, so that the public may be well acquainted

* *Phar. Zeitsche. f. Russl.* 1876, pp. 737–740.

with the danger to their health from the sources indicated.

In a review of Dr. Charles Murchison's book 'On Diseases of the Liver, etc.,' *The Lancet*, speaking of chemical pathology, says: "Now that physiological and chemical laboratories, in which students can obtain manipulative skill as well as a theoretical knowledge, are attached to most hospitals, observations in this department of medicine will become every year more extensive, more accurate, and above all more practical." This would be good news indeed, if it were true, but it is a delusion. In the first place, the chemical education of medical students is not of the nature to enable them to cope with questions in chemical physiology and pathology, and even were it so, there is scarcely a laboratory in Great Britain where such subjects are investigated. This is the more to be regretted, because there can be but little doubt that the future of medical science depends in no small measure upon advances in animal chemistry.

Some experiments conducted at the West India Docks a few days ago have scarcely attracted the attention they merit. The apparatus experimented with was Jablochkoff's electric light, which consists of an electro-magnetic machine worked by a small steam-engine. With it some insulated wires are connected, and these communicate with M. Jablochkoff's electric candles, consisting of two carbons placed side by side with an insulating slip between them. It is this insulating substance which burns away with the carbons exactly in the same way as the body of an ordinary candle is consumed with the wick. The light thus obtained appeared to be quite free from the glare of ordinary burners which so painfully affects the eyes, while at the same time it is said to be so powerful that it is possible to read small print at a considerable distance from the candles. All the experiments were eminently successful, and each candle is stated to have furnished an illumination equal to that given by 100 gas-lights; moreover, the light is said to be much less expensive than gas. If this be correct, a large use may be anticipated for the invention of M. Jablochkoff.

The proposal to establish "Home Hospitals" is one which merits special and earnest consideration, inasmuch as such institutions will, if properly carried out, meet a most serious public requirement. A meeting was held on the 27th inst., at the Mansion House, and presided over the Right Hon. the Lord Mayor, to consider the advisability of establishing an association for purposes which may be briefly set forth as follows:—

To provide hospital buildings fitted with all desirable accommodations and conveniences for receiving patients of all classes who can afford to pay for medical assistance and proper skilled nursing. In this way it will be seen that not only will patients have the advantage of being treated by their own doctor, and there can be no doubt that this is a great advantage, but such an institution would meet an ever increasing and growing demand. As ordinary hospitals are now conducted, they can scarcely be said to be palatable to persons whose social position admits of the enjoyment even in sickness of those comforts indissolubly connected with such homes and assistance as affluence can secure. At the same time, to fall ill in one's own home, and to remain there during treatment, often exposes the other inmates to serious danger; infection proceeds but too often, and that not rarely to a fatal extent. But if there existed home hospitals or institutions where it would be possible by virtue of the 'sinews of war' to experience all the comforts of a home and to be attended by one's own doctor, such places would be free from all objections, and would but meet a demand which people in health may fairly make of those friends who are sick. It is therefore to be hoped that the movement now on foot will meet with the greatest success and encouragement at the hands of the general and medical public.

The month of June has been singularly devoid of news so far as chemical science goes, and there remains but one subject on the list which is to form matter for comment. It is purposed, however, to consider more fully at a future opportunity the few observations which here follow. If there be one subject more than another which is uppermost in the minds of people during this hot weather, it is that of cooling drinks. But where are they to be had? On all sides it has been demonstrated that the ordinary supplies of water are not above suspicion, and so much has been heard regarding the impurity of water and the danger accruing to health from the consumption of contaminated water, that although there may be water everywhere, it appears there is not a drop to drink. And this in such thirsty weather leads us in despair to the effervescent and diuretic waters of Wildungen, and the acidulous alkaline waters of Carlsbad, the refreshing aerated water of the Taunus Brunnen, and the springs of Apollinaris. It is a question partly of palate to decide which to drink, and partly the determination must rest upon the chemical constituents. One natural water is said to be highly charged with lime salts, and warnings of diseases of the nature of stone are urged against its use; then turning to another, the presence of potash salts may conduce to heart disease, and worse than all, a recent writer* suggests, on the basis of some experiments he has conducted, that the natural sulphuretted waters derive their sulphurous properties from the reduction of sulphates by the agency of confervæ and vegetable detritus. Thirst increases, however, and men must drink, spite of objections raised against the various natural waters. But what a moral shock would be experienced should a suspicion cross the mind that certain waters, described in such a way that mentally they may be seen flowing and sparkling from the real springs, were after all—compounded! And where is the guarantee that many of them are not? For viewing the published analyses of mineral waters, it is so palpably easy to make them artificially, that for the moment, at least, the suspicion forces itself upon the mind.

Professor Hufeland exclaims, in speaking of the Wildungen natural mineral water: "Praise and thanks to the Almighty who gave us the delightful gift of the Wildungen springs;" and yet, from the published analyses of George Victor-Quelle and Helenen-Quelle, a chemist could well undertake to compound a water which should satisfy Professor Hufeland, and he would still thank the Almighty!

To be serious, solutions containing, in a concentrated form, the peculiar constituents of mineral waters, could easily be prepared, and upon the addition of a small quantity to ordinary water, charged with carbonic acid, such artificially mineralized waters would not be distinguishable from the most charming natural waters of Germany or other countries.

* E. Planchard (*Compt. Rend.*, lxxxix., 235-237).

FORMULÆ FOR NEW MEDICAMENTS ADOPTED BY THE PARIS PHARMACEUTICAL SOCIETY.

(*Continued from page* 1041.)

CALCIUM ACID PHOSPHATE (*Phosphate acide de Chaux*).

This product, which is prepared by treating bones calcined to whiteness with dilute sulphuric acid (see Codex) and evaporating the solution obtained after removal of calcium sulphate, occurs in the solid crystalline form, or, more frequently, as a paste. In consequence of the variable quantity of water it contains in the latter state, it is preferable to prepare solutions, syrups, etc., with the bibasic calcium phosphate (see before, p. 1041) and medicinal phosphoric acid, according to the following formulæ :—

Syrup (Sirop de phosphate acide de chaux).—Bibasic Calcium Phosphate, 12·5 grams; Phosphoric Acid, sp. gr. 1·45, as little as possible, about 18 grams; Distilled Water, 335 grams; White Sugar, 625 grams; Alcoholate of Lemons, 10 grams. Suspend the calcium phosphate carefully in the distilled water and add sufficient phosphoric acid to dissolve the salt. When solution is effected, add the sugar, coarsely powdered, and let it melt in the cold or with a very gentle heat. Filter and add the alcoholate to the cooled syrup.

20 grams of this syrup represent 0·25 gram of bibasic calcium phosphate, or, approximately, 0·40 gram of pure acid phosphate.

Solution (Solution de phosphate acide de chaux).—Bibasic Calcium Phosphate, 17 grams; Phosphoric Acid, sp. gr. 1·45, as little as possible, about 23·5 grams; Distilled Water, 959·5 grams. Suspend the phosphate carefully in the distilled water, allow the solution to go on during some minutes, and filter.

15 grams of this solution represent 0·25 gram of bibasic calcium phosphate, or, very approximately, 0·40 of pure acid phosphate.

MONOBROMATED CAMPHOR (*Camphre monobromé*) $C_{10}H_{15}O, Br$.

Coarsely powdered camphor is introduced into a flask of about ten times the capacity of the amount it is intended to prepare. A fine stream of bromine is then allowed to fall upon the powder, with continual agitation; the addition of bromine ceases when the camphor is liquefied. A large long abductor tube is then fitted to the flask and the other end plunged into an alkaline solution which will absorb the vapour that would otherwise incommode the operator. The flask is placed in a water-bath that is raised to ebullition, when the reaction soon commences. This is at first rather active, there being an abundant evolution of hydrobromic gas, and some vapour of bromine and undecomposed camphor. The liquid, which is at first dark brown colour, acquires an amber colour and the evolution of gas suddenly slackens. The operation should be carried out at a temperature between 80° and 90° C. The amber coloured liquid that remains in the flask solidifies upon cooling and appears then as a slightly citrine-coloured friable mass. It is purified by treating it several times with boiling 90° to 95° alcohol, filtering the liquor and leaving it to crystallize. The crystals obtained are dried in the air upon unsized paper.

Monobromated camphor consists of tufts of acicular crystals, which are prisms with a rectangular base, attaining an inch or more in length. The crystals are hard and crackle between the teeth; they have an odour of camphor and turpentine, less pungent than that of camphor, but also less fugacious. Their slightly bitter taste recalls that of camphor and Venice turpentine. Monobromated camphor is insoluble in water; soluble in alcohol, fixed and volatile oils, ether, carbon bisulphide, chloroform, etc.

CHLORAL. C_2HCl_3O.

This body is obtained by passing into absolute alcohol a current of dry chlorine until it is saturated. When the alcohol becomes coloured yellow the vessel is heated gently and the colour disappears. The heating of the alcohol is continued and a rapid current of chlorine is kept up, until the chlorine ceases to exercise any further action upon the nearly boiling liquid. Two layers are formed. The lower is hydrate of chloral, which is separated and agitated with a considerable quantity of sulphuric acid. The chloral is found in the upper layer, and it is purified by distilling over sulphuric acid, then over quicklime. It is rectified by distilling it at a temperature of 94° to 95°.

Chloral is a very thin, colourless liquid, greasy to the touch, with a pungent odour, irritant to the eyes; it is very soluble in water, alcohol, ether and chloroform.

CHLORAL HYDRATE (*Hydrate de Chloral*) C_2HCl_3O,H_2O.

Anhydrous chloral is mixed with one eighth its weight of distilled water. There is a considerable elevation of temperature and a formation of crystals having a saccharoid aspect. The product is purified by dissolving in boiling chloroform, from which the greater part is again deposited on cooling.

Chloral hydrate boils without decomposition at a temperature of 120° C. Its odour is sharp and purgent, and it is very disagreeable to the taste. It is soluble in alcohol, ether, benzine, chloroform, carbon bisulphide, and spirit of turpentine, and extremely so in water. In aqueous solution it should be without action on or scarcely redden blue litmus paper. It is not precipitated by silver nitrate. Treated with a concentrated solution of caustic potash it is decomposed into formic acid and chloroform. The odour of chloroform ought to be very clear and the liquid colourless.

Syrup (Sirop d'dydrate de chloral).—Syrup of Orange Flowers, 950 grams; Crystalized Chloral Hydrate, 50 rams. Dissolve the crystals in the syrup and filter. 20 grams of syrup contain 1 gram of chloral hydrate.

COCA. *Erythroxylon Cocà* (*Erytroxylées*).

Only the leaves of this shrub are employed in medicine, under the following forms:

Powder (Poudre).—Powdered s. a. almost without residue.

Infusion (Tisane).—Leaves, 10 grams; Boiling Water, 1000 grams. Infuse in a close vessel and filter.

Wine (Vin).—Bruised Coca Leaves, 30 grams; Alcohol (60°), 60 grams. Macerate for 24 hours and add Lunel wine, 940 grams. Leave in contact ten days, stirring frequently, and filter.

Elixir.—Bruised Coca Leaves, 100 grams; Alcohol (60°), 600 grams. Leave in contact during ten days; express strongly; mix the liquor with 100 grams of sugar syrup, and filter.

Extract (Extrait).—Coarsely powdered Coca Leaves, 1000 grams; Alcohol (60°), 6000 grams. Introduce the powder into a displacement apparatus, and pour upon it, moderately packed, sufficient alcohol to allow it to become uniformly saturated. Close the apparatus and allow the spirit to remain in contact twelve hours; then run the liquor off, and afterwards pass through the remainder of the alcohol. Distil off the alcohol and bring the residue to the consistence of a soft extract.

Syrup.—Coca Leaves, 100 grams; Boiling Water, 1000 grams. Infuse for 24 hours, express, and filter upon sugar in the proportion of 100 parts of infusion to 190 of sugar.

CALUMBA WINE (*Vin de Colombo*).

Lunel Wine, 940 grams; Alcohol, 60 grams; Calumba Root, 30 grams. Add the wine and alcohol to the coarsely crushed Calumba root, macerate for ten days with occasional stirring, and filter.

Calumba Wine may also be prepared with Malaga wine, but in that case wine must be substituted for the alcohol.

(*To be continued*).

The Pharmaceutical Journal.

SATURDAY, JUNE 30, 1877.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W.*

Envelopes indorsed "Pharm. Journ."

SWEET SPIRIT OF NITRE.

SWEET spirit of nitre has again become the subject of discussion in a court of law, under the circumstances detailed in the report we publish at page 1071, but fortunately the case to which we refer was not in this instance based upon the assumption that the British Pharmacopœia is the sole standard of quality and authority for the preparation of all the compounds that are sold to the chemist and druggist. Such an assumption would be in our opinion not only unreasonable but untenable. To object to sweet spirit of nitre, such as is very commonly met with, having a specific gravity of ·850, upon the ground that it does not agree with the description given in the British Pharmacopœia, and because it has probably not been prepared exactly according to the directions there given, and to institute a prosecution on that ground against a person selling it, would be straining the Sale of Food and Drugs Act beyond the intention even of those who hold strong views as to the magnitude of the evil of adulteration.

It is, however, a very different case when we find an article sold under the name of sweet spirit of nitre, which contains some 20 to 27 per cent. more water than it ought to contain, while at the same time it is entirely destitute of the particular substance which is considered to constitute the active medicinal ingredient of this preparation. Having regard only to the excess of water, amounting to from one-fifth to nearly one-third of the article as it was sold, the difference between such compound and that to which the title of sweet spirit of nitre can be properly applied, is evidently one that is not fully allowed for by the difference in price at which they are sold. The difference in price, upon which so much stress was laid by the defence, is moreover not a difference to the advantage of the consumer, and its character is partly indicated by the total absence of any nitrous ether in the samples.

The allegation that the preparation, for the sale of which the defendants were prosecuted, was used popularly in a manner distinct from the medicinal use of the legitimate sweet spirit of nitre is not entitled to very much respect. If, indeed, it be true that, as stated by the solicitor who conducted the defence, it is the popular practice to administer as much as half an ounce of the compound which he sought to represent as a proper article of trade, there is in this circumstance alone a reason for preventing its sale. We should be loth to see our druggists' shops become in any degree tippling shops or offering inducements to drunkards to seek intoxication under the guise of medication, after the manner which gave the United States Government a pretext for bringing the trade in that country under the operation of the Excise laws. But there is another use to which sweet nitre is frequently put, viz., as a simple remedy for slight febrile conditions in young children, and it does not require great power of imagination to conceive the effect produced upon children by giving them copious doses of an article three times as strong as common gin, and using it in the free manner MR. BERRY stated to be usual.

In conclusion, there is one point to which we would allude as worthy of note, and that is, that in not one case was the defendant a chemist and druggist. Of course it would be more gratifying to know that the sale of such preparations was not carried on by incompetent persons, like grocers and herbalists, but it is some consolation that the prosecution and publication of such cases will help to educate the public as to the folly of going for their medicines to persons to whom the label on the bottle or package is usually the sole character by which they can identify or judge of the quality of the articles they sell.

THE MEDICAL ACT AMENDMENT BILL.

THE curtailment which this Bill has met with at the hands of its nominal author does not appear to recommend itself to the judgment of the Nottingham Branch of the Medical Defence Association. On the 14th inst. a meeting was held by that body and several resolutions were passed, which have been communicated to the medical papers. The first urges upon DR. LUSH, and the other Members of Parliament associated with him in introducing the Bill, the great importance of adopting a clause whereby prescribing, as at present carried on by "many druggists and "other unqualified practitioners," should be considered an infringement of the Act, and render such persons liable to a penalty. Another lays down the proposition that no amendment of the Medical Act can be considered satisfactory which does not make the carrying out of prosecutions of offenders incumbent on the General Medical Council.

The Bill does not appear to make much progress in the House, the second reading having been again postponed until the 9th of next month.

COPPER IN PEAS.

AT the Borough Court of Bradford, on the 25th inst., several wholesale grocers were summoned for having sold preserved peas coloured with copper. MR. RIMMINGTON, the Borough Analyst, submitted his certificate which showed that the three samples of peas contained copper varying in amount from

2 to 2½ grains of sulphate of copper to the pound. In the course of the defence it was mentioned that in reply to a letter addressed to the parties who supplied the peas sold, a statement had been received to the effect that ten pint tins of the peas contained barely two grains of copper, and that this quantity was the minimum amount required to preserve the colour of the peas.

The opinion has more than once been stated in these columns that the copper undoubtedly present in preserved peas does not constitute an addition made with the view either of colouring them or of preserving their colour, and this opinion remains unaffected by the above statement. The copper is not unlikely introduced in an accidental manner. But what is more important to determine is the truth as to the oft-stated prejudicial influence of such peas as an article of food; this is a matter by no means definitely established, and we question whether it would bear investigation.

THE BRITISH ASSOCIATION.

SOME of the arrangements for the next meeting of the British Association for the Advancement of Science, which is to commence at Plymouth on Wednesday, August 5, under the presidency of Professor ALLEN THOMSON, M.D., LL.D., F.R.S., etc., have now been announced. The reception room will be opened for the issue of tickets, etc., at 1 P.M., on Monday, August 13, and on following days at 8 A.M.; no tickets will be issued after 6 P.M. The first General Meeting will be held on Wednesday, the 15th, when Professor THOMSON will assume the presidency and deliver an address. On Thursday, the 16th, and Tuesday, the 21st, *soirées* will be held. On Friday evening, August 17, at 8·30, there will be a discourse by Professor WARINGTON SMYTH, F.R.S., on the Physical Phenomena connected with the mines of Devon and Cornwall; and on Monday evening, the 20th, there is to be another discourse, the final arrangements for which have not yet been made. The concluding General Meeting will be held on Wednesday, August 22.

The local arrangements are not yet matured, but they will probably include an exhibition of paintings chiefly by artists of Devon and Cornwall. There will also be excursions to Torquay or Kent's Hole, and the Dart; up the Tamar or Cotehole; to the Moss Clayworks, over Dartmoor; to the Eddystone Breakwater and Government establishments; to the Caradoc Mines; and to Penzance, the Lizard, the Land's End, etc.,

In accordance with usual arrangements, the annual meetings of the British Pharmaceutical Conference will also be held in Plymouth, commencing on Tuesday, August 14, at 10 a.m. It may also be added that at the last meeting of the Council of the Pharmaceutical Society of Ireland a resolution was passed instructing the Secretary to write to the President of the British Pharmaceutical Conference, expressing a hope that the Conference will meet in Dublin in 1878, at the time of the visit of the British Association.

Transactions of the Pharmaceutical Society.

DINNER IN AID OF THE BENEVOLENT FUND.

The following donations have also been received since the last publication of the list:—

Cresse and Blackwell, 21, Soho Square, W.	10	10	0
Lockyer, George, Jun., 21, Mincing Lane, E.C.	1	1	0

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A Meeting of the Society was held on Thursday, June 21; Dr. Gladstone, President, F.R.S., in the chair. After the announcement of visitors, the minutes of the previous meeting were read and confirmed.

The President then announced the following grants from the Research Fund of the Society: Mr. Johnson, £50, for researches on potassium triiodide; Dr. Wright, £50, for researches on chemical dynamics; Mr. Neison, £25, for researches on octyl compounds; Mr. C. Williams, £25, for a research on hydrocarbons of the paraffin series; Mr. G. Harrow, £10, for a research on acetoacetic ether.

The list of presents to the library was then read by Dr. Armstrong. The following certificates were read for the first time: Dr. G. Kühnemann and J. Hadkinson; the following gentlemen were then balloted for and duly elected, the balloting occupying the Society till nine o'clock: F. H. T. Allan, H. S. Bell, C. T. V. Buck, J. Y. Buchanan, Dr. A. E. N. Franchimont, J. Gardner, W. Lapraik, G. A. Milne, J. Napier, C. G. Neison, J. L. Notters, J. H. Poland, I. Scarf, H. Senier, H. G. Stacey, S. G. Thomas, Beeby Thompson, F. W. Toms, A. Watt, W. Webster, jun., J. R. Young.

The Secretary then read a paper—

On Diamyl. By H. GRIMSHAW.—This substance was prepared from amyl bromide, boiling at 119°–123°; to 300 grm. of the bromide were gradually added 50 grm. of sodium, and the mixture finally raised to 140°–150° C. for about six hours. On distilling, diamyl was obtained, which was dried and purified by fractional distillation. When pure it boiled at 160° C. at 751 mm. By passing dry chlorine into the vapour of the boiling hydrocarbon, the chloride was obtained, boiling at 198°–213°. By heating the chloride in sealed tubes at 160°–170° for about forty-eight hours with lead acetate and acetic acid, an acetate was formed, boiling at 198°–215°, as a colourless mobile liquid of a fruity smell. On mixing this liquid with an excess of caustic potash and a little water, allowing to stand for twenty-four hours, and then boiling for six hours, an inverted condenser being attached, two alcohols were obtained, boiling at 202°–203° and 211–213° respectively; they were light, colourless liquids, having an agreeable orange-like odour. These two liquids were mixed and oxidized with bichromate of potash and sulphuric acid, and the acid distilled. The silver salt had the composition $C_2H_3O_2Ag$. Another acid, whose silver salt contained 63·66 per cent. Ag was obtained by the action of bichromate in the cold.

The next paper was read by the Secretary.

On the Action, at a high Temperature, of Certain Volatile Metallic Chlorides on Certain Hydrocarbons. By WATSON SMITH.—The author investigated the action of antimony trichloride and tin tetrachloride on naphthalin benzene and toluene, when these substances were severally passed in the state of vapour through red-hot tubes. Benzene was boiled and the vapours passed through a flask containing boiling antimony trichloride, the mixed vapours then passed through a heated combustion tube, loosely filled with fragments of pumice and porcelain; the products of the reaction were passed into a receiver connected with which was a Liebig's condenser. The contents of the receiver were returned to the benzene flask, a fresh quantity of trichloride added to the other flask, and the distillation repeated a second and third time. The reaction expected was

$$6C_6H_6+2SbCl_3=3\begin{matrix}C_6H_5\\C_6H_5\end{matrix}+6HCl$$

The diphenyl was extracted from the residues and purified: it melted at 70°, boiled at 243°, the yield of diphenyl by this process was much larger than that obtained by passing the vapour of benzene alone and through a red-hot tube (Proc. Lit. and Phil. Soc., Manchester, 1871), but was not quite satisfactory, so the action of tetrachloride of tin was tried: 62·4 grm. of benzene were distilled with 52 grm. of the tetrachloride. A very large yield of diphenyl was obtained in one distillation and very little benzene escaped decomposition. *Toluene and antimony trichloride:* oils were obtained, boiling 270°—320°, having very disagreeable odours resembling burnt cheese. *Naphthalin and Antimony Trichloride*—77 grm. of naphthalin were distilled with 46 grm. of trichloride, the mixed vapours being passed through a red-hot tube. The distillation was repeated three times, 15 to 16 grm. of trichloride being added. 37·4 grm. of a crude product were obtained by distillation; this yielded 24·2 grm. of yellow crystalline isodinaphthyl. *Naphthlalin and Tin Tetrachloride.*—Some difficulty was experienced from the blocking of the tubes by the separated carbon, and a special form of apparatus had to be devised. A large yield of isodinaphthyl was obtained, but the process is not so convenient as when antimony trichloride is used. A reddish oil boiling about 250°–300°, resembling "Red Anthcraene Oil," and some quantity of a citron yellow powder were formed.

II. *Isodinaphthyl Sulphoacids and Salts with certain other Derivatives.*—By treating 1 part of naphthalin with 5 parts of concentrated sulphuric acid for four hours to 140°–150°, treating with barium or lead carbonate, and evaporating, a large yield of the soluble barium or lead salt was obtained, the difficultly soluble β salts separating out during evaporation. By heating 4 parts of isodinaphthyl with 2 parts of concentrated sulphuric acid to 180°–190° for five hours, a large yield of the β acid was obtained with but little α acid. The α acid was prepared from the barium salt as minute transparent, yellowish, slightly fluorescent scales, easily soluble in water and ether, slightly in absolute alcohol, insoluble in benzol; the lead salt is easily soluble in water and weak alcohol. The β acid resembles the α acid, but is less soluble; its lead salt is difficultly soluble in water. An oxydinaphthyl or phenol, a nitro-substitution product, and a cyanogen derivative were prepared, and to some extent examined.

III. *A new Dinaphthyl.*—When napthalin is submitted to a high temperature, either alone or in the presence of a volatile easily decomposable chloride, a yellow substance, soluble in petroleum spirit, is formed together with isodinaphthyl. In the purification of the crude isodinaphthyl by petroleum spirit a fine red solution was obtained, which by spontaneous evaporation yielded several crops of warty crystals. These were distilled and gave a transparent bright resinous distillate. By fractional crystallization and the expenditure of much time and trouble, the author succeeded in separating three substances melting at 75°, 147° and 250°–255° respectively; the body melting at 250°–255° was present in very small quantities in brown transparent plates, and was soluble with a magnificent blue fluorescence in benzene or alcohol. The author believes it to be identical with Lossen and Otto's polymeric dinaphthyl (Ann. Chem. Pharm. lxviii. 89, and cxlvii. 170, 181). The body melting at 147° is an isomeric dinaphthyl, obtained also by Lossen by the action of manganese and sulphuric acid on naphthalin (Ann. Chem. Pharm. lxviii. 71); it boils at 300°. The body melting at 75° is a third dinaphthyl. So three isomeric dinaphths are obtained by passing naphthalin together with antimony trichloride through a red-hot tube; the one melting at 187° is formed in the largest quantity; next, the one melting at 75°, whilst only a small quantity of that melting at 147° is obtained. The three isomers are, then—

Dinaphthyl, No. 1.—Isodinaphthyl. β.β.

Melts at 187°

Crystallizes most readily in beautiful rhombic plates.

Soluble with difficulty in alcohol and ether, with moderate facility in boiling petroleum spirit and benzol.

Dinaphthyl, No. 2.—Lossen's. α.α.

Melts at 147° Smith.
154° Lossen.

Crystallizes readily; form variable, modified by impurities.

Soluble in alcohol and ether; easily in petroleum spirit and benzol.

Dinaphthyl, No. 3. α.β.

Melts at 75°

Crystallizes with much difficulty, requiring days or weeks.

Soluble. Very soluble in alcohol, ether, benzol and petroleum spirit.

In conclusion, the author points out the interesting results to be obtained by gentle oxidation, chlorination, etc., of the above bodies, a subject which he intends to take up on an early occasion.

The next paper was—

On the Action of Alkaline Oxalates on the Earthy Carbonates, and of Solutions of Alkaline Carbonates on the Earthly Oxalates. By WATSON SMITH.

The author having observed that when a solution of ammonium oxalate was brought into contact with chalk or powdered marble an ammoniacal odour at once became apparent set to work to measure the extent of this and similar reactions. Sodium oxalate in solution on calcium carbonate, if the reaction were complete, 5·3 grm. of sodium carbonate would have been formed; in the cold 1·05 grm. was obtained = 19·83 per cent.; boiling for three hours, produced 1·2135 grm. or 22·90 per cent. Sodium carbonate solution on calcium oxalate in the cold, 16·07 per cent.; boiled for thirty minutes 52·34 per cent. Sodium oxalate in excess on powdered marble in the cold, 20·97 per cent.; boiling, 26·00 per cent. Sodium carbonate in excess on calcium oxalate, cold, 13·09 per cent.; boiling, 78·35 per cent. By treating the same portion of calcium carbonate with successive quantities of sodium oxalate, 45·87 per cent. of sodium carbonate was obtained, the action gradually ceasing. By heating the same quantity of calcium oxalate with successive portions of sodium carbonate, 93·83 per cent. was decomposed. Sodium oxalate on strontium carbonate, cold, 7·63 per cent.; hot, 7·63 per cent. Sodium carbonate on strontium oxalate, cold, 57·24 per cent.; hot, 79·96 per cent. Sodium oxalate on barium carbonate, cold, 4·84 per cent.; hot, 4·97 per cent. Sodium carbonate on barium oxalate, cold, 73·20 per cent.; hot, 87·96 per cent. Ammonium oxalate on calcium carbonate, cold, 12·27 per cent.; with excess of oxalate, 13·53 per cent.; with excess of carbonate, 19·94 per cent. Sodium oxalate on lead carbonate, cold, 6·35 per cent.; hot, 13·08 per cent. Sodium carbonate on lead oxalate, cold, 81·54 per cent.; hot, 90·61 per cent.

The next paper was entitled

Note on Thallous Platinocyanide. By R. J. FRISWELL and A. J. GREENAWAY.—In 1871, one of the authors described a compound of thallous platinocyanide with thallous carbonate Tl_2PtCy_4,Co_3Tl_2, crystallizing in dark red crystals reflecting a green metallic light; by treatment with nitric acid colourless crystals were obtained, having the formula Tl_2PtCy_4. Carstanjen, however (Jour. Prac. Chem. 102, p. 144; Watts, Dic. Supp., I., 536), states that he obtained thallous platinocyanide in blood red needles having a metallic green lustre by reflected light. As this is not in accordance with the above statement, the authors have reinvestigated the subject with great care. Hydroplatinocyanic acid was prepared and neutralized with an equivalent quantity of thallous carbonate $Tl_2CO_3+H_2PtCy_4=Tl_2PtCy_4+CO_2+OH_2$, a colourless neutral acid was obtained. On adding to a fresh portion of the acid, twice the above amount of thallous carbonate, the dark red salt, already described, was obtained. Baric platinocyanide was also decomposed by thallous sulphate; the resulting crystals were quite colourless. The authors gave the following analysis of the colourless thallous platinocyanide: Pt 28·09 C 6·60 and 6·78 N 7·76 and 7·91. Theory requires Pt 27·82 C 6·76 N 7·89. These numbers show conclusively that the salt described by Carstanjen (especially as he gives no analysis) was really the double carbonate, and that thallous platinocyanide is a colourless compound.

The next paper was—

On Crystallized Barium Silicitate. By E. W. PREVOST. Pisani (*C. Rend.*, lxxxiii., 1056) states that he has found the above substance attached to the sides of bottles in which barium hydrate solution had remained for several years. The author has obtained crystals formed under the same conditions, and having the same measurements, but containing 0·78 per cent. silica: they consist of barium hydrate, and contain 45·4 per cent. water, and 72·5 per cent. barium. Theory requires 45·6 per cent. and 73·09 per cent.

The next paper was—

A Note on Anethol and its Homologues. By W. H. PERKIN. —The author mentioned that he had already (*Chem. Soc. Jour.*, 1877, 409-414) stated that methylparoxyphenylacrylic, methylparoxyphenylcrotonic, and methylparoxybenzylangelic acids, when heated, split up into carbonic acid and oily products; that from methylparoxyphenylcrotonic acid, being supposed to be anethol, and those from the other acids, homologues of that substance. Further experiments on this subject have since been made. On boiling *methyparoxyphenylacrylic acid* in a bulb-tube provided with a side delivery tube, the heat being so moderated that a thermometer placed in the upper part of the tube does not rise above 220°-240°, an oil gradually distils over, but after a time ceases, leaving a good deal of a dark coloured residue in the retort. The oil after purification gave numbers on analysis corresponding with the formula $C_9H_{10}O=C_6H_4\left\{\begin{matrix}OCH_3\\ CHCH_2\end{matrix}\right\}$ When cooled in a freezing mixture it solidifies to a crystalline mass, having an odour and taste like fennel. When heated in a retort it rapidly changes, and before much has distilled over the principal part of it thickens, and on cooling forms a transparent nearly solid product. When oxidized it yields apparently anisic acid. *Methylparoxyphenylcrotonic acid*, when distilled in the same manner as the above also yields an oil but leaves less residue in the retort. This oil does not change much on distillation, and when fractionated begins to boil at 220°, the principal quantity, however, comes over between 230°-240°, leaving a little high boiling residue in the retort. Both of these fractions when cooled in a freezing mixture solidify, but the higher fraction freezes most readily and becomes harder; on pressing these products between bibulous paper white crystals were obtained, which were purified by crystallization from alcohol. This substance has the composition, melting and boiling points as well as the taste, odour, and appearance of anethol. This indicates that the constitution of the C_3H_5 group in anethol has the constitution $CH=CH-CH_3$ as will be seen thus—

$$\underbrace{C_6H_4(OCH_3)CH,CH,CH_2,COOH}_{\text{Methylparoxyphenylcrotonic Acid.}}=\underbrace{C_6H_4\left\{\begin{matrix}(OCH_3)\\ (CHCHCH_3)\end{matrix}\right.}_{\text{Anethol.}}\begin{matrix}\\ \\ +CO_2\end{matrix}$$

The author proposes to examine this body more critically when a sufficient quantity has been prepared. Methylparoxylphenylangelic acid also, when carefully distilled, yields a crystalline anethol-like body as already mentioned in the paper previously referred to, but although there can be no doubt about its formula, it has not yet been obtained sufficiently pure for analysis.

Dr. Armstrong thought that it was not at all proved that the C_3H_5 group had the constitution $CH=CH-CH_3$, as isomeric changes might occur in the heating and from other considerations it seemed much more probable that its constitution was $CH_2=CH-CH_2$.

The next paper was entitled—

Note on Persulphocyanic Acid. By R. W. ATKINSON, Japan. The author commences by stating that the constitution of the above body is still uncertain, and points out the decompositions which must be indicated by its formula. The substance was prepared and purified by recrystallization from boiling water; its properties are described, also the precipitates produced by argentic nitrate, mercurous nitrate and solution of iodine. Numerous experiments were made by adding varying quantities of argentic nitrate to the acid dissolved in alcohol, and evidence of the existence of $Ag_2C_2N_2S_3$ and $AgHC_2N_2S_3$, was obtained. When the yellow argentic persulphocyanate is boiled with water it quickly decomposes with effervescence, a heavy black precipitate being produced. Attempts were made to determine the composition of this precipitate but the results obtained vary widely. The general nature of the reaction is probably—

$$Ag_2C_2N_2S_3+3\,AgNO_3=$$
$$2\,Ag_2S+AgCNS+CO_2+N_2O_4+N_2O_3.$$

The mercurous salt is not apparently decomposed by boiling. In conclusion the author points out the resemblance between the (probably correct) formula proposed by Glutz (*Deut. Chem. Ges.*, iii., 343), with that of parabanic acid.

The next paper was on—

The Oxidation Products of the Aloins. By W. A. TILDEN, D.Sc., Lond.—When nataloin is digested with 10 per cent. solution of bichromate of potassium, acidified with sulphuric acid, carbonic and acetic acids were alone obtained. If, however, barbaloin be similarly treated, only a small quantity of acetic acid is formed, but a brown precipitate is deposited; this on analysis gave C 63·3 per cent. H 3·2 per cent. The corresponding body from socaloin, and purified by a solution in acetic ether, etc., gave C 63·8 per cent. H 3·4 per cent. On treating in a rapid current of carbonic anhydride, a yellow pulverulent sublimate, containing a few orange needles, was obtained: this recrystallized from acetic ether, gave C 61·6 per cent. H 3·4 per cent. The substances from socaloin and barbaloin are identical, and the author proposes the name of aloxanthin. This substance forms an orange granular powder, melting imperfectly at 260°-265°, subliming slowly at the same temperature in orange scales and dust. It is slightly soluble in water, very slightly in bisulphide of carbon, chloroform, alcohol, and ether. Its best solvents are ethyl acetate and glacial acetic acid. In caustic soda it dissolves to a bright cherry red solution without absorption bands. Heated with zinc dust, a hydrocarbon having a greenish fluorescence is obtained, melting at 203°-205°: this consists principally of methylanthracene. Aloxanthin, fused with caustic potash, forms an indigo-blue mass. Aloxanthin does not combine with mordants. Its formula is probably $C_{15}H_{10}O_6$, being a methyltetroxyanthraquinone. Three analyses of the purest sample gave C 62·2 H 3·3. Theory requires C 62·9 H 3·3 per cent. An acetyl compound was formed. Aloxanthin treated with fuming nitric acid in the cold yields a yellow nitro-acid, having the properties of aloetic acid.

The Society then adjourned over the vacation to Thursday, November 1.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

THE DIFFERENT METHODS OF FLOWER FERTILIZATION.*

BY J. F. SAVORY.

(*Concluded from p.* 1052.)

Another striking instance occurs in *Epilobium angustifolium* and *E. parviflorum.* These two flowers again, differ most strikingly in a similar manner. The flowers of *Epilobium angustifolium* being of a larger size, brighter colour, grouped in splendid clusters, and exciting attention at a great distance are so largely visited by insects as never to have any need of self-fertilization. Indeed, this is impossible, the four stigmatic branches unfolding so long after the maturity of the eight anthers, and so far overtopping them as to be completely shut out from the pollen of the same flower. The flowers of *Epilobium parviflorum,* on the other hand, being of smaller size, lighter colour, and single, are so inconspicuous that insects but rarely visit them. Accordingly, its four upper anthers so closely surround the four-lobed stigma, which is mature at the same time, as to cover it largely with its pollen, whilst the pollen grains of the four lower anthers, lying on the way to the honey, cannot reach the stigma of the same or of another flower unless transferred by insects.

One more illustration. Among the many species of the genus Polygonum which grow in our country, there are two, *P. Fagopyrum* and *P. Bistorta,* most distinguished by their attractiveness for insects, which is due, not only to the size and colour of the single flowers and to their collection into handsome spikes, but also and even more perhaps, to the abundance of honey secreted by eight globular nectaries at the base of the filament. Thus by the frequent visits paid them by insects, they have been adapted to inevitable cross fertilization by these visitors, self fertilization having become difficult or even impossible.

The least attractiveness for insects, on the contrary, among all native species of Polygonum, is possessed by *P. aviculare,* its flowers being of small size and of a greenish and white or reddish colour, standing singly on procumbent plants and offering only a small quantity of pollen to insects, but no honey. No wonder then, that insects are induced in very rare cases only to visit and fertilize them and in compensation for the loss of cross fertilization, these little flowers regularly experience spontaneous self fertilization, the three inner anthers lying so close to the stigma, that their pollen grains inevitably come into contact with them.

There are many other genera containing species quite analogous to those just mentioned, such as the geranium, stellaria, cerastium, rubus, veronica, carduus, hieracium, etc.; and as a summary of the recorded facts, we may admit the following propositions: In many species, the flowers vary, and have always varied in size, colour, the quantity of secreted honey, and consequently in their attractiveness for insects. Whenever in such a varying species, the one variety possesses such a degree of attractiveness for insects as to receive sufficiently frequent visits from them, those variations which afford facility for cross-fertilization by insects have always been preserved and accumulated by natural selection, whereas the possibility of self-fertilization has, at the same time, frequently been lost. Hence we may infer that cross-fertilization is more advantageous to a plant than self-fertilization. Whenever, on the contrary, another variety presents so little attractiveness for insects as to remain commonly overlooked by them, only such individual peculiarities as induce self-fertilization have been preserved and accumulated by natural selection, whereas cross fertilization by insects has frequently become very difficult, although perhaps never quite impossible.

There is another curious point in regard to the facts stated above. We have seen that more or less attractive flowers, adapted to cross or self-fertilization, sometimes occur in slightly differing, sometimes in well marked species; sometimes in doubtful, sometimes in good and distinct varieties.

The two functions of crossed and self-fertilized flowers, which we have seen to occur in different forms of the same species or genus, are in most cases successively presented by the same form of flowers, and the modifications by which self fertilization is attained by different plants, where the visits of insects are wanting, are almost as various as the contrivances by which cross-fertilization by insects is secured. I will now give an illustration.

Myosurus minimus is as remarkable for the great variability in the size of its flowers and in the number of its parts, as for the enormous growth of the cone of pistils, which affords no other benefit to the plant but the self-fertilization of the greater part of the numerous stigmas by the small number of anthers, in case it is not visited by insects. When the flower opens it stretches forth its small petals, which serve as nectaries, and offers a small drop of honey, by which very minute insects (their size not exceeding 1½ mm. in length), are attracted in sunny weather. These little visitors, licking up the drops of honey and walking round the cone of ovaries, stop many seconds in a single flower before visiting another. The anthers lying close round the cone of ovaries open by two lateral slits and are soon afterwards covered with pollen on their whole outer surface. Consequently, insects walking round the ovaries may easily be charged with pollen, and flying to another flower effect cross-fertilization. But upon the whole the flowers, because of their being scentless, and very inconspicuous, are so scantily visited by insects, that I believe that even in sunny weather more than 90 per cent. remain without any visit.

This deficiency of secured cross-fertilization is supplied by regular self-fertilization in the following way:—The axis of the flower, extending gradually during the blooming time into a long cone, brings a great part of the stigmas into contact with the lateral pollen grain of the anthers, those which now are in contact with the anthers soon overgrowing them, and others below the anthers now reaching them. Thus a number of styles grazing the anthers during the growth of the long cone, are self-fertilized by about five or more pollen grains; besides, also, the lowest stigmas of the flower are fertilized by their own pollen, many pollen grains falling down from the anthers. Consequently, only those ovaries are never self-fertilized which are already situated above the anthers before the opening of the flower.

Whilst in *Myosurus minimus* self-fertilization is effected by a number of stigmas passing along each of the anthers, *Myosurus versicolor* attains the same effect in the contrary way, viz., all five anthers of the flower passing along the single stigma.

We now come to fertilization without insect aid. There are some attractive flowers which are as much adapted to secure self-fertilization, as other flowers are for cross-fertilization. For example, take the greenhouse annual, *Boswallia elata,* belonging to the Scrophulariaceæ, having an attractive blue flower. Not only does it produce abundance of perfect seeds without insect acid, but also, the entrance of an insect would ensure self fertilization. The style is nearly as long as the corolla tube, and the slightly longer stamens are arranged closely around it. Two of the anthers are inverted over the stigma, and their connective is densely bearded, appearing like petaloid processes completely closing the tube of the corolla. No insect can thrust it proboscis into the tube except through this mass, and if it has any foreign pollen adherent to it, it will be cleaned off by the beard. Furthermore, the very act of penetration will thrust the anthers forward on to the pistil, and aid in rupturing the pollen sacs, and securing self-fertilization.

Fertilization by birds.—In *Marcgravia Nepenthoides*, a native of America, there is a group of pitchers below the flowers, which attracts insects. Numerous insectivorous birds come to feed on these insects, and in doing so necessarily brush off the pollen and convey it to other flowers. In a species of *Erythrium*, having a sword-shaped flower, which will only admit very minute insects to the nectary, two species of long-billed humming birds, probe the flower in search after the insects, and in doing so get the pollen on their heads, and convey it to other flowers. In this case, the nectar is protected by a thick fleshy calyx, which effectually prevents bees and wasps from breaking in and stealing the attractive liquid.

I now pass to another remarkable peculiarity of plants, which I think may possibly have reference to their relation with insects, and that is the habit of "sleeping," which characterizes certain species.

Many flowers close their petals during rain, which is obviously an advantage, since it prevents the honey and pollen from being washed away or spoilt. Everyone however, has observed that even in fine weather, certain flowers close at particular hours. This habit of going to sleep is surely very curious. Why should flowers do it?

In animals we can understand it: they are tired and require rest. But why should flowers sleep? Why should some flowers do so and not others? Moreover, different flowers keep different hours. The daisy opens at sunrise, and closes at sunset, whence its name, "day's eye." The dandelion is said to open about seven and close about five. The white water lily from about seven to four. *Tragopogon pratensis* opens at four in the morning and closes just before twelve, whence its English name, "John, go to bed at noon." Farmers' boys, in some parts, are said to regulate their dinner time by it. Other flowers on the contrary, open in the evening. Now, it is obvious, that flowers which are fertilized by night flying insects, would derive no benefit from being open by day; and on the other hand, that those which are fertilized by bees and day insects, would gain nothing by being opened at night. Nay, it would be a distinct disadvantage, because it would render them liable to be robbed of their honey and pollen by insects which are not capable of fertilizing them. I would venture to suggest then, that the closing of flowers may have reference to the habits of insects, and it may be observed also in support of this, that wind fertilized flowers do not sleep; and that some of those flowers which attract insects by smell, emit their scent at particular hours: thus *Hesperis Matronalis* and *Lychnis vespertina*, smell in the evening, and *Orchis bifolia* is particularly sweet at night.

But this sleep of plants, or closing of the flower at nightfall, has also been found to have reference to self-fertilization in *Claytonia Virginica*, and some buttercups, which seed abundantly without being visited by insects.

In *Claytonia*, the stamens, on expanding, fall back on the petals expanded during daylight. At night, when the flower closes, the petals carry the anthers into closer contact with the stigmas, and actual fertilization only occurs in this way. In many cases, the stamens recurve so much as to be considerably doubled up by the nocturnal motion of the petals; thus the anthers are not brought into contact with the stigmas, and the flowers are barren.

In specimens of *Ranunculus bulbosus*, in the evening following the first days' expansion of the flower, the immature anthers and young stigmas were found to be covered with pollen. This would naturally be supposed to be the consequence of insect visits, but none had taken place in the cases examined. However, on carefully examining the flower, it was found that coincidently with its expansion, a single outer series of stamens shed their pollen into the petals, from which it easily fell on to the immature anthers and stigmas when the flower closed for the night.

Another equally remarkable instance of self-fertilization occurs in *Ranunculus abortivus*, whose petals do not close at night. It seeds profusely, yet is wholly neglected by insects, notwithstanding that it possesses large nectariferous glands. Instead of the flower closing, the slender pedicles droop at night, inverting the flowers and thus allowing the pollen to fall from the petals on which it is shed upon the stigmas.

In connection with this subject of fertilization, the production of "hybrids," or "mules," deserves attention. When the pollen of one species is applied to the stigma of another species, so as to effect fecundation, the seeds thus formed give rise to individuals which are intermediate in their characters between the two parents. The plants produced by this heterogeneous fertilization are called hybrids or mules.

A true hybrid is a cross between two species, but the term is often applied to crosses between mere varieties, races, or sub-species. The latter sort of crosses have been occasionally denominated "sub-hybrids" to avoid confusion. In hybridizing it is necessary to bring together species which are allied, as for instance, the species of the same genus, or those of allied genera. It is not easy, however, to determine the plants which can produce hybrids. Many plants which seem to be nearly allied do not inoculate each other. Sageret failed in his endeavours to fecundate an apple tree by a pear tree, and no one has succeeded in getting hybrids between the currant and gooseberry, nor between the strawberry and raspberry. It is not common to meet with hybrids in a wild state, because there is a much greater likelihood of the pistil being impregnated by the pollen of the anthers beside it, than by that from a distance, and if fecundation has taken place, then pollen applied from other sources has no effect.

It has been found that for successful hybridizing the pollen must be in perfection, and the stigma also must be fully developed. There appears always to be a preference for its own pollen on the part of the stigma. When strange pollen is applied, even in the case of species which hybridize, it does not act so effectually on the ovules as the pollen belonging to the flower.

When impregnation takes place between two pure species, the characters of the parents never remain pure and unaltered in the formation of the hybrid. In general every part of the new product is modified, so that it presents a decided difference from either of the parents, though resembling one more than the other. Sometimes the influence of the male predominates, sometimes that of the female. Hybrids occur in which the characters of the parents are intimately blended, so that it is impossible to say to which there is a greater resemblance. Sometimes the number of the organs is curiously intermediate, thus cucubalus has three stigmas, and lychnis five, and a hybrid between them has four. Again hybrids occurs in which one part or another approaches the paternal or maternal form, though the characters of the parent never pass altogether pure into the new organism. There is a third set of hybrids in which there is a resemblance to one of the parents, whether male or female, so decided, that the agreement is at once perceptible and beyond doubt.

Hybrids, although they may be fertile at first, rarely continue so for many generations. The cause of sterility in mules has not been fully ascertained. Henslow could not find in a hybrid digitalis any structural changes which could account for barrenness. Hybrids may be fertilized by pollen taken from one of the parents, and then the offspring approaches in character to that parent. Hybrids impregnated for a third or fourth time with the pollen of the original male plant approach more and more to the male type. Such is also the case when the impregnation is effected by pollen taken from the original female plant, but in this instance the change is usually slower. Gärtner gives a tabular view of the number of impregnations requisite to complete change of species by hybridization. He produced hybrids between two species, and then by using the pollen of the original male or female parent, he found that in process of time, the species were brought back to the male or female type.

Hybridizing is an important horticultural operation. By it the gardener endeavours to increase the size of flowers, to improve their colour, to approximate their form to some assumed standard of perfection, to enlarge the foliage, as in esculents, to render tender plants hardy, to heighten the flavour of fruits, and to exchange early for late varieties.

The changes produced by muling on the size and colour of the blossoms are very remarkable. By inoculating *Cereus speciosissimus* with *C. grandiflorus*, we find that the *immediate* result is a seedling, whose flowers are ten inches in diametre. The hues resulting, however, from the union are not necessarily intermediate. Blue and yellow do not produce green, as proved by a hybrid between *Verbascum phœniceum* and *V. Phlomoides*. In the cases of rhododendrons, gardeners have been able to secure the fine colour of the Indian *R. Arboreum*, with the hardiness of the American species. By inoculating the common heart's-ease with the large flowered pansy of the Altai Mountains, a degree of vigour has been infused into the former which we could not hope to obtain by ordinary means. The fine varities of pelargonium have been obtained by cultivation and hybridizing from the small-petaled pelargonium of the Cape.

Fruits and culinary vegetables are sometimes improved by hybridity. These hybrids cannot be continued from seeds, but must be propagated by offsets or cuttings. The effects of hybridizing or crossing is very marked in the case of certain cereal plants.

Parliamentary and Law Proceedings.

Adulteration of Sweet Spirit of Nitre.

At the Bradford Borough Court, on Monday, before Alderman Law and Mr. Wilson Sutcliffe, Messrs. Stephenson Brothers, grocers, etc., Thornton Road; Mr. George Batty, herbalist, Otley Road; and Mr. Joseph Robinson Lund, Barkerend Road, appeared to answer informations laid at the instance of the Town Clerk (Mr. W. T. McGowen), charging them with having, on the 19th March, sold sweet spirit of nitre which was not of the nature, substance, and quality demanded by the purchaser, contrary to the provisions of section 6 of the 38 and 39 Vict. cap. 63. The Town Clerk appeared in support of the informations; Mr. B. Terry was present on behalf of Messrs. Stephenson Brothers and of Mr. Batty and Mr. Lund was represented by Mr. J. Berry.

Mr. Booker, Inspector of Nuisances, stated that he went to the warehouse of Stephenson Brothers, and asked for a pound of sweet spirit of nitre. A liquid was given him for which he paid three shillings, and he subsequently placed it in the hands of Mr. F. M. Rimmington, the borough analyst. He purchased six ounces of what was called sweet spirit of nitre at the retail shop of Lund.

The Magistrates' Clerk (Mr. G. R. Mossman) read out the certificates of Mr. Rimmington's analyses as follows:

Lund's Sample.

	Per cent.
Sweet spirit of nitre	67
Water of composition	13
Water over and above that which ought to be present	20
Parts	100

Batty's Sample.

Sweet spirit of nitre	60
Water of composition	13
Water in excess	27
Parts	100

Stephenson's Sample.

Sweet spirit of nitre	61
Water of composition	13
Water in excess	26
Parts	100

Mr. Berry was about to ask witness whether two strengths of sweet spirit of nitre were not sold in many retail shops, when

The Town Clerk objected, saying he was there to make a specific complaint.

Dr. B. H. Paul (Consulting Chemist) was next called. He stated that in the course of his practice he had had his attention directed to the article, sweet spirit of nitre. Specimens of the sweet spirit of nitre under consideration had been laid before him, and he quite agreed with the results reported by Mr. Rimmington. He might state, however, that the standard specific gravity of ·845 was one very seldom adhered to, but the sweet spirit of nitre made by respectable houses had a specific gravity not below ·850. The specific gravity of one of the samples produced was ·915. The preparation having a specific gravity of ·850 was very much in favour with medical practitioners. In making up a physician's prescription the pure spirit of nitre should be used. The ether, which was the essential medicinal constituent of sweet spirit of nitre, would not be formed by using spirit so diluted as the sample referred to (specific gravity ·915).

Mr. Rimmington also stated that ·843 or ·845 was the proper specific gravity, but he should not reject sweet spirit of nitre having a gravity of ·850.

In order to demonstrate the difference between a good and proper spirit and one highly diluted, Dr. Paul poured a quantity of the genuine liquid into a test tube, and added small quantities of sulphate of iron and sulphuric acid; the effect was at once apparent, the liquid in the tube turning a deep black. Treating one of the diluted samples in the same way, no such reaction was observed. The difference, he said, consisted in this, that ether was present in the former, but absent in the latter specimen. At the request of Mr. Berry, Lund's sample was tested, and, although least diluted with water, it was found to be the worst sample with regard to the absence of ether.

Mr. Jno. Nettleton Terry, surgeon, Bradford, said he had tested the adulterated spirit of nitre by tasting it. The samples were of a very poor quality. They were almost tasteless; indeed, if he had not been told he would not have known that they were intended for spirit of nitre. The drug did not act properly when water was present in such excess.

Mr. Terry, in defence, said that the article before the court was sold at a certain price, and purchasers knew what they were getting it for; they took it at the price, and did not complain of being prejudiced by it. If a purchaser had asked for the pure spirit of nitre, the person supplying it would have known that he wanted a certain other thing under a different name. If the Bench could not see any course open to them but to convict, he would ask that the penalty should only be a nominal one.

Mr. Berry then addressed the magistrates on behalf of his client. He contended that manufacturing chemists throughout the country had on their lists sweet spirit of nitre of specific gravity ·900; but they also kept the Pharmacopœia strength if required, and when they got a physician's prescription, it was made up with spirit of ·850 specific gravity. If an ordinary customer asked for the best spirit he got the stronger nitre, so that there was not the slightest imposition. Then this dilution was, he argued, a matter of proper precaution. The usual practice of medical gentlemen might be to give sweet spirit of nitre in doses up to two teaspoonfuls, but where, as was often the case, it was administered in the family without calling in the doctor, as much as half an ounce would be given in gruel or in other ways. In these cases, if the stronger spirit were used, serious results might arise. Sweet spirit of nitre was a thing known in commerce; and this he held was of the same strength as the samples, and if the defendants had been selling it he thought they would hardly be liable. Besides, there was no other sweet spirit of nitre. The only compound answering to it in the Pharmacopœia was called by another name—*spiritus ætheris nitrosi*, and that could not be bought for 2½*d.* per ounce as this had been. The vendors did not profit by the addition of water, for it was sold to customers at a reduced price. He pointed to acetic acid, which he said was treated in a somewhat similar way. Mr. Berry in conclusion asked for a mitigation of the penalty, if one was to be inflicted.

The Bench imposed the nominal penalty on each defendant of £1, with costs £3 10*s.*, and said they had seldom heard evidence of a more conclusive kind than that given by Dr. Paul.

Poisoning by "Nurse's Drops."—Prosecution under the Pharmacy Act.

An inquest, opened some time since, at the Queen's Head, Acle, by R. T. Culley, Esq., Deputy Coroner for the county of Norfolk, upon the body of John Morse, aged seven weeks, and adjourned from time to time; first, that a *post-mortem* examination might be made, and next, that a mixture called "Nurse's Drops," and the stomach of the deceased infant might be subjected to analysis, was concluded on Wednesday, the 13th inst. The evidence adduced at the several sittings of the Coroner and jury may be briefly stated. The infant son of a labourer died on the 18th of May, after ailing for a few days. It had been healthy from its birth, except that it seemed to suffer pain, which made it cross. To remedy this, on the 16th of May, the mother ordered Edwin Braddock, an assistant to Mr. Charles William Clarke, grocer and draper, of Martham, to bring her when next he called some Nurse's Drops. Braddock accordingly poured an ounce of Nurse's Drops out of a large bottle which Mr. Clarke had amongst his stock of medicines, into a phial, which he enclosed in Mrs. Morse's parcel, and left it at her house. The bottle in Mr. Clarke's shop is labelled "Nurse's Drops—Poison;" but Braddock put no label upon the phial, and stated that he did not generally put labels on the bottles he sent out. It was subsequently elicited from Ezekiel Everson, another assistant of Mr. Clarke, and who had had four years' experience in a druggist's shop, that he was in the habit of writing labels, with directions for the use of the contents, upon the bottles he sent out from his employer's shop. The Nurse's Drops were obtained from Messrs. Smith and Sons, druggists, Norwich; and if a customer had asked him for the drops for a child seven weeks old, he should have said that a dose was not to exceed five drops. According to the statement of the mother, finding the bottle not labelled, and not knowing what quantity to give the child, she first of all tasted the mixture, and perceiving that it was hot, she administered only two drops in some water and sugar. An hour and a half later, the child, which had previously suffered from, was seized with, convulsions, which continued intermittently till half-past nine, when it died. Mr. Cufaude, surgeon, saw the child before it died. It was then in an insensible condition, suffering, in his opinion, from some narcotic. By direction of the Coroner, he made a *post-mortem* examination, when he found great congestion at the base of the brain, with effusion of serum; fluid blood and a small clot in the right side of the heart, and nothing in the left. He was of opinion, finding no traces of inflammation in any other organ, that death was caused by congestion of the brain and spinal cord. What caused this congestion he could not say, but he thought the symptoms pointed to poisoning by some narcotic substance. The phial and stomach of the child, both placed under seal, were submitted for analysis to Mr. F. Sutton, analyst for the county of Norfolk. Mr. Sutton found the phial to contain a composition known as Nurse's Drops, consisting of laudanum, oil of caraway seed, and spirit of wine. The proportion of morphia in the composition he estimated to be little more than one grain, which would represent one-third of the contents of the bottle, and be laudanum of full strength. He also found the presence of meconic acid, a constituent of opium. The stomach, which was in a state of partial decomposition, and contained no food, showed traces of meconic acid and oil of caraway seed. Considering the strength of the composition in the bottle, five or six drops would be sufficient to kill a child seven weeks old. The mixture, which was of the ordinary strength, was dangerous on account of its strength, and required great care and attention in the administration of it. He did not think two drops would be sufficient to cause death, though it might accelerate the death of a child seven weeks old. The mother was further questioned as to the dose she gave, and she said it was only two drops. The jury came to the following verdict: "That deceased died of having had a composition or mixture called Nurse's Drops administered to him, but whether the said composition or mixture caused the death, or in any way accelerated the death, there is no evidence to show. But they are of opinion that the sale and consumption of such a dangerous composition or mixture as aforesaid is most irregular and improper, and ought at once to be discontinued."

On Monday, the 25th of June, Mr. Charles William Clarke, the shopkeeper who sold the Nurse's Drops mentioned in the above case, was charged before the magistrates of the Blofield and Walsham Hundreds, with illegally selling a preparation containing opium, he not being on the Register of Chemists and Druggists.

Mr. Francis Sutton, the Local Secretary of the Pharmaceutical Society for Norwich district, attended with a copy of the Register, and was prepared to prove by his analysis the composition of the mixture.

The defendant, however, pleaded guilty, and the magistrates fined him the sum of £4, which, together with costs, £3 1*s.* 6*d.* were paid by him, the magistrates remarking that in case of a second offence they would inflict the fullest possible penalty, and the superintendent of police, at the instance of Mr. Sutton, expressed his determination to put the law in force wherever he could find any infringement of the Pharmacy Act.

Poisoning by Carbolic Acid.

Mr. Humphreys held an inquest at the Gladstone, Mare Street, Hackney, on Monday, relative to the death of Sarah Silver, aged 52 years, a widow. Deceased had been found on the floor in the kitchen, apparently the worse for drink, and on the table was a pint champagne bottle, labelled "Carbolic acid—Poison." A doctor was called, but she died in three hours from poisoning by carbolic acid. The Jury returned a verdict of "Death from misadventure."

An inquest was also held the same day by Mr. Bedford, at York Street Board Room, on the body of Frederick Cresswell, aged four years. A bottle of carbolic acid had been left on the washstand, inadvertently, in the room where three infants were playing, and on the mother's return she found the deceased insensible and another child very ill. Mr. S. K. Birch, a surgeon, stated that when he was called there was a strong smell of carbolic acid in the room. There was an unaccountable patch on the stomach of deceased and another on the head.—The inquest was adjourned for an analysis to be made.

Charge of Personation at the Preliminary Examination.

On Monday last, George Frederick Webb, a chemist's assistant, was charged before Mr. Vaughan, at Bow Street Police Court, with fraudulently procuring his registration under the Pharmacy Act, 31 and 32 Vic., 1868.

Mr. Douglas Straight prosecuted on behalf of the Pharmaceutical Society, and stated that the defendant presented himself for the Preliminary examination, and having failed, allowed one named Andrew Ritchie Hunter to pass the examination on another occasion in his (Webb's) name. A warrant was out against Hunter, but he was not yet apprehended. He had already been charged with the same offence on a previous occasion in conjunction with two men named Colegrove and Hinks, all of whom at their trial had pleaded guilty.

Evidence of handwriting, etc., was given by Mr. Elias Bremridge, the Registrar under the Act, who had sent the forms of application to the defendant; and Detective Sergeant Andrews, Scotland Yard, deposed that he arrested the defendant at his employer's place of business. The defendant then denied all knowledge of the case, but now expressed a wish to plead guilty to the charge.

Mr. Straight said he did not intend to proceed further with the case that day, and note having been taken of the defendant's plea, the case was adjourned.

Strange Accident.

The following paragraph appeared in the *Echo* on Tuesday:—"A correspondent sends the following: An extraordinary accident occurred yesterday at a small shop in Fleet Street, where American 'crullers' and iced drinks are sold. Some person, it is stated, had recommended to one of the young ladies employed in this shop the use of nitric acid and quicksilver for cleaning silver. The person thus advised purchased the prescription, telling the chemist, it is alleged, for what purpose she intended it. Whether this was so or not, negligence would seem to have been shown in giving to an inexperienced person two such dangerous agents without due warning of the consequence of their admixture. The poor girl proceeded to mix what she had obtained directly she returned to her place of occupation, with the result of a violent explosion, which, it is feared, has destroyed her sight. She now lies in a hospital."

Dispensing Memoranda.

We are constantly in receipt of requests for aid in overcoming difficulties met with at the dispensing counter, and so far as lies in our power such assistance is always rendered. But it has been suggested that instead of a reply being given among the Answers to Correspondents, where frequently it stands as an individual opinion, intelligible to only one person, it would be more widely advantageous were such questions published, with an invitation for suggestions as to their solution. We therefore propose as an experiment, to devote a certain amount of space every week specially to these and other "Dispensing Memoranda." In order to assist our younger brethren as much as possible, considerable latitude will be given to the definition of what may be considered to be a difficulty, but it is evident some discretion will have to be exercised in excluding trivial matter. Each note will bear a number, which it is requested may be quoted in all correspondence respecting it. Opportunity will be taken every month of calling attention to the more important points brought out in the various discussions.

[3]. Explosive Mixture.—In reply to Mr. J. W. Yeats's query on No. 3, it may give him some consolation to know that he is not the only one who has been troubled by such mixtures. On one occasion after I had dispensed the mixture, the effect of the effervescence was such that it left on the ceiling a mark which was decidedly not ornamental. It is more than three years since I met with any bismuth subnit. which produced any chemical action with soda bicarb., although I am constantly dispensing it. I found then that the only way to dispense such mixtures, was either to keep them until such a time as the effervescence had subsided, or better still to use *warm water*, which rapidly effects the decomposition. J. J. Smith, *Pharmaceutical Chemist.*

[3]. Explosive Mixture.—In reference to Explosive Mixture, query 3, I beg to state a similar occurrence happened to me on two occasions when dispensing bismuth nitr. with potas. bicarb. On one occasion the cork was driven with violence out of the bottle, and in the other the bottle burst. There can be no question this result is owing to the liberation of carbonic acid.
Wm. Proctor.

[3]. Explosive Mixture.—About three and a half years ago we dispensed the following:—

2.	Bismuthi Trisnit.	ʒiv
	Sodæ Bicarb.	ʒiii
	Tinct. Nucis Vomiciæ	ʒi
	Aqua ad	℥vi

A tablespoonful three times a day. The resulting mixture exploded in the messenger's pocket. We again dispensed it, again it exploded. Finally we got over the difficulty by allowing the bottle to stand uncorked for some time before sending it out. On mentioning the matter to the prescriber, he informed me he never heard of such an occurrence before, and had ordered it often, but he at once saw that it arose from the decomposition of the two salts, and since then has ordered the subcarbonate in place of trisnitrate in similar mixtures. J. Hallaway.

[3]. Explosive Mixture.—The nitrate of bismuth of commerce is not unfrequently acid even to the taste, owing to the incomplete decomposition of the nitrate. In such cases it has been made by washing the crystals with water, a process which yields a much more variable product than that of pouring the solution into water. The best method for getting bismuth nitrate in the pure state is to dissolve the metal in nitric acid, being careful to leave a portion of the metal undissolved, and to throw the solution into a large quantity of water. The use of the small portion of bismuth left undissolved is to keep other metals, such as copper and silver, out of the solution. The acid nitrate of bismuth which remains in solution may be afterwards thrown down as carbonate or chloride, for use as pearl powder. Bismuth has the repute of turning the skin brown, when used as a cosmetic. It seems worthy of inquiry if the effect be not due to the action of nitric acid. E. H. Holmes.

[3]. Explosive Mixture.—In this query there is evidently an error, it should be eight ounces not eight drachms. I have made up many similar prescriptions of bism. subnit. and soda carb., and never met with the occurrences described by Mr. Yeats: No doubt it (the explosion) was owing to the acidity of the bismuth and being corked so quickly. An Assistant.

[4]. AMORPHOUS QUININE.—Can you give me any information as to the *dose* and *therapeutical action* of the sulphate of Amorphous Quinine (De Vrij)? I have read all I can find about it in the Journal, but all the information relates simply to its chemical and physical properties. J. J. Smith.

[5]. ANOTHER EXPLOSIVE MIXTURE.—I should like to ask a few questions relative to a prescription. When Ung. Sulph. Hypochlor. Crass. is prescribed, what proportion of Sulph. Hypochlor. is used? What chemical article is meant? (I know the description of Sulph. Hypochlor. in Bentley and Redwood's 'Materia Medica,' also the descriptions of the chlorides of sulphur given by standard chemical works.) I think the commercial hypo. is meant, but what are the tests for this article? Having recently required a fresh supply of it, I obtained ten ounces from a leading London house, it was sent to me in a strong stoppered bottle; I put away unopened in a cupboard; two days after I heard a sharp report, and directly after scented an odour of some compound of sulphur (it was neither H_2S nor SO_2). The bottle had burst and scattered the Sulph. Hypochlor. all over the cupboard, which also contained nearly a pound of sodium as well as some potassium and liquids. The reason why this latter fact is mentioned is to show that if the explosion had had more force it would only have been the fusee to a still greater one. Has any one known Sulph. Hypochlor. burst the bottle, and what is the cause? A question similar to one of the above is sent out by the British Pharmaceutical Conference. OCCIDENT.

[6]. CHLORIC ETHER.—Would it be correct to dispense Spt. Chloroformi or Æther. Chlor. when "Spt. Æther. Chlor." is ordered? T. N. LEIGH.

[7]. SYR. QUINIÆ DIKINATIS.—Will you kindly give me the formula for Syr. Quiniæ Dikinatis. I am informed it was published by Dr. Donovan in the *Pharmaceutical Journal* many years ago, but I cannot find it.

[*** The article in which this preparation was described appeared in the first series of this *Journal*, vol. iv., p. 155. The following abstract of it is taken from Beasley's 'Pocket Formulary,' where it appears as Syr. Cinchonæ Conc.:—Digest ℥viij of yellow bark in coarse powder in two successive pints of proof spirit, and press strongly; boil the residue for half an hour with a pint of water, strain, and press; repeat this a second and third time; evaporate the mixed decoctions to f℥viij; reduce also the mixed tinctures to f℥viij; mix the concentrated liquors, and boil them with a solution of 55 grains of oxalic acid and 284 grains of dry quinine; add ℥xxj of sugar and ℥iv of gum arabic, and water q. s. to make f℥xxxij of syrup, which strain, while hot, through flannel.

Obituary.

Notice has been received of the death of the following:—

On the 6th of June, 1877, Mr. Robert Appleford Watson, Chemist and Druggist, Wilton Place, Knightsbridge. Aged 69 years.

On the 17th of June, 1877, Mr. John Shaw, Chemist and Druggist, Broughton Furness. Aged 54 years.

On the 19th of June, 1877, Mr. Edwin John Huggins, Chemist and Druggist, Wainfleet. Aged 31 years.

On the 21st of June, 1877, Mr. Henry Lawrence, Pharmaceutical Chemist, Lower Phillimore Place, Kensington. Aged 43 years.

On the 25th of June, Mr. William Edward Chapman, formerly of Queen Street, Hull. Aged 83 years. For many years Mr. Chapman was a Member of the Pharmaceutical Society.

BOOKS, PAMPHLETS, ETC., RECEIVED.

ON THE SCIENCE OF WEIGHING AND MEASURING AND STANDARDS OF MEASURE AND WEIGHT. By H. W. CHISHOLM. Illustrated. London: Macmillan and Co. 1877. "Nature Series." From the Publishers.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

COUNTER PRACTICE.

Sir,—I am sure many of your readers will coincide with the opinions expressed in the communication of Mr. Wade, in your last issue, especially with the tenor of the proposed Act which he has so pertinently framed. If such a bill once passed into law, it would prove an inestimable boon to our trade, for, at present, we appear to be harassed on all sides, and the majority of our *confrères* have a hard struggle to eke out a respectable and comfortable livelihood, notwithstanding the common belief of the public, who labour under the delusion that our profits are enormous, and with that idea instilled into their minds (ignoring altogether the limited demand for drugs), constantly rave about the chemists' business being so exceedingly lucrative.

It does seem preposterous to think that we could not from behind the counter recommend anything calculated to relieve sickness, nor yet express our approval of sundry remedies when appealed to; yet any person outside the fold of pharmacy can tell his neighbour what benefit he has derived from the judicious use of a certain medicament, and recommend a trial of the same. In the face of such a lawful custom who dare dispute our rights as individuals, apart from our avocation?

So long as we do not charge for the advice given, there could be no restriction of this sort in a free country; the people would be up in arms against any such measure, and with the cry of "*pro bono publico*" stamp out the excessive legislation which threatened to destroy or check their liberty.

I heartily agree with your correspondent about the insufficient equipment of medical men for the routine of dispensing, considering the little stress laid upon that point by the faculty; all the training in that department required in their curriculum being three months' experience either in a pharmacy or hospital, a period of tuition which is quite insignificant when compared with the five years' apprenticeship supposed to be necessary to fit one as a reliable dispenser amongst ourselves. Then why, seeing they cannot efficiently perform the responsible duties connected with "compounding," should they so largely monopolize our proper work? To look on the other side of the question, although not advocating counter prescribing, I maintain that chemists, by virtue of prolonged observation, have many opportunities of learning what substances are best adapted for the cure of specific complaints, as well as the best methods of administering them, and can mark the progress the patient makes towards recovery, when under the physician's treatment; so that, even when he cannot diagnose disease, he may effect a cure if the nature of the malady be told him. I am afraid difficulties would attend the establishment of a rule prohibiting us from repeating prescriptions at the invalid's request, still there is great need for alteration is this respect. Thousands of people, it is well known, continue to renew the physic ordered at a time when the condition of the body was vastly different; the consequence is that hundreds who follow this course, instead of enjoying the greatest of all earthly blessings—good health—are always ailing, and by inducing an abnormal state of the system, gradually, but surely, undermine their constitutions, which are thereby rendered more susceptible to the contraction of other illnesses, perhaps worse than the first. I have known instance of personal injury occurring in this way in spite of the remonstrances of the conscientious chemist (which too often prove futile). The result of declining is then a demand for a copy of the formula, which is immediately taken elsewhere to be made up. Probably numerous cases of opium and chloral eating might be traced to the above cause.

I take exception, however, to that part of Mr. W.'s letter wherein allusion is made to the selection of members of Council from simple "chemists and druggists." I certainly think that no candidate should be eligible for election in the capacity of examiner, nor take a seat in the Council, unless he bear the title of "Ph. C." Then every one can pass the "Major" if he wishes to share in the "monopoly" or rather the privileges accruing to pharmaceutists proper.

JAMES B. L. MACKAY.

Newcastle on-Tyne, June 19, 1877.

Sir,—Mr. Wade's letter in the Journal of to-day is simply absurd, and for the honour of the medical profession it should not be allowed to pass without protest. To begin, there was no need of such a letter, for the obnoxious clause of Dr. Lush's bill was withdrawn, and as the bill now stands it will operate only against pretenders; rightly so too! what more do we want? There should therefore be an end of the matter.

By the withdrawal of the clause counter-prescribing is indirectly acknowledged to be legal, and Mr. Wade states that it is "granted by the Act of 1815." This he confirms by stating, in the same paragraph, "to put a stop to counter-prescribing they would have to apply to a legislature which," etc. He means, I suppose, that a law would have to be passed to put a stop to counter-prescribing, in order to make it illegal. Right! Why then does he say, in the fifth paragraph of his long letter, "the doctors would be spared the anguish of seeing the public suffering from our illegal practice?" Illegal practice! What does he mean? Counter-practice has never been illegal, and as to its producing "public suffering," I think this would be universally denied. If Mr. Wade means the practice of pretenders, then Dr. Lush's bill meets their "illegal practice." I pity the conscience of chemists if they think they act illegally when they prescribe over the counter. They could not lay claim to the title of a "law-abiding community." But do they break the law? Certainly not! All noxious pretenders, however, should be banished from society.

The absurd part of Mr. Wade's letter is seen in reference to the medical profession. He draws up "a short Act to regulate the dispensing of medicine, and to amend the Apothecaries Act of 1815." "It shall be unlawful to employ as his assistant, to prescribe, visit or perform any act of surgery, either in his absence or under his direction, any person who shall not have become qualified." How about the medical student learning his profession, the nurse, the attendant on the sick, the chemist? Such a "suggestion" needs no comment.

Mr. Wade proceeds: "It shall be unlawful for any medical practitioner, or his assistant, to dispense any medicine for any person that he may have prescribed for, in any city, or town, or village," in case there should be "a chemist within half a mile of his patient's or his own house." Monstrous! You deny a medical man a privilege which every other person in the kingdom enjoys to the full. And at the end of his letter Mr. Wade says, "I think, with such an arrangement as this, the medical men would have no reason to complain;" and a host of other advantages are to follow, which I for one fail to see.

I think the draughtsman of such an Act should at the same time have informed us what he means by an "Act of surgery," "illegal practice," and the word "dispense," the latter term he uses in more senses than one. Let the medical men alone (except to recommend them patients), and they will let us alone. Our relations with them have been very ably and rightly settled by the Council of the Pharmaceutical Society, and they are secured by our own "Act," by the Act of 1815 and indirectly by Dr. Lush's bill. Why should we then stir up the mud? Let that come from without, and when it does, I have no doubt that the Pharmaceutical Society will be equal to the task of allaying the troubled waters as it has done hitherto.

GEO. P. POND.

June 16, 1877.

Sir,—I have read with much interest the draft of that which will, of course, speedily become law, and probably be known as Wade's Act, and if so, the name of Wade will remain an evergreen on the memory of all future generations of chemists and druggists.

The intention of his proposed Act is clear and distinctly defined. The last clause of the fourth section relative to repetitions will be specially applicable, and doubtless appreciated by those who live miles from a medical man who seldom sees some of his patients, and those who for years have been in the habit of having certain prescriptions repeated as often as necessary without let or hindrance.

But, sir, in spite of all its excellences, which will make it so acceptable to all dispensing chemists, it is far from being so perfect as I think it can be made with my assistance, and proud ought I to be to help in so noble a cause, and no feelings of a false modesty or unpardonable reticence shall prevent my immortalizing myself in such a high and noble undertaking!

While the proposed Act will doubtless meet the necessities of all dispensing chemists, my case, which is but a sample of many more, will be to a certain extent unblessed by such a measure unless it is extended, and therefore I crave a space in your columns to state my case and suggest a remedy.

My business is situate near the river side of a large commercial city, where wharves, yards, works, and warehouses abound; the dwelling-houses near are densely populated by the working classes and their numerous offspring (at the present time it is said there are one hundred and twenty cases of whooping cough among the latter), so you can easily imagine the kind of business I do—general retail, prescribing, tooth extraction, and dispensing. Sometimes I bind lint or adhesive plaster upon cuts, wounds, or bruises; sometimes I plaster broken heads. Some of these cases are honorary as regards payment; sometimes promises are made for future payment. Some of the latter still remain in the indefinite future.

But all this in compliance with "Wade's Act" must of course be put a stop to, and therefore I beg to suggest that such addition as the following be made if not too late.

"And be it further enacted that from and after the 31st of December, 1877, it shall be unlawful for any legally qualified chemist to discuss with any of his poorer customers the relative advantages of dill water over peppermint water for wind in infants, or the superiorities of rhubarb (either syrup or powder), over magnesia (fluid or powder), as an aperient for children, or the merits of rhubarb pills or other pills, commonly known as or styled antibilious pills as an aperient for themselves, over sulphate of magnesia, commonly styled Epsom salts; neither shall it be legal for him to answer any question whatever, however simple, or dire the necessity, or render assistance of any kind which ought to be obtained from a medical man; and failing to observe the provisions of the law for each offence he shall pay," etc.

"And be it further enacted, That no legally qualified chemist shall apply any remedy to allay toothache, or upon any pretence whatever extract a tooth; neither shall he apply any remedy to allay any pain whatever, no matter from what cause it proceeds; neither shall he apply lint, adhesive plaster, or in any other way render assistance in any cases of cuts, burns, or bruises that may be brought under his notice." [To make this section more binding it might be made punishable with fine or imprisonment]. "And be it also enacted that no legally qualified medical man shall under any pretence whatever keep drugs, lint, or plaster at hand, in case of emergency, but all shall be procured from the nearest legally qualified chemist, unless he resides more than five miles therefrom; in which case he shall be licensed to keep such remedies and in such quantities as shall hereafter be determined upon by special Act of Parliament; neither shall he be expected to prescribe in any case, or answer any question without a fee, which he shall be enabled to demand beforehand if he has any doubt in his mind as to whether his patient has it in his or her pocket ready at hand."

I have not thought it necessary to insert any clause making any of these things penal (except where it is specially mentioned), as there would not be any occasion for them so to do.

With these trifling additions I think the Act will be as near perfection as possible. Doubtless it will cause much anxiety, pain, loss of time, and even in some cases death. Still these will be trifles light as air (as medical man and chemist will, of course, be held legally free from all that may occur by the provisions of this Act being strictly carried out) in comparison with the greater blessings of our "taking pride in the elevation of our business and a place in society befiting our education."

YECAPNHOJ.

Bristol, June 26, 1877.

The Council Prizes.

Sir,—As the time is near at hand when the Council prizes annually offered for competition to those who have passed the Major examination during the preceding year will be competed for, permit me to express, through the medium of your columns, an opinion which is pretty generally held on this side of the Tweed, and certainly by all to whom I have spoken on the subject. Last year, a complaint was raised that out of all who were eligible to compete for these prizes, so few entered the lists. An examination of the papers then set will not, I think, tend to draw out more candidates. Surely the questions should have been intimately connected with the subjects of the Major, yet, in many cases they seem to be far separated from these. For instance, in materia medica we have, "What are the alkaloids yielded by the plants of the order Melanthaceæ, and how are they distinguished?" Now truly, many Major men might answer the first half of the question, at least with regard to the more important plants; but I venture to think that but very few (excepting those who have studied in a London school of pharmacy) would be competent to answer that second half. I know from experience that even a course under Professor Sir Robert Christison, for so many years the distinguished professor of materia medica in this city, would not assist in this matter, and how then is a country pharmacist to manage? Certainly "cram" is the only door open. Again,—"Describe the drugs imported as pareira, and state how they are distinguished."

This smelt strongly of the 'Pharmacographia,' but is not to be found in Scoresby Jackson, the common text-book in this unenlightened part of the country. While I uphold, as strongly as any, the advantages of making the "Major" and its connections as scientific as possible, I still think that catch questions and such as can only be answered after a special course, should be avoided and are unfair to provincial and Scotch candidates alike. Science, while it deals with minutiæ, has always first striven to establish the great general features, and so it should be with pharmacists. Surely in the wide field of materia medica there is ample scope for scientific searching questions, without being compelled, out of four, to give the two already mentioned, and another belonging more to chemistry than to materia medica, "How would you detect the adulteration of essential oil of almonds with nitro-benzol?"

With the other two papers, viz: Botany and Chemistry, little fault can be found, as although not easy, they are fair questions, if we except the following, "What is the average composition of coal gas?" If by this is meant merely, a very rough approximation, good and well, but if a percentage composition is required, many a scientific chemist would fail to give it. Why? Simply because it is a matter of no consequence to remember. One may as well ask for the atomic weights of all the rarer elements. I trust that, although not coming from a Major associate, these remarks may not fall amiss to those who frame the next set of questions, but that they will remember that they being entirely chosen from the London Board of Examiners, to the utter exclusion of the Scotch board, matters with which they and London students are perfectly conversant are not necessarily of importance, and therefore not so well known in other cities, and that if the examiners were all Scotch and did not give general but catch questions, the Englishmen might find themselves non-plussed.

Edinburgh, June 20, 1877. Auld Reekie.

Castor Oil Pills.

Sir,—The police of Hampshire are just now scouring the county for the purpose of capturing as many samples of "castor oil pills" as they can effect, in order that the county analyst may test if they are being sold "genuine" or "adulterated."

I am no advocate for misnomers, and wish no druggist would frame any; but surely no one outside an asylum for lunatics or idiots can imagine that a little globule about the size of a large pin's head can possibly be made of castor oil, the well-known ordinary dose of which is half a large wine-glassful! The Adulteration of Food and Drugs Acts were passed to prevent the public being defrauded or damnified by the admixture of a cheaper and inferior foreign article with the genuine one. But here no one is either damnified or defrauded. The pills, though called "castor oil pills," are simply intended as, and understood to be, a very mild and gentle laxative in pill form, the use of which may avoid the necessity of taking the nauseous purgative oil.

I recently ordered of my tailor a top coat, and pair of trousers, and chose from his pattern book what he told me was a "beaver" for the one, and a "doeskin" for the other. Both garments appear to be made of sheeps' wool. I have not examined them microscopically—certainly neither is made of the skin of the animal with whose name it is identified in the account rendered me. Were I to enter an action against the tailor, contending that he has consequently defrauded me, the ludicrousness of my act would be about on a par with this Hampshire raid on castor oil pills! The druggists of this unfortunate county must be prepared for harass of no ordinary kind. Probably the next step will be to prosecute them for professing to sell plasters spread on "moleskin," which, instead of being made of a mole's skin, is nothing but cotton!

Southampton. Robert Chipperfield.

"No Dissenter Need Apply."

Sir,—Your correspondent, "Equality," infers so much animus "in the meaning of an advertisement in a recent number," that I had the curiosity to refer to it, and I found it in the advertising sheet of the Journal, for June 2, 1877, p. xviii.

I know nothing whatever of the advertiser or of his business, but it appears as if he had some good customers, who are churchmen, and if he were succeeded by a stiff dissenter these customers might go over to some opponent.

It is evidently intended to appear as a tempting opportunity for a pharmacist who happens to be a churchman. This may, or may not, be true; and the pharmacist may safely rely on his knowledge of the business and on his honesty.

But "Birds of a feather, flock together," and I suppose baptists may go to baptists, Scotchmen to Scotchmen, churchmen to churchmen, etc., if they think proper so to do.

Fraternity.

G. Andrew.—If you are in possession of such information as to breaches of the Pharmacy Act as will secure a conviction, you are recommended to communicate at once with the Registrar, 17, Bloomsbury Square. We believe inquiries are already being made respecting the case referred to.

"*Herba.*"—(1) *Centaurea nigra*; (2) *Apargia hispida*; (3) *Chiococca racemosa*, not indigenous; (4) *Rhinanthus Christa-galli*; (5) *Bryonia dioica*; (6) *Torilis nodosa*.

C. T.—*Polemonium cœruleum*, *β album*.

J. W.—There is not at present any legal obstacle to such a course.

"*Spes.*"—'A Manual of Dental Mechanics,' by O. Coles (Churchills), price 7*s.* 6*d.*

Justicia.—By the 16th section of the Pharmacy Act, the "business of wholesale dealers in supplying poisons in the ordinary course of wholesale dealing" is exempted from the provisions of the previous sections.

S. G.—(1) You will find ample information in the "Students' Numbers" of the medical journals published just before the commencement of the session. (2) There is nothing to prevent such an arrangement being made.

H. L.—We entirely disagree with the opinions you express, and think that harm is rather done by pharmacists charging too low for the exercise of their skill in the most legitimate part of their trade, namely, dispensing. It is not so much to have medicines dispensed that people go to the stores, as to purchase articles for the sale of which no skill is required.

"*Stellaria.*"—(1) *Geranium dissectum*; (2) *Epilobium montanum*; (3) *Myrrhis odorata*; (4) *Veronica arvensis*; (5) *Stellaria graminea*.

J. Hope.—(1) *Chiococca racemosa*: (2) *Linum catharticum*; (3) *Stachys sylvatica*.

F. G. Walton.—*Habenaria viridis*.

E. F. Jarvis.—A formula for Syr. Calcis Lactophosphatis will be found on p. 1041.

W. Greig.—*Marking Ink.*—Try the following, from the 'Chemists and Druggists' Diary.'—Nitrate of Copper, 3 parts; Carbonate of Soda, 4 parts; Nitrate of Silver, 8 parts. Mix and dissolve in Liq. Ammon. 100 parts.

Communications, Letters, etc., have been received from Mr. Evans, Dr. Hesse, Messrs Mawson and Swan, Dr. Cooke, Mr. Baynes, Mr. Sindall, Mr. D. Howard, Mr. Baker, Mr. Hooper, Occidens, One Interested, An Assistant, Delta, J. A. C. B.

INDEX TO VOL. VII.

(THIRD SERIES.)

All Letters to the Editor will be found arranged under the head of "Correspondence;" Leading Articles, etc., under the head of "Editorial Articles and Notes."

THE END.

PRINTED BY STEVENS AND RICHARDSON,
5, GREAT QUEEN STREET, LINCOLN'S INN FIELDS, LONDON, W.C.