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THE

MAGAZINE OF NATURAL HISTORY,

AND

JOURNAL

OF

ZOOLOGY, BOTANY, MINERALOGY, GEOLOGY, AND METEOROLOGY.

CONDUCTED

By J. C. LOUDON, F.L.S. G.S. &c.

MEMBER OF THE ZOOLOGICAL SOCIETY OF LONDON, AND OF VARIOUS NATURAL HISTORY SOCIETIES ON THE CONTINENT.

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PREFACE.

This Second Volume of the Magazine of Natural History will, it is hoped, not be found deficient in that increase of interest and general improvement, which may reasonably have been expected from the progressive experience of the Conductor, and from a continually increasing correspondence.

The grand object with which we set out, that of promoting a taste for Natural History among general readers, and especially among young persons, has been steadily kept in view. The Introductions to Zoology, p. 128.; to Conchology, p. 22. and 148.; to Botany, p. 155.; to Geology, p. 26.; and to Meteorology, p. 177., have been continued; and in our Third Volume these Introductions will, for the most part, be completed. The other Original Communications, and the Collectanea, embrace every department of Natural History; and the Miscellaneous Intelligence reports its progress in every part of the world, but more especially in Britain. Throughout the work the subjects are treated with sufficient technicalities for the purposes of scientific accuracy; but at the same time so as rather to invite the stranger to these studies, than to deter him from them. As the taste of our young readers becomes more refined and critical, it will demand articles more rigidly technical and profound, and we shall not then be wanting in affording a supply. In the mean time, our correspondents may regard themselves as cooperating in a Magazine of their own, for the improvement of one another, as well as for the benefit of the public. To those who are impressed with the importance of Natural History, as a means of educating the feelings and the heart, it must be satisfactory to know, that this science is spreading among all classes, and that Natural History Societies, Museums, and Libraries (we wish we could add Public Botanic Gardens) are formed, or are forming, in many of our provincial towns. By reference to our article, *Natural History in the English Counties*, p. 87. 197. 266. 383. and 473., a great variety of very interesting details will be found on this part of the subject. We hope the time may not be far distant when a museum, a library, a botanic garden, and a school institution will be formed in every parish.* Finding it impracticable to present a satisfactory general summary of the progress of Natural History throughout Europe, for the past year, we have given the best substitute for such a summary, an abridged translation of the Baron Cuvier's Report for France, p. 409.

The great use of Natural History and Comparative Anatomy is to humanise and soften the heart. If boys were acquainted with the wonderful structure of insects, and of other animals low in the scale, they would not be found sticking pins into flies, or tormenting cats; nor, when men, would they treat those noble domestic animals, the horse and the ox, with cruelty. The girl who has learned to derive enjoyment from observing the operations and watching the metamorphoses of insects, who knows their history, and is conversant with their structure, habits, and curious economy, will mark these circumstances in animals higher in the scale; and, ascending to her own species, will learn also the elevation of her own nature. As she grows up to womanhood, she will feel more intensely the delicacy and dignity of the feminine character, and resist with more force the temptations which always beset innocence, amiability, and inexperience, both from without and from within. The mind rationally occupied with the study of nature, will no longer seek refuge from *ennui* in bad novels; and the same superior taste for information, and the same admiration of the wisdom of Nature, as displayed in her works, will lead to a more select choice of companions, male as well as female.

To procure the advantages resulting from the knowledge of Natural History, at the easiest rate of labour, recourse must be had to scientific study, which is to the acquirement of knowledge what machinery is to the production of manufactures. To render this machinery available to every reader, and especially to young persons, without the aid of a teacher, is the principal object of the Magazine of Natural History; in conducting which we have only to assure our readers, that the most unremitting exertion on our part will be continued, in order to secure success, and to procure for the work the honourable reputation of having given an impulse to the mind of the country in matters of Natural Science.

J. C. L.

Bayswater, Oct. 25. 1829.

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* See "Parochial Institutions; or, Outline of a Plan for a National Education Establishment," &c., in the *Gardener's Magazine* for December.

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MARCH, 1829.

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Art. I. *An Account of Mr. Needham's original Discovery of the Action of the Pollen of Plants; with Observations on the supposed Existence of active Molecules in Mineral Substances.* By Robert Bakewell, Esq.

Sir,

The accounts which have been recently published on the action of the pollen of plants, and particularly Mr. Robert Brown's observations on this subject, and on the general existence of active molecules in organic and inorganic matter, have excited much attention among the naturalists of our own country, and on the Continent.

After my return from Hampshire in October last, I put my microscopes in requisition, to examine some of the extraordinary phenomena described by Mr. Brown. The season being far advanced, my garden did not furnish many species of flowers, but sufficient to confirm some of the facts stated by Mr. Brown, and to present others, not less curious, which are not described by him. While engaged in amusing myself with these microscopic researches, I found, behind a neglected corner of my book-shelves, an octavo volume, uncut, entitled, *An Account of some Microscopic Discoveries.* These discoveries are detailed, under different heads, in the titlepage: among others are, "Observations on the Farina fœcundans of Plants, with a new discovery and description of the action of those minute bodies analogous to that of the calmar's milt-vessels, and an examination of the pistil, uterus, and stamina of several flowers, with an attempt to show how the seed is impregnated." The work was published in 1745, and is signed T. N. On perusing it, I find that the author was Mr. Needham, to whom Mr. Brown refers, as having obscurely seen the motion of the particles of pollen. I suppose Mr. Brown had not met with this volume, which I believe is scarce; for

Mr. Needham has not only minutely and accurately described the action of the pollen, but has correctly delineated it in the act of ejecting the particles contained within it. He also mentions having seen the particles move when within the pollen of the pumpion. He appears, indeed, to have described most of the principal facts, respecting the action of pollen, that have yet been satisfactorily ascertained. As similar microscopic observations at present engage the attention of many distinguished naturalists on the Continent, it is but justice to our own countryman, Mr. Needham, to bring forward the discoveries which he made near a century ago. An account of his work cannot fail to be acceptable to many of your readers.

In order that those who are not at present acquainted with vegetable physiology may have a clear notion of Mr. Needham's discoveries, it may not be improper to state that the farina, or pollen, of plants, is that fine powder which may be observed within many flowers, and is particularly abundant in the white lily, where it occurs in the form of an orange-coloured meal. This powder is supposed to perform the important function of impregnating the seed. When seen through a microscope, as Miss Kent well describes, in p. 232. of your useful Magazine, " every particle appears a little bag, containing a meal yet finer."

Pollen is generally translucent, and the smaller particles may be seen within, like the seeds of a white currant, but much smaller in proportion. The grains of the pollen of the geranium are oval, and do not exceed the 400th part of an inch in diameter, as I ascertained by a micrometer scale; the particles or granules within it do not exceed the 10,000th part of an inch. The pollen of some plants, as the mallow and hollyhock, is surrounded by minute spines, and, when magnified, the grains resemble the seeds of cleavers or goose grass (*Gàlium Aparìne*). Mr. Needham, as will be shortly shown, was the first who discovered the internal particles in the grains of pollen, and attributed to them the property of impregnating the seeds of plants.

The first sixty pages of Mr. Needham's work contains an account of his discoveries of the structure of the animalcules in the milt-vessels of the calmar, a species of cuttle-fish. His object is to prove that these minute animalcules have an internal organisation, resembling a pump and sucker, and contain within them " opaque globules, in a kind of serous liquor," nearly similar to what he afterwards discovered in the pollen of plants; and he considers these internal particles to be in both cases the real fecundising agents. The succeeding twenty-four pages contain his discovery of the action of the pollen of plants when placed in water. This action, he says, "had escaped the observation of all naturalists till that time, as appears by their express assertions; for they affirm that water causes no alteration in the farina." His observations appear to have been made in the warm climate of Portugal, where the action of the pollen was vigorous and rapid. Mr. Needham says, "The farina of the *Lílium flòre reflexo* was the first in which I discovered the action of the globules; for, upon viewing it in water, I thought I perceived some alteration in these minute bodies, as if the shell, or case, had emitted through a small aperture a train of minute globules, which appeared but as points in the microscope, involved in a filmy substance, as the eggs of some aquatic insects are, and, in effect, not much unlike them. I immediately applied some fresh farina; and having first fitted the microscope to a due focal distance, I dropped, with the tip of a pencil, a quantity of water upon the object; when, in the course of some few seconds, I distinctly perceived a train of globules, involved in a filmy substance, to be ejaculated from within these minute bodies, and contorting itself from one side to the other during the time of action, which does not last above a second or two of time, and may be easily understood by a view of *figs.* 1. and 2. The drawings were taken from the pollen of the mallow. The several species of farina differ but little from each other in this particular, their action in general resembling that of an eolipile violently heated. I have since repeated this experiment upon almost every species of farina with the like success, particularly upon that of the pumpion, which afforded me a more than ordinary gratification, not only because the globules are larger than those of the farina of most flowers, and may be observed with the second magnifier, where I had the advantage of a large field, but also because I could plainly perceive by two or three lucid specks, which continually shifted their places during the time of action, an intestine commotion within the globules, and a stronger ejaculation of the emitted particles." He farther observed, "that some species of farina act with so much force, that, when two globules are contiguous, the action of the ejaculated substance in one will repel the other to the distance of six or seven times its diameter." Where the pollen was transparent, he could not perceive particles in the matter ejected, which appeared like a thin pellucid vapour; of which he cites the pollen of the *Nastúrtium* as affording an instance. Mr. Needham made use of the reflecting microscope, and the above account will show that he obtained a correct view of his object. His style is somewhat obscure, as he does not well distinguish between the pollen itself, which he calls globules, and the particles contained in, and ejected from, the pollen; but his meaning is sufficiently obvious to prevent any mistake respecting them. *Fig.* 1. represents the pollen of the mallow ejecting the particles, as seen with his third magnifier; *fig.* 2. represents one grain of pollen in the act of ejection, as seen with his highest magnifier.

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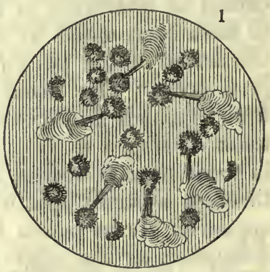
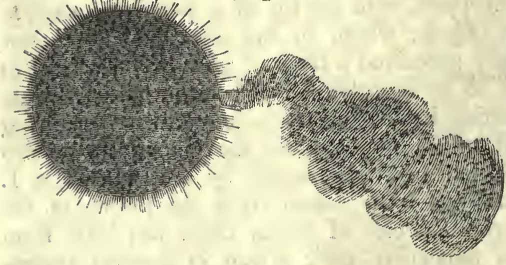


Mr. Needham asserts that the pollen should be fresh gathered; but this is not necessary, as Mr. Brown has proved. He also says that the act of ejecting the particles continues only a few seconds.

2



This may be true with the pollen gathered in the summer months: but the pollen on which I made the experiment was taken from plants in the month of October, and the action did not begin till the pollen had been some time in water, and it continued for nearly an hour in many of the grains; others ejected the whole of their particles in less than a minute. The pollen of a hollyhock, which had been between the plates of mica in the slider of a microscope at least fifty years, emitted the particles very copiously, after immersion in water for four or five minutes. They were of different magnitudes, some being more than four times the size of others. When these particles were detached from each other, by stirring the drop of water, they continued to move about for some time, like the Animálcula infusòria: but when the grains of pollen had ceased to eject more particles, and the agitation from external causes ceased, I could never perceive any active motion of the particles, though I have repeated my observations frequently with different microscopes.

The first remarkable circumstance which takes place when the pollen is immersed in water is, sometimes, a change of form in the grains of pollen themselves. I was greatly surprised to see the pollen of the sweet pea change almost instantly from a cylindrical to a nearly globular form. Some of the grains which lay beyond the edge of the water being unchanged, gave me the opportunity of comparing them in these two forms. Frequently a transparent globule of considerable size, and sometimes two, are first protruded gradually through the coats of the pollen. Sometimes the granules rush out rapidly in a mass, as represented in *fig.* 2.; at other times they flow out slowly in a winding train. The coats of the pollen sometimes burst in two places. The figures drawn by Mr. Needham very accurately represent the appearance of the pollen in action.

The year being far advanced when I began my observations, I was unable to extend them to many species of plants. I, however, carefully examined again and again the pollen of those plants that were accessible. Though I could never perceive any motion of the granules when they were clearly separated from the pollen, after the first ejection, it is not improbable that the particles within the pollen may possess greater activity in the summer months. I find it stated in p. 473. of your Magazine, that the Continental naturalists remark that the granules from the pollen of the same plant exhibit at one time a perceptible motion, and at another perfect immobility, under circumstances to all appearance alike.

The accounts which have recently been published, of the seeds of certain species of mosses possessing spontaneous motion, and then sending forth roots, and becoming fixed vegetables, appear at first truly surprising. Mr. Ellis, the well known author of the work on Corallines, and a very accurate observer, was not unacquainted with this circumstance half a century ago, and has given a satisfactory solution of the phenomenon. He says the "minute seeds which evolve under water from fungi and mosses, and appear to have spontaneous motion, derive that motion from more minute animalcules in the water, which, by pecking at these seeds, moved them about in various directions, while the little animals were scarcely visible, till the food they had eaten discovered them." Other early microscopic observers were acquainted with the apparent metamorphosis of animalcules into vegetables.

In what has been advanced, it is not intended to deny the existence of active vegetable molecules, but to maintain that their existence is still problematical. That the tissues of all organic bodies may consist of molecules, and that these molecules may possess a moving power, when detached from each other, seems accordant with many observations on the effects of macerating vegetable and animal substances in water, but that the molecules of mineral substances should possess this power, can only be admitted upon the most rigorous scrutiny.

I have made repeated observations on several mineral substances, which Mr. Brown says are chiefly composed of these active molecules; and though in some instances I was at first persuaded that I had seen the motions of the molecules similar to those of the smallest species of Infusòria, a more careful examination proved that I was mistaken, and that the motions were derived from causes that had not been properly appreciated. In these experiments it is absolutely requisite to employ fresh-distilled or fresh-boiled water. The Thames water and water in cisterns generally contain numerous animalcules. I chiefly made use of single lenses from $\frac{1}{12}$ to $\frac{1}{28}$ of an inch focal length, varying in magnifying power, from 100 to 220 times in linear dimensions: the use of the compound microscope is, I think, inadmissible in such delicate observations. With the lowest of the above-mentioned powers, a particle less than $\frac{1}{20,000}$ part of an inch in diameter is distinctly perceptible, and the form of a particle of twice that diameter may be observed.* To make use of higher powers than what are absolutely required, renders the examinations more difficult, and the result more uncertain.

To obtain glass in a highly comminuted state, I took the powder-blue used by laundresses, which I still farther triturated. The small portion of the oxide of cobalt which enters into the composition of this glass, could not be supposed to paralyse the action of the molecules, as all the metals that can be reduced to powder are said to contain these active molecules.

By making use of powder-blue, I had the advantage of seeing when all the larger particles were deposited. Among other substances which I more particularly examined, were finely powdered adhesive slate, mountain cork, quartz, flint, and kaolin, from a specimen of the best kind used in the manufacture at Sevres, given me by M. A. Brongniart. When a drop of water containing any of these substances was placed under the microscope, I perceived particles in motion, which continued for some time, and then was scarcely discernible, but on laying my hand upon the table the motion recommenced, and was evidently produced by a current in the drop; although many particles appeared to be more influenced by it than others, which occasioned a change in their relative positions. Hence I became convinced, that in order to make the experiment

* According to Sir William Herschell, though an object which subtends a visual angle less than a minute may be perceived, yet, to ascertain the form of it, it should subtend two minutes and a half.

properly, the microscope should be placed on a support not liable to be affected by vibrations of any kind, and I therefore placed the instrument on a support made for a telescope stand, so constructed as to prevent vibration when examining the more delicate double stars. I found that even the pulsation of my body occasioned an oscillatory motion of the particles, when the microscope was placed upon a table. After repeated trials, I became satisfied that whatever motions may appear to take place among the particles, for some time after the drop of water is first placed under the microscope, they will soon subside, if not kept up by agitation from external causes. In London, as an excellent practical philosopher, the late William Nicholson, justly observed, it is scarcely possible to avoid the effects of vibration; this may be seen by the continual tremours visible on the surface of mercury placed in a basin. Now, if the particles of dust that fall on the surface of the mercury could be brought under a powerful microscope, they would appear in constant motion. Let us suppose the mercury to be changed for water, a similar effect will take place, and the particles that may sink under the surface will represent the particles of dust in a single drop; and Mr. Brown informs us that the whole of the London dust is composed of active molecules. I am fully convinced, however, that their activity in a drop of water, as well as when dancing in the sunbeam, is derived from external agitation. The very force of gravity constantly drawing the particles downwards must not be overlooked, for it is not contended that the vitality of inorganic particles is sufficient to keep them permanently suspended in water. The observer's breath, and the constant evaporation of the drop, have also a tendency to produce counter-currents. A drop of water placed under the microscope, may be regarded as equal, in apparent magnitude, to a quart of the same fluid in a water-glass, and will be subject to the various currents that may be produced by agitation in the larger quantity; but the slightest movement which occasions a displacement of the particles, even the one-thousandth part of an inch will, under a high magnifying power, make them appear to perform a long voyage. Some of the animalcules discovered by Lœwenhoeck, the motions of which excited so much surprise, he informs us, never travelled farther than a hair's breadth.*

It is highly improbable that we shall ever be able to reduce mineral substances to their ultimate molecules by pulverisation.

* Hicce progressus non majus habebat spatium quam quod capilli diametrum æquaret.

Their essential qualities remain the same after pounding as before; and, could we construct microscopes that would magnify twenty thousand times in linear dimensions, we should see in pounded quartz, flint, &c., fragments and pebbles, the size of walnuts, exactly resembling those of the same minerals at the foot of a mountain, and it is difficult to believe that they would gain active moving powers by simple immersion in water. Still the philosophical world is greatly indebted to Mr. Brown, for having directed the attention of naturalists to this curious subject. About ten years ago, I was informed that Mr. Bywater, an ingenious optician, now residing in Liverpool, had discovered moving animalcules in coal-ashes, pounded marble, and other mineral substances. Little interest was then excited by the supposed discovery, it required an eminent naturalist like Mr. Brown, whose merits are well known, and highly appreciated in his own country and on the Continent, to direct public attention to statements so much at variance with our preconceived notions of matter. If, contrary to my expectation, after all due caution in the observations, it should be finally established that mineral substances are composed of active molecules, what new views of nature will the discovery unfold! Beds of siliceous sand, like those on our Hampstead Heath, are only awaiting a further process of trituration, to be awakened into life by the torrent that shall bear them into the ocean; and the geologist, while he contemplates the organic remains of a former world embedded in solid rocks, must regard the rocks themselves as the parents of future living beings. But who shall presume to say that we have at present discovered all the properties which the Creator has communicated to material substances? It should be borne in mind, that, less than a century since, latent heat, electric and galvanic energy, and crystalline polarity were unknown as important agents in nature; and that philosophers attempted to explain the phenomena of thunder-storms, and even of vital action, on mechanical principles. It will not be denied that many important processes take place in the mineral kingdom, which cannot now be explained by the agency of known causes, but await the discovery of other principles for their satisfactory elucidation.

As it is probable that many persons may be desirous of entering this new field of enquiry, it will materially assist them in forming an accurate judgment of what they observe, to provide pepper water, and other vegetable or animal infusions, that they may from time to time compare the motions of the real Animàlcula infusòria with those of the supposed active molecules; and, if modern philosophy did not disdain to profit by the illustrations which common life frequently offers, I would recommend them to look attentively at the bubbles, or the crumbs that float on the surface of a basin of tea, and they will soon be convinced, that change of relative position is not a sufficient proof of spontaneous motion or vitality.

I am, Sir, yours, &c.

Hampstead, Feb. 29. 1829. ROBT. BAKEWELL.

PS. — Since the above was written, I have most carefully re-examined various mineral and inorganic substances, without discovering any proper motion of the molecules if the water was recently boiled. When I used unboiled water, I was once or twice deceived by an apparent motion which, I am convinced, was caused by animalcules previously existing in the water. — *R. B., Feb.* 20.

ART. II. *Anecdotes of a Diana Monkey.* By Mrs. BOWDICH.

Sir,

ALTHOUGH anecdotes of monkeys are as numerous as the beings to whom they owe their origin, although they are brought forward to all ages, and at all times, still I have observed that no one gets tired of them, that their histories or portraits create an interest common to all human beings, of whatever race, or in whatever situation. The negro delights in relating the wonders or rogueries they perform, and the saying, " that monkeys could talk if they liked, only they are afraid white men would make them work if they did," is every where to be heard among the more indolent inhabitants of the tropics. English men, women, and children resemble their black brethren: and there is yet another feeling in which the most savage and the most refined seem to agree, it is the dislike, or mortification, call it what you will, which we feel in seeing how nearly they resemble ourselves. There was a restless, tormenting, and agile creature on board a vessel in which I sailed up an African river, who was incessantly teasing and hovering about me. If I called another, he was sure to leap across the deck, and come to perform that which the other would have done much better. I never thought myself quite alone, but this fellow's head was sure to start from some unexpected corner; and one day, wearied with his officiousness, I pointed to a black monkey sitting opposite to us, and said to him, " Rapoynda, that is your brother." Kind words, presents, nought availed me afterwards, for I was never forgiven. The same feeling might be traced in a very different form, when a friend of mine pulled me away from the contemplation of Landseer's admirable picture*, exclaiming, "How can you look at that so long? Such things ought never to have been made, and I am sure ought never to have been painted." I obeyed, but the recollection of Rapoynda flashed across me.

After this I will not apologise for intruding an old ship companion of mine on your notice, although he belongs to the never failing theme of monkeys. He was a native of the Gold Coast, and was of the Diana species (*Símia Diàna*). (*fig.* 3.) He had been purchased by the cook of the vessel in which I sailed from Africa, and was considered his exclusive property. Jack's place then was close to the cabooce; but as his education progressed, he was gradually allowed an increase of liberty, till at last he enjoyed the range of the whole ship, except the cabin. I had embarked with more than a mere womanly aversion to monkeys, it was absolute antipathy; and although I often laughed at Jack's freaks, still I kept out of his way, till a circumstance brought with it a

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closer acquaintance, and cured me of my dislike. Our latitude was three degrees south, and we only proceeded by occasional tornadoes, the intervals of which were filled up by dead calms and bright weather. When these occurred during the day, the helm was frequently lashed, and all the watch went below. On one of these occasions I was sitting alone on the deck, and reading intently, when, in an instant, something jumped upon my shoulders, twisted its tail round my neck, and screamed close to my ears. My immediate conviction that it was Jack scarcely relieved me: but there was no help; I dared not cry for assistance, because I was afraid of him, and dared not obey the next impulse, which was to thump him off, for the same reason, I therefore became civil from necessity, and from that moment Jack and I entered into an alliance. He gradually loosened his hold, looked at my face, examined my hands and

* "The Monkey who had seen the World."

rings with the most minute attention, and soon found the biscuit which lay by my side. When I liked him well enough to profit by his friendship, he became a constant source of amusement. Like all other nautical monkeys, he was fond of pulling off the men's caps as they slept, and throwing them into the sea; of knocking over the parrots' cages to drink the water as it trickled along the deck, regardless of the occasional gripe he received; of taking the dried herbs out of the tin mugs in which the men were making tea of them; of dexterously picking out the pieces of biscuit which were toasting between the bars of the grate; of stealing the carpenter's tools; in short, of teasing every thing and every body: but he was also a first-rate *equestrian*. Whenever the pigs were let out to take a run on deck, he took his station behind a cask, whence he leaped on the back of one of his steeds as it passed. Of course the speed was increased, and the nails he stuck in to keep himself on produced a squeaking; but Jack was never thrown, and became so fond of the exercise, that he was obliged to be shut up whenever the pigs were at liberty. Confinement was the worst punishment he could receive, and whenever threatened with that, or any other, he would cling to me for protection. At night, when about to be sent to bed in an empty hen-coop, he generally hid himself under my shawl, and at last never suffered any one but myself to put him to rest. He was particularly jealous of the other monkeys on board, who were all smaller than himself, and put two out of his way. The first feat of the kind was performed in my presence: he began by holding out his paw, and making a squeaking noise, which the other evidently considered as an invitation; the poor little thing crouched to him most humbly, but Jack seized him by the neck, hopped off to the side of the vessel, and threw him into the sea. We cast out a rope immediately, but the monkey was too much frightened to cling to it, and we were going too fast to save him by any other means. Of course Jack was flogged and scolded, at which he was very penitent; but the deceitful rogue, at the end of three days, sent another victim to the same destiny. But his spite against his own race was manifested at another time in a very original way. The men had been painting the ship's side with a streak of white, and upon being summoned to dinner, left their brushes and paint on deck. Unknown to Jack, I was seated behind the companion door, and saw the whole transaction; he called a little black monkey to him, who, like the others, immediately crouched to his superior, when he seized him by the nape of the neck with one paw, took the brush, dripping with paint, with the other, and covered him with white from head to foot. Both the man at the helm and myself burst into a laugh, upon which Jack dropped his victim, and scampered up the rigging. The unhappy little beast began licking himself, but I called the steward, who washed him so well with turpentine, that all injury was prevented; but during our bustle Jack was peeping with his black nose through the bars of the maintop, apparently enjoying the confusion. For three days he persisted in remaining aloft; no one could catch him, he darted with such rapidity from rope to rope; at length, impelled by hunger, he dropped unexpectedly from some height on my knees, as if for refuge, and as he had thus confided in me, I could not deliver him up to punishment.

The only way in which I could control his tricks was by showing him to the panther on board, which excited his fears very strongly. I used to hold him up by his tail, and the instant he saw the panther he would become perfectly stiff, shut his eyes, and pretend to be dead. When I moved away, he would relax his limbs, and open one eye very cautiously, but if he caught a glimpse of the panther's cage, the eyes were quickly closed, and he resumed the rigidity of death. After four months' sojourn together, I quitted Jack off the Scilly Islands, and understood that I was very much regretted: he unceasingly watched for me in the morning, and searched for me in every direction, even venturing into the cabin; nor was he reconciled to my departure when my servants left the vessel at Gravesend. It may not be out of place to mention here the extraordinary animal which is said to exist in the countries to the north of the Gaboon river. The natives describe it as the largest of all monkeys, but of a breadth more tremendous than its height; they declare that one blow of its paw would fell a man to the earth. Both males and females are very much attached to their young, and the latter carry them about after death till they drop from their arms. They are fond of imitating men; walk upright; and, having seen the natives collect ivory, if they find a tusk, they carry it on their shoulders till they sink with fatigue. They are said to build huts with leaves and boughs of trees, but not to have sufficient sagacity to live in them, as they get on the roof, and there abide the inclemencies of the tornado season. They attack travellers as if they thought them intruders, and have never yet been taken alive.

It is alleged that the African ourang approaches nearer to man than any other. It would, therefore, be extremely interesting to procure one of these Ingheenas, which are probably quite new; for although we know nothing of them except by report, and doubtless hear a number of absurdities respecting them, I feel assured that they exist, and are extremely formidable, both in stature and cunning. I am, Sir, yours, &c.

S. Bowdich.

Art. III. *On riding on the Back of a Crocodile.* By J. H. P. H.

Many people on possessing the original and highly interesting *Wanderings in South America*, by Charles Waterton, Esq., altogether disbelieve his account of catching the crocodile, or, as it is here called, the *Cayman*, and laugh at the extreme improbability of his having "*jumped on his back*," in order to conquer him. (*fig.* 4.) This the greater part of his readers

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have looked upon as a fiction; and others have considered it as a downright falsehood. The following observations, therefore, will tend to counteract this idea, and to show that it has actually been the custom, among some nations, both in ancient and modern times, to mount on the backs of crocodiles, that these animals may be taken with more facility and safety.

The great Roman naturalist gives this curious description of catching crocodiles: — "Gens hominum est crocodilo adversa in ipso Nilo Tentyritæ, ab insulâ in quâ habitat appellata. Mensura eorum parva, sed præsentia animi in hoc tantum usû mira. Terribilis hæc contra fugaces bellua est, fugax contra insequentes, sed adversum ire soli hi audent. Quinetiam flumini innatant, *dorsoque equitantium modo impositi*, hiantibus resupino capite ad morsum, addita in os clava, dextra ac læva tenentes extrema ejus utrinque, ut frænis in terram agunt captivos, ac voce etiam solâ territos, cogunt evomere recentia corpora ad sepulturam." * —*Plinii Hist. Nat.*, lib. viii. cap. 25.

In a rare and very singular book of field sports †, containing one hundred and one coloured plates, to which are annexed four lines in Latin descriptive of each subject, tab. 88. represents, most probably from this account of Pliny, some men riding on crocodiles, and bringing them to land by means of a pole across their mouths, whilst others are killing the beasts with large clubs. The foregoing sketch (*fig.* 4.) is a figure taken from that plate, with the following verses: —

> " Tentyra in Ægypto, Nilum juxtà, insula gentem
> Intrepidam gignit; crocodili hæc *scandere dorsum*
> Audet: refrenat baculo os: discedere cogit
> Ex amne in terram: mortem acceleratque nocenti." ‡

Dr. Pococke, in his observations on Egypt, mentions a method of taking the crocodile still more like that which our author practised in South America. He says, " they make some animal cry at a distance from the river, and when the crocodile comes out, they thrust a spear into his body, to which a rope is tied: they then let him go into the water to spend himself, and afterwards drawing him out, run a pole into his mouth, and, *jumping on his back*, tie his jaws together." (vol. i. p. 203.)

Now, Mr. Waterton and his Indians having secured a monster of the Essequibo, by a baited hook fastened to a long rope, " they pulled the cayman," as he describes (p. 231.), " within two yards of me, I saw he was in a state of fear and perturbation; I instantly dropped the mast, sprung up, and *jumped on his back*, turning half round as I vaulted, so that I gained my seat with my face in a right position. I immediately seized his

* " There is a race of men hostile to the crocodile, called Tentyritæ, from an island in the Nile itself, which they inhabit. Their stature is small, but their courage in this practice is wonderful. This beast is terrible to them that flee from him, but runs away from his pursuers, and these men alone dare attack him. Moreover, they swim after him in the river, and *mounting on his back, like horsemen*, as he opens his jaws to bite, with his head turned up, they thrust a club into his mouth, and holding the ends of it, one in the right hand, and the other in the left, they bring him to shore captive as if with bridles, and so frightened with their shouts only, that they compel him to disgorge the bodies he had but just swallowed, in order to be buried."

† It is entitled " Venationes ferarum, avium, piscium, Pugnæ Bestiariorum, et mutuæ Bestiarum, depictæ à Joanne Stradano, editæ per Nicolaum Visscher, cum privilegio ordinum Hollandiæ et West-Frisiæ."

‡ " Tentyra, an island of the Nile, in Egypt, is inhabited by an intrepid people, who climb the crocodile's back, and, bridling his mouth with a staff, force him out of the river, and slay him."

fore legs, and by main force twisted them on his back: thus they served me for a bridle."

Herodotus (*Euterpe*, chap. 70.), relates a different way of catching this animal on the Nile. — Ἐπεὰν νῶτον ὑὸς δελεάσῃ περὶ ἄγκιστρον, μετίει ἐς μέσον τὸν ποταμόν· αὐτὸς, δὲ ἐπὶ τοῦ χείλεος τοῦ ποταμοῦ ἔχων δέλφακα ζωὴν, ταύτην τύπτει. ἐπακούσας δὲ τῆς φωνῆς ὁ κροκόδειλος, ἵεται κατὰ τὴν φωνήν· ἐντυχὼν δὲ τῷ νώτῳ, καταπίνει· οἱ δὲ ἕλκουσι· ἐπεὰν δὲ ἐξελκυσθῇ ἐς γῆν, πρῶτον ἁπάντων ὁ θηρευτὴς, πηλῷ κατ' ὦν ἔπλασε αὐτοῦ τοὺς ὀφθαλμούς. τοῦτο δὲ ποιήσας, κάρτα εὐπετέως τὰ λοιπὰ χειροῦται. *

Tab. 87. of Johannes Stradaen's *Huntings* represents the manner of taking these beasts, as described by Herodotus, and the lines below it are: —

> " Escâ Niliacus capitur crocodilus et hamo,
> Qui latet occiso in porcello: bellua vivi
> Illectns porci grunnitû, ad littora tendit,
> Escam hamumque vorat; limo obruiturque et arenâ." †

Herodotus says that the people of Elephantine in Egypt call the crocodile χάμψη (champsē) (*Euterpe*, cap. 69.); and it is worthy of remark, that Bryant gives, among other names for it, that of *Caimin*. (*Mythology*, vol. ii. p. 398.) Pococke and Herodotus both assert that some animal is made to *cry* near the river, so that by its noise the crocodile may be attracted to the spot, and we find due notice was likewise given on the banks of the Essequibo; for we read, "the Indian," having laid the bait, "then took the empty shell of a land tortoise, and gave it some heavy blows with an axe. I asked why he did that? He said, it was to let the cayman hear that something was going on. In fact, the Indian meant it as the cayman's dinner-bell." (p. 227.)

Although a ride on the back of a crocodile is not likely ever to become very fashionable, as a morning's exercise or amusement, even in this age of the "march of intellect," yet, it is seen, from the above authorities, that it really is, and long has been, adopted in the process of killing these monsters of the deep.

Jan. 27. 1829. J. H. P. H.

* "When they have fixed a piece of swine's flesh on a hook, they cast it into the middle of the river; and on the bank they have a live pig, which they beat. The crocodile, hearing the squeaking, goes to the noise; and, having seized the flesh, devours it: they then pull him; and when they have dragged him on shore, they first of all fill his eyes with mud; and having done this, he is very easily despatched."

† "The crocodile of the Nile is taken with a hook baited with a dead pig. The reptile, allured to the shore by the squeaking of a live pig, devours bait and hook, and is overwhelmed with mud and sand."

Art. IV. *On the Arrival and Retreat of the British* Hirúndines, *with a Table of Arrivals and Departures, from* 1800 *to* 1828. By the Rev. W. T. Bree, M.A.

It has long been a question among naturalists, and one that has not yet been so fully and satisfactorily answered as could be wished, what becomes of the swallows during the winter, after they have disappeared from our view in the autumn. The opinion adopted by Linnæus, and other northern naturalists, that they retire under water for the winter, if it ever prevailed to any extent among the more intelligent in this country, has, I believe, been long since exploded. Little doubt, I think, need be entertained, that the greater part of them migrate to warmer climates: but do not a few individuals of at least some of the species secrete themselves in this country, and lie in a torpid state during the winter months? No naturalist, perhaps, ever paid more minute attention to this subject than the celebrated Gilbert White; and though his diligent and repeated efforts to discover any of these birds in their brumal retirement invariably proved unsuccessful, still the result of his various observations amounts, I believe, to what has just been stated, that while the great body of swallows migrate, some few lie dormant, and remain in this country.* There are several circumstances connected both with their first appearance and their departure which tend to confirm the above opinion. It almost invariably happens that a few individuals of the swallow tribe are to be seen in the early spring (by the beginning of April, or even in March), long before the general flight arrives; hence the common saying, that "one swallow does not make summer." And, again, a few linger on with us long after the general flight has disappeared in the autumn. These stragglers, too, both in spring and autumn, frequently withdraw for some days, or even weeks, and then reappear after a considerable interval. "A circumstance, this," as White observes, "much more in favour of hiding than migration; since it is much more probable that a bird should retire to its hybernaculum just at hand, than return for a week or two only to warmer latitudes." The autumnal stragglers, it is supposed, are weakly birds that have been hatched late in the season; and they are frequently to be observed flying feebly and heavily about, not with their accustomed alacrity. To all appearance, therefore, they seem to be ill calculated to undertake a long journey over the seas, and to encounter the tempestuous weather likely to occur at that late season of the year. Of all our British species the

* See Hist. of Selborne, Letter xxi. to Thomas Pennant, Esq., and Letter xviii. to the Hon. D. Barrington.

sand marten is the one which we should naturally expect to be the most likely to hide during the winter in the deep recesses of banks, in which it makes its nest.* And, accordingly, this is, occasionally at least, the earliest which makes its appearance in the spring. White, indeed, says that the house swallow comes first; but the earliest appearance I find recorded in his calendar is of the sand marten on the 21st of March. In two several seasons I have observed the sand marten on the 31st of that month; once in Cornwall, and once in this neighbourhood, as appears by the following table, under the years 1818 and 1822. I have been informed by an intelligent friend, accustomed to pay attention to these birds, that a house swallow once took up its residence, late in the autumn, within St. Mary's Church, at Warwick, and was regularly observed there by the congregation until Christmas eve, after which it disappeared, and was seen no more. And, a few years since, I heard of one making its appearance, in the middle of winter, about the old mansion at Wroxall, in this county, but to which species this bird belonged I was unable to ascertain. The above facts, however far they may fall short of positive proof, undoubtedly afford much probability to White's opinion, that the *H*irúndines do not all leave this island in the winter. At the same time, if this be the case (a case, too, which, if it occur at all, occurs, we may suppose, every year), it certainly is extraordinary that these birds should never, either by accident or design, have been discovered, while dormant in their winter quarters. And of such discovery I am not aware that any instance has been adduced sufficiently well authenticated to be relied on.

The swift (*H*irúndo *A*pus), I am inclined to think, does not hide with us, but is altogether migratory. Its appearance in the spring is more simultaneous than that of the other *H*irúndines, few of this species being to be seen much before the general flight makes its appearance. It retires, for the most part, by the middle of August or earlier, and does not visit us again till towards the end of April or the beginning of May. Now it seems hardly probable that a bird of such matchless powers of wing, whose entire occupation, save only when engaged in rest and incubation, is carried on in the air, should be doomed to spend more than two thirds of the year in a state of inactivity. Nor, again, is it likely that this species would retire so *early* in the season as it does, if it were for the pur-

* White, however, observes that "these birds do not make use of their caverns by way of hybernacula." (Letter xx. to the Hon. D. Barrington.) Possibly they may occasionally do so, nevertheless, though he failed to discover them in those situations.

pose of passing into a dormant state; especially as we know that it can, and occasionally does, subsist with us for a considerable time after the usual period of its disappearance. The following Table shows that the swift is sometimes seen in September, once so late as the 15th of that month; and the same friend who related to me the circumstance of the house swallow taking up its abode in St. Mary's Church, informed me, likewise, that he once recollected an instance of a swift, at Warwick, remaining till about the time the swallows in general took their departure. The bird was observed by many persons, and attracted attention the more, from the circumstance of its flying about along with the swallows, with a piece of string or rag, or something of the sort, adhering to it. Most probably it had been caught by some unlucky boy, who turned it off again in sport, after having affixed to it this cumbrous appendage, which, no doubt, proved the cause of deterring the bird from migrating along with its associates at the usual season.

The calendar from which the following Table has been constructed, was kept for the most part in the midland counties, and chiefly in Warwickshire. In some few instances, however, the observations were made in distant counties; and such are, accordingly, distinguished by a note at the bottom of the Table. I have to regret that the notices relating to the house marten and sand marten are so scanty. The fact is, though the sand marten is less than the house marten, and of a different colour, the two species are not always readily to be distinguished from each other, unless a tolerably near view of them can be obtained; when at a distance, or high in the air, the one may be easily mistaken for the other. And I have made it an invariable rule never to enter in the calendar any occurrence of which I was not perfectly certain; accuracy of observation being the chief, if not the only, merit such a journal can well possess. The sand marten, too, is but partially distributed through the country, and is the least domestic of the genus, mostly frequenting wild commons, cliffs, sand-pits, &c., and but seldom approaching the haunts of men. Sometimes it happens that the summer may have far advanced before one of this species has presented itself to my view. And to record its appearance at such a season as its *first* arrival would tend rather to mislead than inform the naturalist. The frequent omission in the Table of these two species is, however, the less to be regretted, as their periods both of arrival and departure for the most part coincide pretty nearly with those of the house swallows. If the *exact* order in which our British species arrive be required to be stated, I should arrange it thus, sand marten, house swallow, house marten, swift.

TABLE showing the earliest and latest Appearances of the British *Hirúndines* from the Year 1800 to the present Time.

	1800. First seen.	1800. Last seen.	1801. First seen.	1801. Last seen.	1802. First seen.	1802. Last seen.	1803. First seen.	1803. Last seen.	1804. First seen.	1804. Last seen.
Swallow (*H. rústica*)	Ap. 16.	Nov. 1.	Ap. 10.		Ap. 15.	Oct. 22.	Ap. 3.	Oct. 17.	Ap. 14.	Nov. 6. *a*
Marten (*H. úrbica*)				Nov. 7.			Ap. 3.			
Sand Marten (*H. ripària*)										
Swift (*H. A'pus*)	May 3.	Aug. 27.	Ap. 29.	Aug. 20.	Ap. 27.	Aug. 19.	May 4.	Aug. 17.	Ap. 30.	Au. 21. *a*

	1805. First seen.	1805. Last seen.	1806. First seen.	1806. Last seen.	1807. First seen.	1807. Last seen.	1808. First seen.	1808. Last seen.	1809. First seen.	1809. Last seen.
Swallow	Ap. 11.	Nov. 9.	Ap. 25.	Nov. 20.	Ap. 10.	Oct. 28.	Ap. 7.		Ap. 25.	Oct. 23.
Marten							Ap. 21.			
Sand Marten							Ap. 21.			
Swift	May 10.	Aug. 13.	May 13.	Aug. 12.	May 9.	Aug. 11.	May 9.	Aug. 11.	May 8.	Aug. 18.

	1810. First seen.	1810. Last seen.	1811. First seen.	1811. Last seen.	1812. First seen.	1812. Last seen.	1813. First seen.	1813. Last seen.	1814. First seen.	1814. Last seen.
Swallow	Ap. 13.	Oct. 14.	Ap. 12.	Oct. 14.	Ap. 15.	Oct. 14.	Ap. 8.	Oct. 24.	Ap. 3.	Oct. 24.
Marten	Ap. 13.							Nov. 14.	Ap. 14.	
Sand Marten										
Swift	May 3.	Aug. 16.	May 1.	Sep. 5. *b*	May 8.	Aug. 6.	May 2.	Sep. 7. *c*	May 1.	Aug. 22.

	1815. First seen.	1815. Last seen.	1816. First seen.	1816. Last seen.	1817. First seen.	1817. Last seen.	1818. First seen.	1818. Last seen.	1819. First seen.	1819. Last seen.
Swallow	Ap. 9.	Nov. 1.	Ap. 21.	Oct. 10.	Ap. 20.	Oct. 24. *e*	Ap. 10. *g*	Oct. 9.	Ap. 15.	Nov. 3.
Marten			Ap. 24.				Ap. 18. *g*	Oct. 24.		
Sand Marten							Mr. 31. *h*			
Swift	May 7.	Au. 21. *d*	May 7.	Aug. 19.	May 7.	Sep. 15. *f*	May 5.	Aug. 9.	Ap. 30.	Aug. 17.

	1820. First seen.	1820. Last seen.	1821. First seen.	1821. Last seen.	1822. First seen.	1822. Last seen.	1823. First seen.	1823. Last seen.	1824. First seen.	1824. Last seen.
Swallow	Ap. 23.	Oct. 24.	Ap. 17.	Oct. 15.	Ap. 20.	Nov. 9. *l*	Ap. 10.	Oct. 15.	Ap. 18.	Oct. 17.
Marten	Ap. 25.								May 1.	
Sand Marten	Ap. 12. *i*		Ap. 22.		Mar. 31.					
Swift	Ap. 29.	Aug. 11.	May 11.	Au. 24. *k*	May 5.	Aug. 16.	May 5.	Aug. 23.	May 1.	Aug. 9.

	1825. First seen.	1825. Last seen.	1826. First seen.	1826. Last seen.	1827. First seen.	1827. Last seen.	1828. First seen.	1828. Last seen.	1829. First seen.	1829. Last seen.
Swallow	Ap. 23.	Nov. 7. *m*	Ap. 12.	Oct. 20. *n*	Ap. 19.	Oct. 11.	Ap. 11.	Oct. 14. *p*		
Marten		Nov. 7. *m*			Ap. 28.			Oct. 11.		
Sand Marten					Ap. 27.		Ap. 18. *o*			
Swift	May 6.	Aug. 18.	May 8.	Aug. 10.	Ap. 30.	Aug. 15.	May 8.	Aug. 17.		

a. In the Isle of Wight.

b. This was a single bird seen at Birmingham. I observed others in Northamptonshire on the 21st of August, and one at Coventry on the 24th. The last seen at Allesley were on the 5th of August.

c. At Worksop, in Yorkshire; a single bird.

d. At Lancaster; many birds flying in packs, and squealing about the town. I had observed none elsewhere since the 7th of August.

e. Near Penzance. I was informed by an observant friend that one swallow appeared at Allesley on the 10th of November, and martens at Oxford on the 14th; and at the latter place one marten or swallow on the 20th.

f. Two or three swifts sporting about with the large assemblies of swallows and martens by the sea-side, near Penzance, to the eastward. These birds, there can be little doubt, were on their passage from this country to a more southern climate. I had seen none for a month previously; the last I observed were on the 1st of August, near Bristol. In Warwickshire swifts were seen this year on the 27th of August.

g. Near Penzance.

h. Upwards of a score sand martens seen in the evening, sporting over the marshes between Gulval and Marizion, near Penzance. The wind at that time was N. W., and the thermometer stood on that day at 50 in the shade at noon.

i. A single bird seen in this parish; one, and most probably the same, individual had been observed by another person at the same place, on the 6th of April.

k. A single bird seen in Northamptonshire. In Warwickshire they were mostly gone by the 15th of August; one seen on the 20th.

l. A single bird seen at Birmingham. I had observed none since the 20th of October.

m. At Eastbourne, Sussex.

n. Two or three birds seen near London. Last seen in Warwickshire on the 15th of October. Mostly gone by the 6th.

o. Two birds so high in the air that I could not be quite certain whether they were sand martens or house martens, but believe them to have been the former.

p. I am informed that a swallow was seen at Maxstoke Castle in this county on Nov. 11th.

Let it be remembered, that it is the *earliest* and the *latest* appearance of the several species of *Hirúndo* that are recorded in the Table above, not that of the *main body* of them. Of the first three species, viz. swallow, marten, and sand marten, the general flight does not usually appear till about the end of April or beginning of May, and retires about the beginning of October. Of the swifts the general flight may be stated as arriving about the middle of May, and departing early in August. Yours, &c.

Allesley Rectory, Aug. 6. W. T. Bree.

Art. V. *An Outline and Description of Centrotus Bennetii and Hardwickii.* By the Rev. William Kirby, M. A. F. R. S. L. S. &c.

Sir,

There are no tribes of animals, with the exception, perhaps, of fishes, in which so much singularity and eccentricity of form are observable, as in that of insects; of this, examples may be produced from almost every order, but in none is this sportiveness more conspicuous than in the homopterous section of the Hemíptera, especially in Fabricius's genus Centrotus. Having received two insects that remarkably verify this observation, from two very distant quarters of the globe, one from General Hardwicke, well known for the spirit and talent with which he has collected and illustrated zoological subjects in the East, and the other from Edward Bennet, Esq., of Rougham Hall, in Suffolk, who collected insects with singular assiduity in the West, at Choco, in Colombia, I thought an outline and description of such strange forms might amuse and interest some of your readers. I have added to them four other figures of insects of the same genus, copied from *Stoll's Cigales*, a work in few hands, which are all calculated to excite astonishment in the mind of the beholder, who, at first, would be disposed to doubt the existence of creatures armed in so extraordinary and grotesque a manner. The only conjecture one can form, with regard to the use of the apparatus that distinguishes them, is that it is designed to deceive their enemies, the birds, who may thus often be led to mistake them for part of the spray of the tree or shrub on which they feed.

Centrotus Bennetii. (*fig.* 5. *a*) — Body not four lines long, of a lurid colour, obscure; rather hairy, hairs erect; thorax thickly punctate, with a compressed reflexed horn elevated above the head, and as long as the body, bifid at the apex, and with an internal branch near the base; behind this is another shorter blunt horn, with a branch on each side; the scutéllum near the end is also armed with a short blunt horn. The tégmina and wings are veined longitudinally.

Country. Choco, in Colombia.

5

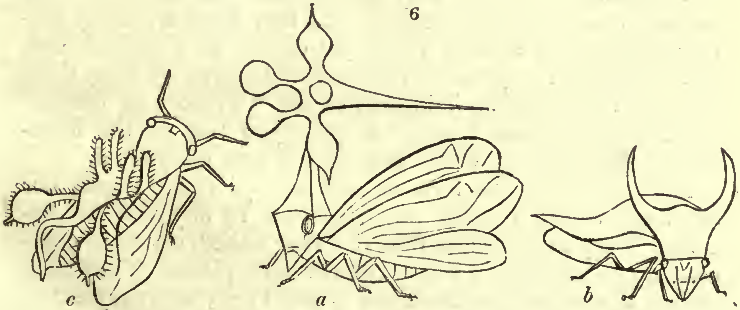
b *c* *a*

Centròtus Hardwíckii. (*fig.* 5. *b*) — Body four and a half lines long, brownish-black, sprinkled with short, decumbent, inconspicuous hairs; legs, except the thighs, paler than the rest of the body; thorax minutely punctate, elevated above the head into a recurved quadrangular horn rather shorter than the body, and terminating in a fork resembling a pair of concavo-convex pedunculated pointed leaves; scutéllum length of the body, punctate, acute, and elevated into a rounded lobe near the apex. Tégmina naked, punctate, veined longitudinally.

Country. Nepal, in the East Indies.

Centròtus cruciàtus *Fab.* (*fig.* 5. *c*) Stoll's Cigales, pl. 2. f. 8.

6



c *a* *b*

Centròtus globulàris *Fab.* (*fig.* 6. *a*) Stoll's Cigales, pl. 28. f. 163.

Centrótus marginátus *Fab.* (*fig.* 6. *b*) Stoll's Cigales, pl. 11. f. 53.

Centrótus cláviger *Fab.* (*fig.*6. *c*) Stoll's Cigales, pl. 21. f. 115. I am, Sir, yours, &c.

Barham, October 15. 1828. William Kirby.

Art. VI. *The Natural History of Molluscous Animals.* In a Series of Letters. By G. J.

Letter 1. *Introduction.*

Sir,

I am not surprised at the pleasure you express having received from the sight of the rich cabinet of Lady Conchylia. Shells, from the ease with which they can be preserved, from their elegance and beauty, have, at all times, been favourite objects with collectors; and as show was in general the main object, so various methods were devised to heighten their gloss, and unveil their hidden colours. Much of the effect produced by Her Ladyship's splendid specimens is the result of these artifices: but this childish amusement has gradually given way to a more rational pursuit; and while shells are collected with greater eagerness than ever, it is with the view of unfolding a page in the volume of creation; of enlarging our knowledge of the structure and functions of animated beings; of satisfying a blameless curiosity concerning the habits and purposes of creatures whom their Author has pronounced to be all "very good;" of improving our taste by the contemplation of the most beautiful and elegant forms; and for the very interesting end of illustrating the structure of the earth, and chronicling its revolutions.

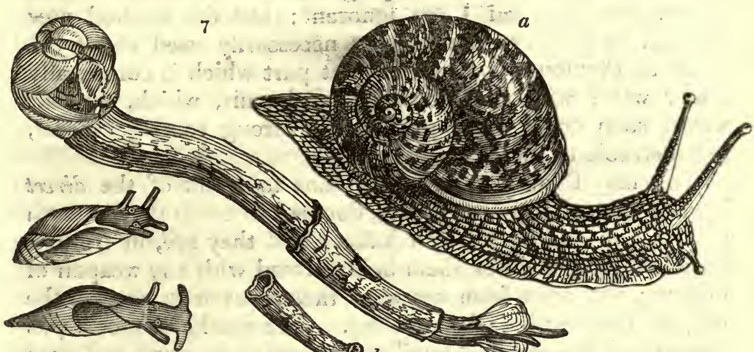
Naturalists, however, have now agreed that shells form no isolated class of natural objects; but that there are many animals destitute of a shell, which yet cannot be disjoined from them without the grossest violation of nature. These, then, we must not omit; and, instead of the "History of Shells" you request, I shall attempt to give you that of the Mollu'sca, the name by which this class is now designated.

Molluscous animals have no internal articulated bones, nor are their bodies divided into segments by any external fissures. They are soft and fleshy; either naked, or, more commonly, covered with a shell of one or more pieces. They have no legs nor articulated members of any kind; and they either crawl on the earth, or swim in the water, by means of extended portions of their skin, which can rarely claim a title to be called fins. The cuttle-fish and slug are examples which will give you a general notion of the naked tribes; and with the great variety in the shelled species you are now familiar.

At the first glance, you might suppose that such creatures can be productive neither of much benefit nor much injury to man; but a little detail will convince you that this would be a hasty conclusion.

The catalogue of their "injuries," I must acknowledge, is not extensive. The slug (*L*ìmax) and snail (Hèlix horténsis) (*fig.* 7. *a*), the gardener will inform you, frequently

7 *a*



c *b*

destroy, and perhaps always more or less injure, his early crops, while they mutilate and render disgusting the fruits of autumn: but the farmer often finds them a more serious pest; for in spring they often issue, in inconceivable numbers, from their concealments on a dewy eve, and feed upon the young and tender crops. No kind of herbage seems unpalatable to them, but to clovers they give a preference; and the damage they annually do to them and to turnips is really very great. Many fields were this summer made barren by them, and more were so thinned as to require to be resown.

Of the marine tribes the *T*erèdo navàlis (*fig.* 7. *b*), or Ship-worm, is the only one which has excited notice by its destructive powers. This shell-enclosed worm, which Linnæus has emphatically, yet not undeservedly, styled the "calamitas navium," is said to have been introduced into our seas from the East within little more than a century. They are now common in all the seas of Europe; and being gifted with the power of perforating wood, they have done, and continue to do, extensive mischief to ships, piers, and all submarine wooden buildings. The soundest and hardest oak cannot resist them; but, in the course of four or five years, they will so drill it, as to render its removal necessary, as has happened in the dock-yard of Plymouth. In the years 1731 and 1732, the United

Provinces were under a dreadful alarm, for it was discovered that these worms had made such depredations on the piles which support the banks of Zealand, as to threaten them with total destruction, and to claim from man what he had wrested from the ocean. Fortunately they, a few years after, totally abandoned that island, from causes unknown, but suspected to be "from their not being able to live in that latitude when the winter was rather severer than usual." But still they might return; and so a prize of value was offered to any one who should discover a remedy against their attacks. What answer was returned I am ignorant; but the method now adopted to preserve the timbers necessarily used about the docks at Plymouth is, to cover that part which is continually under water with short broad-headed nails, which, in salt water, soon cover every part with a strong coating of rust, impenetrable to these animals.

You may think it rather ridiculous to speak of the *direct* injuries such sluggish creatures, doomed to creep on the earth or crawl in the waters, can inflict: and they are, in truth, a harmless race, none of them being armed with any weapon of offence; yet, even from amongst them, has man sought the means of aiding his vile purposes. The sea-hare, the *L*èpus marìnus of the ancients, familiar to classical readers, and once famous in the annals of superstition, is a member of this class. Modern naturalists call it Aphýsia depìlans. (*fig.* 7. *c*) It is a snail-like animal, of a purplish-brown colour, common on our own shores, which, at pleasure, discharges from under its cloak large quantities of a fluid of the richest purple colour. This creature, it was once believed, held such antipathy to man, that the mere touch of it would cause the hair to fall of, and the sight of it was sufficient to subdue the obstinacy of concealed pregnancy. That such an animal should supply a potent poison is not wonderful; and accordingly we are told that Nero mixed it with the food of those inimical to him, and that with this poison Titus was despatched by Domitian. Its operation was speedy, and inevitable destruction the effect: yet it was not often used, as it was believed to betray itself by some peculiar symptoms. (See *Beckman's Hist. of Inventions*, vol. i. p. 82.) And yet it is curious that, notwithstanding all this has been said by very grave men, and very gravely too, modern naturalists have proved it to be perfectly harmless, neither offensive to the smell, nor poisonous to the touch.

Some shell-fish, however, are really poisonous when eaten. This is frequently the case with muscles (*M*ýtilus edùlis). I have known them to produce an itchy eruption and swelling over the whole body, attended with great anxiety and considerable fever. On some parts of the Yorkshire coast they are considered poisonous, and in consequence never eaten; and several cases are on record in which their use proved fatal. Some of Captain Vancouver's men having breakfasted on roasted muscles, were soon after seized with a numbness about their faces and extremities; their whole bodies were shortly affected in the same manner, attended with sickness and giddiness, and one died. In the month of June, 1827, a great number of the poor in Leith were poisoned by eating these shellfish, which they procured from the docks. "The town," says Dr. Combe, "was in a ferment, and the magistrates, with great propriety, issued a warning against the use of the muscles. Many deaths were reported, and hundreds of individuals were stated to be suffering under it. Luckily, matters were not so deplorable; but we ascertained that, in addition to the man mentioned before, the companion of our patient, an elderly woman, had died. In all, about thirty cases occurred, with great uniformity of symptoms, but varying very much in severity; but none, so far as I know, have left any permanent bad effects." To what cause these deleterious effects are to be ascribed is uncertain; for muscles, you are aware, may commonly be eaten with impunity. Some attribute them to disease in the fish, or to its being in a state of putrefaction; others to its having fed on some poisonous articles, more particularly on the ores of copper; and others, again, to the peculiar idiosyncrasies of the sufferers. In many cases this latter explanation will suffice; but sometimes, as in the Leith cases, it is obviously insufficient. The disease of the fish has never been satisfactorily ascertained: they are eaten fresh and alive, and cannot, of course, be putrid; while the most delicate chemical tests give no indications of cupreous impregnation. Upon the whole, the effects seem to be best explained by attributing them to a *peculiar* poison generated in the fish, under unknown circumstances; an opinion adopted by those medical men who have attended most to the subject.

Now list! One of the Mollúsca actually doth attack man *vi et armis.* I must beg you will, like a good-natured hero of Mr. Crabbe's, dispose yourself "wonders to believe," and be ready to grant

"That things improbable may still be true."

"A friend of mine," says Mr. Pennant, when speaking of a kind of cuttle-fish (Octòpus vulgàris), "long resident among the Indian isles, and a diligent observer of nature, informed me that the natives affirm that some have been seen two fathoms broad over their centre, and each arm nine fathoms long.

When the Indians navigate their little boats, *they go in dread of them;* and lest these animals should fling their arms over, and sink them, they never sail without an axe to cut them off." The same story is to be found in Pliny, but he of course was not Mr. Pennant's friend; and the following — fact, shall I call it? — adds to its credibility: — The celebrated diver, Pescecola, whom the Emperor Frederic II. employed to descend into the Strait of Messina, saw there, with horror, enormous cuttle-fish attached to the rocks, the arms of which, being several yards long, were more than sufficient to strangle a man. (*Malte-Brun*, *Geogr.*, pt. i. p. 316.)

I am, Sir, &c.

G. J.

Art. VII. *An Attempt to form a Table of the Geological Arrangement of British Fossil Shells.* By R. C. Taylor, Esq. F.G.S.

The following is an abstract of a more extended index, constructed chiefly from the *Mineral Conchology* of Mr. Sowerby, and from authentic details, after essential corrections in the localities and formations. The genera are distinguished under the four principal subdivisions of Simple Univalves, Simple Bivalves, Complicated Bivalves, and Multilocular Univalves. The species, for the purposes of the Table, can only be enumerated in one formation, although they sometimes appear to recur in several; but it has been endeavoured to introduce them where they are most characteristic.

Having the *Mineral Conchology* for its basis, the list has been carefully augmented by selections from such local catalogues of fossils as have been communicated in the scientific journals and Transactions, and in the publications of eminent naturalists; and this has been done with the greater satisfaction, since many of those lists, particularly those in the *Transactions of the Geological Society*, were previously submitted to Mr. Sowerby.

Occasionally the compiler has been enabled to make some additions and corrections from his own acquaintance with the secondary formations. Care has been exercised to avoid repeating species which are already enumerated in *Mineral Conchology*, and enlarging the catalogue without sufficient authority. In most of the doubtful cases they have been rejected altogether, and in others they are admitted into the column of formations, but not into that of numbers or species.

As several species, there is reason to believe, are distributed throughout a series of beds (perhaps even of what are collectively styled formations), and a false estimate of number would result from repetition, they have been arranged under those formations which they more particularly characterise, where they are most conspicuous, or whence they were originally figured by Mr. Sowerby. The authorities for many of the additional fossils are affixed.

The present is by no means offered to geologists as a perfect Stratigraphical Table. There is still much to add, and much to correct; but should it prove the means of eliciting a more elaborate classification hereafter, by those better qualified for the undertaking, the object of the writer will be fully attained.

SIMPLE UNIVALVES.

Tot. sp.	Genera.	Formations.	Sp. in f.
6	Actèon (Tornatélla)	Lias (1, Coneybeare)	—
		Upper oolite (Ancliffe)	2
		London clay	2
		Crag	2
7	Ampullària	Mountain limestone, and cornbrash	1
		Inferior oolite (3 species, Coneybeare)	1
		London clay	4
		Upper marine, I. W.?	1
		Crag, 1?	—
4	Ancílla	Forest marble (2 species, Smith?)	1
		London clay	2
		London clay, and upper marine	1
1	A'ncylus	Lower fresh water	1
7	Aurícula	Lower green sand	1
		Upper green sand } Chalk marl }	1
		London clay	2
		Crag	3
3	*B*álanus	Chalk (Mantell)	1
		Crag	2
6	Bellérophon	Mountain limestone	6
26	*B*úccinum	Mountain limestone	4
		Brora coal measures	—
		Great oolite	1
		Upper green sand (T.)	1
		Woolwich and upper marine, I. of Wight	1
		London clay	4
		Crag	15
6	Búlla	London clay	5
		Crag	1
2	Bùlimus	Upper fresh water	2
3	Cancellària	London clay	3
3	Cássis	London clay	2
		Crag	1
9	Ceríthium	London clay	6
		Plastic clay	3
9	Círrus	Mountain limestone	2
		Lower oolite	3
		Gault	1
		Upper and lower chalk 2 (1, Mantell)	3
3	Cònus	London clay	3
4	Cypræ̀a	London clay	1
		Crag	3
10	Dentàlium	Upper lias clay	1
		Lower green sand	—
		Gault	2
		Upper green sand	1
		Chalk marl, and London clay	1
		London clay	4
		Crag	1
1	Dòlium	Chalk	1
1	Ebúrna (*B*úccinum)	Crag	1
5	Emargínula	Inferior oolite	3
		London clay, and crag	1
		Crag	1
8	Euómphalus	Mountain limestone	7
		Upper oolite	1
1	Fissurélla	Crag	1
13	Fùsus	London clay	11
		Crag	2

SIMPLE UNIVALVES — *continued.*

T. sp.	Genera.	Formations.	Sp. f.	T. sp.	Genera.	Formations.	Sp. f.
4	Helicìna -	Lias - -	3			Plastic clay, 1? -	—
		Marly sandstone				London clay -	4
		above lias -	1			Crag - -	5
3	Hèlix -	Mountain limestone?	1	8	*N*erìta -	Mountain limestone	1
		Upper green sand	1			Inferior oolite }	
		Lower fresh water,				Inferior oolite of }	2
		Isle of Wight -	1			Sutherland }	
5	Infundíbulum	Plastic clay -	1			Great oolite -	2
	(Calýptrea)	London clay -	3			Stonesfield slate, 2	—
		Crag - -	1			Portland limestone	1
6	Limnèa -	Fresh water, I. of W.,				London clay -	1
		upper and lower	6			London clay, and up-	
11	Melània -	Mountain limestone	1			per marine -	1
		Lias and coral rag -	1	2	Neritìna -	Woolwich beds }	
		Inferior oolite -	2			Isle of Skye? }	
		Upper oolite, Port-				Plastic clay, and }	2
		land coral rag, and				upper marine }	
		Kimmeridge beds	1			Lower fresh water }	
		Weald clay -	2	2	Olìva -	London clay -	2
		Upper green sand?	—	1	O'vula -	Crag - -	1
		London clay -	1	11	Patélla -	Lias — alum shale	1
		Upper marine, 1 -	—			Great oolite -	2
		Lower fresh water	3			Stonesfield slate -	1
4	Melanópsis -	Woolwich bed, upper				Forest marble -	1
		marine, and lower				Oxford or clunch clay	1
		fresh water -	1			Gault, and green sand	1
		Upper and lower fresh				London clay -	1
		water - -	2			Crag - -	3
		Upper and lower fresh		3	Paludìna -	Purbeck beds }	1
		water, and upper			(originally	Hastings sands }	
		marine - -	1		Vivípara)	Weald clay, and Sus-	
5	Mìtra -	London clay -	3			sex marble -	1
11	Potamìdes -	Woolwich bed (Ce-				Isle of Skye -	1
		ríthia?), and upper				Upper and lower fresh	
		marine -	3			water, and upper	
		Lower fresh water,				marine -	—
		Isle of Wight -	2	3	Phasianélla -	Fresh water, I. of W.	3
		Upper marine forma-		2	Pilèolus -	Upper oolite -	2
		tion - -	6	7	Planórbis -	Mountain limestone?	1
36	*M*ùrex -	Mountain limestone	1			Lower oolite? }	1
		Oolite and pisolite	1			Upper green sand? }	
		Upper green sand	2			Upper green sand?	1
		Woolwich beds -	2			Woolwich beds -	1
		London clay -	19			Lower fresh water	3
		Upper marine, I. of W.	1	11	Pleurótoma -	London clay -	10
		Crag, and Woolwich				London clay, and up-	
		beds - -	—			per green sand -	1
		Crag - -	9	2	Pýrula -	London clay -	2
11	Nática -	Mountain limestone		14	Rostellària	Inferior oolite (Coney-	
		(Miller) -	—		(*S*trómbus)	beare) -	3
		Lower green sand	1			Kelloway stone, and	
		Upper green sand	1			cornbrash -	1

SIMPLE UNIVALVES — *continued.*

T. sp.	Genera.	Formations.	Sp. f.
		Oxford clay, and Brora limestone	1
		Forest marble	—
		Lower green sand, with two others	1
		Upper green sand	2
		Gault, and chalk marl (Mantell)	1
		Plastic clay, and London clay	1
		London clay	3
		Crag, and sand of plastic clay	1
12	Scalària	London clay	7
		Crag	5
1	Seraphs	London clay	1
6	Sérpula	Lias, Kimmeridge; Inferior oolite; Fuller's earth rock; Cornbrash, Forest marble; Clay of great oolite (2, Smith); Coral rag, green Sand, and London clay	2 at least.
		Upper chalk	3
		Above the upper fresh water, Isle of Wight (T.)	1
		Lower fresh water, 1	—
1	Sigarètus	London clay	1
5	Solàrium	Portland limestone	1
		London clay	4
1	Terebéllum	London clay	1
25	Tròchus	Blue lias, and lias marl	2
		Inferior oolite (and 2 others)	10
		Fuller's earth ?	—
		Clay over great oolite (2, Smith)	—
		Coral rag	1
		Kimmeridge clay (1, Smith)	—
		Portland rock	1
		Gault, 1 (1, Mantell)	2

T. sp.	Genera.	Formations.	Sp. f.
		Upper chalk, 2 (2, De la Beche)	2
		London clay	4
		Crag	2
		Crag and lias	1
11	Túrbo	Mountain limestone	1
		Lias (De la Beche)	—
		Under oolite	2
		Coral rag	1
		Kimmeridge clay (1, Smith)	—
		Upper green sand	4
		London clay	1
		Crag	2
14	Turritélla	Mountain limestone	1
		Lias shale ?	1
		Inferior oolite (3, Coneybeare and Smith)	1
		Stonesfield slate ?	—
		Coral rag, and shelly limestone of Brora	1
		Forest marble, and clay ?	1
		Upper green sand	4
		Plastic clay ? (Coneybeare)	—
		London clay	3
		London clay, and crag	2
9	Vermiculària (or Vermètus)	Inferior oolite	1
		Upper oolite, and Portland	1
		Coral rag	1
		Lower green sand	1
		Upper green sand	1
		Chalk marl, and chalk (1, Mantell)	2
		London clay	2
5	Vivípara (afterwards Paludìna)	Weald clay, and marble	2
		Fresh water (lower and upper)	2
		Crag, doubtful	1
14	Volùta	London clay	12
		London clay, and upper marine	1
		Crag	1
		Upper marine ?	—
1	Volvària	London clay	1

SIMPLE BIVALVES.

T. sp.	Genera.	Formations.	Sp. f.
1	Anòmia	London clay	1
10	A'rca	Mountain limestone	1
		Magnesian limestone	1
		Oolite, and pisolite	2
		Gault	1
		Upper green sand	1
		Plastic clay	1
		London clay	1
		Crag	2
22	Astárte	Lias	1
		Inferior oolite	4
		Superior oolite	3
		Brora limestone, and grit of Dunrobin	—
		Clay above oolite	1
		Stonesfield slate, 1	—
		Oxford clay, and Kelloway stone	1
		Oxford clay	1
		Portland beds	1
		Lower green sand	1
		Upper green sand	1
		London clay	1
		Crag	6
		Diluvium	1
12	Avícula	Lias slate, Kelloway, Sutherland limestone, and Stonesfield slate	2
		Cornbrash, and Oxford clay	1
		Inferior oolite, and clay on upper oolite; Kimmeridge clay	2
		Stonesfield slate	2
		Upper green sand (1, Taylor; 1 Murchison)	1
		Oxford clay, and London clay	1
		Lower green sand	3
2	Axìnus	Magnesian limestone	1
		London clay	1
14	Cardìta (since subdivided into Cardìta and Pholadomỳa)	Lias, and cornbrash	1
		Brora limestone	1
		Brora limestone, and Stonesfield slate	1
		Inferior oolite	4
		Inferior oolite, marl stone, and cornbrash	1
		Fuller's earth rock (Smith)	—
		Cornbrash, and Kelloways	1
		Great oolite	2
		Kimmeridge clay (1, Smith)	—
		Lower green sand (Martin)	1
		Upper green sand	1
		London clay	1
21	Cárdium	Mountain limestone	3
		Brora coal shale	1
		Robin Hood's bay	1
		Fuller's earth ? (Sm.)	—
		Kimmeridge clay (2, Smith)	—
		Brora, Portland rock, calcareous grit	1
		Weald clay, and London clay	1
		Upper green sand	5
		Chalk marl, gault	1
		Plastic clay, and London clay	1
		London clay	3
		Bagshot sand ?	—
		Crag	4
9	Chàma	Clay above great oolite (3, Smith)	—
		Kelloway stone, and green sand	1
		Kimmeridge clay, and coral rag	2
		Upper green sand	5
		London clay	1
		London clay	1
1	Clavagélla	Calcareous grit ?	1
1	Córbis	Sandstone above Brora coal	1
13	Córbula	Lower green sand (1, Mantell)	2
		Upper green sand	3
		London clay	3
		Upper marine	2
		Crag	2

SIMPLE BIVALVES — *continued.*

T. sp.	Genera.	Formations.	Sp. f.
1	Crània	Chalk	1
3	Crassatélla	Lower green sand (Mantell)	1
	-	London clay	2
	-	Bagshot sand, 2 species	—
1	Crenátula	Lias, inferior oolite, and Portland	1
14	Cucullæ'a	Inferior oolite	3
		Brora limestone? 2	2
	-	Great oolite (Ancliffe)	2
		Lower green sand (Mantell)	1
		Upper green sand	5
		Upper green sand, and chalk	1
	-	Plastic clay ? 1	—
9	Cỳclas (Cyrèna.)	Isle of Skye (Murchison)	3
		Weald clay, and Hastings sandstone and grit, Purbeck	3
	-	Plastic clay, and Woolwich beds	3
	-	Upper marine, I. of W.	—
		Lower fresh water, 2	—
1	Cỳpris	Purbeck, Weald clay, and marble	1
		Lower fresh water, Isle of Wight	1
		Hastings beds	
3	Diánchora	Upper green sand	1
		Lower chalk, and upper	1
		Upper chalk	1
2	Gastrochæ'na	Sandstone, Robin Hood's Bay	1
		London clay	1
7	Gervíll*ia* (and *P*érna)	Cornbrash, and Brora limestone	2
		Inferior oolite, and clunch or Oxford clay	2
		Lower green sand	3
15	Gryphæ'a	Lias, I. of Pabba, Mull, and Kelloway	2
		Lias	2
		Marl stone, 1	—
		Fuller's earth rock	1
		Inferior oolite; Clunch clay, 2; Marly sandstone; Portland freestone	3

T. sp.	Genera.	Formations.	Sp. f.
		Stonesfield slate, 2	—
	-	Inferior oolite	1
	-	Calcareous grit; Grit of Dunrobin; Kimmeridge clay	1
		Lower green sand	2
		Upper green sand	2
		Upper chalk	1
2	Hippopòdium	Lias, 1 (1, Coneybeare)	2
16	Inocéramus	Mountain limestone	1
		Alum shale	1
		Inferior oolite	—
	-	Lower green sand (1, De la Beche; 1, Martin)	2
		Chalk, and upper green sand	4
	-	Gault, and upper green sand	3
	-	Chalk marl (Mantell)	2
		Upper chalk	3
10	Isocárdia	Mountain limestone	1
		Upper oolite	1
		Cornbrash	2
		Kelloway stone	1
	-	Upper green sand (T.)	3
	-	London clay	1
		Crag	1
4	Lìma	Lias, inferior oolite, marly sandstone, great oolite	2
		Oxford clay, and cornbrash	1
	-	Coral rag, and Stonesfield slate	1
3	Língula	Coal shale	1
	-	London clay	1
		Diluvium	1
6	Lucìn*a*	Lias? (De la Beche)	—
		Calcareous grit, Brora oolite series	1
		Lower green sand	2
		London clay	1
	-	Lower fresh water	1
		Crag	1
8	Lutrària	Lias?; Inferior oolite; Marly sandstone; Upper oolite; Cornbrash; Portland series	4
		Fuller's earth	1

SIMPLE BIVALVES — *continued.*

T. sp.	Genera.	Formations.	Sp. f.
		Upper green sand -	1
		Lower chalk -	1
		London clay -	1
4	Máctra -	Crag - -	4
1	Màgas -	Upper chalk -	1
1	Megálodon -	Mountain limestone	1
20	Modìola -	Lias, and alum shale	4
		Lias, Brora oolite, and green sand -	2
		Inferior oolite (5, Smith) and sandstone - -	2
		Stonesfield slate, and green sand -	1
		Cornbrash -	3
		Fuller's earth (three others, Smith) -	1
		Clay of great oolite (3, Smith) -	—
		Kimmeridge clay (1, Smith - -	—
		Dunrobin grit, and upper green sand	1
		Portland rock, and Stonesfield slate	1
		Lower green sand -	2
		Gault? - -	1
		London clay -	2
18	*M*ỳa -	Lias, Kelloway rock, and Isle of Skye	1
		Fuller's earth rock	1
		Inferior oolite -	—
		Brora limestone, and Scarborough -	1
		Oxford clay, and Brora - -	1
		Oxford clay -	1
		Forest marble -	—
		Lower green sand (2, Martin) -	1
		Gault, and upper green sand -	1
		Inferior oolite, upper green sand, and London clay -	1
		Plastic clay, and lower fresh water -	1
		London clay -	1
		London clay, and lower fresh water	1
		Crag - -	5
		Upper marine -	1
		Lower and upper fresh water - -	1
1	Myocóncha -	Inferior oolite -	1
11	*M*ýtilus -	Coal shale -	1
		Great oolite -	1
		Stonesfield slate -	1
		Cornbrash -	1
		Kimmeridge clay -	1
		Upper green sand -	2
		Crag - -	2
		Lower fresh water	2
20	Nùcula -	Mountain limestone	1
		Lias, and alum shale	1
		Great oolite -	3
		Lower green sand (Martin) -	1
		Gault - -	2
		Upper green sand -	3
		London clay -	4
		Upper marine, I. of W.	1
		Crag - -	3
		Diluvium -	1
4	Orbícula - -	Lias — alum shale	1
		Lower oolite -	1
		Oxford clay -	1
		Lower green sand (Martin) -	1
		Upper green sand (1, Mantell) -	—
26	*O*′strea -	Lias - -	1
		Inferior oolite, (6, Coneybeare; 4, Smith)	2
		Inferior oolite, fuller's earth, clay of great oolite (3, Smith), ferruginous sand of Woburn, and upper oolite (Ancliffe)	2
		Upper oolite -	2
		Stonesfield slate, 2.	—
		Cornbrash, forest marble, and great oolite (3, Smith) -	1
		Oxford clay -	1
		Oxford clay, Kimmeridge, Brora coal field, and diluvium	1
		Coral rag, and upper green sand -	1

SIMPLE BIVALVES — *continued.*

T. sp.	Genera.	Formations.	Sp. f.
		Portland beds -	1
		Weald clay and I. of Skye (Dr. Fitton and Mr. Murchison)	1
		Lower green sand (with 2 others) -	1
		Upper chalk, 2 (1, De la Beche) -	3
		Plastic clay -	5
		London clay -	3
		Crag - -	1
		Upper marine, Isle of Wight ? - -	—
1	Pachymỳa -	Lower chalk -	1
45	*Pécten* -	Mountain limestone	2
		Coal measures -	1
		Lias, and Scottish isles	2
		Inferior oolite, marl stone, cornbrash, 1, Forest marble (5, Smith), Kelloway rock, great oolite and clay, clay above great oolite (2, Smith), and coral rag - -	6
		Brora stone -	3
		Cornbrash -	3
		Stonesfield slate -	1
		Forest marble, and coral rag -	1
		Portland beds, and upper green sand	1
		Lower green sand (1, Martin) -	1
		Gault, and chalk marl (1, Martin) -	3
		Upper green sand -	5
		Chalk - -	1
		London clay -	4
		Bagshot sand series	—
		Crag - -	9
		Diluvial - -	1
10	Pectúnculus -	Great oolite series	2
		Upper green sand -	2
		Plastic clay -	1
		London clay -	4
		Crag - -	1
	Pérna, see Gervíll*ia*		
1	Petrícola -	Crag - -	1
2	Phòlas -	Green sand (lower ?)	1

T. sp.	Genera.	Formations.	Sp. f.
		Crag - -	1
	Pholadomỳa, see Cardìta.		
7	*Pínna* -	Lias - -	—
		Inferior oolite, and cornbrash -	1
		Stonesfield slate, 1	—
		Oxford clay, and upper green sand -	1
		Lias, Kimmeridge clay, and Isle of Skye	1
		Weald clay ? (1, Mantell) - -	—
		Lower green sand (Murchison) -	1
		London clay -	3
19	Plagióstoma	Lias, and inferior oolite - -	3
		Lias, Dunrobin grit	1
		Fuller's earth -	1
		Upper oolite and clay, and Stonesfield slate	1
		Cornbrash, and upper oolite - -	1
		Upper oolite -	1
		Brora stone -	2
		Coral rag, and calcareous grit -	1
		Kelloway rock -	1
		Portland series, and inferior oolite -	2
		Upper green sand, and chalk marl -	1
		Firestone (1, T.)	
		Lower chalk, 1 (1, Mantell) -	2
		Upper chalk, 1 (1, Mantell), and diluvial flints -	2
4	Plicátula - (Hárpax)	Lias - -	1
		Oxford clay -	2
		Upper green sand, chalk, and gault, (1, Mantell; 1, De la Beche) -	1
1	Podópsis -	Upper green sand (De la Beche) -	1
1	Psammòbia -	Upper marine formation, I. of Wight	1
5	Sanguinolària	Mountain limestone -	1
		Lias, Scotland -	1
		Brora coal shale -	1

SIMPLE BIVALVES — *continued.*

T. sp.	Genera.	Formations.	Sp. f.
3	Saxícava	London clay	2
		Upper green sand (T.)	—
		Crag	1
3	*Sòlen*	London clay	1
		London clay (one larger species, T.)	—
		Crag, T.	2
1	Sphæ'ra	Portland rock	1
10	*T*ellìna	Lower green sand (Ma rtin	2
		Upper green sand	2
		London clay	3
		Crag	3
87	Terrebrátula	Mountain limestone	18
		Coal shale	1
		Magnesian limestone, 1	—
		Lias	4
		Marly sandstone	5
		Inferior oolite	13
		Fuller's earth rock	4
		Fuller's earth rock, and Stonesfield slate	1
	Several species are probably common to many strata, but can only be classed in the one in which they are most conspicuous.	Great oolite	1
		Clay over great oolite (5, Smith)	3
		Cornbrash	3
		Cornbrash and Stonesfield slate	1
		Kelloway stone, cornbrash, and lias	1
		Calcareous grit (iron sand) of Farringdon, &c.	6
		Kimmeridge clay, and Isle of Skye	1
		Lower green sand	1
		Kentish rag, and lower green sand	1
		Gault	2
		Chalk marl	4
		Upper green sand	5
		Diluvium of upper green sand?	2
		Chalk	8
		London clay, chalk marl, and green sand	1
		Crag	1
1	*T*erèdo	Upper green sand?	—

T. sp.	Genera.	Formations.	Sp. f.
		Upper chalk, and London clay	1
2	Thèti*s*	Lower green sand	1
		Upper green sand	1
21	Trigònia	Inferior oolite	6
		Stonesfield slate	1
	The same remarks apply to these species as to the Terrebrátulæ.	Inferior oolite, fuller's earth (4, Smith) Clay, Forest marble (2, Smith) Cornbrash, Kimmeridge clay, and Kelloway stone (3, Smith)	2
		Clay of great oolite, 1	—
		Brora sandstone, inferior oolite, cornbrash, and Portland	1
		Portland stone	2
		Teignmouth stone	1
		Lower green sand	2
		Upper green sand (6)	5
		Upper green sand, and chalk	1
10	Venericárdia	Lower green sand?	—
		London clay	5
		Crag	4
		Plastic clay, alum bay	1
19	Vènu*s* (Cytherè*a*)	Brora coal measures	—
		Cornbrash	1
		Lower green sand	1
		Upper green sand	7
		London clay	6
		Crag	4
17	U'nio	Coal shale	1
		Coal shale, and cornbrash	1
		Magnesian limestone, inferior oolite, and sandstone (3, Smith)	2
		Lias, and Portland stone	1
		Inferior oolite	1
		Cornbrash	1
		Hastings beds, Tilgate and Weald clay	7
		Plastic clay (Mantell)	1
		Crag (and 1 ?)	1
		Lower fresh water	1

COMPLICATED BIVALVES.

T. sp.	Genera.	Formations.	Sp. f.
3	Pentámerus -	Mountain and transition limestone -	3
29	Prodúcta -	Mountain limestone	19
		Magnesian limestone	3
		Limestone shale, and coal measures -	7
19	Spírifer - (Anomites)	Mountain limestone	17
		Magnesian limestone	1
		Lias, and mountain lime - -	1

MULTILOCULAR UNIVALVES.

T. sp.	Genera.	Formations.	Sp. f.
134	Ammonites	Mountain limestone	6
		Coal shale -	2
		Lias, and alum shale	31
		Lias of Western Isles, Scotland -	3
		Clay under lower oolite - -	5
		Marl stone (14, Smith)	6
		Inferior oolite, great oolite - -	1
		Inferior oolite, and contiguous strata, including the Brora coal field (21 species in this series)	17
		Fuller's earth rock? 2	—
		Cornbrash, and lias	1
		Kelloway rock -	3
		Oxford clay -	2
		Calcareous sand and grit	4
		Coral rag -	3
		Kimmeridge clay, 3 } Kimmeridge clay, and Portland, 1 }	4
		Portland series -	3
		Weald clay beds -	1
		Iron sand of Woburn } Lower green sand }	1
		Lower green sand (3, Martin and Murchison) - -	1
		Chalk marl -	8
		Gault - -	7
		Upper green sand -	9
		Green sand (De la Beche) -	1
		Lower chalk -	6
		Upper chalk, 2 (1, Mantell) -	3
		London clay, Minster cliffs (qu. diluvial?)	1
		Diluvial, and sites not identified -	5
1	Ampléxus* -	Mountain limestone	1
2	Baculites -	Upper green sand -	1
		Lower chalk } Grey chalk marl }	1
15	Belemnites	Lias, and lias clay -	4
		Lias, shale, east coast of Scotland, Isle of Skye, inferior oolite	2
		Inferior oolite, Dunrobin grit, Brora and Oxford clay	1
		Fuller's earth rock	—
		Inferior oolite, and marly sandstone	3
		Clay of great oolite, 1	—
		Stonesfield slate -	1
		Lower green sand (T.) - -	1
		Gault, or blue marl	2
		Chalk - -	1
1	Belóptera -	London clay -	1
2	Conulària -	Mountain limestone	2
19	Hamites -	Lower green sand -	2
		Upper green sand, and chalk marl -	1
		Upper chalk (2, Mantell) - -	2
		Chalk marl -	2
		Gault - -	12
32	Nautilites -	Mountain limestone	11
		Blue lias -	3

* A coralloid rather than a multilocular shell?

MULTILOCULAR UNIVALVES — *continued.*

T. sp.	Genera.	Formations.	Sp. f.	T. sp.	Genera.	Formations.	Sp. f.
		Inferior oolite -	5			Bagshot sand? -	—
		Fuller's earth rock, 1	—	13	Orthoceratites	Mountain limestone	9
		Upper oolite, and calcareous grit -	1			Lias - -	1
		Stonesfield slate?	—			Limestone shale, and coal shale -	2
		Kimmeridge clay -	—			Mountain limestone, and alum shale -	1
		Coral rag -	1	4	Scaphites	Lias, Yeovil -	1
		Upper green sand -	3			Chalk marl (2, Mantell) - -	2
		Upper green sand, and chalk marl -	2			Chalk - -	1
		Chalk marl -	1	4	Turrilites	Upper green sand, and gault - -	1
		Gault - -	1			Upper green sand -	1
		Chalk (2, De la Beche) -	—			Chalk marl -	2
		London clay -	4			Chalk (1, De la Beche) -	—
3	Nummulites	Green sand? -	—				
		London clay -	3				

We are thus made acquainted with the geognostical distribution of about thirteen hundred fossil Testacea; and from the caution employed in the foregoing classification, these are probably considerably short of the actual number known to collectors, without including the varieties, or the many unpublished species, perhaps even several genera, remaining in the cabinets of individuals. Had Mr. Farey's suggestion been adopted, of naming the shells in each stratum separately, and of treating them as distinct species or varieties, as often as they occurred in successive beds, their amount would, by this time, have been so great as to counterbalance any supposed useful result. Even now, the opinion is not wholly abandoned by some of our best naturalists, that distinct fossil species are peculiar to each formation.

But it has been held, and apparently with some reason, that too much stress is laid on insignificant distinctions, whereby an unnecessary increase of species has arisen, productive of no slight embarrassment to the student, and of little adequate benefit to the practical geologist.

It results from the foregoing investigation, that the following series of fossil shells are known to English naturalists: —

Simple univalves	58	genera, which comprise	401 species.
Simple bivalves	62	- - -	583
Complicated bivalves	3	- - -	51
Multilocular univalves	12	- - -	230
	135		1265

From data so ample, we can now obtain accurate notions of the geological position of certain groups of shells; of the relative proportion of the different classes, and of how far their structure has been influenced by different degrees of antiquity. To render this analysis more complete, it may be useful to make three principal divisions of the formations containing organic remains. The first is the most ancient series; the second, or middle, division contains the remainder of the secondary strata; and the third consists of the tertiary deposits.

The *first*, which is also the lowest or most ancient division, may be subdivided into two series of formations.

1. Carboniferous order of Mr. Coneybeare.		2. From the carboniferous to the lias, inclusive.
Species 27	Simple univalves	9 species.
34	Simple bivalves	33
46	Complicated bivalves	5
33	Multilocular univalves	50
140		97

The *second*, or middle, division, from the lias upwards, includes the entire oolite series, and the strata up to the chalk, inclusive.

Simple univalves	106 species.
Simple bivalves	375
Complicated bivalves	0
Multilocular univalves	139
	620

The *third*, or most recent, division, comprises all the beds above the chalk, or the tertiary formations.

Simple univalves	259 species.
Simple bivalves	141
Complicated bivalves	0
Multilocular univalves	8
	408

In treating on the order of arrangement of shells in the several formations, Mr. Parkinson was struck with the fact, that the shells of the most ancient formations exceed, in complexity of structure, those in the subsequent strata, and in our present seas. It is in this early creation, also, he observed that those shells are found which possess "that complicated structure, very rarely found in the shells of this day, which enabled their inhabitants to rise and sink with them in the water." Of this latter class are the numerous race of many-chambered univalves, the Nautilites, the Ammonites, and Orthoceratites; and of the class of complicated bivalves are the Spirifers, and the genera Pentámerus and Prodúctus.

Our Table furnishes the means of at once comparing the numbers which existed in each class, during separate periods or geological intervals.

First Division. Ancient strata, including lias.			Second and Third Divisions. maining strata, above the lias, up to diluvium.	
	Species 36	Simple univalves -	365 species.	
	67	Simple bivalves -	516	
134	51	Complicated bivalves	0	147
	83	Multilocular univalves	147	
	237		1028	

It will thus be perceived that the number of complex species in the first division is nearly equal to those in the immense series of succeeding strata, 134 being peculiar to the lowest, and 147 to the remainder. But the individuals are infinitely more numerous in the older strata than in the later, and give a more decided character to those formations than appears from a comparison of genera or species; and the class of complicated bivalves is wholly limited to this older division. The difference is yet more striking when we compare the first with the third division; the simple univalves in the former being to those in the latter in the proportion of 1 to 7; but the complicated species, in the same divisions, are in the reverse ratio nearly of 17 to 1.

On comparing the proportions which the classes of shells under each division bear to each other, differences equally remarkable are observable. Thus the univalves in the first division are to the complex species as 1 to 4; in the second, as 1 to $1\frac{1}{3}$ only; and, in the third, as 32 to 1.

In concluding this summary, we may repeat, as a general rule, that the ancient formations are characterised by complicated shells, the middle series by bivalves, and the upper by simple univalves.

In illustration of the habits of two great classes of testaceous Mollúsca, the investigation of Mr. Dillwyn developes some unexpected differences in their modes of existence; and the subject is the more interesting, as being singularly confirmatory of other essential changes observed in the structure of antediluvian animals, at different epochs or stages of the creation.

This examination is limited to the turriculated univalves, of which our list contains 337 species.

All those Mollúsca whose shells have a notch or canal at the base of their apertures, are furnished with the power of perforating shells, and other hard substances, by means of a retractile proboscis. In Lamarck's arrangement of invertebral animals they form a section of the Trachelípodes, under the name of

Zoóphages. — On comparing Lamarck's list of *carnivorous* or predaceous genera with our present Table, it will appear that, in the English formations, this class comprises 22 genera, and 171 species. These abound in our tertiary strata, and are extremely rare in the secondary formations: in fact, only 18 species have been detected lower than the plastic clay. They may, therefore, be considered as appertaining to, if not wholly characteristic of, the tertiary formations; and many of the genera are continued in our present seas. The numerous perforations, both in recent shells, and in those abounding in the beds above the chalk, are the work of these animals.

In all the other genera of turbinated univalves, the lower margin of the aperture, instead of being either notched or channelled, is entire. Mr. Dillwyn describes the Mollúsca of these shells as having jaws, which are formed for feeding upon *vegetable* substances, and as entirely *herbivorous;* the marine genera feeding on *A'*lgæ, and the fresh-water and land genera on the leaves of vegetables and aquatic plants. These constitute the other section of Trachelípodes, called by Lamarck *Phyllíphages.* — Of these shells, forming the herbivorous class, 22 genera and 168 species are distributed through the secondary and tertiary formations; and it will be observed that in the aggregate of genera and species, in each of these great sections, there is a remarkable correspondence. This uniformity of numbers is not maintained so closely in the detail, when we arrange the members of these sections according to our three geological divisions.

Turbinated, or Turriculated, Univalves.

Zoóphages, or testaceous Mollúsca of the carnivorous class.	Phylli'phages, or testaceous Mollúsca of the herbivorous class.
Species.	*Species.*
5 comprised in the lowest, or most ancient division, of strata containing organic remains.	24 in the lowest division, carboniferous formations.
13 in the secondary formations, or middle division.	63 in the secondary formations (between the mountain limestone and the chalk).
153 in the tertiary formations, or upper division.	81 in the highest division (beds above the chalk).
171	168
Genera.	*Genera.*
2 originated in the lowest division.	12 originated in the most ancient division.
1 originated in the middle division.	5 others added in the middle division.
19 originated in the highest division, or tertiary beds.	5 more added in the upper division.
22	22

There remain about 62 species of fossil univalves which are not turbinated.

Hence it will be perceived that the turbinated univalves of the older strata or rocks belong almost entirely to the herbivorous family, 12 genera having originated there, which have been perpetuated through all the successive strata, and still inhabit our waters; that in the middle series of formations, this preponderance of animals possessing similar habits was preserved; and that, in the last series, after the chalk was deposited, this order was suddenly reversed, in the proportion of 5 to 19.

Mr. Dillwyn observed that all the marine Trachelípodes, of the herbivorous tribes, in the ancient strata, are furnished with an opérculum, seemingly intended as a protection against the Cephalópodes, or carnivorous order of *N*aútili, Ammonites, &c., which, at that time, abounded in the seas. After the epoch of the extinction of this order (which terminated chiefly with the chalk), numerous unoperculated genera appear, as if no longer requiring such a shield to protect them from an extinct enemy. As carnivorous turbinated univalves were, almost entirely absent from the strata which contained the Ammonites, the *N*autilídiæ, and the Belemnites, so the extinction of these immensely numerous tribes, being also carnivorous, or predaceous, was counterbalanced by the creation of a multitude of new genera, possessed of similar appetences.

Recurring again to our table for illustration of these positions, we observe that only 3 genera and 18 species of carnivorous turbinated univalves were coeval with the Cephalópodes, comprising 200 species, in the secondary formations; but that the same strata contained 17 gen. and 87 species of Phyllíphages.

When the Cephalópodes ceased with the chalk, at the same time with the numerous families of fossil *E*chinídiæ, the Trigòniæ, and nearly all the Terrebrátulæ, they were replaced by 19 genera and 153 new species of Zoóphages.

As we have the materials before us, and as the enquiry is not devoid of interest, it may be worth while to compare the existing classes of shells with corresponding series in the antediluvian creation.

	Simple Univalves.	Bivalves and Multivalves.	Multilocular Univalves.	Total
	Species.	Species.	Species.	Species.
Testaceous Mollúsca of the present world, ascertained from the *Index Testaceologicus* of Mr. Wood, last edition - -	1961	874	58	2893
Species of British fossil shells, heretofore described, dispersed throughout the entire range of the formations - -	401	634	230	1265

In the aggregates thus exhibited, there is an apparent want of conformity in the relative proportions of each class. This wholly arises from the extinct genera of the ancient strata; for, on making the comparison between the recent series and those of the latest group of deposits, no such difference will be perceived. On the contrary, a considerable agreement between the proportions of existing species and the several classes of fossil shells in the tertiary beds prevails; the average increase of numbers being about sevenfold.

If we follow the investigation further, we may observe that the fossil multilocular and complicated Testàcea, which characterise the oldest formations, and decidedly preponderate in that end of the series, form one fifth part of the entire catalogue; but, amongst the recent shells, this class constitutes less than a fortieth part, and in the tertiary series only a fiftieth part.

The conclusion to be drawn from a summary of facts more numerous, and on a more extended scale than, until recently, has been attainable in this department of natural history, is, that in proportion as we descend the vast series of deposits that overspread this portion of the earth, so do we recede, step by step, from the circle of existing organised beings, and from the phenomena attendant on their structure, their habits, and their adaptations.

R. C. T.

February, 1829.

Art. VIII. *An Account of a new Species of Trilobite, found in the Barr Limestone in the Neighbourhood of Birmingham.* By Frederick Jukes, Esq. With a Note by J. D. C. Sowerby, Esq.

Sir,

Allow me to present to you the enclosed drawings of a curious fossil (*figs.* 8, 9, 10.), discovered in the lime quarries at Hay Head, near Great Barr, a village about nine miles from this town. It appears to be of the Trilobite kind, retaining a considerable quantity of a fine crustaceous covering of a dark brown colour, and highly polished. The drawings represent its exact size, measuring in length about 5 in., and in width 3¼ in., being much larger than fossils of that character usually found in this country. The Trilobites already discovered in the Dudley lime formation are of two kinds; viz. one which is commonly called the Dudley fossil (*fig.* 11.), and mentioned in Parkinson's work upon *Organic Remains*, and another (*fig.*

12.), which, I believe, has not yet been particularly noticed, arising, probably, either from their scarcity, or from the imperfect condition in which they are usually found, the head and tail being generally apart. The points of difference in the Dudley Trilobites may be seen by the accompanying sketches, which are taken from specimens in my possession. (See *figs.* 11, 12.) Mr. Payton of Dudley has been at the pains of having similar fossils drawn upon stone, in a masterly manner, by Mr. G. Scharf, which

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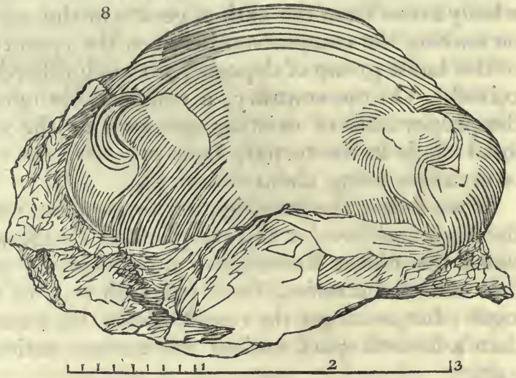

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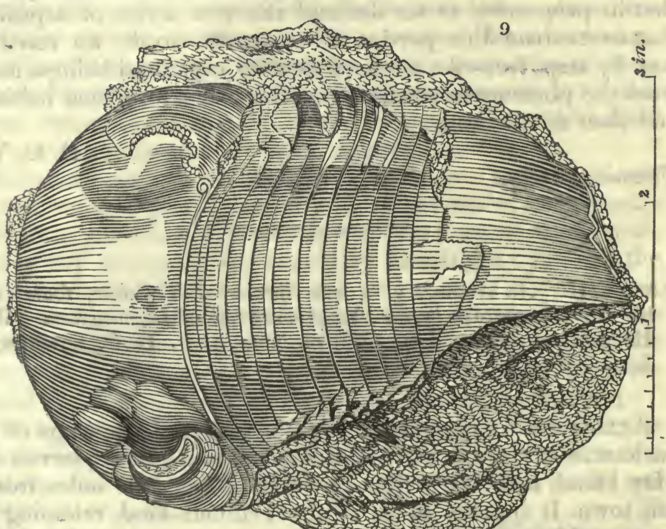
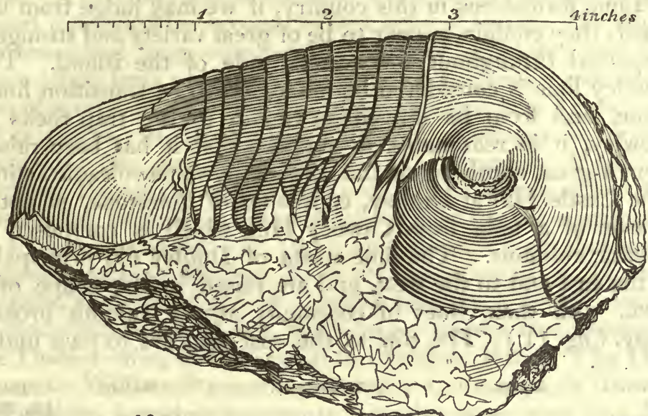


also represent their differences most satisfactorily. These have a crustaceous covering, and twenty-four transverse lines or ribs across their lobes.

The Trilobite from Barr, which I have in my possession, has a very remarkable appearance, and differs in so many respects from the Dudley Trilobites, that it can scarcely be classed with those fossils. It has ten transverse lines across the lobes, covering only the upper half of the body, the lower half being a smooth surface to its termination. The lobes (if



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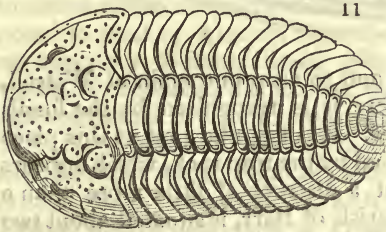
they may be so called) do not extend lower than the transverse lines, and their division is so unequal that the middle lobe is



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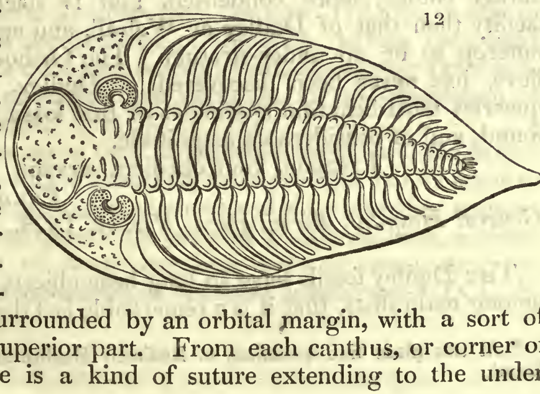
almost four times the width of those of the side. This animal has probably had the power, like the Dudley Trilobites, of coiling itself up, by making the tail meet the mouth; and, from the curvature at the lateral termination of the transverse lines, which give the appearance of side lobes, this is not an improbable supposition. The head, which, perhaps, is the most peculiar part, occupies nearly a third of the animal. The eyes are very prominently marked, exhibiting the palpebræ, or eyelids, distinctly and partially open, surrounded by an orbital margin, with a sort of notch in the superior part. From each canthus, or corner of the eye, there is a kind of suture extending to the under



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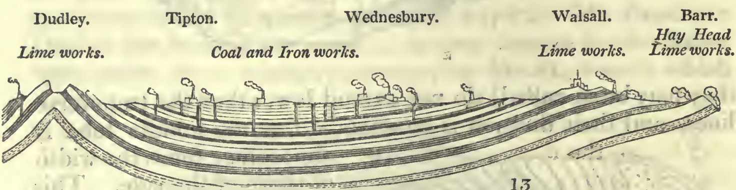
surface of the head. There is also a small tuberosity situated in the centre of the head between the orbits.

Lime formations in this country, if we may judge from the fossils they contain, appear to be of great variety and strangely dispersed throughout the western side of the island. The Dudley lime is considered by geologists to be transition limestone, and from its immediate vicinity to the trap rocks of Rowley, it is reasonable to suppose that it has been raised from a great depth below the surface, by some volcanic action. The Castle Hill at Dudley, consisting of limestone, is not a quarter of a mile from Cawney Hill, which is composed of basaltic columns. The lime strata of Dudley dip principally to the east and to the west, and are raised in the shape of a cone, with their lines of continuity at the summit broken away. (*fig.* 11.) The dip to the east appears to pass under



the Wednesbury coal field, and to crop out again at Walsall, a distance of nine miles, where it is recognised by the fossils bearing an exact resemblance. It is singular that at this place it should be again accompanied by the trap rock, which appears at Pouch Hill *, situated at a distance of little more than a mile. Hay Head, in the parish of Barr, is situated about two miles east from Walsall, and is the spot where this singular Trilobite was discovered. The limestone here appears of a darker colour, more condensed, and is slacked with less facility than that of Dudley or Walsall, and appears from its outcrop to be an under-stratum. The Orthoceratite, I believe, has never been discovered at Dudley, but in these quarries most beautiful specimens of that fossil are frequently found, and of considerable magnitude.

I remain, your obedient servant,

FREDERICK JUKES.

General Hospital, Birmingham, Nov. 12. 1828.

THE Dudley fossils have so long been objects of admiration among naturalists, that it is a remarkable fact that so large and

* At this place fine specimens of Radiated Zeolite and Prehnite are found.

handsome a species as the one found in the Barr limestone (*figs.* 8, 9, 10.) should have remained undiscovered in England until now. It certainly was not known when M. Alexandre Brongniart published his account of that tribe of fossils. The Dudley fossil had long obtained the name of Trilobite (from the three-lobed form of the body); but, as considerable difference was observed among the several species found at Dudley an other places, M. Brongniart judged it necessary to divide them into five genera or subgenera, Calymène, A′saphus, Ogýgi*a*, Paradóxides, and Agnóstus. The common Dudley fossil is the Calymène Blumenbách*ii* (*fig.* 11.), the scarce one is A′saphus caudàtus (*fig.* 12.); and these are all that were known at or near Dudley. Your correspondent, J. A. H., has supplied you with a figure of A′saphus Debùch*ii* (*fig.* 27.), found in Radnorshire, which is a much larger species than either of the Dudley ones, but not equal to that from Barr. The Honourable William Strangeways found at Calomenca, in Russia, a Trilobite, agreeing apparently with this large one, and M. Adolphe Brongniart obtained, during his travels in Sweden, in 1825, specimens of the same species at Husbifjol, near Linkoping. It was immediately seen that this did not belong to either of the divisions above referred to, he therefore proposed to treat of it as the type of a new genus to be named in an appendix to the *Histoire Naturelle des Crustacés Fossiles*, which, if published, has not yet reached England. (Drawings and specimens are in the possession of Charles Stokes, Esq. M.G.S., to whom I am indebted for this information.) In the *Annals* of the Lyceum of New York, for December, 1824, (vol. i. No. 6.) observations, with figures, are given by Mr. Dekay, upon a new genus of Trilobite discovered at the Trenton Falls, upon West Canada Creek. He has named it Isótelus, from *isos*, equal, and *telos*, end; the two extremities being nearly alike. It differs from the Barr Trilobite chiefly in the number of the divisions of the body, having only eight instead of ten; a difference scarcely sufficient among Trilobites, for a generic character, but excellent for the distinction of sections or species.

As Trilobites occur only in transition rocks, and the lowest beds of the mountain limestone, their presence in any country is an important geological feature; and since it further appears that the different species are peculiar to different beds, a means is pointed out of identifying these beds or strata, as in the case of the Barr limestone, at immense distances.—J. D. C. S.

PART II.

REVIEWS.

Art. I. *A brief Account of Microscopical Observations made in the Months of June, July, and August,* 1827, *on the Particles contained in the Pollen of Plants ; and on the general Existence of active Molecules in organic and inorganic Bodies.* By Robert Brown, F.R.S. &c. [Not published.]

This little unpublished pamphlet, consisting of sixteen pages, has excited more curiosity at home and abroad than any thing we recollect for many years. It is the production of a gentleman who is acknowledged by every one to stand at the head of botanical science, and who deserves confidence for the correctness of his observations, and for the faithfulness with which he records them. His discovery is no less than this, that the ultimate particle he can obtain from all bodies, organic and inorganic, has inherent motion, like unto vital action.

A discovery like this is not likely to be received without considerable scepticism: and hence we find one portion of the world believing by the exercise of faith; and another, by far the larger portion, doubting the existence of the facts, because their theories anticipate the laws of nature, and they have not patience to await for further information. No doubt microscopical observers, by seeking for magnifying power, and not for distinctness, are very subject to causes of illusion, and that many of the wonders which they have seen are to be referred to a lively imagination. Not so, however, the philosopher who now claims our attention. He is patient in observing, scrupulous in admitting, and faithful in recording, and, moreover, is borne out in his facts by a cloud of witnesses.

To make his observations, Mr. Brown employed a simple lens, the focal length of which was about $\frac{1}{32}$ of an inch, but he had recourse to much higher powers, to confirm them, and to investigate several minute points.

The several steps of the author's enquiry are more fully stated in his pamphlet than it is necessary to do here; but in the month of June, 1827, he examined the grains of pollen belonging to the Clárk*ia* pulchélla, a plant just then brought from the north-west coast of America, by Mr. David Douglas, which grains, taken from the anthers full grown, but before bursting, were filled with particles, or granules, of unusually large size, varying from $\frac{1}{4000}$ to $\frac{1}{5000}$ of an inch in length, and of a figure between cylindrical and oblong, perhaps slightly flattened, and having rounded and equal extremities. While examining these particles immersed in water, he observed many of them very evidently in motion; their motion consisting, not only of a change of place in the fluid, manifested by alterations in their relative positions, but also not unfrequently of a change of form in the particle itself; a contraction or curvature taking place repeatedly about the middle of one side, accompanied by a corresponding swelling or convexity on the opposite side of the particle. In a few instances the particle was seen to move on its longer axis. These motions were such as to satisfy him, that they arose neither from currents in the fluid, nor from its gradual evaporation, but belonged to the particle itself.

He extended his observations to many other plants belonging to the same natural family, namely Onagràriæ, and found the same general form and similar motions of particles: and, indeed, in all the different families he examined, particles were found varying in form from oblong to spherical, having manifest motions similar to those already described. In the grasses the membrane of the grain of pollen is so transparent, in some cases, that the motion of the particles within the entire grain was distinctly visible, and it was manifest also in some other plants. This is the first stage of his observations.

The second and most curious stage is, that in looking after these particles he saw others of a much smaller size, of a different shape, apparently spherical, and in rapid oscillating motion. These he denominates Molecules. He found them in the anthers of mosses, and on the surface of the bodies regarded as the stamina of *E*quisètum (Horsetail), and then in bruised portions of other parts of the same plants. He now thought he had got hold of the constituent or elementary molecules of *organic* bodies, first so considered by Buffon and Needham, then by Wrisburg with greater precision, soon after and still more particularly by Müller, and very recently by Dr. Milne Edwards. Following up this examination of *organic* bodies, he found the molecules to exist in various animal and vegetable tissues, whether living or dead; in gum resins, and substances of vegetable origin, such as pit-coal, and other mineralised vegetable remains. He then went to decided minerals, and the first substance examined was a minute fragment of window-glass, from which, when merely bruised on the stage of the microscope, he readily and copiously obtained molecules agreeing in size, form, and motion, with those he had already seen. Metals, volcanic ashes, meteorites, rocks of all ages, granite itself, and, lastly, a fragment of the Sphinx in the British Museum, yielded the molecules in abundance. The dust, or soot, so miserably abundant in London, is entirely composed of these molecules, possessing visible, rapid, spontaneous, or inherent motion.

In many of the substances examined, especially those of a fibrous structure, such as *A*sbéstos, along with the spherical molecules other corpuscles were found, like short fibres, somewhat moniliform, whose transverse diameter appeared not to exceed that of the molecules, of which they seemed to be primary combinations. These fibrils, when of such length as to be probably composed of not more than four or five molecules, and still more evidently when formed of two or three only, were generally in motion, at least as vivid as that of the simple molecule itself; and which, from the fibril often changing its position in the fluid, and from its occasional bending, might be said to be somewhat vermicular.

In many instances oval particles were perceived, which seemed to consist of a simple combination, perhaps of two molecules, and these possessed a motion generally more vivid than that of the simple molecule; their motion consisting in turning usually on their longer axis.

The author is disposed to believe that the ultimate molecule, if we may so speak, is of uniform size in all bodies. Mr. Brown does not pretend that his facts relative to the particles of pollen are wholly original: but that still more curious (because more elementary and remote) existence of molecules in all organic and inorganic bodies, possessing an inherent motion, not to say voluntary; and, in simple combinations, a motion of two kinds at the same time (the one ambulatory, and the other on its own axis), is wholly, entirely, and undividedly his own.

No Englishman has dared to set up any claim to a fraction, not even a molecule, of this extraordinary discovery; and if there be those abroad, who now insinuate that the theories they have propounded to explain the motion of the particles of pollen, necessarily prove that they knew of, saw, and compassed these molecules, it only shows how much more importance they attach to theory than to experiment, and how little justice they are disposed to concede to an observer, who is behind none in doing justice to them. O.

Art. II. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

Britain.

Stark, J.: Elements of Natural History, adapted to the present state of the Science. 2 vols. 8vo. 1*l.* 12*s.*

Transactions of the Linnean Society of London. Vol. XV. Part III. London. 4to.

Hewlett, Esther, now *Copley:* Scripture Natural History for Youth. London. 2 vols. 16mo, 82 plates. Bound in cloth, 12*s.*; with coloured plates, 18*s.*

"Quite a treasure for any deserving child, from six years of age to the time of teens." (*Lit. Gaz.*)

Trimmer, Mrs. *M.*, Author of the *Natural History of Man,* &c.: A Natural History of the most remarkable Quadrupeds, interspersed with interesting characteristic Anecdotes. London. 2 vols. 12mo, 300 cuts. 8*s.*

ZOOLOGY.

The Zoological Journal, No. XIV. London. 8vo. Quarterly. 7*s.* 6*d.* plain; 10*s.* coloured.

The first paper is on the supposed identity of Whitebait and Shad, by William Yarrell, Esq. F.L.S. The diminutive fishes called whitebait have hitherto been generally considered as the young of the shad (*Clùpea Alòsa*). Mr. Pennant gives the whitebait as an appendage to the bleak (*Cýprinus* albúrnus); and Dr. Shaw also describes the whitebait as a species of the *Cýprinus,* or carp genus. Dr. Turton, Mr. Donovan, and Dr. Fleming determine the whitebait to be the fry of the shad. Mr. Yarrell was first led to investigate this subject by observing the early appearance (March) of whitebait in a fishmonger's shop; and, knowing that shads, which they were supposed to be, did not make their appearance till much later (May), he took up and persevered in a course of investigation which lasted from March to August, 1828. The details we shall not enter into; but the specific distinction between the two fishes, on which he relies as of the greatest value, is the difference of their anatomical character, and especially in their number of vertebræ. "The number of vertebræ in the shad, of whatever size the specimen may be, is invariably fifty-five; the number in the whitebait is uniformly fifty-six; and even in a fish of two inches, with the assistance of a lens, this exact number may be distinctly made out." To show the value of this character as a specific distinction, he gives the following quotation from Dr. Fleming's excellent work on the *Philosophy of Zoology,* vol. ii. p. 311.: — "The number of the bones of the vertebral column in different species of fishes being exceedingly various, suggested to Artedi the use of this character in the separation of nearly allied species. Among the species of the genus *Cýprinus,* for example, a difference in the number of vertebræ has been observed to the amount of fourteen. In ascertaining this character, Artedi recommends the greatest circumspection. The fish should be boiled, the fleshy parts separated, and the vertebræ detached from one another; and these counted two or three times in succession, to prevent mistakes. This character is of great use, as it is not liable to variation; individuals of the same species exhibiting the same number of vertebræ in all the stages of their growth."

The other new facts in this and preceding numbers of the *Zoological Journal* will be found in due time among our Collectanea.

The Zoological Periodicals. — Curtis's British Entomology, No. LXII., for February (*Mag. Nat. Hist.* vol. i. p. 54.). — Stephens's Illustrations of British Entomology, No. XXIII., for February (*Mag. Nat. Hist.*, vol. i. p. 55.). — Sowerby's Genera of Recent and Fossil Shells, No. XXXI. (*Mag. Nat. Hist.*, vol. i. p. 56.). — Sweet's British Warblers (*Mag. Nat. Hist.*, vol. i. p. 57.) is completed in one volume 8vo, 16 col. pl., 16*s.* 6*d.* This is a very handsome work; the plates are from living specimens in the author's collection, "including the nightingale, redstart, blackcap, whitethroat, garden warbler, and all the interesting birds of passage belonging to the genus Sýlvia, which contains the choice singing birds that visit this country; with a full account of the author's method of treating them, in which is shown how they may be kept in confinement in as good health as any common bird whatever."

The Tower Menagerie; comprising the Natural History of the Animals contained in that Establishment, with Anecdotes of their Characters and History. Illustrated by Portraits of each, taken from life, by William Harvey, and engraved on Wood by Branston and Wright. London. 8vo.

The wood engravings which illustrate this work are equal, if not superior, to any thing which has appeared since the invention of the art; and they show how extensively, and with what advantage, that description of illustration may be employed in natural history. Much of the effect of a wood engraving depends on the paper on which the impression is taken, and on the care and skill of the pressman. In the present work every possible care seems to have been taken in these respects; and, in consequence, one of the most elegant octavo volumes has been produced which ever issued from the British press. The literary matter is also highly entertaining and instructive. The history of sixty wild animals, including some birds and serpents, is given; and, in the introduction, is ably and elegantly traced the origin and progress of menageries. Menageries date from the most remote antiquity, and are alluded to even in the obscure traditions of fabulous ages. The barbarian warrior sought amusement in the chase, and treasured up his spoils in common with the trophies of battle. Afterwards the strength and ferocity of the brutes of the forest were rendered available as auxiliaries in war; and the animals so employed were confined in what may be considered as menageries.

Many wild animals occupied a distinguished place in the theology of the dark ages: they were either worshipped or sacrificed, and for these purposes must have been preserved in some sort of menagery. The domestication of animals may be considered as having taken place by similar means; and fields and stables, and their inhabitants, only differ from the apartments for wild animals in containing those which minister to necessity and convenience, instead of curiosity and science. Aristotle's *History of Animals* is materially indebted to the menagery formed in civilised Greece by the Macedonian conqueror, on his return from India. The Romans had first menageries for the use of the public amphitheatres, and afterwards vivaria of rare and curious animals, for the gratification of naturalists. The first establishment of this kind, in modern days, was that founded at Versailles by Lewis XIV., and to that we owe the *Natural History* of Buffon. The first notice of a royal menagery in England relates to a collection of lions, leopards, and other strange beasts, kept at Woodstock by King Henry I. From Woodstock they were transferred to the Tower, and the Sheriffs of London, Bedford, and Buckingham, of this and succeeding reigns, had orders to maintain these animals and their keepers. "In 1252, the Sheriffs of London were commanded to pay four-pence a day for the maintenance of a white bear; and, in the following year, to provide a muzzle and chain to hold the said white bear while fishing or washing himself in the river Thames. In 1255 they were directed to build a house in the Tower for an elephant, which had been presented to the King, by Louis, King of France." In 1657 there were six lions in the Tower; in 1708, eleven lions, two leopards or tigers (Strype, the historian, it seems, knew not which), three eagles, two owls, two cats of the mountain, and a jackall. The collection varied till 1822, when Mr. Alfred Cops, the present keeper, succeeded to the office, and greatly increased it, as the sixty animals described in the present work fully prove.

The whole of the drawings of these animals are from the pencil of that eminent artist, to whom this Magazine is so much indebted, Mr. William Harvey, "who, in seizing faithful and characteristic portraits of animals in restless and almost incessant motion, has succeeded in overcoming difficulties which can only be appreciated by those who have attempted similar delineations." The literary department has been superintended by J. T. Bennet, Esq. F.L.S., a scientific naturalist, and an active member of the Zoological Society, assisted by various eminent zoologists.

The engravings, we have already said, are equal to any thing that has ever been done; and we hope their appearance, as well as those in our own and similar works, will lead publishers to adopt this mode of illustration much more generally than they have hitherto done. The *Encyclopædia Metropolitana*, for instance, now in the course of publication, illustrated by elaborate, highly finished copperplate engravings, would have been a much more useful book if the engravings had been on wood, and printed along with the text; and it might also have been sold at a less price: in short, we see little use for copperplate engravings, except where they are to be coloured after nature.

Thompson, John V., Esq. F.L.S., Surgeon to the Forces, Author of a Memoir on the Pentacrìnus europæ'us, &c.: Zoological Researches and Illustrations; or Natural History of Nondescript or imperfectly known Animals. In a series of Memoirs. Illustrated by numerous figures. Cork. 8vo. No. I. *3s. 6d.* Sept. 1828.

The first memoir is on the Metamorphoses of the Crustàcea, and on Zoëa, exposing their singular structure, and demonstrating that they are not, as has been supposed, a peculiar genus, but the larva of Crustàcea. Dr. Leach, one of the chief investigators of the Crustàcea, has assigned it (*Encyc. Brit.*, art. Crustàcea) as one of their principal characters, that they undergo no metamorphoses; but Mr. Thompson having, in 1822, met with the genus Zoëa (ord. Crustàcea) in the harbour of Cork, kept some of them, and had the satisfaction of witnessing the metamorphoses first described by the Dutch naturalist, Slabber. The second memoir is on the genus Mysis, or Opossum Shrimp. The author is evidently an ardent and scientific student: he has already added several new facts to science, and will, we have no doubt, increase their number in the course of his pursuits.

Swainson, W., Esq. F.R.S. F.L.S. M.W.S. &c.: Zoological Illustrations (New Series); or Figures and Descriptions of New or Interesting Birds, Insects, and Shells. London. 8vo. Monthly. *4s. 6d.*

"The reputation of the former series of this work renders it necessary only to state that the execution of the new series will be equally beautiful. Each number will contain five coloured plates, resembling drawings, with their descriptions." (*Lit. Gaz.*, Feb. 7. 1829.)

Jardine, Sir *W.*, Bart., and J. Selby, Esq.: Illustrations of Ornithology. Part IV. Royal 4to. *1l. 11s.*

Anon. (A Lady, an instructress in the study of Conchology, and who may be heard of at Messrs. Harvey and Darton's, Gracechurch Street): Rudiments of Conchology; designed as a familiar Introduction to the Science, for the use of Young Persons; with Plates, and References to the Collection of Shells in the British Museum. London. 12mo. *3s. 6d.* plain.

A useful little work, which was very much wanted.

A Lady: Caroline and her Mother; or Familiar Conversations for Children on Entomological Subjects. 12mo. *4s. 6d.*

BOTANY.

The Botanical Periodicals. — Curtis's Botanical Magazine, No. XXVI. — Edwards's Botanical Register, No. XII., completing Vol. XIV. — Botanical Cabinet, No. CXLII. — The Botanic Garden, No. L. — The British Flower-Garden, No. LXXII. — *G*eraniàceæ, No. VIII. of second series. — *C*istíneæ, No. XXII. — Medical Botany, No. XXVI. — Flòra Médica, No. XVI. (*Mag. Nat. Hist.*, vol. i. p. 58.)

In the *Botanical Register* and the *British Flower-Garden*, the names are accented, and the derivations given, agreeably to our recommendation (Vol. I. p. 59.). In the *Botanic Garden* this was done from the beginning. We therefore recommend these three works; the first to the lovers of rare and new plants from all countries; the second to the lovers of new and beautiful hardy herbaceous plants and shrubs; and the third to beginners in botany, and those who cannot afford expensive works. Every number of the *Botanic Garden* contains coloured figures, descriptions, and historical and scientific notices of four handsome hardy garden plants, and costs only a shilling. The author deserves the highest praise for thus bringing an elegant and scientific botanical work within the reach of families in moderate circumstances.

Burgess, Henry, Esq.: Eidodendron, or Views of the General Character of Trees, foreign and indigenous, connected with Picturesque Scenery. London. Lithog. pls., in folio Numbers.

Twelve plates are published, containing the beech, oak, whitethorn, alder, spruce fir, Scotch pine, ash, birch, Lombardy poplar, a pollard willow, elm, deciduous cypress, cedar of Lebanon, lime, and larch. As they are all drawings from nature, their faithfulness can only be estimated by comparison; and, in this respect, they can have no great public value. Their merit rests on very different ground, viz. how far they are cognizable as expressive types of the respective kinds they are intended to represent. On this point it may be affirmed that Mr. Burgess has been fortunate in his figures of the beech, oak, Scotch pine, birch, deciduous cypress, cedar, and larch: but, in the instances of the whitethorn, lime, and the pollard willow, his choice has been less happy; because neither of these, however truly drawn, give the general character of the kinds.

Mutilated individuals should not have had a place in such a work: the general character only should have been the aim; all accidental circumstances should have been disregarded. Such can be no further useful than as copies to be introduced into other compositions.

The author's purpose is commendable; it will bring the character of trees more into the notice of junior artists, to whom the work will give good examples for imitation, and a useful direction to their ideas in this branch of their profession; especially as we are informed the future numbers will, in all respects, be improved. — *J. M. Chelsea.*

Alman's Analysis of the Genera of Plants. 4to. *10s. 6d.*

GEOLOGY AND MINERALOGY.

Ure, Andrew, M.D. F.R.S., Member of the Geological and Astronomical Societies of London, &c. &c.: A New System of Geology, in which the great Revolutions of the Earth and Animated Nature are reconciled at once to Modern Science and to Sacred History. London. 8vo. Numerous Engravings.

Transactions of the Geological Society of London. Second Series. Vol. II. Part III. London. 4to, 16 plates.

This part contains the six following articles: — On the Volcanic District of Naples; by G. Poulett Scrope, Esq. F.G.S. F.R.S. — Supplementary Remarks on the Strata of the Oolitic Series, and the Rocks associated with them in the Counties of Sutherland and Ross, and in the Hebrides; by Roderick Impey Murchison, Esq., Sec. G.S. F.R.S. F.L.S. — On the Fossil Remains of two new species of Mástodon, and of other vertebrated Animals, found on the left bank of the Irawadi; by William Clift, Esq. F.G.S. F.R.S. &c. — Geological Account of a series of Animal and Vegetable Remains, and of Rocks, collected by J. Crawfurd, Esq., on a Voyage up the Irawadi to Ava, in 1826 and 1827; by the Rev. William Buckland, D.D. F.G.S. F.R.S. F.L.S. — Description of Fossil Remains of some Animals from the North-east border of Bengal; by J. B. Pentland, Esq. — On the *C*ycadeöídeæ, a family of Fossil Plants, found in the Oolite Quarries of the Isle of Portland; by the Rev. William Buckland, D.D. &c.

These interesting communications are accompanied by sixteen beautiful plates, chiefly illustrative of the fossil bones, and the *C*ycadeöídeæ. Twelve out of these sixteen plates are understood to have been liberally presented by Dr. Buckland.

Anon.: A Manual of Mineralogy; in which is shown how much Cornwall contributes to the Illustration of the Science. London. 8vo, 1 pl. *7s. 6d.*

This manual contains a concise description of minerals in general, and the localities of those of Cornwall, hitherto known, in particular; with the economical uses of the metals, and other species; an account of the mode of smelting tin and copper ores; an explanation of terms; and mineralogical questions. A plate of the primary forms, from which the various crystalline modifications proceed, and several new analyses of the mineral productions of the country, are also given. — *Pref.*

FRANCE.

Baron *Cuvier, Desmarest,* and *Geoffroy Saint-Hilaire:* Planches de Seba, accompagnées d'un texte explicatif mis ou courant de la Science, et rédigé. Paris. Folio, livr. 7. à 12. *4s.* each.

The Bulletin des Sciences Naturelles, &c. No. 12., for December, 1828. 8vo. Monthly. (Supra, Vol. I. p. 63.)

The Annales des Sciences Naturelles, &c. Paris. 8vo. Monthly. (Supra, Vol. I. p. 63.)

Dictionnaire des Sciences Naturelles. Tom. 56. Paris. 8vo. *6s.*

Dictionnaire Classique d'Histoire Naturelle, dirigé par M. Bory-de-Saint-Vincent. Tom. 14., avec cahier 14. de planches. Paris. 8vo. *13s.*

Cuvier, M. le Baron: Histoire des Progrès des Sciences Naturelles depuis 1789 jusqu' à ce jour. Paris. 8vo. Tom. 3 and 4; *3s. 6d.* each; avec 2 atlas de planches, *5s.*; color. *6s.*

Humboldt, Baron *de:* Tableaux de la Nature, ou Considérations sur les Déserts, sur la Physiognomie des Végétaux, sur les Cataractes de l'Orénoque, sur la Structure et l'Action des Volcans dans les différentes regions de la terre. Trad. de l'Allemand par Eyriès. Paris. 2 vol. 8vo. 16*s.*

Mémoires de la Société d'Histoire Naturelle de Paris. Tom. 4. 4to. 1*l.*

Bowdich, E. E., Chief of the English Embassy to the Ashantie country, &c.: Excursions dans les Isles de Madère et de Porto-Santo, faites dans l'automne de 1825, pendant son troisième voyage en Afrique. Traduit de l'Anglais et accompagné de notes de M. le Baron Cuvier et de M. le Baron Humboldt. 1 vol. 8vo; avec atlas in 4to de 22 planches, dont plusieurs coloriées. Paris and London. 1*l* 5*s.*

Deleuze, M.: Histoire et Description du Muséum Royal d'Histoire Naturelle; ouvrage rédigé d'après les ordres de l'Administration du Muséum. Paris and London. 2 vols. 8vo; avec trois plans et quatorze vues des jardins, des galeries, et de la ménagerie. Prix pour les souscripteurs au Dictionnaire des Sciences Naturelles, 12*s.*

Anon.: Guide des E'trangers au Muséum d'Histoire Naturelle et du Jardin du Roi. Paris and London. 1 vol. 18mo, orné du plan du Jardin du Roi et d'une belle lithographie représentant la giraffe. 2*s.*

Saintfond, Faujas de: Histoire Naturelle de la Montagne Saintpierre de Maestricht. Paris and London. 1 vol. 4to. 1*l.* 10*s.*

ZOOLOGY.

Lacépède, M. le Comte *de:* Histoire Naturelle de l'Homme. Précédée de son éloge historique, par M. le baron Cuvier. 1 vol. 8vo, avec le portrait et fac simile de M. de Lacépède. 6*s.*

Steffens, M.: Anthropologie. 2 vols. 8vo. 22*fr.*

Duperrey, M.: Voyage autour du Monde, pendant les années 1822–25. Première division; Zoologie. Liv 6. Paris. Folio. 14*s.* each.

Cuvier, Fréderic, brother to the Baron:

1. Histoire naturelle des Mammifères. Liv. 57. Folio. 13*s.*
2. Dents (des) Mammifères, considérées comme caractères zoologiques. 8vo, 1 vol. cartonné, avec 103 planches. 2*l.*

Geoffroy Saint-Hilaire: Cours de l'Histoire Naturelle des Mammifères. Leçon 15 à 20. Paris. 8vo.

Lesson: Complément des Œuvres de Buffon, ou Histoire naturelle de tous les animaux rares et précieux, découverts depuis la mort de Buffon. Paris. 8vo, tom. 1. 3*s.* 6*d.* Planches noires, Liv. 1. 2*s.* 6*d.*; col. 5*s.* (To form 10 volumes, and 20 livraisons of plates.)

Eloquet, H.: Faune des Médécins. Liv. 27. Paris. 8vo. 2*s.*; col. 3*s.*

Anon.: Faune Française, ou Histoire Naturelle des Animaux qui se trouvent en France. Livrs. 17 et 18, texte et planches. Paris. 8vo.

Cours d'Histoire Naturelle, contenant les principales espèces du Règne Animal, dessinée par Paul Oudart, publie par Engleman. Livraisons 1 à 12. Paris. 4to. Plain, 4*s.*; coloured, 8*s.* each

Temminck: Nouveau Recueil des Planches coloriées d'oiseaux. Livr. 75 Paris. 4to, 10*s.* each; folio, 15*s.*

Werner: Atlas des Oiseaux d'Europe pour servir de complément au Manuel de Temminck. Livr. 10. Paris. 8vo. Col. *6s. 6d.*; plain *3s. 6d.*

Levaillant: Histoire Naturelle des Perroquets. 2 vols. folio. *26l.*

Polydore Roux: Ornithologie Provençale, ou Description avec fig. color de tous les Oiseaux qui habitent constamment la Provence, ou qui n' y sont que de Passage. Livr. 13. Marseilles. *7s. 6d.* (To form 50 livraisons.)

L'Herminier, M., *F.J. D. M.:* Recherches sur l'appareil sternal des Oiseaux, suivies d'un essai, sur la distribution de cette classe de vertèbres. Paris, 1828. 2d edit. 8vo, pp. 108, 4 pl. lith. *3 fr.*

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Larivière, M. A. Engelspach: Mémoire sur un silicate d'alumine considéré sous les rapports chimique, minéralogique, et géognostique. Brussels, 1828. 12mo, pp. 15.

Art. III. *Literary Notices.*

Pliny's *Natural History* is proposed to be translated, with notes, &c., by John Bostock, M.D. F.R.S. L.S. G.S. and H.S. M.R.I. Member of the Medico-Chirurgical, of the Astronomical, and of the Zoological Societies, &c. A specimen of the first and thirty-third books has been printed; in a preface to which, the author states that his object is "to present the English reader with a faithful translation, and to give it, as much as possible, in the style of the original." One object of the specimen is to show the kind of notes and illustrations proposed to be added, so as to render the text intelligible, without appending "an endless accumulation of matter." To us the notes appear judicious; and the text, being full of the absurdities of the time, is at least very amusing, and, to those fond of antiquity, will be instructive.

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A Systematic Catalogue of British Insects, by James Francis Stephens, Esq. F.Z.S., &c., the author of *Illustrations of British Entomology*, is in the press, and will be published by subscription. It will be comprised in one very thick 8vo volume, price to subscribers 1*l.* 1*s.* This will be an invaluable work to every entomologist, and we hope it will enable us to attain to greater correctness in spelling the names of insects, than we have hitherto been enabled to do for want of such a guide.

Plantæ Asiaticæ Rariores; or, Descriptions and Figures of a Select Number of unpublished East Indian Plants. By N. Wallich, M. & Ph. D. Superintendent of the Hon. E. I. C.'s Botanic Garden at Calcutta; F.R.S. of Edinb. and Copenh.; of the Linn., Geol., and Royal As. Soc. of London, &c. To supply a desideratum, which cannot but be regretted by all who are interested in the sciences of botany and horticulture, Dr. Wallich proposes to publish a work containing descriptions and figures of a select series of Asiatic plants: an undertaking for which he entertains hopes of being in some manner qualified, by the materials he has accumulated during a residence of more than 20 years in that part of the globe: in 13 of which he had the advantage of being attached to the botanic garden at Calcutta, and of being supported by the matchless liberality of the Honourable East India Company, both in the charge of that noble institution, and during various extensive journeys, performed in Hindustan, Nepal, the Straits of Malacca, and the Burma countries. The work will consist of 3 volumes in folio, each containing 100 plates, engraved and coloured in the best style, from the Honourable Company's drawings, accompanied by full descriptions in Latin, with the addition of such observations in English as may appear necessary and interesting. It will be published in 12 numbers, each containing 25 engravings, with the appropriate letter-press; to appear every three months. Price 2*l.* 10*s.* each number. Subscribers names received by Messrs. Treuttel and Wurtz, the publishers.

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PART III.

COLLECTANEA.

Art. I. *Zoology.*

The Attachments formed by Animals, from living together, have produced several remarkable facts. Feeling has been evinced by those reckoned most insensible, and even the strongest laws of nature have been set aside. The cobra di capello and the canary bird, who have, for years, inhabited the same cage at Mr. Cross's, in Exeter Change, are strong instances of the latter; but my communication more particularly alludes to the former.

When I lived in Paris, there were two remarkably fine ostriches, male and female, kept in the Rotunda of the Jardin du Roi. The skylight over their heads having been broken, the glaziers proceeded to repair it, and, in the course of their work, let fall a triangular piece of glass. Not long after this, the female ostrich was taken ill, and died after an hour or two of great agony. The body was opened, and the throat and stomach were found to have been dreadfully lacerated by the sharp corners of the glass which she had swallowed. From the moment his companion was taken from him, the male bird had no rest; he appeared to be incessantly searching for something, and daily wasted away. He was moved from the spot, in the hope that he would forget his grief; he was even allowed more liberty, but nought availed, and he literally pined himself to death. I heard of a curious expedient the other day, which prevented a similar catastrophe, and which has led me to address you: —A gentleman residing in this country, had for some years been possessed of two brown cranes (*A'rdea pavonìna*); one of them at length died, and the survivor became disconsolate. He was apparently following his companion, when his master introduced a large looking-glass into the aviary. The bird no sooner beheld his reflected image than he fancied she for whom he mourned had returned to him; he placed himself close to the mirror, plumed his feathers, and showed every sign of happiness. The scheme answered completely, the crane recovered his health and spirits, passed almost all his time before the looking-glass, and lived many years after, at length dying from an accidental injury. — *S. Bowdich.*

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The Cape of Good Hope Horse is a beautiful, lively animal, and, although of small size, is admirably adapted to light draught or saddle. — *W. T.*

The Camel. — On a camel the saddle is always open above, that it may not hurt the bunch of the animal; but a dromedary's saddle is made like a horse's, and covers the bunch. It walks with long and regular steps, and the rider, of consequence, feels the motion no otherwise than if he was rocked in a cradle. The two-bunched camel bears even as severe a climate as that of Siberia. — *Id.*

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The Rein Deer. — As attempts to naturalise the rein-deer have nearly failed, it would be advisable, in any future efforts, to consult the 57th number of the 4th volume of the *Swedish Amœnitates Academicæ.* — *Id.*

An Indian Antelope, or Elk, was tamed near the Cape of Good Hope. It always kept very near to mankind, and about the farm; whence it appears how easy it would be to domesticate this species of gazel, which, in its tame state, might be more serviceable than either horses or oxen, and, in a great measure, perform the offices for which both these animals are used, and especially as this beast is said to keep up its flesh without taking much food. The flesh is universally of a fine grain, juicy, and well tasted. (*Sparrman's Voyage to the Cape of Good Hope,* vol. ii. p. 206.) — *Id.*

The Flat-horned Antelope is easily tamed, and the flesh is excellent meat; the Chinese antelope, if taken young, is easily tamed; the young of the cervine antelope quickly grow tame, and herd with other cattle; the white-footed antelope is usually very gentle and tame, and has been bred in England. (*Pennant's History of Quadrupeds,* vol. i.) — *Id.*

Broad-tailed Sheep. — Of this kind of sheep there are several varieties; the flesh of some of them is very good; the tails weigh from 15 to 50 lbs. These tails are esteemed a great delicacy, and are of a substance between fat and marrow. In Thibet the fleece is very fine, beautiful, and long, and is worked into shawls. A number of this kind of sheep have been introduced into North America from the interior of Africa; they are said to be extremely valuable, both on account of the wool and the flesh; and the tail, in particular, which is 8 or 10 in. in breadth, is esteemed a great delicacy. — *Id.*

West India Sheep. — These are frequently brought to England by the merchant ships, and, after being fed for a short time in our pastures, the flesh is so improved as to be compared to venison. — *Id.*

Abyssian Sheep. — A breed has been produced between an Abyssinian ram and a French ewe; their fleece surpasses in brilliance any hitherto known in Europe, and they are exceedingly hardy and prolific. Their beauty excited general admiration. (*From a newspaper of June,* 1826.) — *Id.*

Cachemire Goat. — In France a cross breed has been obtained between the Cachemire goats and Angora bucks: the hair of the kids is in much greater quantity, and much longer. — *Id.*

The Warree Hog is very common in some parts of South America. In size and shape it nearly resembles the European hog. Its flesh is less oily and more delicate than the European pork, and is much esteemed by the white inhabitants. — *Id.*

Effect of Incubation in lessening the Timidity of Birds. — Sir, Perhaps the following communication may not be uninteresting to your readers, as it shows how much the natural timidity of birds is lessened during incubation. Some time since, a pair of blue titmice (Pàrus cærùleus) built their nest in the upper part of an old pump, fixing it on the pin on which the handle worked. It happened that, during the time of building and laying the eggs, the pump had not been in use; when again set going the female was sitting, and it was naturally expected the motion of the pump-handle would drive her away. The young brood were hatched safely, however, without any other misfortune than the loss of a part of the tail of the sitting bird, which was rubbed off by the friction of the pump-handle; nor did they appear disturbed by the visitors who were frequently looking at her. — *Wm. Henry Hill. Newland, Gloucestershire, Sept.* 10. 1828.

The Great American Bittern. — I was much interested with an account I heard the other day of a bird, a species of heron. I believe it is called by Wilson, in his *Ornithology*, the Great American Bittern; but, what is very extraordinary, he omits to mention a most interesting and remarkable circumstance attending it, which is, that it has the power of emitting a light from its breast, equal to the light of a common torch, which illuminates the water, so as to enable it to discover its prey.

As this circumstance is not mentioned by any of the naturalists that I have ever read, I had a difficulty in believing the fact, and took some trouble to ascertain the truth, which has been confirmed to me by several gentlemen of undoubted veracity, and especially by Mr. Franklin Peale, the proprietor of the Philadelphia Museum. (*Extract of a Letter from Philadelphia, to Mrs. C., Hackney, Oct.* 11. 1828.)

Yellow Greenfinch. — I beg to call your attention to a variety of the Lóxia *C*hlòris (greenfinch), which was accidentally shot in a flock of chaffinches, yellowhammers, &c., in the neighbourhood of Ross, Herefordshire. The prevailing colour is a rich yellow, tinged with green; the top of the head mottled with green, yellow, and a dirty white; the neck and throat yellow, fading into white; the lesser coverts green, edged with bright yellow tipped with white; the secondary quills ash-colour, edged with bright yellow; the breast, shades of green, yellow, and dirty white; back and rump greenish yellow; vent, yellow; tail, bright yellow on the outside; the centre feathers ash-colour, edged with green; legs, dirty white. I have had this curious mule set up by Mr. B. Ledbetter. — *Id.*

Change of Colour in the Plumage of the Goldfinch. — It has been stated that when the goldfinch is fed on hemp-seed exclusively, the red and yellow colours of the plumage become black. I possess a living example of this curious change. — *J. Murray.*

The Natural Intelligence of the Goldfinch (F*ringílla* C*arduèlis*), were it not well authenticated, would scarcely merit belief; but as the fact is undoubted, I think it deserves being put on record. The circumstances are as follows; but as no dates were kept, the periods mentioned are only quoted from memory: — It was very early in the spring of 1827, that a bird had been lost from a cage, which was still hanging up, with the door open, in the passage entrance to the back court of a gentleman's house in this town, when a goldfinch was one morning found feeding in it, and the door was closed upon it; but, on inspection, as it appeared to be a female, it was very shortly after restored to liberty. In the space, however, of about two hours it returned, and entered the cage, when it was again shut in, and again liberated; and these visits were repeated daily for a considerable time. She was then missing for some few days, but then returned, accompanied by a male bird; she entered the cage, and fed as usual; but her companion, after perching on the outside of the cage, retired to a neighbouring tree until she joined him. They then quitted, and were no more thought of; but, at the end of about seven or eight weeks, she again made her appearance, and accompanied not by her former companion, but by four young ones, when she again entered the cage, and fed as usual; but as she could not induce her brood (for such they were presumed to be) to follow her example; she finally went off with them, and has not since that time again made her appearance. I have written the foregoing account precisely as it was related to me by the gentleman at whose residence it occurred, and I have not the smallest doubt of the truth of it in every particular. — *Mentor. Exmouth, Aug.* 26. 1828.

The Nightingale. — This "poet bird," *Motacílla Luscínia*, sometimes displays an eccentric and novel taste in the materials of her nest. One interesting specimen of this kind was wholly constructed of skeleton leaves. — *J. Murray.*

Presentiment in a Goose. — An old goose, that had been for a fortnight hatching in a farmer's kitchen, was perceived, on a sudden, to be taken violently ill. She soon after left the nest, and repaired to an out-house where there there was a young goose of the first year, which she brought with her into the kitchen. The young one immediately scrambled into the old one's nest, sat, hatched, and afterwards brought up the brood. The old goose, as soon as the young one had taken her place, sat down by the side of the nest, and shortly after died. As the young goose had never been in the habit of entering the kitchen before, I know of no way of accounting for this fact than by supposing that the old one had some way of communicating her thoughts and anxieties, which the other was perfectly able to understand. A sister of mine, who witnessed the transaction, gave me the information in the evening of the very day it happened. — *C. A. Brew. Ennis, July* 9. 1828.

Desertion of Geese. — I do not know if the following circumstance be of frequent occurrence; if not, it may interest the readers of the Magazine of Natural History. I was walking along the beach which lies between the rivers Dee and Don, one morning, about twelve months ago. It was blowing a gale from N.W., and a cloudy thick atmosphere. I was attracted by a loud cackling, seemingly overhead, and, on looking to windward, I observed a large flock of birds. From the awkward motion of their wings, I was convinced they could not be wild ducks, and they seemed to be impelled rather by the wind than their own exertions. They continued their course to the seaward, and I lost sight of them in the haze. Next day I had a letter from a friend in the county, stating that Mrs. —— of —— 's duck-pond had been deserted the former morning by her thirty geese, which had all taken flight, and had not since been heard of. — *A. B. Aberdeen, Nov.* 13. 1828.

Flying Geese. — In confirmation of H. S.'s notice of a curious duck, and the fifteen geese mentioned in your Magazine (Vol. I. p. 377.), allow me to state that it is very common for domestic geese to take flights to a considerable distance. Some time ago, my father had a large flock, which fed on high ground not visible from the house. They were lessened, as occasion required, to about six; these were fetched home every night, for some weeks; and very frequently, on seeing the house from the top of the hill, they would take wing and fly homewards, making a circuit of about a mile. On one occasion they were nearly alighting at a pond of water at the next farm-house, instead of a similar one near home; they soon, however, discovered their mistake, and raised themselves in the air to nearly as great a height as before, alighted at their own water, and were at it long before their driver, notwithstanding that the latter mostly went in a direct line. This is the more singular, because these geese were considered *heavy* and *fat*, and nearly ready for making into good old-fashioned goose-pie. *Query.* Was it not owing to their wanting water, and at the top of the hill, which elevated the geese's spirits (if I may use the term), and made them try to accomplish that, on their *wings, sooner* than they could do on their *legs?* — *T. F. Near Huddersfield, Dec.* 12. 1828.

Fishes, and Mode of preparing them. — At Lake Ilmen, near Valdai, they have a fish so like a herring, that it is called the fresh-water herring, and also another fish said to resemble a smelt. They have a mode of preparing them for a distant market, by putting them into ovens of a moderate temperature, and gradually but thoroughly drying them. (*Capt. Jones's Travels in Norway.*) Why may we not naturalise this fish, and adopt the same mode of curing other fresh-water fishes? — *Rusticus in Urbe.*

Attempt to naturalise the A'rctia phæorrhæ'a, or Brown-tail Moth. — Sir, The account in your Magazine (Vol. I. p. 376.) of Sir John Sinclair's unsuccessful attempt to naturalise the nightingale in the northern parts of the island, calls to my recollection a somewhat similar experiment I once tried, and with like success, on a subject of entomology; a rather dangerous experiment, you will perhaps think it, considering the ravages sometimes committed by the insect in question, A'rctia phæorrhæ'a (*fig.* 14.), and the serious alarm it once caused in the vicinity of London. (See *Curtis's Observations on the Brown-tail Moth.*) A'rctia phæorrhæ'a is never found in this district (Warwickshire); and my first acquaintance with it, in any state, took place some years since, in the Isle of Wight, where the hedges, in autumn, were absolutely blighted to disfiguration with the numerous webs of this insect, under shelter of which the infant caterpillars lie secure during the winter, ready to come forth and devour the young foliage in the spring. Being anxious to possess specimens of the moth, which at that time I had never even seen, I accordingly took home with me a number of the webs, which, as I have stated, formed the hybernacula of broods of the infant caterpillars. Many of these I bred up in confinement to the perfect state. But wishing to see whether I could not have a constant brood of them at hand, I placed a number of the webs on the hawthorn hedges, as soon as the leaves came out in the spring. The young caterpillars fed freely, not seeming to regard their transportation to a distant country. When arrived in due time at their full growth, they retired, as I conclude, for the purpose of changing to the pupa state; but, though I have no doubt that many of the perfect insects were produced, I could never observe a single specimen of the moth at large, nor were any of the webs to be found about the hedges the following autumn. The insect, in short, ceased to propagate itself in this district, and the new-planted colony came speedily to an end. Whatever disappointment I might feel on the occasion (less, certainly, than Sir John Sinclair might reasonably feel in his case), you will, perhaps, think I ought to rejoice at the total failure of my experiment. — *W. T. Bree. Allesley Rectory, Nov.* 13. 1828.

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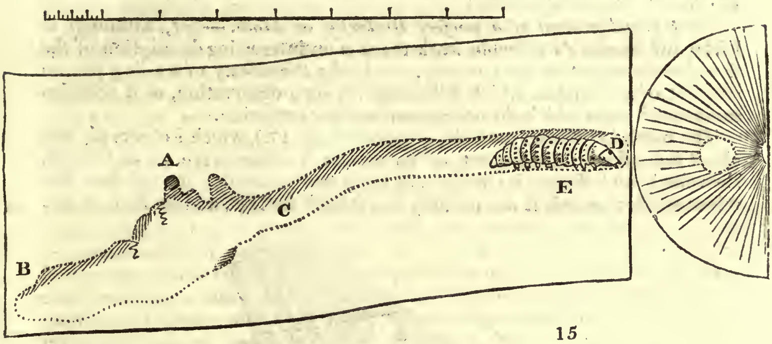
The Zeuzèra æ'sculi (*Wood-leopard Moth*) is by no means a common insect in this country; and as the habits and localities of lepidopterous insects are of essential service to young entomologists, I hope the following notice may be acceptable to some: — On the 10th of last May, whilst examining the trunk of a pear tree in my garden, I observed, between four and five feet from the ground, a substance resembling decayed sawdust, apparently protruding from beneath the bark, of about the size of a small pea. Upon removal, I found the bark had been perforated by some insect; and on removing some of the bark, I was enabled to trace the course taken by the insect, which may be better explained with the assistance of the annexed sketch. Upon entering the bark at A (*fig.* 15.), the insect appeared to have taken its direction downwards, as the cavity was not more than two eighths of an inch sunk into the wood, till reaching B, where it was rather more than three eighths, and partly filled with the excrement of the larva; at C, the cavity began gradually to approach towards the centre of the tree, and take a regular shape, and continued at about half an inch in diameter to D; extending from B to D, $11\frac{1}{2}$ in., and at D, $1\frac{1}{2}$ in. from the circumference of the tree. When the whole cavity was exposed, the larva appeared as at E, with its head upwards. On account of the hardness of the wood, and distance to which the insect had penetrated, I had some difficulty to get at it without injuring it, and accidentally let the chisel slip against its side;

the wound, though but slight at first, was sufficient to cause its death after it had changed to a pupa. Not knowing the insect in that state, I took it to Mr. Samouelle, who very kindly informed me, and also what treatment it required.

I should be obliged to any of your correspondents who would inform me if the larva undergoes its changes in the tree, and in what manner the imago



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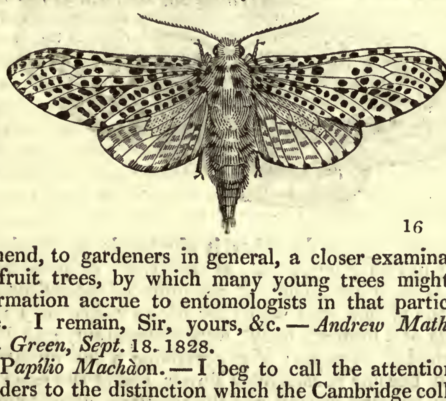
extricates itself. It appeared to me that the cavity, at and near the entrance A, was much too small for the exit of the insect in either the larva or imago state.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The moth (*fig.*16.) is found in July, as Mr. Samouelle states, (See *Ent. Usef. Comp.* p. 246.) in St. James's Park, against trees. I would strongly recommend, to gardeners in general, a closer examination of the stems of their fruit trees, by which many young trees might be saved, and much information accrue to entomologists in that particular branch of the science. I remain, Sir, yours, &c. — *Andrew Mathews. Alfred House, Turnham Green, Sept.* 18. 1828.

Distinction of Sex in P*apílio Machàon*. — I beg to call the attention of your entomological readers to the distinction which the Cambridge collectors consider as marking the sexes of the *P*apílio Machào*n* while in the pupa state, viz. the colour. I obtained a number of the pupæ of both kinds this spring; but, from an unlucky accident which happened to my specimens, was unable to decide this fact. I subjoin a description of both. They are exactly alike in shape, and correctly described in books as "angulated with two processes in front," and are fastened, by an anal and transverse thread, to the stalk of the *S*elìnum palústre, or marsh milk-parsley (on which the larvæ feed), with the head upwards, and the back of the abdomen touching the stalk. The colour of that which is said to be the female is grass-green with a slight tinge of rufous down each side. The colour of the male varies from nearly black to a light brownish rufous, having a darker line down each side, and bordering the wing-cases; the two prominences on the front of the head, that on the under side of the front of the thorax, and the inner side of the prominences representing the fore legs of larvæ, are dark rufous, nearly approaching to black. The wing-cases are slightly tinged with the same colour, having a few black veins originating at the base, and running towards the anal angle, giving out branches toward the exterior margin throughout their whole extent. The parts between what appear to be the antennæ are of a dark rufous colour; all parts which are not dark, are of a milky white. The characters which appear to be common to both are, the shape, and the rufous lines down the sides. I have found the above characters to hold in a large number of specimens. — *C. C. Babington. 7. Hanover Street, Bath, July* 8. 1828.

First Developement of a perfect Butterfly, or Moth. — Sir, Although in Kirby and Spencer's valuable work there is an interesting description of the first developement of the butterfly, yet I take the liberty of sending you an account of an instance which fell under my own observation, as it contains some particulars which do not appear in their narration.

The moth (*P*halæ̀na *p*avònia, emperor) (*fig.* 17.), which I observed, was about five minutes getting out of its tomb; its wings were at first small, shrivelled, and flabby, its body very large and unwieldy; for the first five minutes after its exit it did nothing but stretch its legs, and lie first on one

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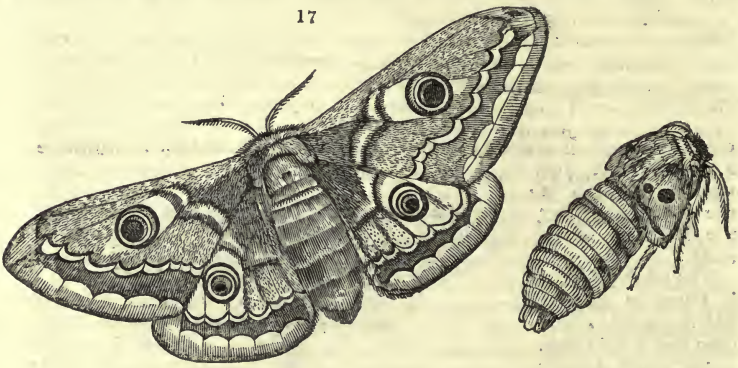

side and then on the other, it afterwards lay gently down on its back, with its wings lying negligently at each side; its pulse at this period was at 60, for, as it lay stretched out, the joints of the abdomen, if I may use that term for the pliable parts which are not so visible in a mature subject (like the joints of a lobster's body), were transparent, and I could therefore see the internal movements: after remaining a few minutes in this state, the pulsation became considerably slower, and at the same time the wings began to grow, the first process was the injection of a yellow fluid from the body, which shot very rapidly into the nervure of the wings, and seemed to strengthen them. Their further developement continued to proceed from the base: the action resembled the convulsions of a bit of parchment in the fire, and the wings, from the nervures being tense, were very like a leaf of Savoy cabbage. In about a quarter of an hour they had attained to their full size, but not strength: one side was perfected before the other was half done; the colours and pencilling grew more evident and brilliant, as the wings increased in size, which was the most beautiful part of the process. The moth at last turned itself heels over head, and then walked about a little, but was very dull, and the wings did not attain their maximum of strength till about five hours after, when a copious evacuation took place, and it immediately became quite lively. — *E. T. January,* 1829.

The stinging of a Gnat. — Sir, As an illustration of the principle that knowledge and pleasure are the result of care and labour, even in the most trifling things, I will relate to you the interest I lately felt in watching the operations of a gnat while it was stinging me. On the 25th of October last, and about two o'clock in the day, a gnat (*C*ùlex pípiens) alighted on my forefinger; I held my hand still, and observed it. It immediately applied its proboscis to the skin, at the same time moving its antennæ and hind legs slowly up and down, which it continued to do for a few seconds, when it became apparently motionless, resting on its four front legs, with its hind ones stretched out in a line with its abdomen. I now felt a slight sensation where the proboscis was inserted, but so faint that, had not my áttention been directed to it, I probably should not have noticed it; and this I only felt for a second or two. The abdomen now began to swell gradually, the influx of the blood being clearly visible, through its semi-transparent skin; at the same time, a clear watery liquid began to ooze from the anus, forming a round globule; it had a curious appearance, to see blood flowing in at one end, and water out at the other; the drop fell, and another formed, the abdomen all the time getting larger and larger, and redder and redder, till the second drop fell. The abdomen had now attained full three times its natural size, with a deep blood-red hue, when, to my great vexation, the door opened, and away flew my little toper, without appearing the least encumbered with its bloody cargo

I must further observe, that the insect was altogether about one minute on my finger; that no part of the outer sheath of its proboscis was inserted beneath the skin; that I did not receive any warning of its bloody intentions from its pipes. I mention this, because I think I have heard it affirmed, that they always do give warning before an attack; but what appeared to me the most remarkable is, that there was not the slightest pain, inflammation, or mark of any kind left that was perceptible. I remain, Sir, yours, &c. — *J. A. St. John's Wood, Nov.* 20. 1828.

Spinning Slugs. — Sir, I have now before me a spinning slug, I mean a slug, which I discovered suspended by the tail from the leaves of a tree for the space of about a foot or more, and letting itself down towards the earth by means of a fine thread, like that of a spider, or that by which the larvæ of many lepidopterous insects descend from the branches of trees. With the single exception of its spinning propensity, the slug appears in all respects exactly like the ordinary small grey slug (*L*ìmax agréstis), so common every where, and so destructive in our gardens. I have several times met with these spinning slugs suspended by their threads; but, as I can discover no difference in size, colour, or form from the common slug, I should be glad to know whether they are to be considered as a distinct species, or whether the common slug may not uniformly possess the same faculty, though it has seldom occasion to exert it. The author of *Elements of Natural History*, speaking of slugs in general, says that "they spin a thread, by which they sometimes suspend themselves, or let themselves down from heights:" but this observation he makes while describing the general habits of the genus, without appropriating it to any particular species. My slug unfortunately made its escape from under the glass in which it was confined, before I had fully satisfied my curiosity respecting it. I could not perceive that it showed any disposition to spin while in confinement. — *W. T. Bree. Allesley Rectory, near Coventry, July* 29. 182?

Art. II. *Botany.*

Curious instance of Viviparous Production. — As a friend of mine, a botanist, in this town, was looking at some pieces of the *A'llium* arenàrium, which he had kept by him for about two years, he found that several of the seeds were germinating in the calyx and some had even put forth their cotyledon. — *L. E. O. Richmond, Aug.* 10. 1828.

Lathræ'a squamària. — This curious plant is certainly not parasitic, as has been supposed, for the plant has been transplanted from its original site to the garden, and it there grew well enough. I know of none capable of giving a more interesting account of it than my friend, J. C. Bowman, Esq. F.L.S., who has paid particular attention to its habitats and habits. — *J. Murray.*

White Varieties of Flowers. — There are many flowers of which white varieties are to be found not mentioned by Smith. The *S*cílla nùtans occurs perfectly white in a small wood close to Chestford Bridge, near Kenilworth, and likewise at Leamington, in a wood attached to the beautiful cottage of R. Poole, Esq., solicitor. It has been found also at Halstock, in this county. We have here the *Prunélla* vulgàris, snow-white, the bracteas of which are without any tinge of purple. — *W. H., R. N. Yeovil, August 5.* 1828.

Spontaneous Appearance of E*pipáctis latifòlia.* (*fig.* 18.) — Sir, about the year 1811 I enclosed a small piece of ground, for the purpose of making an oak plantation. In the course of a few years, when the young trees began to form a low wood, I was surprised to see several fine plants of *E*pipáctis latifòlia make their appearance among the oaks. They have ever since continued to do so in considerable abundance, and in various parts of the plantation. I observe too, that it frequently (though by no means always) happens, that an individual plant dies after flowering, or at last ceases to come up again in the same identical spot a second year. Thus, e. g., in the summer of 1827, I had in the plantation several remarkably fine specimens, bearing a profusion of flowers, throwing up two or more stems from the root, and growing to the height of between 3 and 4 ft., the largest, in short, that I ever saw of the species. But, to my disappointment, these fine specimens did not throw up any shoots or leaves the following season; nor had I, though there was an abundance of specimens, either so many, or such fine ones, as in the preceding year. I do not find any very weak plants, having the appearance of being young seedlings, few occurring but such as are strong enough to produce flowers. I am unable, therefore, to state with any certainty, by what means the plant has propagated itself to its present extent. Still less am I able to account for its first appearance in this situation, coming up, as it did, spontaneously, and apparently springing into vigour all at once.

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Your botanical correspondents will probably be ready to propose an easy solution of the difficulty, by suggesting that the seeds had lain dormant in the ground (as, we know, often happens), till they were roused into vegetation by the earth being disturbed and prepared for the purpose of making the plantation. But this could hardly be the case in the present instance; for the piece of ground taken for the plantation consisted of a part of two fields, one arable, and the other sometimes in grass and sometimes in tillage; and both of them had frequently been ploughed no long time before the plantation was made. Neither, again, will it be thought probable that the seeds had been wafted to the spot by the wind, when it is stated that I never met with a single wild specimen of the *Epipáctis* in any other situation in this neighbourhood, the nearest place where I have observed it to occur in a wild state, being not less than eight or ten miles distant. As Epipáctis latifòlia, though by no means a very rare plant, is yet entitled to rank *inter rariores*, I confess I have felt some pleasure in its having taken up its constant and voluntary abode on my premises; and should you think this account of the circumstance likely also to afford any interest to your readers, you will perhaps find a corner for it in your Magazine. — *W. T. Bree. Allesley Rectory, Nov. 3.* 1828.

Art. III. *Geology and Mineralogy.*

Volcanic District between the Rhine and Moselle. — Few districts in Europe are more interesting to the geologist than that lying to the north of the Moselle, and the west of the Rhine, and occupying the greater portion of the angle formed by the confluence of these two rivers. This tract, which has an average breadth of thirty to forty miles, bears indubitable traces of having in remote ages been the scene of volcanic eruptions throughout a great part of its extent, and the most determined Neptunist, whatever he may contend as to the subsequent agency of water, must admit that here, *once* at least, fire has been in general and extensive agency. In some quarters are seen isolated conical hills, which bear every appearance of being of volcanic origin; in others are deep circular lakes, of no great extent, which have been plausibly supposed to occupy extinct craters; and in various directions where the ground has been opened, lava, pumice stone, and other volcanic products are found in profusion. One of these is the well known cement, improperly called *Dutch Tarras*, from the circumstance of its being brought from Andernach, and other towns on the Rhine, to Holland, whence before the invention of Roman cement, it was shipped to England, and still is to various parts of Europe. As little of this interesting district is seen by those who pass from Brussels into Germany or Switzerland, by the ordinary route on the left bank of the Rhine, I would advise geologists travelling in this direction, to make the same deviation from the direct road that I did last summer, going from Spa across the country to Bertrich-Bad, a romantic watering-place, excellently situated for making excursions in different directions, and where we staid ten days, and thence to Coblentz, and there resume the main road. The distance is not greater than the direct route by Aix-la-Chapelle and Cologne, the scenery often highly picturesque, and the road very tolerable. In one part, in crossing a heath, it was necessary to have a fifth horse, in addition to the four which our well-filled berline required; but in general the roads were equal to the cross roads in England, and much of the way very superior. The whole distance from Spa to Bertrich-Bad is about seventy miles, of which we made an easy three days' journey, sleeping the first night at the village of Schœnburg, and the second at Gerolstein. At this last, and indeed at almost every neighbouring village is a mineral spring, containing oxide of iron, held in solution by an excess of carbonic acid gas, exactly resembling the Spa water. If one of these numerous springs, of which the water, sparkling like champagne, and hardly less agreeable to the taste is constantly drank by the villagers as their ordinary beverage, and has, besides medicinal virtues far more potent than those of Tunbridge, could be transported to England, it would be cheap at the price of many thousand pounds. Fastidious travellers would not relish the humble fare of these village inns, but our party look on this excursion as one of the most delightful of our whole tour, from the opportunity it afforded of seeing a genuine picture of the manners of the German peasants, and the many amusing little adventures which befel us. At Gerolstein, near to which is a distinct crater, and many other interesting geological objects, besides much picturesqe scenery. Our hostess, Fraulein Klein, an old maid, was a perfect counterpart to Meg Dods, in *St. Ronan's Well:* and an imitator of Sir Walter Scott might advantageously take up his abode with her for a fortnight, to study the oddities of this original, as the sub-heroine of a novel to be called the *Castle of Gerolstein*, the ruins of which frown over a perpendicular rock, towering close above the inn. Such travellers, however, as do not think the laughable eccentricities of an original character a compensation for bad fare, I would advise to leave Spa in the afternoon, and sleep the first night at Malmedy, and the second at Prüym, at both which places are very tolerable inns; and thus perform the whole journey in two days and a half, dining the last day at Daun, a village between Gerolstein and Bertrich-Bad, where is an excellent inn, in the parlour of which we found a piano-forte, with Mozart's opera of Don Juan lying open, and violins and flutes, &c., hanging on the walls; and while my daughter played on the piano, the host's son (in a blue smock frock) accompanied her on the guitar, and, like the rest of this amiable family, was as intelligent as well bred. As there are no post stations, it is necessary to hire horses for the whole journey; and as no one at Spa could give any account of the road, which few English have travelled, and the voiturier who conducted us, and was previously equally ignorant of it, is the only one there who has been the road, it may not be superfluous to mention that his name is Remacle Deblon, and that we found him very civil and careful.

Bertrich-Bad, besides being very romantic and delightful in itself, is a convenient station for examining the geology of this district at leisure, as there is a large hotel, much frequented in the summer both by patients using the warm baths, and by lovers of the picturesque; and very frequently by German geologists from Bonn, &c., who, as well as Herr Bodifé, the bath-inspector, would afford every information as to the objects most worthy of attention. The two near to Bertrich-Bad, are the Käse Grotte, a highly curious grotto, formed in part of basaltic columns, intersected at regular distances by deep transverse circular furrows, so as to resemble cheeses piled on each other, whence the name; and the crater of Falkenlei, an extinct volcano, which alone is worth a long journey to see. The hill occupied by this crater, and in fact formed by the volcano, has been split in two by some great convulsion, and while one half has fallen into a deep adjoining valley, the other half remains erect, and, being easily accessible by convenient walks, offers a close and extremely interesting view of the interior of the crater, with the lava just as fresh and full of air-bubbles as the slag of a blacksmith's forge, and looking as if it had not been extinguished a twelvemonth. Of this and the other interesting objects which the neighbourhood affords, full accounts may be found in Dr. Harless's *Das Bad zu Bertrich* (Coblentz, 1827), and in several other German publications quoted in this useful work. I regret that both ill health, and my superficial acquaintance with geology, prevented me from making those minute observations which alone could give any scientific value to the present article, the only object of which is to show my sense of the utility of your well-planned Magazine, and to induce competent geologists to take the route which I and my family found so interesting. — *W. Spence. Brussels, Jan.* 20. 1829.

Evident traces of Manganese in Slate. — Slate inclining to pearly, from a quarry about half a mile west of Ilfracombe, and a dark greenish slate from Dennifole, in Cornwall, as also some of the dark-coloured micas, give very evident traces of manganese, when treated with borax and soda in the manner described in my former letter (Vol. I. p. 384.). — *W. H. M.*

Fossil Astèria. — I send you a drawing of the *A*stèria (*fig.* 19.), found at Horsington, by the Rev. James Hooper, Rector of Stawell. It was taken

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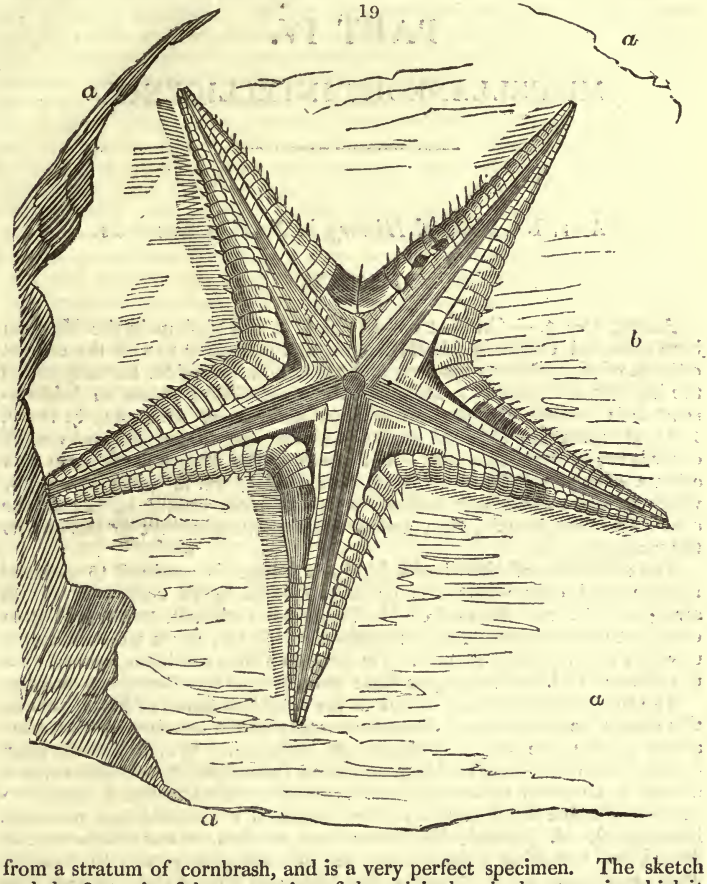

from a stratum of cornbrash, and is a very perfect specimen. The sketch and the figure is of the exact size of the original; *a* is the stone in which it is embedded, and *b* a section of a small bivalve shell. I am, Sir, &c. — *W. H., R. N.* *Yeovil, Aug.* 21. 1828.

Washing of Gold. — The art of washing gold was practised on the Rhine from early antiquity up to 1824, when it ceased near Basil; but a few men continue to be employed in the environs of Lohr, as at Wittenweir there are three, at Nonnenweir fourteen, &c. The gold is found in a coarse alluvial deposit, and sometimes forms a coating on the pebbles. The banks containing the gold are usually about 100 paces in length. They are for the most part on the margin of the river, and rarely in the islands. The banks of pebbles containing the gold are covered with coarser pebbles and vegetable earth. (*Zeitschrift für Mineral.*, Juin, p. 533.)

PART IV.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Natural History in Foreign Countries.*

FRANCE.

Metz, Dec. 9. — Our last notes (Vol. I. p. 472.) left us in the Museum here collected chiefly by M. Hollandre, and proposing to visit the cabinet of birds of M. Meslier de Rocan, and the plantations of M. Durand, and of the late Baron Tschoudy. M. Hollandre has published *Faune du Département de la Moselle, et principalement des Environs de Metz, &c.*, in 12mo, 1825. It is arranged after the system of Cuvier, and the number and variety of birds are very considerable. At the end of the work a list is given of a cabinet of white varieties of birds belonging to M. le baron Marchant, which includes specimens perfectly white of birds usually black; as the crow, blackbird, magpie, &c.; and of others naturally more or less red, as the redbreast, &c.

The collection of birds in M. Meslier's cabinet is confined to those of Europe, and only wants two or three species to be complete. It is arranged after the *Manual* of M. Temminck (4th edit. 1820), and is in excellent preservation. He had been offered for it, as we were informed, upwards of a thousand pounds. He gave us a MS. catalogue, which, with the *Faune* of M. Hollandre, we have presented to the Zoological Society.

The by-roads are in such a state in the neighbourhood of Metz, that at this season we were informed it was scarcely possible to approach the plantations of the late Baron Tschoudy at Colombé. We, therefore, after taking leave of M. Coutie, Madame Coutie (who, having no children, and finding it necessary to occupy herself with something, devoted herself to botany, in which she is known to have acquired a scientific and practical knowledge), M. Durand, M. Simon (the readers of our Magazines at Metz), and our other friends there, and promising to return to them in about two years, left for Paris on the 10th, and arrived there on the 12th of December.

Paris, Dec. 13. 1828, *to Jan.* 11. 1829. — It would not be very easy to relate all that we saw and did here during our stay in September (Vol. I. p. 385.) and at this time. It is unnecessary to talk of the Jardin des Plantes, of the Museum d'Histoire Naturelle, and of other cabinets, libraries, and exhibitions, which are, or ought to be, seen by every body. We had the satisfaction of showing specimens of our forthcoming *Encyclopædia of Plants* and *Hórtus Británnicus*, and of explaining the improvements which we have attempted in the abridgment of botanical description to Professor Decandolle, MM. Mirbel, Desfontaines, Bory de-St.-Vincent, Ad. Brongniart, the Baron de Férussac, and a number of the members of the Natural History Society, and of receiving their approbation. This approbation, however, we shall only value when we see our improvements adopted by these gentlemen in their published works; and this we do not expect to see, unless from M. Decandolle, till our *Encyclopædia* and *Hórtus* have been some time in circulation.

The naturalists and other scientific men of Paris have great advantages over those of London. The French government devotes a large sum annually to the support of scientific and literary institutions in the metropolis. Public lectures on every subject may be attended gratis; the most complete museums and libraries are of the easiest access. The social meetings at the houses of distinguished individuals, or of public bodies, such, for example, as those of the Baron Cuvier, the Baron Férussac, the Institute, the Athenæum, &c., are frequent; and the intercourse at such meetings is of real use to literary men, because difference of worldly circumstances enters into them for little or nothing. It is not to be wondered, therefore, that with superior native vivacity and acuteness, and all these opportunities, the French philosophers should be the first in the world. To profit from this state of things, a stranger should reside in Paris at least two years; and this we would most strongly recommend to parents, as the finishing process previous to travelling, for young men of from sixteen to twenty years of age.

Man in the North of France. — As we gave our opinion (Vol. I. p. 482.) on the natural and artificial character of man in the south of Germany, we hope to be excused for offering a few remarks in a natural-history point of view on man in the north of France. Whether our opinion be considered right or wrong, we shall only say that it is not to be considered as hastily formed after a single visit; because we have been in France at different times since 1814, and met with French people in various parts of Europe before and after that period. Our opinion is, that the Frenchman of the northern provinces is, by nature, a superior animal to either the Englishman or the German; but that by education, including the influence of government, religion, and the backward state of the useful arts, he is, at present, inferior to them. The cause of the natural superiority we consider to be principally the climate, and chiefly the superior purity and freedom from moisture of the air. This element is inhaled by us for what may be called its nutriment, during every moment of our existence, and its quality must, therefore, have an effect upon our constitution and character, so much greater than all the other elements of nutrition put together, that it is hardly possible for us to form an adequate idea of the full extent of its influence. The next powerful natural agent is temperature, and, we think, it may be very safely affirmed that of any two people, alike in respect to education and civilisation, those will be highest in the scale of excellence, who have been born, and who live, in the purest air and mildest climate. If agriculture and the useful arts, including government and religion, were as far advanced in France as in England, we think the Frenchman would be the superior character to the Englishman; and were the arts in France equal to the arts in England, and the state of education equal to what it is in Wurtemburg, we cannot avoid coming to the conclusion that the Frenchman in the latitudes of Paris and Rouen would be the first being in the west of Europe. Some may think this conclusion humbling, but we cannot see how it is to be avoided. There is some presumption that man in certain parts of Asia Minor and Greece, and possibly of Italy, might attain to a higher degree of perfection than in France, as civilisation first began to spread in these countries; but our comparison does not extend to them.

The native excellence of the character of the French consists in the warmth of their affections, and in the clearness and rapidity of their intellectual faculties. Their native faults are, of course, the extremes of their native virtues; insincerity, because they are led by the warmth of their feelings to promise more than, upon trial, they find they can perform; and speculative rather than useful science, because the reward of the latter is the work of time, and requires the exercise of patience, while the lustre of a brilliant invention encircles the head of the inventor with rays of immediate glory.

The defects in the natural character of the French, are to be counteracted by the progress of civilisation, and more especially by inducing, among all ranks, a greater taste for what an Englishman calls the solid comforts of life. To improve the country people to the utmost in a physical point of view, it is necessary that they should eat a greater proportion of animal food, drink better wine, cider, or beer, and that their houses should be more commodiously planned, and more fully stocked with furniture. The introduction of an improved agriculture, and of useful manufactures, will effect both these objects; and if, while this improvement is taking place, care be taken to educate, not slightly, but effectually, every individual, so as to elevate the moral character and taste of the laborious classes, and prevent them from falling into that state of degradation and misery which is connected with improved agriculture and the extreme of manufacturing industry in England, every thing will be attained which the friends of human nature could desire.

The grand principle wanting to develope every other in France, is general and effectual education. Not an education which merely teaches a slight knowledge of reading, writing, and arithmetic, such as was formerly open to every body in Scotland; but a system of instruction commencing in the third or fourth year of infancy, in the manner of what are called infant schools, and continued alike to males and females to the age of fourteen or fifteen. During this period every thing worth knowing may be taught, and a style of manners and morals formed and impressed in such a way as to remain during future life. Every one submitted, so to speak, to this degree of education, will not profit from it alike; and it is in the nature of things, and suitable to the constitution of society, that this difference should exist; but every one, even the most intellectually obtuse, will know how to read, write, and count, and take a certain tone of manners and moral habits, which will fit them for some one useful capacity or other, and render them agreeable and honest to any who come in contact with them.

We never contend that all will benefit equally from education, however well or however long they may be subjected to it; all we insist on is, that all should be subjected to a certain degree of it during a certain length of time. We would, if possible, put every human being on a level in point of knowledge, morals, and manners: we know we cannot do this, because the original faculties of man are opposed to it; but we would give to all a fair and full chance of developing their faculties to the utmost, and, having done this, we would leave individuals to work their way in the world subject to the influence of all that it contains. Supposing education to be a fluid, we would immerse every male and female child in it (and for very important reasons, in addition to that of humanising all ranks, *in the same vessel*), during a certain length of time, that the body of each might imbibe according to its powers of absorption.

Being taken out, those of the poorest parents, and who at the same time, in consequence of natural defect, had imbibed least of the education fluid, would fall into the ranks of house servants, male and female, or would engage as sailors or soldiers; those who, in consequence of a little more native intellect, had absorbed a little more fluid, but who were still of the poorest parents, would take the grade of labourers, agriculturists, and gardeners, the females following dress-making, or other light trades, or becoming body-servants to ladies of rank; those whose parents had some little property, whatever quantity of fluid they might have absorbed, would commence their business education, by being apprenticed to some trade or manufacture, the females becoming governesses and teachers; those a little higher, when taken out, would commence their professional education, with a view to law, physic, the fine arts, &c., by being sent to college; and the same of the children of persons of rank and independence, whose education would be completed by a course of travelling and residence in other countries.

It may to some, perhaps, seem frivolous or ridiculous to enter into such details: but we have considered them necessary, in order to prevent ourselves from being misunderstood; and lest any one should think that, because we wish to bring all men and women, as near as their natures will admit, to a level in point of knowledge and manners, we wish to subvert the existing orders and ranks of society. We contemplate nothing of the kind. According to the above system, the servant and the labourer will be as completely subordinate to their masters as at present, though under such a system of education the servant would necessarily know more then than the master does now. All the contemplated difference between the present state of society, and that which *high and equal education and manners* would produce, would be a much more general diffusion of humanity, sympathy, and happiness.

To produce this state of things, it appears to us essentially necessary that the education for the lowest class of society should be enforced by government. At first sight, it appears inconsistent with approved principles to maintain such an opinion; for, if education be of so great an advantage, why should not individuals be left to pursue it as they do every other good? Our answer is, that this reasoning will apply to all those classes of society who are in easy circumstances; but that we do not think it will ever apply to the lowest class in any country, however highly civilised that country may be. The lowest class may, in all times and places, be considered as treading the brink of misery; the only means of preventing their precipitation into the gulf, is by the continual exercise of their labour. Now, the temptation of poor parents, or of a poor widow or widower, to make use of the labour of their children as soon as the physical strength of the latter permits, is, or appears to us to be, too great to be continually before them without their falling into it. We think, therefore, that for a perfect system of education to be effective, whatever may be the state of the country to which it is applied, it will always be necessary to compel the lowest class to send their children to school during a certain period, as in Germany (Vol. I. p. 483.); and that it will always be advantageous to have a law, rendering it illegal to employ any one who could not show a certificate of having attended this period, as in the same country. For the class above the lowest, perhaps the law declaring it illegal to employ any person without a certificate might suffice; and, for all the higher classes, we should say, admit none as officers in the army or navy, to public or state employments, or to what is called good society, who were not known to have taken a degree at some university, or to have done something equivalent. We have elsewhere shown * that, in a properly educated and highly civilised nation, the name of every individual, when he or she had completed the prescribed education, or, in other words, were intellectually *born into society*, ought to be published in a local newspaper or gazette, in the same way as physical *births into the world* are at present.

In order that a system of education, to be applied generally, may effect all that it is capable of effecting, we think that it should be conducted on what we shall call the Natural History System; i. e. that it should be totally

* Des E′tablissemens pour l'éducation publique en Bavière, dans le Wirtemberg, et à Bade; et Remarques sur les Améliorations à introduire dans ces établissemens pour les faire adopter en France, en Angleterre, et autres pays. Paris, pamph. 8vo, 1829. — The essence of this work will be given in the *Gardener's Magazine*.

freed from peculiar religious instruction.* Experience shows that, where mankind are allowed to think at all, they will never be brought to think alike on so indefinite a subject as religion; and, therefore, in a school to which the children of persons of all religions are to be sent, instruction in any one particular religion must necessarily be omitted. But morality, which, in most countries, is more or less taught as dependent on religion (most erroneously, in our opinion), must not be omitted; and this is what we would teach on what we call the Natural History principle; i. e. simply with reference to the good it produces to man in his worldly character. There are a sufficiency of motives exclusively belonging to this life, to produce all the charitable, generous, honest, and honourable actions taught by the laws of Christianity, or by any other laws. These motives are independent of abstract opinions, and refer simply to the rewards and punishments, from the grosser to the most refined, of this life. Being, therefore, more certain, they must be safer to build on than any system of promises and threats, on the fulfilment of which the party, however firmly he may believe and conscientiously he may act at one time, may at another have doubts, and so far change his opinion as to be left without any other guiding principles than those to which we allude. It were better, therefore, to begin with these motives, because, being mattters of fact, they cannot be denied or overturned; while religious principle can, in due time, be superadded. We have entered into details on this subject in the pamphlet referred to, and therefore shall not here repeat them; but we cannot help adding, that almost every execution that we read of in the newspapers confirms us in our opinion. It is common among the Protestants to express horror at the *idea* of absolution being given for moral offences by a Catholic priest; but is not the idea of absolution as certainly obtained by the Protestant murderer, on the scaffold, by some other process? It is ascertained that the Catholic banditti of Italy trust for salvation entirely to this *idea*, and will it be said that Protestant sinners are exempt from some corresponding influence? Might not a stranger to both systems of Christianity say, there must be something radically wrong, either in the principles of your religion, or in its administration, which, in its application, admits of the most horrid murderers that ever existed, when brought to punishment, dying on the scaffold full of happiness and joy, instead of being overwhelmed with a sense of remorse, or a feeling of infamy?

The liberal and enlightened party in France are at present intensely occupied with the subject of general education; and we most sincerely hope that they will not rest short of establishing it in as perfect a manner, and on as firm a basis, as the present enlightened age and the existing state of political harmony admit. They will, by this means, and by means of the rapid improvements which they are making in agriculture and manufactures †,

* Let no reader take alarm at this assertion, which has nothing to do with religion, as such, but merely the introduction of one particular kind of religion into a school composed of children whose parents are of various sects. The principle contended for is already acted on by the School Society of Ireland. (*Gard. Mag.*, vol. v. p. 84.) It was also set out with in the London University; though we regret to see, in a letter signed by Dr. Lardner and Mr. Dale, in this (Feb. 12.) day's *Times*, that a sort of accommodation to existing opinions has been made by these gentlemen, which we cannot but consider as derogatory to the University, whose chair of moral philosophy ought to have been sufficient for every purpose proposed to be effected by the divinity lectures of Mr. Dale.

† See two excellent articles in the *Foreign Quarterly Review* (arts. i. and xi.), attributed to Professor M'Culloch. These articles, written in the best spirit, alike merit the perusal of thinking men in both nations. See also the

not only raise themselves to a degree of civilisation and happiness hitherto unattained, but, by their example, effect the same object for England, Germany, and all other countries.

To return to our legitimate subject, we hope to show, in future Numbers, that the time we spent in Paris, and generally the whole of our four months' tour, has not been without profit to our readers; and conclude by stating that *R*àna arbòrea, Vallisnèri*a* spiràlis, Wistàr*ia* Consequà*na*, Andrómed*a* arbòrea, and other plants and animals which we brought from Carlsruhe (Vol. I. p. 481.), arrived safe at Bayswater. — *Cond.*

GERMANY.

The Congress of the German Naturalists. — In all ages and countries, men who have followed the same pursuits have felt themselves to be united in interest and happiness, and have sought to realise this union, and strengthen it, by actual personal associations. In the earliest ages, these unions or societies were few and comparatively local, and they must generally have been confined to nations speaking the same language. With the progress of things, the circle of these associations has extended wider; and the probability is, that, in time, every society whose objects do not interfere with established religions or governments, will reckon amongst its members people of all nations. The fairs and games of the earliest ages indicate the infancy of this state of things; and the voluntary annual meetings of the naturalists, of the military men, of the musicians, and of the students of Switzerland, in the different towns of that country, and of the German naturalists and medical practitioners, in the different towns of Germany, indicate its present state.

The Congress of the German naturalists owes its origin to Professor Schweigger at Halle, and Professor Oken at Jena, who traced the plan, in 1818, that was first carried into execution at Leipsic, in 1822. There were then only eight members present; but Professor Blumenbach was among them, and they resolved to meet every year, on the 18th of September, this period falling in the middle of one of the two long vacations of the German universities. "The sessions are held alternately, one year in a town of the north, and the next in one of the south of Germany; always fixing, by a majority of voices, the place for the next session; and the president and secretary having there their abode, to make the necessary arrangements for the meeting. Other regulations have not been wanting; and, since that time, the Congress has assembled successively at Leipsic, Halle, Würzburg, Frankfort, Dresden, and, last year, in Munich, where its members were most nobly received by the King of Bavaria, the greatest patron of the arts in our times. Then they resolved to meet, in 1828, at Berlin; and the Aristotle of the modern age, Baron Alexander von Humboldt, was chosen president; and M. Lichtenstein, Professor of Natural History at the same university, honorary secretary." (*For. Rev. and Cont. Misc. for Oct.* 1828, p. 505.) The Prussian government did all that the officers of the Congress suggested, in order to make the stay of its learned guests at Berlin as comfortable as possible. The Meeting lasted a week, and the following is a statement of the countries from which the members came who were present: — The whole number was 467, of which Berlin alone supplied 197, the rest of Prussia, 127; Saxony, 31; Bavaria, 12; Hanover, 7; Wurtemberg, 3; the other States of the German Confederation and Switzerland, 55; the Austrian States, 1; Sweden, 12; Denmark, 7; Poland, 5; Russia, 2; England, 2; France, 2; Norway, 1; and Naples, 1.

Journal d'Education et d'Instruction, de M. le Comte de Lasteyrie. Paris, 8vo, monthly.

Baron Humboldt delivered a discourse at the opening (which has been printed), and another at the close, of the Meeting. Various memoirs were read by different members; and, amongst them, one by M. Reinwardt (of Leyden), on the characters of the vegetable kingdom in the Indian Archipelago. The project of a new edition of *Pliny's Natural History* was discussed. It was stated that the King of Bavaria had sent a young scholar to collate the MSS. at Florence and in Paris, and that the King of Saxony had promised his assistance to obtain a collection of those at Madrid, in the Escurial, and at Toledo; and a hope was expressed that the Prussian government might defray the expense of a collation of the Vossian Codex, at Oxford. Professor Lichtenstein said that the Berlin Academy had made such great sacrifices for an edition of Aristotle, that it could do nothing on this occasion. Professor Oken, on this, suggested that every member present should subscribe a dollar, as a fund towards the expenses of the projected edition of Pliny, which was done, to the number of about 400.

The following is an extract from the opening speech of Baron Humboldt, as given in the *Foreign Review and Continental Miscellany:* — "In every place where the German language is resounding, where its philosophical structure exercises its influence on the minds and on the feelings of the nation, from the highest top of the Alpine mountains of Europe down to the other bank of the Vistula, where astronomy is raised to new splendour in the country of Copernicus, in every place of the large regions inhabited by the German nation, we make it our business to enquire into the secrets of the powers of nature, displayed in the ample vault of heaven, in the deepest problems of mechanics, in the bowels of the terraqueous globe, or in the finest tissues of organic beings. Protected by magnanimous princes, this Society has increased every year in interest and in extension. Every difference produced by diversity of faith and of political constitution has vanished here. Germany reveals here its intellectual unity; and this unity weakens none of the ties attaching us to the constitution or the laws of our birthplace, in the same manner as the knowledge of truth, and the performance of duty, are the final scope of morals. It is this separation in life, this emulation of mental efforts, which the glorious annals of the German nation prove to be productive of the highest achievements of humanity, of science, and of the fine arts.

"The principal purpose of this Society does not consist, like that of other academies forming a close corporation, in the communication of memoirs, in giving a number of lectures, all written to be printed, after some time, in their Transactions. No; its principal purpose is to encourage the intercourse of men cultivating the same field of science; the oral exchange of ideas making them more impressive and stimulating in the shape of facts, of opinions, or of doubts; and in the formation of relations of friendship; illustrating the science, agreeably tempering the habits of life, and giving forbearance and amenity to the manners.

"Truth cannot be discovered without difference of opinions; for it is never known at once in its whole extent, nor simultaneously by the whole of mankind. Every step appearing to lead the naturalist towards his distant goal, brings him only to the entrance-door of new labyrinths. The quantity of doubt is not diminished; it spreads only, like a movable mist, over other regions. Those who call a golden age the times when diversity of views, or, vulgarly speaking, the disputes of men of learning, will be settled, have no idea of the wants of science, and of its uninterrupted progress, and are like those who, with lazy self-complacency, defend, from year to year, immutably the same opinions."

The Meeting of next year will be held at Heidelberg. Baron Humboldt mentioned, in his farewell discourse, that he should be unable to attend, as he calculated that he should be then on his travels in Asia, most probably in the heart of Siberia. Report speaks in the highest terms of the excellent arrangements of the late Meeting, and of the extreme kindness of the king, in providing, in the most liberal manner, for the comforts and accommodation of all the members who attended. (*For. Quart. Rev.*, Jan.)

We hope the time is not far distant when there will be similar assemblies, not only of naturalists, but of scientific men in every department, from every part of the world. — *Cond.*

The Wurtemberg Society for undertaking Voyages of Natural History, has hitherto sent out only botanists, whose collections in Sardinia, Istria, Smyrna, Carinthia, &c., have given entire satisfaction to the shareholders. It is now proposed to send out mineralogists, and M. Kurr has already departed for Scandinavia. The shares are 15 florins; and, on the expiration of the voyage, the shareholder receives, according to his wishes, either specimens in botany or mineralogy. (*For. Rev.*, Jan.)

Universal Language. — M. Bürger, of Heidelberg, well known by his mathematical works, has announced a system of universal language, by which a correspondence may be kept up, on easy and certain principles, by individuals of all nations, although totally unacquainted with each other's native language. The acquisition of the system will scarcely require two days. (*For. Rev*, Jan.)

Remains of Tropical Plants. — M. Humboldt seems to be of opinion that the existence of the remains of tropical plants, &c., in northern latitudes, may be accounted for from the former internal heat of the globe, now, as he imagines, greatly diminished by volcanic spiracles, &c. (*Tableau de la Nature.*)

HOLLAND AND THE NETHERLANDS.

Weather at Brussels. — The present winter seems likely to exceed that of 1826–7 in severity. It set in on the 6th, and the frost has been keen and steady ever since. As you may like to compare our weather with yours, I copy my register of the height of the thermometer in the shade, at 8 o'clock each morning, for this month. [We have added the temperature at Edmonton, near London, from the *Literary Gazette*, for the same days.]

	Brussels.	London.		Brussels.	London.		Brussels.	London.		Brussels.	Lond.
Jan. 1.	34°	33°	Jan. 6.	29°	25°	Jan. 11.	22°	27°	Jan. 16.	11°	28°
2.	39	47	7.	28	30	12.	24	28	17.	20	25
3.	38	29	8.	29	28	13.	25	33	18.	23	19
4.	35	32	9.	32	30	14.	29	29	19.	25	16
5.	35	31	10.	30	30	15.	30	31	20.	21	15

Brussels, Jan. 21. 24°; at noon, 20°; and at 10 P.M. 10°.
22. 9°; most bitter, with a high E. wind.
23. 8°; most bitter, with a high E. wind.

There was a fall of snow, 6 in. deep, on the 10th, but none since. Clear and sunny on the 16th, 21st, and 22d; all the other days cloudy, but calm. — *W. S. Brussels, Jan.* 20. 1829.

Edmonton, near London, Jan. 4. — A violent hail-storm; hailstones of an irregular shape, 3 and 4 in. in circumference; 14th, a little snow; 20th, snow; 26th, snow; 27th, heavy shower of rain. During the first three weeks, generally cloudy, and the wind N. and N.E.; the last week cloudy, and a heavy shower of rain on the 27th. Wind S.E. and N.E.

SOUTH AMERICA.

The Sun's Rays reflected from a dark-coloured Sand. — In Captain Basil Hall's *Journal*, written on the coasts of Chile, Peru, and Mexico, the following passage occurs: — "On the 26th of May, 1821, we sailed from Valparaiso, and proceeded along the coast of Lima. During the greater part of this voyage the land was in sight, and we had many opportunities of seeing not only the Andes, but other interesting features of the country. The sky was sometimes covered by a low, dark, unbroken cloud, overshadowing the sea, and resting on the top of the high cliffs which guard the coast; so that the Andes, and, indeed, the whole country, except the immediate shore, were then screened from our view. But at some places this lofty range of cliffs was intersected by deep gullies, called quebradas, connected with wide valleys, stretching far into the interior. At these openings we were admitted to a view of regions which, being beyond the limits of the cloud I have described, and therefore exposed to the full blaze of the sun, formed a brilliant contrast to the darkness and gloom in which we were involved. As we sailed past, and looked through these mysterious breaks, it seemed as if the eye penetrated into another world; and, had the darkness around us been more complete, the light beyond would have seemed equally resplendent with that of the full moon, to which every one was disposed to compare this most curious and interesting appearance. As the sun's rays were not, in this case, reflected from a bright snowy surface, but from a dark-coloured sand, we are, perhaps, thus furnished, by analogy, with an answer to the difficulties sometimes started, with respect to the probable dark nature of the soil composing the moon's surface." Yours, truly, — *G. M. Lynn Regis, Nov.* 17. 1828.

Art. II. *Natural History in London.*

Linnean Society.—The first Meeting for the present session was held on the 4th of November, when a paper was read, entitled, a "Description of a new species of the genus Phalangísta from New Holland;" by Thomas Bell, Esq. F.R.S. & L.S.

Dec. 2. Read. An Account of a new Species of Pheasant; by Mr. Benjamin Leadbeatter, F.L.S. Two living specimens of this splendid bird, which is originally from the mountains of Cochin-China, were presented by the King of Ava to Sir Archibald Campbell, and by him to the Countess Amherst. Her Ladyship succeeded in bringing them both alive to England; but they unfortunately died soon after their arrival.

Nov. 18. Read. On the Nature and Origin of the Lingulate Rays in Zínn*ia*, and on a remarkable Multiplication observed in the Parts of Fructification of that Genus; by Mr. David Don, Lib. L.S. Notices of several Land and Fresh-water Shells, new to Great Britain, with occasional Observations; in a Letter addressed to Lewis Warton Dillwyn, Esq. F.R.S. & L.S.; by S. G. Jeffreys, Esq.

Dec. 16. Read. Observations on some Species of the Genera *T*étrao (grouse) and *O*rtyx, Natives of North America; with Descriptions of four new Species of the former, and two of the latter Genus; by Mr. David Douglas, F.L.S. Specimens of these birds were exhibited to the Meeting, and some of the grouse were of great beauty, especially one named *T*étrao urophasiànus, about the size of the wood-grouse (*T*étrao urogállus), which it may be considered to represent in the new continent.

Jan. 20. Read. Descriptions of new Genera and Species of the Class Compósitæ, belonging to the Floras of Peru, Mexico, and Chile; by Mr. David Don, Lib. L.S.

Feb. 3. Read. Some Observations on the common Bat of Pennant; with an Attempt to prove its Identity with the Pipistrelle of French Authors; by the Rev. Leonard Jenyns, M.A. F.L.S.

Feb. 17. Read. A Paper on the Plants called Compósitæ; by Mr. David Don, Lib. L.S. The Secretary communicated to the Meeting that the Council had completed the purchase of the collections and library of the great Linnæus, with those of the late President, for 3000 guineas. These collections and books will be removed immediately into the house of the Society in Soho Square. We congratulate the Society and the public on the acquisition of these treasures to science. Nearly all the materials which Linnæus employed, are now in the possession of the British public.

Geological Society. — The first Meeting for the present session was held on the 7th of November. — Read. On the Geology of Nice; by H. T. De la Beche, Esq.

Nov. 21. Read. On the Geology of Nice, continued. The diluvium of Nice is peculiar; it, in general, takes the form of breccia, either diffused regularly, or occupying clefts: appearing, however, in both situations to be intimately connected. The secondary rocks of Nice consist of two great formations; the upper one composed of siliceous, argillaceous, and calcareous particles, intimately mixed, but in very variable proportions; some of the beds abounding in green grains, which circumstance, together with the nature of their fossils, induces the author to rank the formation to which they belong with the green sand of England. Nummulites, however, which are rarely found in the green sand of this country, are found plentifully in that of Nice. The strata are very much disturbed and contorted; so that an unguarded observer might often suppose them to be inferior to rocks on which they are in reality incumbent.

Dec. 5. and 16. Read. On the Excavation of Valleys, as illustrated by the Volcanic Rocks of Central France; by Charles Lyell, Esq. V.P.G.S. F.R.S. &c. and R. I. Murchison, Esq. For. Sec. G.S. F.R.S. &c.

The theory long since announced, which ascribes the excavation of valleys to the long continued erosion of streams, has been supposed to derive remarkable support from the appearances of the volcanic tracts in the interior of France; and the authors referring especially to the works of M. de Monlosier, and the illustrations of that district recently published by Mr. Scrope, conceive that what they had seen themselves in Auvergne and the Vivarrais, strongly confirm the views of these and preceding writers.

Jan. 2. 1829. Read. A Letter on the Series of Rocks in the United States; by G. W. Featherstonhaugh, Esq. F.G.S. The writer, after having made himself acquainted, by personal observation, with the rocks of England, states his opinion that the rocks in North America, which would appear from Mr. Eaton's *Synopsis*, to succeed one another in an order perfectly irreconcilable with that which has been observed in the British Islands, do, in reality, follow the same order.

In confirmation of his opinions, the author gives a detailed account of observations made by himself in the course of an excursion from the city of Albany to the Hilderberg Mountains, over a plain which extends about thirty miles from north to south, and sixteen miles from east to west. The surface of this plain, which is 324 feet above the level of the Hudson River, consists of sand incumbent upon a very thick deposit of the marl above noticed, which is found also in various parts of the United States as far south as Louisiana. Near the Hudson River this marl is incumbent on transition rocks, but at the Hilderberg Mountains, on carboniferous limestone, containing the fossils usually found in that formation, and imperfect seams of black chert or flint. This range is remarkable for its fissures and caves; one of which, more than 1500 feet long, situated in the town of Bethlehem, is minutely described by the author. Within this cavern is a pool of water, along which one of the attendants paddled himself in a small skiff, to the distance of 800 feet, in a course parallel to that pursued by the author, and separated by a screen of natural pilasters with occasional openings; this pool forms the head of a rivulet about one third of a mile from the entrance of the cave. The author was unsuccessful in his endeavours to discover bones within the cavern, though it abounds in diluvial matter, which, in some places, presents a section of, at least, seven feet in height. There is another cave in the same neighbourhood, said to be still more extensive, which he proposes to explore. No regular search for bones has yet been made in the caves of the United States. The only fossil bones hitherto found in any cave in that country, are those of the megalonyx; although the bones of the megatherium, elephant, mastodon, ox, and horse have been discovered in other situations: but so little attention has been paid to the circumstances under which they occurred, that it is impossible to decide whether they were lodged in alluvial or diluvial deposits. In the author's opinion no fossil remains of the hyæna, rhinoceros, hippopotamus, bear, or tiger, have ever yet been found in the United States.

A Letter respecting some remarkable Fossil Remains found near Cromer in Norfolk; by Samuel Woodward, Esq. Mr. Woodward notices the limited extent of the marine formation of eastern Norfolk, and is of opinion that its rejectamenta may point out the boundary of a former sea in that district.

The marine remains denominated crag are found at Cromer, and westward of that town, at Coltishall and around Norwich. To the eastward of these situations, instead of marine shells, a layer of ligneous and mammalian remains is found reposing on the chalk. The author considers that a line drawn from Cromer, or a little east of it, and passing in a south-east direction towards Lake Lothing by Lowestoff, will very nearly describe the course of the antediluvian shore; to the eastward of which, immense numbers of the fossil remains of the elephant, horse, deer, &c., mingled with the trunks, branches, and leaves of trees, have been found even to the distance of twenty miles out at sea; and on the Knole-sand the tusk of a mammoth (drawings of which are annexed to the letter) was found in the year 1826, resembling those recently brought to England from Behring s Straits.

For more ample details of the Geological Society, see the *Philosophical Magazine and Annals of Philosophy*, new series. No. 26. Feb.

Zoological Society, Jan. 1829. — The Museum in Brook Street now contains 600 species of mammalia, 4,000 birds, 1,000 reptiles and fishes, 1,000 testacea and crustacea, and 30,000 insects. The gardens were opened to the public in June, and with the museum have been visited by upwards of 30,000 persons. In the former are 430 living quadrupeds and birds. The members of the Society exceed 1200; and on the whole it may be stated to be in a flourishing condition. A bird's-eye view of the gardens engraved on wood, and giving a very perfect idea of them, will be found in the *Arcana of Science* for 1829, a work which is one of the cheapest and best of the day.

Commemoration of Ray. — The second centenary of the birth of the illustrious John Ray, which happened on the 29th of November last, was celebrated by the lovers of every branch of natural history, by a public dinner, attended by about 130 of the most distinguished cultivators and patrons of science in and about London, including the officers of the Royal, Linnean, Geological, Horticultural, and Zoological Societies, the Rev. the Provost of Eton, and several of the Professors of the Universities of Oxford, Cambridge, and London. The chair was taken by Davies Gilbert, Esq. M.P. the much-respected President of the Royal Society.

After dinner the President proposed, "The memory of Ray," and accompanied the toast by an eloquent speech, setting forth his merits. "Men who had done good service to their country, whether in the field of science or elsewhere, were entitled to its grateful remembrance; the display of that remembrance was calculated to incite others to an honourable struggle for similar distinction; and he was sure that when these proceedings should become known, they would tend greatly to promote the cultivation of the science of natural history.

After enumerating the principal works which Ray produced, he observed "Ray was the first who reduced natural history to a system, and prepared, the way for those more perfect arrangements which have since had so salutary an influence on its cultivation. It was to his penetrating genius and indefatigable exertions, that the civilised world was indebted for many most important discoveries. If he did not himself always arrive at the goal, he pointed out the road; and it was to his pursuing the course he had commenced, that we owed our present advanced state in many particulars of natural history. Haller felt how much he owed to Ray, and he termed him the greatest botanist in the memory of man.

"Of this inestimable author Stillingfleet observes, 'that no writer, till his time, ever advanced all the branches of natural history so much as that sagacious, diligent, English observer, whose systematical spirit threw a light on every thing he undertook, and contributed not a little to those great and wonderful improvements which have since been introduced.'"

Mr. Bicheno, Secretary to the Linnean Society, pronounced a warm eulogy on Ray, "whom Cuvier had justly called *un Methodiste*, and whose works he had studied, still with fresh advantage, for the last twenty years. Ray was, indeed, a methodist. He was the first who arranged the grand outlines of natural history, and enabled every one to become acquainted with the groups, the grand formations of nature. With the minute particulars of his subject, Ray had not much interfered, but he had originated that system of arrangement which gave perspicuity to the labours of others, and had accurately described the characters of nature's grand operations."

Mr. E. Forster, Vice-President and Treasurer of the Linnean Society, said, that born and educated in the same county with Ray, he had been taught, from his infancy, to admire that great man; and his admiration soon became veneration from a study of his writings. Nearly forty years ago he had first visited his tomb, before it had long undergone a repair at the expense of a gentleman present (Sir Thomas Gery Cullum). In his pilgrimages to Ray's tomb, he had felt great delight in seeing also the place of his birth, the church in which he had been baptised; and in entering the house in which this good man had lived and died, it was pleasing to reflect that he was treading the very boards which Ray had trodden, and that he was looking, perhaps, on trees and plants which Ray had admired.

Dr. Fitton, the President of the Geological Society, and Mr. Greenough, passed each a high eulogy on the character of Ray, who made many sagacious observations on geology, and entertained some opinions much beyond the state of the subject in his own time.

Mr. Vigors, the Secretary of the Zoological Society, spoke of the high sense now entertained of Ray as a philosophical zoologist.

On the healths of the Naturalists of Great Britain and Ireland being drunk, coupled with the name of Mr. Kirby, the Rev. Gentleman said that he had never before addressed a public assembly of a festive character; but he felt it right to take that opportunity of testifying his admiration of the great and good Ray. He was great as a natural philosopher, and great also as a moral philosopher. He penetrated the world of science further than any of his contemporaries, and by his exertions formed a bright constellation of information, whose beams had served as a guide and beacon to more modern labourers. In entomology, the branch of science to which he himself was devoted, the naturalist of the present time was, indeed, deeply indebted to Ray, who had combined the system of Aristotle with that of Swammerdam, and cleared the way for Linnæus. Much had been done to unveil nature, but still much remained to be done; and he hoped that a course of perseverance would be pursued until all was accomplished.

The healths of Cuvier and Jussieu, and the Naturalists of Europe, were drunk with much approbation.

Dr. Buckland's health, and Prosperity to the University of Oxford, having been most cordially received, the learned Professor addressed the meeting at considerable length, bearing testimony to the merits of Ray, whom, as an individual, we must ever esteem, love, and venerate, and whose name the annals of philosophy will never cease to record among the first founders and benefactors of natural science.

On giving "the University of Cambridge," the Chairman took notice of the expulsion of Ray from that University, which harsh act he was disposed to attribute to the persecuting spirit which raged without the walls of that learned seminary. He could say of many of the present members of Trinity College, that they regret that the violence of the times had compelled their predecessors to acquiesce in the retirement of Mr. Ray from his Fellowship, for refusing to subscribe a declaration altogether unwarrantable. Oxford had as much to answer for in regard to her treatment of Mr. Locke.

The Rev. Professor Henslow returned thanks. He remarked that the University of Cambridge had, so far as the marble or the canvass could make amends, endeavoured to atone for the little, or, he should rather say, the great, injustice which Mr. Ray had sustained. The bust of that great man was ranged by the side of those of Newton, Boyle, Barrow, Dryden, and Willughby; and his portrait was considered to confer honour on the place in which it was. But Cambridge might, with justice, boast of possessing a far more powerful proof than those, of the estimation in which it held the genius and conduct of Ray: his spirit still lived there; and although the study of natural history had not yet been brought to that degree of perfection there which it might be, he hoped the day was not far off when it would command general attention. Such pursuits he considered the best correctives of fanaticism and bigotry.

"The Universities of Edinburgh, Glasgow, and London," and the healths of Baron Humboldt and Dr. Wollaston, having been severally drank, the Chairman retired amidst the applauses of the Company.

The health of Mr. Children, who suggested the Commemoration, was then given with hearty approbation, and the company separated, after having spent a day which they will long remember with delight.

A more full account of this Commemoration will be found in the *Philosophical Magazine and Annals of Philosophy*, for February, 1829, from which the above is extracted.

Art. III. *Natural History in the English Counties.*

Breeding of Woodcocks in England. — Sir, The fact that woodcocks occasionally breed in this country has long been established on undoubted authority. The occurrence, I am inclined to think, may perhaps take place oftener than is generally supposed. It should be remarked, that the woods, which are the usual haunts of the species, are comparatively but little disturbed during the breeding season, viz. the end of April, or beginning of May; so that these birds may, possibly, sometimes retain quiet possession of their sylvan domains without attracting our observation. It is highly probable that the individuals of this species, which are sometimes seen in the beginning of autumn, may not have migrated from the north at that early period, but may be such as have remained in this country through the summer (as is suggested in one of the extracts from the public journals below). I beg to offer you the following instances of woodcocks breeding in this country, which have come to my knowledge. On the 19th of May last, James Smith, keeper to John Chetwode, of Ansley, Esq., near Nuneaton, shot two young woodcocks in a wood called Hore Park, in that neighbourhood; and, on the following day, an old bird was shot by the same person at the same spot. The young birds are described to me as having been dry and bad when cooked and brought to table, but the old one was excellent.

John Wigson, woodman to W. Dilke, Esq., informs me that he observed a woodcock sitting on four eggs in Ryton wood, in the neighbourhood of Coventry, in the beginning of May, 1827. From some cause or other, however, the nest was deserted, and some of the eggs destroyed: on breaking one that remained, it was found to be nearly ready to hatch. Ryton wood, I am told, is a very favourite spot with cocks; and J. Wigson thinks there was probably a brood at that place this season, from the circumstance of his having observed a bird there very late in the spring.

One remark presents itself on the above notices; namely, that if the eggs of woodcocks are about to hatch by the beginning of May, and the young birds are able to fly by the 19th, the old ones must have paired and commenced the business of nidification, &c., at least, we may suppose, a month previously, i. e. by the beginning of April, which is earlier than many individuals of this species leave this country for northern climates. The idea, therefore, which I believe is entertained by many sportsmen, that woodcocks pair before they quit our island, appears to be well founded.

I have just been informed that woodcocks were shot in the woods of J. Boultbee, Esq. of Baxterley, which almost adjoin to Hore Park wood, on the 9th of April last.

The following notices from the public journals are in unison with those above recorded: —

England. A few weeks ago, woodcocks were still in the preserves of R. More, Esq., of Linley Hall, in Shropshire. This is not quite a solitary case *this* year. A woodcock's nest was lately found in Chicksand woods, Bedfordshire; since which time, in the same woods, and within 300 yards of the same place, another has been discovered; having, like the other, four eggs in it. They have all been hatched, and four couple of birds produced, which are now about the woods. (*Coventry Mercury*, June 1. 1828.)

Scotland. A very beautiful woodcock was shot last week at Banchory by Major Cruickshank, of Langley Park. This circumstance is looked upon as prognostic of an early and severe winter, as woodcocks usually do not make their appearance before the month of October. (*Aberdeen Chron.*)

Ireland. On the 8th of August, a fine woodcock was shot in Florida demesne, county of Down. This, we believe, is rather a rare occurrence, as these birds do not visit us till about November, and emigrate again in February. As it was seen in the course of the spring, it is supposed to have remained in the country since last winter. (*Belfast Chronicle.*) — Yours, &c. — *W. T. Bree. Allesley Rectory, Sept.* 26. 1828.

Middlesex.

An Artesian Well has been bored in the Duke of Northumberland's grounds, at Syon, to the depth of *535* ft. The first 20 ft. bored through consisted of loose gravel and sand; to this succeeded strong blue clay, to the depth of 410 ft.; next, 10 ft. of green sand; then between 30 and 40 ft of loose chalk; and, finally, very firm and hard chalk, to the depth of *535* ft., which is said to extend to an unknown depth. A strong spring was found in the green sand, but it was not powerful enough to rise higher than 30 ft. from the surface. The next spring was found in the solid chalk; and the two springs, united, now rise to the height of *5* ft. above the surface, and the water flows over at the rate of 5 gallons per minute, of a temperature of 55° Fahrenheit. — *W. Brentford, Feb.* 9. 1829.

Flycatcher in November. — The first week of this month I observed a spotted flycatcher in a field near this place; but it had been apparently wounded in one leg, as it leaned on one side when perching on some rails. — *R. Sweet. Pomona Place, King's Road, near Fulham, Nov.* 28. 1828.

SUFFOLK.

Thècla spìni. — It may be interesting to many of your readers to hear that, during the past summer, a new, or at least a very rare, insect (Thècla spìni) has been taken in this country. Mr. J. Seaman, of Ipswich, a most indefatigable and persevering entomologist, captured many specimens of it during the month of June last. I have a catalogue of some of the rarer British birds killed in this county within a few years, which I will forward to you. — *J. D. Hoy. Stoke Nayland. Nov.* 22. 1828.

Plants in flower on 21st December, 1828, *near Bungay, Suffolk.* — *Gramíneæ: P*òa ánnua, Annual meadow grass. *Euphorb*iàceæ: *Mercuriàlis* perénnis, Perennial Mercury. *Thymèleæ: D*áphne sempervìrens, Evergreen Daphne. *Vínceæ: V*ínca màjor, Great periwinkle. *Labiàtæ: L*àmium álbum, White dead-nettle; *L.* purpùreum, Purple dead-nettle; *H*ormìnum sylvéstre, Wild oculus Christi (*S*álvia *V*erbenàca). *Compósitæ: S*ónchus oleràceus, Kitchen-garden sowthistle; *C*rèpis tectòrum, Roof hawk's beard; *T*aráxacum officinàle, Shop dandelion; Phrýgia nìgra, Black knapweed; *B*éllis perénnis, Perennial daisy; *A*chillè*a M*illefòlium, Many-leaved yarrow; *S*enècio laciniàtus, Jagged groundsel; *S.* vulgàris, Common groundsel. *Leguminòsæ: U*lex europæ'us, European furze; *T*rifòlium arvénse, Fallow trefoil. *Geranièæ: G*erànium Robert*iànum,* Robert geranium; *G.* mólle, Soft geranium; *G.* pusíllum, Pygmy geranium. *Malvàceæ: M*álva vulgàris, Common mallow. *Caryophýlleæ: L*ýchnis vespertìna, Evening lychnis; Stellària mèdia, Middle-size chickweed. *Cruciferæ: S*isýmbrium officinàle, Shop bank-cress; *L*epídium campéstre, Champaign pepperwort; *E*rýsimum cheiranthöìdes, Wallflower hedge-mustard; *T*hláspi cuneàtum, Wedge-shaped treacle-mustard. *Ranunculàceæ: R*anúnculus rèpens, Creeping crowfoot; *R.* àcris, Acrid crowfoot. (Named from Gray's *Natural Arrangement of British Plants.*)— *D. Stock. Bungay, Dec.* 22. 1828.

LANCASHIRE.

Natural History Society of Preston. — Sir, I have enclosed a copy of the laws of our Natural History Society, and a catalogue of the books now in the library. The Society originated with four individuals, has continued to increase gradually, and there are now about thirty subscribers. Several of the members feel anxious to form a museum, more particularly as there is nothing of the kind in the town, and have lately had a meeting to discuss the means to accomplish it, but have not hitherto come to any fixed determination. If you, or any of your correspondents, could furnish a few hints in your Magazine on this subject, and point out how similar establishments have been formed and are conducted in other places, of no greater magnitude than this town, such hints would prove highly acceptable.

Dr. Harwood's late course of lectures here, on the *Mammàlia* and *Aves,* has contributed to enliven the taste already manifested towards zoological pursuits. The lectures were uncommonly well attended, and every one appeared delighted, many expressing sorrow at the shortness of the course.

If a respectable museum could be established, it would doubtless soon be enriched with valuable presents, would tend to keep up a spirit of enquiry into Nature's works, and prove an unfailing source of intellectual gratification and rational amusement. I remain, Sir, yours, &c. — *Jos. Kenyon. Preston, Oct.* 4. 1828.

WESTMORELAND.

Crossbills, as occasional visitants at Ambleside. — For some weeks past a pretty large flock of crossbills (Lóxia curviróstra) have been observed in the vicinity of Ambleside, Westmoreland. Their favourite haunt is a plantation of young larches, where they may be seen disporting almost every day, especially between the hours of eleven and one. The crossbill is a rare British bird, and may be classed among our *occasional visitants,* as, during certain seasons, none make their appearance. They are northern birds, which breed, or are supposed to breed (for, in truth, their real history is still rather obscure), in Sweden and Norway. They are never seen here except during the earlier part of the winter season, or (as in the present instance) late in autumn. I think they were first observed in the neighbourhood this year during the third week of October, which I consider an unusually early appearance. I hope it does not betoken a severe winter? If I happen to detect the period of their final departure, I shall inform you of it. — *J. W. Ambleside, Nov.* 20. 1828.

CUMBERLAND.

Arrival of certain Birds of Passage in the Neighbourhood of Carlisle. — The green sandpiper (*Tótanus* óchropus) was seen in this neighbourhood on the 21st of July, and the woodcock on the 26th of August, both remarkably early. I know not whether you take much interest in the arrival of the various birds of passage, but perhaps some of your friends may be gratified with the following account of the arrival of the swallow tribe in this neighbourhood, during the last four years: —

	1825.	1826.	1827.	1828.
Sand marten (*H*irúndo ripària),	April 10.	April 10.	April 6.	April 4.
House marten (*H*irúndo úrbica),	- 26.	- 27.	- 22.	- 28.
Swallow (*H*irúndo rústica),	- 23.	- 16.	- 20.	- 18.
Swift (*Cýpselus A*'pus),	- 25.	- 29.	- 29.	- 29.

T. C. Heysham. Carlisle, Sept. 29. 1828.

NORTH WALES.

Insects taken at Barmouth, North Wales. — The following list of insects taken at Barmouth, North Wales, and in its vicinity, may not be without interest to travellers fond of entomology: —

*P*apilio hyale, Saffron butterfly; met with under the rock below the inn in 1826, but not seen since. *P. c*ardui, Painted lady; found in great abundance in the same year, but very rarely met with since. *P. u*rtìcæ, Small tortoise-shell. *P.* A'rgus, Common blue. *P.* I'o, Peacock; abundant. *P.* Atalánt*a*, Red admirable; abundant. *P.* Sémel*e*, Black-eyed marble. *P.* Janìra, Meadow brown.

*S*phinx A'tropo*s*, Death's head hawk-moth; two fine specimens taken on the window. *P*halæ'na Jacobæ'*a*, Cinnabar; behind the inn. *P*h. filipéndulæ, Burnet; abundant. *P*h. *p*ìsi, Broom. *P*h. *q*uércus, Large egger. *P*h. zoegàna, abundant; described by Donovan as rare. *P*h. viridàna, Small green oak; this beautiful but destructive little moth completely strips the oak copses about Barmouth of their leaves. *P*h. vauària, Gooseberry. *P*h. *u*rticàta. *P*h. evonymélla, White ermine. *P*h. hexadáctyla, Many-feathered. *P*h. pinetélla, Pearl veneer; described by Donovan as rare, but here not unfrequent. *P*h. atràlis. *P*h. *u*lmària. *P*h. bilineàta. *P*h. càja, Great tiger. *P*h. dáctyla, White-plumed. *P*h. *p*avònia, Emperor;

only in the caterpillar state. *Ph.* typocöìdes, Scarce Gothic. *Ph.* bucéphala, Buff tip. *Ph.* ramèsa, Bramble. *Ph.* gonostígma, Scarce vapourer. *Ph.* cherophyllàta, Great chimney-sweeper. *Ph.* pudibúnda. *S*phínx Elpènor, Elephant hawk.

Chrysomèla Biterula; a very rare insect. *C*urcùlio *p*ìni; rare. *C*icindèla campestris, Sparkler. *T*ípula rivòsa. Panórpa commùnis. *A*rànea diadèma.

It is probable that a practised entomologist would gather a rich harvest in the vicinity of Barmouth; the insects here mentioned having been collected by an unscientific person, not much acquainted with their habits and haunts. — *M. A. R. September* 26. 1828.

Art. IV. *Natural History in Scotland.*

Leaf-cutting Bee. — The editor of the *Dumfries Courier*, in reference to a paragraph which appeared, I believe, in the *Scotsman*, detailing the account of a nest of the leaf-cutting bee (*A*pis centuncularis), formed near Amluch, in Anglesea, cites the case of one in Dumfriesshire, in which the cells were constructed of birch leaves, obtained, it is conjectured, from Callender wood. This remark is followed by an interrogation, whether the circumstance has been noticed before in Scotland? I may answer the query by stating, that my personal observation proves it is by no means rare. This interesting insect is not limited in its choice to one plant. The leaves of Macartney's rose, *M*éspilus canadénsis, *F*ráxinus *O*'rnus, &c., are those, among others, which I have remarked as so singularly scolloped out by its forceps. The summer before last I observed that it exhibited a singular predilection for the leaves of my rose acacias, six of which displayed the most singular configurations, every leaf on every plant being carved and scolloped in an extraordinary manner, and altogether presenting a spectacle at once interesting and unique. — *J. Murray.*

Blackcock (T*étrao tètrix*). — A curious variety of the female of this species was shot in August last by Sir Sidney Beckwith on the muirs above Beatock Bridge, in Annandale. The ground colour of the whole bird was a dusky yellowish white, paler on the under parts, with the dark markings of the feathers umber brown. When shot, she had a brood of several young with her. The specimen is now in the collection of Sir William Jardine, Bart. — *W. J. Oct.* 25. 1828.

Solan Goose (Sùla *álba*). — A specimen of this bird, in the plumage of the first year, was killed last week a considerable way up Moffat Water, Dumfriesshire. It was taken in a marshy pool by a herd-boy, and seemed much exhausted. There appeared no wound. The distance of the place where it was caught from the sea is about twenty-five miles. — *Id.*

Red-breasted Merganser (M*érgus serràtor*). — Mr. Selby and Sir William Jardine met with the nest of this species in June last, when on a fishing excursion upon Loch Awe, in Argyleshire. The nest was found upon a small wooded island, placed among thick brushwood, under the covert of a projecting rock, and completely surrounded with nettles, long grasses, and fern. It was carefully made of moss, plucked from the adjoining rocks, mixed with the down of the bird; both in structure and materials resembling that of the eider duck. It contained nine eggs, of a rich reddish yellow, or fawn colour. The bird was remarkably tame, sitting until nearly taken with a small hand net. — *Id.*

Art. V. *Natural History in Ireland.*

Cork Tree (*Quércus Sùber*) *at Sammerstown.* — I send you a sketch (*fig.* 20.) of a remarkable cork tree now growing at Sammerstown, the

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residence of Daniel Sweeny, Esq., in the vicinity of this city. I have not been able to ascertain at what date, or by whom, it was planted; but, from the size of the elms (some of them 12½ ft. in circumference) and other trees growing near it, and probably planted at the same time, I should suppose the cork tree to be several centuries old. That it must have been a remarkable tree several generations since, is proved by the fact of the proprietor at that time, when about to let the lands on which the tree stands, having introduced a clause in the lease, by which the tenant incurred a penalty of 20*l.* if he cut down or injured the tree. The following are the dimensions of the trunk and principal branches: — Girth of the trunk at 3 ft. from the ground, 8 ft. 10 in.; height of the trunk before it divides, 9 ft.; girth of each of the two principal branches, 6 ft. 10 in.; girth of the second-rate branches, 5 ft. 4 in.; horizontal diameter, or spread, of the head, measuring from the extremities of the branches, 36 ft.; thickness of the cork and outer bark on the trunk, 3 in. I am, Sir, yours, &c. — *James Drummond. Cork Botanic Garden, Dec.* 9. 1828.

Art. VI. *Perennial Calendar.*

We are here enabled to lay before our readers three journals of the weather and calendars of nature, which, whether considered separately or comparatively, are full of interest and instruction.

England.

Journal of the Weather kept at Wycombe, Bucks, Lat. 51° 37′ 44″ North; Long. 34′ 45″ West, during the Year 1828, with Monthly Observations. By James Tatem, Esq., Member of the London Meteorological Society.

Table of Thermometer and Barometer.

Month.	Thermometer.				Barometer.			
	Mean.	Greatest variation.	Greatest Heat.	Greatest Cold.	Mean.	Greatest variation.	Greatest height.	Lowest extreme.
January	38·78	15·28	52·50	23·50	29·67	0·78	30·16	28·89
February	38·93	17·31	56·25	23·25	29·54	0·86	30·22	28·68
March -	41·28	21·28	62·25	23	29·65	0·86	30·11	28·79
April -	44·80	24·44	69·25	25·50	29·49	0·59	30·09	28·92
May -	51·42	21·32	72·75	32·25	29·59	0·45	30·08	29·14
June -	56·73	19 26	76	41·25	29·74	0·67	30·07	29·07
July -	58·28	19·28	76	39	29·46	0·35	29·75	29·11
August	56·19	17·80	74	41	29·61	0·50	30·05	29·11
September	54·95	19·70	74	35·25	29·69	0·59	30·29	29·15
October	46·95	18·70	65	28·25	29·87	0·82	30·22	29.05
November	42·44	23·44	55·75	19	29·62	0·66	30·06	28·96
December	42·23	18·73	54	23·50	29·70	0·78	30·16	28·92
	47·75				29·64			

Table of Rain, Snow, Fair Days, and Wind.

Month.	Number of fair days.	Number of rainy days.	Number of snowy days.	Rain.	Winds.							
				Ins. Dels.	N.E.	East	S.E.	South	S.W.	West	N.W.	North
January	14	15	2	4·67	1	8	3	2	7	6	1	3
February	14	11	4	1·47	3	2	6	3	3	5	3	4
March -	20	10	1	0·77		2		1	8	10	8	2
April -	10	20		3·50	1	2	2	1	3	1	3	7
May -	17	14		1·92	4	8	3	2	5	5		4
June -	18	12		2·68	6	2		3	9	5	5	1
July -	15	16		4·55		1		6	8	6	4	2
August	15	16		5·3	4	3	5	2	14	4	2	
September	15	15		3·25	5	6	1	5	6	1		6
October	23	8		1·8	3	1	4	1	5	7	6	4
November	18	12		1·28	1	10	3	2	4	6	3	1
December	14	17		2·6		6	5	5	7	7		1
	193	166	7	33·83	28	51	32	33	79	63	35	35

January. An extraordinary quantity of rain fell during the month, upwards of three times as much as in January 1827, and very considerably more than for the eleven last years. The mean temperature was higher than since 1817, but the mean height of the barometer was above that of last year, in the corresponding month, notwithstanding the excess of rain. Snow fell on the 11th and 15th; the whole together about 3 in. in depth. Thunder heard and lightning seen about two o'clock in the morning of the 18th. The evaporation 0·05625 of an inch.

February. The mean temperature was above that of the last year, and the maximum higher than observed by the journalist, in the month of February, for twelve years. The mean height of the barometer lower than since 1823, in the same month, but the range greater than for some years; snow fell on four different days, and the whole amounted to 8 in. in depth; the quantity of rain and melted snow 1·475 in., of which about $\frac{3}{4}$ of an inch was from the latter. A lunar halo, with misty area, seen about ten o'clock on the 28th. The evaporation 0·03125 of an inch.

March. This month was remarkably dry, and, about the middle, very warm for the season; the mean temperature above that of last year which was higher than usual. The mean height of the barometer was also above that of March last year. The quantity of rain very considerably less than in any corresponding month since 1822. Some little snow fell on the night of the 28th, but was soon melted. Thunder heard on the 22d and 23d, and a rainbow seen, on the fourth, about five P. M. The evaporation 0·14375 of an inch.

April. Rain fell on twenty different days, between the 3d and 25th, after which the barometer rose, and the weather became fine; the quantity of rain greater than since April 1818, and, as might have been expected, the temperature and barometer were both low. The mean of the thermometer lower than for the last four years, while the mean of the barometer was below that of any year, in the same month, since 1821. An indistinct lunar halo, with misty area, seen on the 28th about nine P. M. The evaporation 0·25625 of an inch.

May. The range of the thermometer not so great as in May last year, but the mean temperature was 1·15227 higher. The barometer was also higher, although below the usual average of May. In the latter part of the month, there was much dull and heavy weather. On the 27th half an inch of rain fell, yet the whole quantity was less than in 1827. The maximum of heat occurred on the 16th, on the evening of which some little lightning was seen in the north and north-east. The evaporation 0·6625 of an inch.

June. The mean temperature was above the average of the month, and considerably higher than in June last year, though not so high as in 1826. The mean elevation of the barometer partook of the same character. The quantity of rain more than since 1824. Lightning seen on the 16th and thunder heard on the following day. The evaporation 0·86875 of an inch.

July. The quantity of rain remarkably great, exceeding that of July in any one year, since 1823 (on the 9th upwards of $1\frac{1}{4}$ in. fell in the course of the day); the temperature was consequently low, the maximum being beneath those of the last six years, and the mean lower than since 1823; the barometer was also much depressed, the mean lower than since 1822. Thunder heard on the 8th, 14th, and 26th, and lightning seen on the 3d. The evaporation only 0·28125 of an inch.

August. The month, like August in last year, was cold, the temperature being extremely low, the maximum never reaching summer heat and the range very small; the barometer was also low, and the quantity of rain greater than what has fallen at Wycombe, in any one month, for the last six years; the wind chiefly from the west and south west. Thunder heard on the 3d, and thunder heard and lightning seen on the 6th, and also on the

10th, when the thermometer was only one degree above temperate. The evaporation 0·41875 of an inch.

September. Less rain fell than for the lsat three years in September, the whole month warmer, the mean being higher than since 1823. The barometer higher than usual although below the mean, of the corresponding month, in last year, which was remarkably high. Lunar halones, with misty areas, seen on the nights of the 20th and 21st. The night of the 28th was remarkably dark; and about midnight it blew a heavy gale from the south-west. The evaporation 0·33125 of an inch.

October. Rain fell on eight days only, and so little has not fallen in this place, in the month of October, for the last six years, the whole quantity was considerably less than half of that which fell in the same month, in 1827. The mean temperature less than since 1823, but the barometer remarkably high during the month, the mean being much above those for many years past. The month might be denominated very fine. The evaporation 0·19375 of an inch.

November. So mild, dry, and fine a November has not occurred for many years. The mean temperature higher than since 1824. The mercury much above the average of the month, although the mean did not reach that of last November, but the quantity of rain was less than has been observed by the journalist, during his residence at Wycombe, a period of six years. The evaporation 0·0875 of an inch.

December. The month was remarkably warm, the maximum being higher than since 1819, and the mean temperature above that of any one for December in the last twelve years; the barometer has also been very much elevated, the mean being considerably higher than since 1818, and the quantity of rain less, by 2¼ in., than last year. Thunder heard and lightning seen on the 7th about 12 P. M. and an indistinct lunar halo observed on the night of the 19th. The evaporation 0·075 of an inch.

SCOTLAND.

Meteorological Table and Calendar of Nature for 1828. Extracted from the Register kept at Annat Garden, Perthshire. N. Lat. 56° 33½′; above the Level of the Sea 172 feet.

	Mean height of Barom.	Mean Temperature.	Depth of Rain in Inches.	No. of days on which Snow or Rain fell.	No. of fair days.	Vegetating season, beginning 20th of March; and ending 20th of Oct. Mean temperature during that period.	Depth of rain fallen during that period.
January -	29·68	38·2	4	14	17		
February -	29·57	39·7	2·80	15	14		
March - -	29·63	44·9	1·05	8	23		
April - -	23·53	44·3	2·69	10	20		
May - -	29·62	52·3	2·50	11	20		
June - -	29·72	58·4	1·50	10	20		
July - -	29·50	61·1	2·20	13	18	53·9	14.53
August - -	29·60	59·1	2·26	12	19		
September -	29·73	56·6	1·38	8	22		
October -	29·79	50·5	2·07	11	20		
November -	29·61	44·1	3·26	16	14		
December -	29·53	44·9	2·55	14	17		
Average of year	29·62	49·5	28·26	142	224		

Observations. It is remarkable that the mean temperature of last season, is within a very small fraction of a degree of the temperature in the extremely hot and dry season of 1826: but the mean temperature for 1826, for the vegetating season, was about 2° higher than in 1828, during the same period; the high temperature that prevailed during the winter months of the last season, will account for the approximation of the annual temperature for both years. The fall of rain in 1826 was only 14 in. the half of which fell during the vegetating season.

The fall of rain last year was near the ordinary average, and measured 28·26 in., 14½ of which fell from the 20th March to the 20th October, which accounts for the general luxuriance of the crops in this country.

The mercury, in the barometer, was highest on the 29th October, being on that day 30 Fahr., it was lowest on the 21st March, being at 28·10. Fahr. The warmest day was on June 28; mean heat of that day 67° 5′, extreme heat 77°. The coldest day was on the 12th February; mean temperature of that day 32° greatest cold 28°. The wind blew from the north-east, east, and south-east, 153 days, and from the north-west, west, and south-west 213 days. The only loud gales of wind occurred on the 16th and 17th January from the east, on the 14th February from the east, on the 9th March from the west, on the 24th and 25th September from the west, on the 20th and 27th November from the west, and on the 7th December from the west.

Calendar of Nature for 1828, *for the Carse of Gowrie, Perthshire.*

January. Frost prevailed from the commencement of this month till the 17th, though not severe. The Winter Aconite (Eránthis hyemàle) appeared above ground on the 19th, and was in flower by the 23d; Snowdrops were in flower on the 31st.

The robin red-breast sang regularly from the 18th, and the mavis and blackbird commenced singing on the 28th.

February. The temperature for the first ten days averaged 46°; a snow storm prevailed from the 10th to the 28th; the weather from the 18th was mild till the end of the month. The common Mezereon (*D*áphne *M*ezèreon) showed its flowers on the 3d, and on that day the field lark commenced singing. Bats were seen flying at Perth on the 5th; partridges began to pair on the 7th; magpies began to build their nests on the 10th, which, on discovering their mistake by a fall of snow, they tore down on the 14th.

The male flowers of the hazel (*C*órylus *A*vellàna) were developed by the 16th, the Water Saxifrage (Chrysosplènium oppositifòlium was in flower by the 27th.

March. In this month there were eleven days of clear sunshine; towards the middle of the month the temperature was unusually high. The *S*axífraga oppositifòlia, a beautiful little Scottish mountain plant, was in flower at Annat Garden on the 4th; rooks began to build on the 6th; frogs were heard croaking on the evening of the 8th; and the female blossom of the hazel appeared on the 9th; gooseberries were in leaf by the 11th; Moorpark apricots in full flowers on south walls, by the 12th; daffodils and jonquils by the 17th; marsh marigold (*C*áltha palústris) by the 20th; peaches in flower, on south walls, by the 26th; wild geese beginning to set off in flocks from the Low Carse.

April. The temperature was as low as 40°, at the beginning of this month, but rose gradually to a mean of 48° towards the end. The wind blew from the N. E. till the 10th; a circumstance not uncommon in the early part of April, and always accompanied with cold, occasioned, as is supposed, by the winds blowing over the melting snows in the northern parts of Europe. Green gage plums were in flower on walls by the 6th, apricots on standards by the 8th, sloe tree in flower and the whitethorn and larch in leaf by the 10th. Swallows appeared on the 23d, and the maple tree was in leaf by the 24th.

May. The wind blew from the east for the most part of this month, and, with the exception of nine days, the atmosphere was cloudy. The scarlet strawberry and common broom in flower, and the birch in leaf on the 1st, the oslin apple was in flower by the 3d. Young rooks had left their nests, and were branching and shot at by the 4th, when the cuckoo was first heard. Teuchats (the proper name?) appeared in marshy grounds by the 6th, the lilac was in flower on the 12th, and the oak in leaf on the 18th. The walnut came in leaf on the 20th, and the Scotch redstreak apple, the latest flowerer, on the 24th. The narcissus came in flower on the 29th. The landrail was heard in the corn-fields on the 14th.

June. The atmosphere was clear during the greater part of this month. The laburnum came in flower by the 4th, the mulberry leaves were fully expanded by the 5th, the common scarlet strawberry was ripe on the 24th, a period of 51 days from the appearing of the flowers, mean temperature of that period 60°. Hay harvest began on the 24th on clover and rye grass grounds. The gooseberry caterpillar appeared on the 7th, and the apple caterpillar on the 17th; the last were coiled up in their downy catacombs by the 24th, and some of their flies were seen by the end of the month.

July. Warm showers were frequent throughout this month, the atmosphere was for the most part cloudy, there being only three days of brilliant, and eight days of partial sunshine. Wheat came in flower on the 6th; and it was soon discovered that myriads of small caterpillars, of a sulphur colour, supposed to be the *T*ípula *t*rit*í*ci described in *Loudon's Encyclopædia* had taken possession of a great part of the ear, and were devouring the embryo grain: within three weeks from the time they were discovered, they were transformed into small flies. The wheat is, in consequence, about one half deficient in quantity all over Scotland. Barley, which was sown on the 1st of May, came in the ear on the 7th, being 68 days. Mean temperature of that period 55° 8′. *L*ýchnis chalcedónica in flower on the 11th. Hare bells (Campánula rotundifòlia) in flower on the 13th. Timothy grass, and the Bùtomus umbellàtus in flower on the 15th, and the *L*ílium cándidum on the 18th, pulled ripe juneating apples from an east wall on the 22d, early varieties of gooseberries ripe by the 23d. The sundew (Drósera rotundifòlia) and the grass of parnassus (*P*arnássia palústris) were in flower on the 26th on moist moor grounds. The cuckoo ceased his note on the 30th.

August. Dull hazy weather prevailed till the 20th, and heavy showers had laid the ripe wheat in the Low Carse, which was partially sprouted. The (*Callùna* vulgàris) common heath, which was in full flower by the 11th, the autumn crocus (*C*ólchicum autumnàle by the 13th. Wheat harvest commenced in the Low Carse on the 15th, and was general by the 21st. Barley that came in the ear on the 7th of last month was cut on the 25th, a period from the earing of 49 days. Mean temperature of that period 59° 4′.

September. The atmosphere throughout this month was for the most part hazy. A violent thunder storm occurred on the 9th, wind westerly. Wheat that had been sown on the morning of the 9th gave a braird on the 17th, a period of eight days. Mean temperature during that period 54° 6′. The harvest was secured on the highest grounds, which form the north bank of the Carse, by the 22d; on the evening of that day there appeared an unusually brilliant Aurora Borealis. Green gage plums were ripe on the 9th, and white beurrée pears on the 15th, elruge nectarines on the 18th. Swallows began to congregate on the 24th.

October. The weather throughout the whole of this month was mild and pleasant; on the 6th and 8th the wind was boisterous from the west; there were eight days of clear sunshine. Wheat sown on the 8th gave a braird on the 21st, a period of thirteen days. Mean temperature of that period 52°. Flocks of wild geese began to arrive from the north on the

16th, and swallows had disappeared. Nothing in the shape of frost occurring, and the soil being tolerably moist, the leaves of forest trees did not begin to drop till near the end of the month, by which time late varieties of pears and apples were taken down.

November. A considerable quantity of rain fell in the course of this month, but the temperature was unusually high for the season. On the 20th a loud gale of wind blew from the west, and slighter gales from the same quarter occurred on the 24th and 26th. The laurustinuses began to open some blossoms on the 12th. Wheat that had been sown on the 29th of last month gave a braird on the 17th, a period of nineteen days. Mean temperature during that period 44°.

December. The characteristics of the weather, throughout this month, were nearly the same as in November, and the temperature fully higher: for the temperature, fall of rain, &c., for each month, I must beg to refer to the table extracted from the register kept at this place. The Christmas rose was in flower by the 20th. The sweet-scented coltsfoot showed some flowers by the 25th. The thrush, blackbird, and robin redbreast sang regularly from the middle of the month. The year concluded with a violent thunder-storm, seldom surpassed in the summer months by loudness, and never equalled by the vividness and luminosity of the flashes of lightning with which it was accompanied. This formed a precursor of a change of weather, and frost set in with the first hours of the new year.— *A. Gorrie. Annat Gardens. Feb.* 11. 1829.

IRELAND.

Extracts from a Meteorological Journal kept near the town of Kilkenny, during 1828. Latitude 52° 35′, W. longitude 7° 25′; about forty miles from the eastern coast, and 500 feet above the level of the sea. The soil light, deep, and gravelly; the subsoil a gravelly loam. The thermometer observations taken at 1 P.M., and hung about four feet from the ground in the angle connecting a north-east and north-west wall.

March. Maximum degree of heat taken at 1 P. M. in the shade on the 14th, wind south, 61°; minimum at 1 P.M. on the 27th; wind north-west, 45°; mean heat at 1 P.M., 51°. Days rainy 3, fair 15, hail 1, hoar frost 2; wind east and north-east 3, south 5, west 7, and north 3. Anemones appeared in blow on the 14th, standard Orleans plum on the 15th, pear trees on a southern aspect on the 16th, *I*bèris sempervìrens on the 27th, *Tróllius* asiáticus on the 28th, *S*axífraga crassifòlia on the 29th. The total absence of frost during the preceding winter, and mildness of the season, hitherto, has brought it considerably in advance of its usual stage at this period.

April. Maximum degree of heat, taken as before, on the 27th, wind south-west, 60°; minimum on the 8th, wind north-east, 43°; mean temperature at 1 P.M. 53° 25′; rain 12 days, hail 2, fair 16; wind east 2 days, south 2, south-west 4, west 4, north-west 5, north 9, and north-east 4. Pear trees in blow on the 2d, Sanguinària canadénsis on the 3d, *I*'ris germánica on the 8th, *P*ŷrus spectábilis on the 17th, *L*eucòjum æstìvum on the 18th. Harsh northerly winds in the latter part of the month, injurious to the early bloom of fruit-trees; but, on the whole, the prospect is promising.

May. Maximum of heat in the shade on the 30th, wind south-west, 68°; minimum on the 17th, wind north, 55°; mean temperature, 58°. Maximum of radiation from the sun influenced by reflection, the thermometer four feet from the ground, on the 19th, wind east, 71°; mean temperature of sun heat 65° 3′ at 1 P.M., exceeding the temperature in the shade on the 18th. Heat of the earth, at the foot of a southern-aspected wall 1 foot deep, 57°, 2 feet deep, 55°; 1 foot deep, at the foot of a northernaspected wall, 56°, 2 feet deep, 55°. Thunder on the 29th, on a change of wind to the north; rain 15 days, fair 16; east wind 9 days, S.E. 4, S. 4, N. 3, S.W. 3, W. 1, and N.W. 7. *Làmium Orvàla* in flower on the 2d, apple trees on the 8th, *Cratæ̀gus Oxyacántha* on the 11th, guelder rose on the 13th, Pompadour and Scots roses on the 25th. The weather in this month moist and chilly; wall-fruit, in general, cut up by north-westerly winds and frost early in the month, and standard fruit much hurt; bush-fruit uninjured; slugs and snails abound in unprecedented numbers, devouring every thing eatable and unprotected. The season still maintains the early impulse it received.

June. Maximum heat in the shade at 1 P.M. on the 28th, wind S.W., 79°; minimum on the 6th, wind N.W., 57°; medium temperature 67° 5′; maximum of sun's radiation on the 29th, wind E. 86°; mean sun heat 69°; excess above heat in the shade about one-thirtieth; thermometer buried at the foot of a south wall 12 inches deep 56°, 2 feet 55°; foot of a north wall 12 inches deep 56°, 2 feet 55°; well water 26 feet deep 52°; rain 12 days, fair 18, high wind 7; wind E. 5 days, S.E. 1, S. 6, S.W. 5, W. 3, N.W. 8, and N. 2; thunder on the 20th, wind shifting from north to south. *Ròsa* villòsa first in bloom on the 8th, pinks on the 9th, red currants ripe on the 23d, Keen's seedling strawberry on the 24th, Mayduke cherries on standards on the 25th, early Antwerp raspberry on the 26th. High north and harsh north-westerly winds early in this month, along with cold rains for some days successively, chilled and blighted such of the young fruit as survived the last, so that, except in favoured spots, the crops are lost; some of the coarser and hardier kinds of fruit partially escaped. North-west winds are those most injurious to the fruit crops of this country, and they occur generally about this season. The easterly do comparatively but little injury.

July. Maximum heat in the shade on the 16th, wind in the east, 70°; minimum on the 26th, wind N.W., 62°; medium temperature 67°; maximum of sun's radiation on the 12th, wind in the west, 84°; mean heat of sun's radiation 70° 5′; excess above temperature in the shade only one twenty-second; well water 53°; thermometer buried 12 inches deep at the foot of a south wall 62°, 2 feet deep 61°, 3 feet deep 60½°; 12 inches deep at foot of north wall 60½°, 2 feet deep 59½°, 3 feet deep 59°; thunder on the 25th, wind shifting from south to north; rain 18 days, heavy from the 20th to the 27th; wind E. 3 days, S.E. 9, S. 6, S.W. 1, W. 2, N. W. 5, N. 5. Gooseberries ripe on the 10th, Magdalen or St. James's pear on the 31st, Rudbéck*ia* hírta on the 23d, Heliánthus multiflòrus first in bloom on the 24th, small fruit abundant. The crops of hay which we commenced cutting about the 24th of last month are much injured by the heavy rains at the beginning of this; much of the corn also laid, the moist weather having encouraged a thick and luxuriant blade.

August. Maximum heat in the shade on the 29th, wind south-east, 74°; minimum on the 9th, wind north-west, 60°; medium temperature 66°; maximum of sun's heat on the 29th, wind south-east, 92°; medium of sun's heat 71°; excess above shade one-thirteenth. Thermometer at the foot of a south wall 12 inches deep 60°, 2 feet 60°; north wall 12 inches deep 59°, 2 feet 59°. Wet days 19, 6 of thin heavy rain, 12 fair. Wind E. 5 days, S.E. 3, S. 5, W. 6, S.W. 4, N.W. 7, N.E. 1. Eve apple or scarlet Juneating ripe on the 3d, chisel pear and wheat-cutting on the 10th, Orleans plum on the 11th, yellow jack plum on the 17th, Oslin apple on the 18th, yellow Alberge peach on the 19th, red Magdalen peach and Pourprée hâtive on the 22d, Grosse Blanquette pear on the 25th, Beurrée Bergamot, and Orange Bergamot on the 28th; sweet clematis in flower in a western aspect on the 1st, *Erìca* multiflòra on the 3d, *Althæ̀a* frùtex on the 19th, Chelòne on the 25th; *Cýclamen* autumnàle on the 27th. This month, for two thirds, was extremely wet; the latter part cleared up, when the crops seemed in a desperate condition, and, in a great measure, redeemed them. The season may, nevertheless, be reckoned among our earliest ones, preceding by, at least, ten days or a fortnight, those of ordinary occurrence; but, owing to the want of radiating sun-heat, fruits have not acquired their perfect flavour or full size this year.

September. Maximum of heat in the shade on the 5th, the wind in the east, 68°; minimum of the same on the 13th, the wind in the north, 55°; mean temperature in the shade at 1 P.M. 64°; maximum of sun's radiating heat on the 2d 84°; mean radiating sun's heat at 1 P.M. 69°; excess of the sun's heat on the 28th, one-thirteenth; thermometer buried 12 inches at the foot of a south wall 60°, at 2 feet 60°; 12 inches deep at the foot of a north wall 58°, 2 feet 59°. Well water 26 feet deep 53·5°. Range of the barometer from 29·20. to 29·78. Thunder on the 13th, wind shifting from south to north; heavy rain on the 23d, high wind on the 24th from the south, and since from the west. The musk rose in blow on the 1st, *C*lèthra arbòrea on the 4th, Bignòn*ia* radìcans màjor on a south aspect on the 19th, *C*ólchicum autumnàle on the 28th; Elruge nectarine ripe on the 3d, purple fig on the 4th, Kerry pippin on the 14th, Marseilles fig on the 18th, aromatic russet apple and Williams's Bonchretien pear on the 19th, Bourdine peach on the 22d, mulberry on the 23d, Bell's scarlet apple on the 25th, dwarf Ischia fig on the 30th, autumn Bergamot pear on the 29th. The first nine or ten days of this month were valuable for completing the harvest; high winds and rain predominated in the latter part. Vegetables are this year abundant and of good quality; the fruits which escaped the late frosts are, in general, stunted and ill-flavoured, though ripening early. — *J. R. Kilkenny.*

Art. VII. *Indicatorial Calendar.*

The two ensuing months are the most interesting to the naturalist of the whole year. With ethereal mildness come forth vegetable and animal tribes, which the winter had hidden or banished.

Flora. In the garden and fields the appearance of the early flowers, and swelling of the pregnant buds, indicate the advancing season, showing the stage of its advancement, by comparing present appearances with those of the like kind which happened in bygone years. Every bed or border flower, every bulb or tuber, are now in motion, rising in gay succession; while the mellowed ground is receiving its charge of annual seeds.

Fauna. The birds that live constantly with us are the first of the animal creation which are actuated by seasonal changes. Many of them are preparing for the business of nidification. The raven and common owl are usually leaders; then the rook, jack-daw, and redbreast. Crows, magpies, and jays are later. Among song-birds, the song-thrush, missel-thrush, and afterwards the blackbird, are among the early builders; but all these are much governed by situation: the inhabitants of a warm, extensive shrubbery of evergreens begin their social connections much sooner than those located in the bleak forest. But our chief seasonal birds are the emigrants. The first is the chiff-chaff: this little bird is sometimes heard so early as the 8th of March. Along with it appears the whinchat and stonechat: the latter is supposed not to leave England entirely, but only shifts from one part of the island to another. The redstart may be expected about the 8th of April; the swallow on the 13th; cuckoo, nightingale, wryneck, blackcap, willow wren, pettychaps, white-throat, and lesser white-throat, about the 20th; the house, sand, and black martens about the 25th; and the turtle-dove and flycatcher about the 30th. Mr. Sweet says, that many of our migratory birds arrive earlier, and remain about London for some time before they disperse themselves into the interior of the kingdom; but do not commence singing till they have chosen their nestling place.

Insects are daily issuing forth from their hybernacula, or bursting from their chrysalises. On a frosty morning not an insect is to be seen in the air; but should this be succeeded by a warm, sunshiny afternoon, the air swarms with them, a general hum is heard on all sides, and, on the return of evening, except the night-flying beetles and moths, they are all fled to repose on the rugged bark of trees, into the sheltering hedge or bush, or into cavities in the ground. The brimstone-coloured butterfly is one of the most conspicuous indices of the naturalist; its first appearance is generally memorandumed.

Weather. In this changeable climate we have very few certain data, enabling us to foretell what kind of weather may be expected. That what is to come depends on that which is just past, is one of our old rules of prognostication, and, in the case of alternations of much rain or drought, the rule holds good, and so often, that proverbs in conversation, and maxims in morality, are founded on the circumstance, viz. "long wet, long dry," "after a storm a calm," &c.; but when a past course of weather is of no decided character, neither very wet nor very dry, the rule is of no value. Within the next month, however, we shall very probably experience what is equally dreaded by seamen and travellers in these latitudes, namely, hard blowing weather between the 18th and 24th of the month.—*J. M. Chelsea.*

Art. VIII. *Queries and Answers.*

The sound or call of some kind of Bird (Vol. I. p. 297.).—Your correspondent, J. N., wishes to know what birds he heard on his way, by moonlight, through part of Galloway. From the description of the sound, I should be inclined to think it was the snipe, as the noise they make is exactly like that of a goat, and they are called, in the north, heather-bleaters. The note of the whimbrel is a plaintive whistle, or occasionally a low tremulous shake.—*William Henry Hill. Newland, Gloucestershire, Sept.* 10.

The Pied Flycatcher.—Sir, I was pleased to see in your Magazine of Natural History (Vol. I. p. 331.), an account of the Pied Flycatcher, by J. Blackwall, Esq., who states it to be abundant in the woods near Ullswater, and in that vicinity. I have never seen this species alive myself; and as I am desirous of obtaining living specimens of all the migratory British warblers, I should also be much pleased with a male bird of this species, or a nest of young ones, which would arrive quite safe if sent by a careful person, and fed on the road with a little raw lean meat, moistened with water. Should Mr. Blackwall, or any of your correspondents, be kind enough to procure and send me a bird or nest, I should feel much obliged, and should be happy to return the favour in any way in my power. Perhaps a nest of eggs that have not been sat on would be more convenient: those could be packed tight in a little box in wool, and would arrive safe; and I could get them hatched and bred up by some nearly related bird in this neighbourhood.

The *Dartford Warbler* and *Grasshopper Warbler* I also wish for particularly, to add to my collection. The former is said to be plentiful on the commons in Devonshire and Cornwall, and is sometimes, but rarely, found on those in the neighbourhood of London; but I have never yet been fortunate enough to obtain one.

The grasshopper warbler, more generally known by the name of grasshopper lark, is plentiful in several counties, but scarce about London; and I would willingly remunerate any person that would procure and send me a living male bird, or nest, of either or both. I have now eleven species of the interesting migratory warblers, all in good health, and several of them in full song; four handsome male blackcaps, a wheatear, and whinchat, that sing nearly all day long; the redstart, and larger and lesser whitethroats, also sing occasionally, but are not yet in full song: the greater part of them, if the weather is mild, will be in full song about Christmas. I am, Sir, yours truly, — *R. Sweet. Pomona Place, King's Road, near Fulham, Nov.* 28. 1828.

A dark-looking Water Bird. — Sir, Very early one morning, in September, 1826, as a friend and myself were paddling about in a small boat in the harbour of Fowey, Cornwall, we spied a dark-looking bird on the water at the mouth of a "pill" or creek. We contrived to get within shot, and my friend fired and shot it dead. On taking it into the boat, I was much delighted at finding that I had got a strange bird. My companion was certain that he had killed a tame duck belonging to a neighbouring miller. I, however, carried it home, and forthwith made a sketch of it, and purposed measuring and examining it more minutely. A cat, however, forestalled me, and having borne it away to her own museum, I was obliged to rest contented with the rough drawing. Enclosed is a copy of my original figure (*fig.* 21.), which is so far accurate as probably to enable some of the

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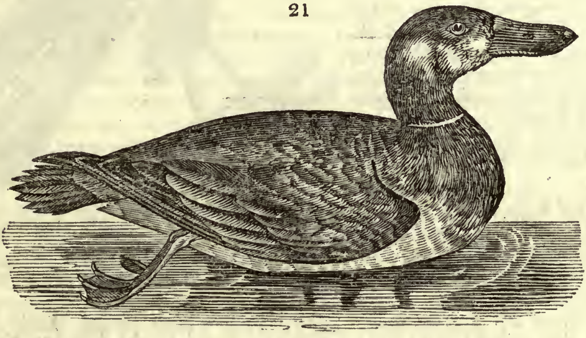

readers of your excellent Magazine to inform me what the bird is, it being a novelty to me. From the long body, roundness of the tail, and situation of the nostrils (in the middle of the bill), it might be placed in the genus *Mérgus*; while, from the form of the bill and leg, it seems to belong to the *A*'nas. The bill, it will be observed, is remarkably large, and the forehead slopes more gradually to it than is usually the case in the duck tribe. This bird was about the size of the wigeon (*A*'nas Penélop*e*), and, I should imagine, had not arrived to its perfect plumage, by the uncertain form of the white spots on the cheek. I am, Sir, yours, &c. — *J. L—s. Liskeard Vicarage, Cornwall, Dec.* 10. 1828.

A Crow, which I saw last Sunday on Barham Downs, had the wings, back, and belly of a slate colour, the wings tipped with black, and the head of a glossy jet black. Pray, Sir, was it a distinct species, or only a variety? — *P. H. Kingston Rectory, near Canterbury, Nov.* 22. 1828.

A Swallow in November. — On Sunday last, Nov. 23., I saw a swallow fly over our garden, as strong and apparently in as good health as at midsummer. The day was very fine, and the flies were plentiful; but how did it subsist during the severe frosty days that were past? — *R. Sweet. Pomona Place, King's Road, near Fulham, Nov.* 28. 1828.

Silver Fish. — Sir, will some of your correspondents inform me, through the medium of your Magazine, whether there are any such fish as silver fish, and from what part of the world they are brought into this country? I remember seeing, a year or two ago, in the pond in the botanical garden, Liverpool, both golden, and (as I then understood) silver fish, in full vigour apparently; but I am induced to make the present enquiry, from having recently heard that there are no such things as silver fish really; and that what are generally known by that name are only the golden ones grown old, and having thus lost their colour. Do not gold fish come from China? [Yes.] — *W. A. C. R.*, *Dec.* 8.

A variety of the Moor Buzzard. (*fig.* 22.)—Sir, I send you a variety of the Moor Buzzard, which I shot in Marsh Gibbon Field, near Bicester, on Nov. 12. I am not certain that my name is right (see Latham quoted by Bewick); but as none of these birds are very common, I thought it might not be unacceptable to you. I observed it late in the afternoon take its station, in its usual heavy listless manner, on an old ash tree, which had a good command of the moor, where there were abundance of snipes, but not liking the sound of my gun, it went off. The next morning, near the same spot, it arose from a thick sedge, and being at a considerable distance, I hoped I had shot a bittern, being a much more likely place for that bird than a bird of prey. I have remarked, that whenever a place is frequented by snipes, there is almost sure to be one or two buzzards in the neighbourhood, although it is probable that they seldom succeed in taking any other than birds which have been shot in the body, and escaped from the sportsman apparently unhurt. — *H. Bicester, Nov.* 1828.

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We thank our correspondent; the bird has been stuffed by Mr. Leadbeater, the eminent artist in this way, employed by the Linnean Society, and is placed in the museum of Messrs. Sowerby, No. 2. Mead Place, Lambeth. Mr. Leadbeater and Mr. Sowerby consider it to be the Moor Buzzard (Fálco æruginòsus, *Linn.*) a variety wanting the light spot on the crown of the head. — *Cond.*

The Animal that inhabits the Nautilus.—Sir, I would wish to be informed, through the medium of your valuable Magazine, as to the nature of the animal that inhabits the *N*aútilus, and the use it makes of the chambers; and, if Conchilla's History of the *T*ròchus and *N*aútilus in your Magazine (Vol. I. p. 24.) be not fabulous, the means the *T*ròchus uses to propel itself to render it such a powerful enemy to the *N*aútilus, the former not seeming to me to be so well adapted for locomotion as the latter. — *A Young Conchologist. Sept.* 18. 1828.

M*ya batàva, the U'nio batàva of Lam.* —I would be glad to know if there be a specific distinction between this and the U'nio pictòrum. Is the distinction sufficient to make it more than a variety? I have received from various parts of Europe the batàva, rostràta, and *A*'nas, and should conclude, from the specimens received, notwithstanding Lamarck and other distinguished conchologists have described them as different, that they are not intitled so to be considered. No conchologist of this country would, if found within our rivers, consider them any thing more than mere varieties. Many of the species from the Ohio have half a dozen varieties more distinct. — *J. L. Philadelphia, August* 16. 1828.

Winter Quarters of Frogs.—Can you, or any of your correspondents, inform me what become of *frogs* during the winter: whether they remain *dormant*, or whether they *die*; if the latter, how the race is preserved? In crossing meadows, late in the autumn, which are liable to floods, I have frequently observed lumps of a jelly-like substance lying on the ground, of a yellowish colour, semi-transparent, and about as much on a spot as would fill a small tea-cup. For some time I was quite at a loss to what to attribute the cause of it, till at length, upon a closer inspection of one of them, I discovered in it the remains of the head and feet of a frog. Am I right in concluding, from this circumstance, that these substances are the bodies of frogs, which have been decomposed by the approach of winter? Yours, &c. — *J. B. Jan.* 21. 1829.

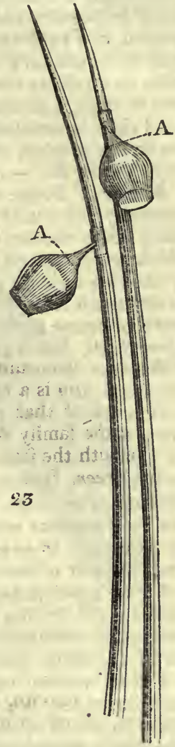
Shower of Frogs. — " As two gentlemen were sitting conversing on a causeway pillar near Bushmills, they were very much surprised by an unusually heavy shower of frogs, half formed, falling in all directions; some of which are preserved in spirits of wine, and are now exhibited to the curious by the two resident apothecaries in Bushmills." (*Belfast Chron.*) Can there be any truth in this strange assertion? When a boy, I remember having heard of young frogs being found on the top of a church steeple. — *G. M. Lynn Regis, Nov.* 17. 1828.

When at Rouen, in September last, we were assured by an English family resident there, that during a very heavy thunder shower, accompanied by violent wind, and almost midnight darkness, an innumerable multitude of young frogs fell on and around the house. The roof, the window-sills, and the gravel walks were covered with them. They were very small, but perfectly formed, all dead, and the next day being excessively hot, they were dried up to so many points or pills, about the size of the heads of pins. The most obvious way of accounting for this phenomenon is by supposing the water and frogs of some adjoining ponds to have been taken up by the wind in a sort of whirl or tornado. — *Cond.*

A Tick which moved on a diseased Part of itself. — Some days ago, I extracted a tick from a dog, and flung it into a finger-glass of water. After floating for some minutes, the abdomen seemed to detach itself from the rest of the body, and the insect to move upon this discarded part of itself, as a man walking on a raft. The abdomen of the tick had been very much distended, and wore the appearance of one of those small leathern bottles in which oil-colours are sold to artists, only considerably less in size. I shall be much obliged to any of your correspondents who would favour me with an explanation of this fact, and to yourself for noticing it. I beg to remain yours, &c. — *C. B. London, Nov.* 3. 1828.

A Curious Worm. — Sir, Perhaps some of your correspondents can acquaint me with the name of a small worm, which I found in my garden in the early part of the summer, and which I will attempt to describe. Its length is exactly 3 in. 2 lines, and it is about as thick as a hog's bristle, tapering to a point at each end; its colour was, I think, when alive, something of a reddish brown, except about two lines at each end, which were nearly white. I observed it throwing two-thirds of its body into the air in a very curious manner, with a motion resembling that of the antennæ of some large insect. I suppose it to be a species of the Górdius, but have always considered the Gordii as water insects, and although this creature seemed to enjoy twisting itself among the herbage, which was at the time teeming with the effects of a long soaking rain, yet my garden is distant from any pond, and enclosed with walls. An examination in a microscope only showed some hundreds of rings, of which the whole body is composed, and enabled me to discover no perceptible difference between the two ends, nor indeed organs of any kind. Upon putting it carefully into the palm of my hand, the heat seemed to distress it exceedingly; it curled itself up into a dozen knots, and was dead in less than a minute. As my best book is Pennant, I shall be obliged to you for any information respecting this very curious insect. — *W. W. Wandsworth, Nov.* 2. 1828.

A Nidus on a Rush. — The enclosed drawing (*fig.* 23.), represents a nidus in my possession attached to a rush; the nidus in the drawing and in the figure being exactly of its natural size. I discovered it whilst botanising in the early part of the summer, and so closely does it resemble a flower, that I mistook it for one, even after it was in my hand. It is perfectly white, and of manufacture the most finished. The lower end is quite flat, with edges as sharp in proportion as those of the crown of a hat, which I consider a great peculiarity, as I cannot recollect any insect manufacture of a web-like material, whether nidus of spider, or cocoon of caterpillar, except such as are round or oval, and certainly none with sharp edges such as I describe. As I found two of them, I cut one open, and found about a dozen eggs sticking to the base at A, but not occupying one-tenth of the interior.



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This large unoccupied space suggests the idea, that it is intended for a sort of nursery for the young when first hatched, and the wonderful instinctive economy of the insect may, I think, easily be imagined. As the rush on which it was fixed was growing in water, the parent insect must have been an inhabitant of the water or its surface. Feeling the period of incubation drawing near, instinct, wonderful instinct, informs it, that the element in which it lives and moves and has its being is not the proper situation for its eggs to be deposited. It ascends to the top of some aquatic plant, forms its very elegant nidus in which it deposits its eggs, and, having hermetically secured every part of it, leaves the rest to the influence of the sun, which, in a few weeks, animates the dormant principle of life, and a living creature bursts from each egg. The young are probably not strong enough, at first, to endure the water, and unable to bear any inclemency of weather; but their first infancy is passed in a dry and comfortable chamber, inclosed in which they may alike defy the wind and rain, and when they have acquired sufficient strength, they have only to eat their way through the walls of their nursery, and, crawling down the rush, commit themselves to the water.

This I conceive to be the economy of the insect, of whatever genus it may be, but any information respecting it will be very acceptable. It is still in my possession, as perfect as when first gathered. Every one who sees it admires it; but I have not yet met with any one who ever saw such a thing before, and as I have only seen two in my life (both of which were close together), I take them to be rather uncommon. (*Id.*)

Aphis on Endive and Lettuce. — Perhaps some of your correspondents would give me some information on the following subject: — Having planted out some endive in the garden, which at first appeared to thrive well, I was surprised to find, after a short period, that the plants drooped and died. On removing them, I found the root surrounded by a host of aphides, attended by a quantity of red ants. These aphides were of various sizes, from the size of a small pin's head to that of the sixteenth part of an inch. I should be glad to know whether this species of aphides is peculiar to the endive and lettuce; also if all the aphis tribe produce honey dew; and, if not, do the ants prey on the bodies of these insects? I observed the ants very busy attacking the aphis behind, and running from one to another. — *William Henry Hill. Newland, Gloucestershire, Sept.* 10. 1828.

Típula trítici. — From the destructive effects of this fly in 1827 the wheat crop in East Lothian was almost entirely annihilated. This season, though its ravages have been less severe in that quarter, yet it has more generally infested the wheat crop throughout the whole of Scotland. You have given a very accurate figure of it in your Magazine of Natural History, Vol. I. p. 227.; but it would be exceedingly interesting to many of your readers if you or any of your correspondents would, in a future Number, give some particulars of the natural history of this destructive insect, and mention if any method has been tried, or can be adopted, to subdue it. — *J. Ferme. Haddington, Dec.* 1828.

Procellària Leáchii. — Some correspondent would, perhaps, favour you with an account of the Procellària Leách*ii.* At present but three of the genus are British, viz. the Procellària glaciàlis, or Fulmar; the Procellària pelágica, or Stormy Petrel, commonly known to sailors as Mother Carey's Chickens; and Procellària *Puffinus*, or Shearwater. — *Id.*

Putting Bees into Mourning. — Sir, In your Magazine of Natural History (Vol. I. p. 93.), Mr. D. Stock wishes to know if the custom of putting bees into mourning is practised in other parts of England. Happening to mention the circumstance to a person who has been used to bees all his lifetime, and who is a native of Kent, I was informed that it is the custom in some parts of that county, to tap at each hive, upon the death of any member of the family where bees are kept, otherwise the bees all die, or do not thrive with the family afterwards. — *Andrew Mathews. Alfred House, Turnham Green, Sept.* 18. 1828.

Lathræ̀a squamària. — Sir, I beg to offer to your correspondent Mr. Smith, of Sandgate (Vol. I. p. 407.), the best description I can supply, from recollection, of the Lathræ̀a squamària found in this neighbourhood: —

Flowering branches frequently more than double the size stated in the *English Flora*, rising 10, 12, or even 14 in. above the surface, bearing from thirty to forty flowers, disposed in three distinct yet perfectly unilateral rows; smooth, shining, tinged with bluish purple, and having a few flowerless bracteæ below, but gradually becoming hairy upwards; thickest about the middle. *Bracteæ* (called *leaves* in *Eng. Flor.*) broader than their length, sitting, smooth, shining, and rather fleshy; one at the base of each petiole, and certainly of a different structure from the true subterranean leaves. *Petioles* and *calyx* hairy; though these and the stem are represented smooth in t. 50. of *Eng. Bot.* In the *English Flora*, the calyx is described as having the hue and texture of the leaves (qu. bracteæ?); whereas, it is soft and thin, not at all succulent. *Flowers* of a dullish *pink* purple; the segments of the upper lip of the corolla much longer than the calyx, collapsed together, enveloping the stamens and the greater part of the style, though the stigma projects beyond them. *Capsules* succulent.

I have confined myself to those points in which I think our plant differs from the description in *Eng. Flo.*, and from the figure in *Eng. Bot.*, not having Hudson's *Flor. Ang.* to refer to. Though, at this period of the year, I am obliged to trust to memory, I flatter myself I shall be found correct; for, being dissatisfied with Sowerby's figure, I made a drawing from nature, in April last, which has fixed its image on my mind; but having since given it to a scientific friend, I am still without reference. I may add, that a comparison of the figure in *Eng. Bot.*, and of t. 160. of Curtis's *British Entomology*, the plates of which, for fidelity of outline and richness of colouring, are beyond all praise, strongly supports your correspondent's doubts.

It is somewhat singular that, though the Lathræ̀a has been long suspected to be parasitical, no botanist has yet told us *how* it is attached to the roots of its parent tree. The elegant and lamented author of the invaluable *English Flora*, with characteristic diffidence, says, "the *real* root is, I believe, fibrous and parasitical;" and the profound philosophic botanist to whom we are indebted for the *Prodrŏmus Flŏræ Nov. Hol.*, &c. &c., and whose extensive knowledge of vegetable physiology first suggested the true nature of the gigantic Rafflĕs*ia*, confessed to me, not many months since, that he had recently endeavoured to discover the mode of growth of the Lathrea, without success. Allow me, then, to state, that after having been frequently baffled in my attempt, I was fortunate enough, during the last season, to ascertain this hidden fact. I also detected some peculiarities in its organisation and economy, which throw considerable light on the functions of this singular and interesting plant; but before giving them to the public through another channel, I wish to confirm them, by further investigation, the ensuing spring. In the mean time, I would feel much gratified to see, in your next Number, any observations which Mr. Smith or any other correspondent may have made, bearing upon this more important part of the subject. — *J. E. Bowman. The Court, near Wrexham, Nov.* 18. 1828.

Smell of new-mown Hay. — Sir, In your Magazine of Natural History (Vol. I. p. 381.), I observed an article on the "Cause of the smell in new-mown Hay," in which the writer there seems inclined to believe that the fragrance in new-mown hay arises from the sweet-scented vernal grass (Anthoxánthum odorătum). I have made, on a small scale, several species of grasses, separately, into hay, with a view to satisfy myself on the subject; and I found the hay made from them all, more or less, partake of fragrance. Might not the scent arise from the fermentation of saccharine matter contained, more or less, in grasses in general, and also from the manner in which the hay is got up? I remain, Sir, yours, &c. — *Humphrey Gibbs. London, Dec.* 1828.

Skeleton Plants. — Will any of your correspondents favour me, by communicating, through your pages, the process necessary for divesting the leaves and capsules of plants of their soft parenchymatous matter, leaving only the blanched and reticulated vessels, which so clearly displays their interior structure or framework, and presents so beautiful a picture of vegetable anatomy? The ingenious Mr. Crow, of Kensington, has brought this art to the highest pitch of perfection; and I am inclined to think it is effected by some simple means. — *J. E. B. Wrexham, Feb.* 4. 1829.

Durability of Seeds. — Permit me to ask you for a reference to any work or works in which the durability and indestructible qualities of seeds are treated of at length? — *Charles Greaves. Devonport, Nov.* 24. 1828.

Marine Vegetables. — Will you call the attention of botanists to marine vegetables, with a special view of ascertaining if there are not many plants fit for eating, which would be serviceable to our seamen on distant shores? Has not Dr. Maculloch printed a paper on this subject? — *Id.*

Coal Fossils from Clifton, near Manchester. — Sir, I send you a sketch (*fig.* 24.) of a fossil cane or reed, which I got out of the little mine coal in

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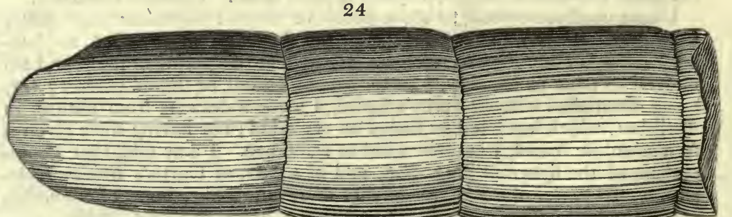

the township of Clifton, near Manchester, at the depth of 81 yards. It is about 2½ in. broad, pressed flat on the under side, but raised in the middle on the upper side. I also send you a sketch of two other vegetable fossils (*fig.* 25. and *fig.* 26.), from the same mine. *Fig.* 25. has the appearance of a kind of rush laid side by side, and extends to about 5 ft. in length, and about 2 ft. in width: it generally is about an inch in depth, and contains three layers, both sides being similarly marked. *Fig.* 26. is simply marked upon a thin seam of coal, for if the coal is taken from off the metal, no part of the impression remains. The fossils (*figs.* 25. and 26.) are composed of metal, being a kind of blue shale, and were both covered with a thin seam of coal. Can you inform me to what order and genus they belong, and also what is the best work published on fossils, with plates? — *B. St. Helen's, Jan.* 19. 1829.

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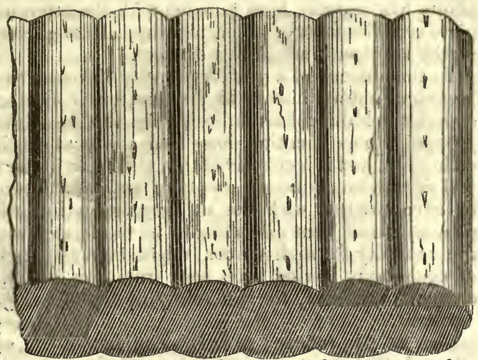

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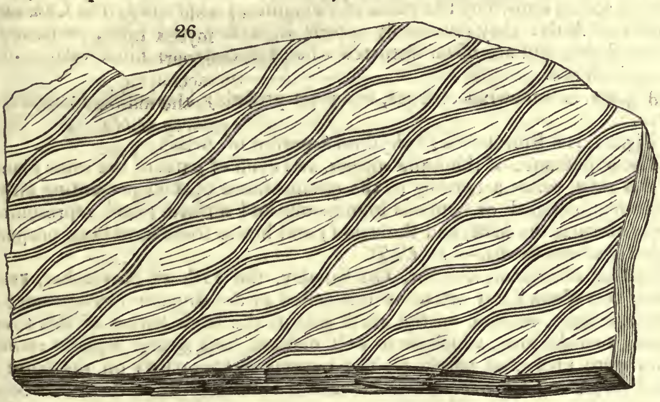

The article on the Progress of Geology (Vol. I. p. 442.) adverted, in chronological order, to the most distinguished and valuable publications which have illustrated this science and its different departments. To this series we refer our correspondent. As an introduction to the knowledge of fossil organised bodies generally, B. will find Mr. Parkinson's *Introduction*, or outlines of oryctology, highly useful; and it is further recommended by its cheapness. It is well deserving a conspicuous place in the library of the geologist. The fossil Testàcea are best illustrated in Mr. Sowerby's splendid and costly *Mineral Conchology*. Artis's *Antediluvian Phytology* deserves also to be consulted. That branch of the science which relates to fossil botany has been, perhaps, the least cultivated in this country. Both of Mr. Parkinson's works contain some valuable illustrations. One volume, indeed, of the *Organic Remains of a Former World* is exclusively devoted to the consideration of its vegetable relics. Martin's *Petrifactions of Derbyshire* may be consulted by B. to advantage. Messrs. Coneybeare and Phillips have contributed some valuable pages on this obscure subject in their *Outlines*. Count Sternberg's magnificent book is of the highest authority in this department. The *Histoire des Végétaux Fossiles* of Adolph. Brongniart, of which two numbers are published, promises to be the first work on the subject.

There is evidently a great general analogy between the fossil Flora of the English and the Continental coal-fields; but the comparison of these plants has scarcely been pursued with the attention necessary to the complete establishment of their identity, although very interesting collections are by no means rare in this country.

In the absence of a work especially devoted to the elucidation of this branch of natural history in England, our collectors have not unfrequently experienced difficulties in referring the fossil plants to their respective genera. Some mention has been made of an intention to supply this deficiency; and it is conceived that the Flora of our carbonaceous formations will furnish an abundant supply of new and interesting productions, and, by a comparison with the existing vegetation, will further illustrate the phenomena of heat and climate in the former world. As an instance of the necessity for such a work, might be mentioned the fact, of a collection of coal plants having been sent from this country into Germany by an eminent naturalist, for the sole purpose of being identified, named, and returned.

Figs. 25. 26., referred to in B.'s communication, are common, probably, to all coal districts, and appear not only in the argillaceous and bituminous shales, but in the superincumbent and inferior sandstones.

Fig. 24. is probably one of those arundinaceous plants with fluted and jointed stems, known by the name of Calamites, and probably the Calamìtes dùbius of Artis: they commonly appear in a flattened form, particularly in the shales, and are often distorted when the casts are filled with argillaceous iron ore.

Fig. 25. is somewhat obscure, but most probably Euphorbìtes vulgàris of Artis.

Fig. 26. is a Phitólithus (Aphýllum ásperum of Artis).

The appearance of the same species, and even of parts of the same plants, of this class, varies according to the circumstance of their presenting either epidermal, cortical, or ligneous impressions and surfaces; each representing the epidermis, the bark, and the wood; and hence these have been properly styled Protean fossils. — *R. C. T.*

Optical Phenomenon. — Sir, On Sunday, the 11th of November, 1827, about two o'clock, my attention was called to the singular circumstance of the passengers, walking on the north side of the High Street of this town, having two shadows, which were well defined, and nearly equally strong. They were projected partly on the pavement and partly on the front of the houses, and formed an angle of about twenty degrees, the heads being nearly 3 ft. asunder. Wishing to ascertain whether the double shadow was visible to the person by whom it was formed, I passed through that part of the street, and found that only one was apparent; but, upon retreating into the middle of the roadway, two shadows were seen as before. This optical phenomenon I am induced to attribute to refraction, occasioned by the state of the atmosphere. About an hour before, rain had fallen, the air was filled with watery particles, and the surface of the street was wet, which would naturally cause a strong exhalation under a brilliant sun, which was the case at the time, and formed a bank of mist, on which the images might be represented. I offer this hypothesis with great diffidence, and should be happy to learn the opinion of yourself, or of some of your scientific readers, on the subject, through the medium of your Magazine. During the eclipse of the sun, on the 29th of November, 1826, I noticed that two shadows were formed. This was the first time I observed it; but similar appearances have occurred twice during the last month. — *Muphatamet. Wycombe, December* 8. 1823.

Scriptural Geology. — Sir, Having lately read a book entitled *Scriptural Geology*, purporting to be written in answer to M. Cuvier's *Theory of the Earth* and Dr. Buckland's *Reliquiæ Diluvianæ*, I much wish to get other opinions than my own as to its merits, and would therefore consider it a great favour if you would inform me whether it has been reviewed in any of the periodicals. If not, some one of your correspondents may, perhaps, at your suggestion, be inclined to notice it in your Magazine.

I trouble you with this communication, also, from the fears I entertain of the mischief which the book is likely to produce among those who are ignorant of the theory of geology, and the evidence on which it is founded, if it be suffered to remain unanswered, and the narrow-minded sentiments therein, in my opinion, displayed, unpointed out. — *An Admirer of Buckland.*

The book is certainly, with some unlearned readers, a little calculated to create the impressions your correspondent speaks of; but I question if such people read the Magazine of Natural History, or any works of science or philosophy. It is wasting words and time to combat with ignorance and prejudice. — *R. C. T.*

A Fossil Shell from a Quarry in Radnorshire. — Sir, The fossil from which I copied the drawing I have sent (*fig.* 27.) was found in a quarry on the estate of D. Thomas, Esq., Wellfield House, Radnorshire, where I believe

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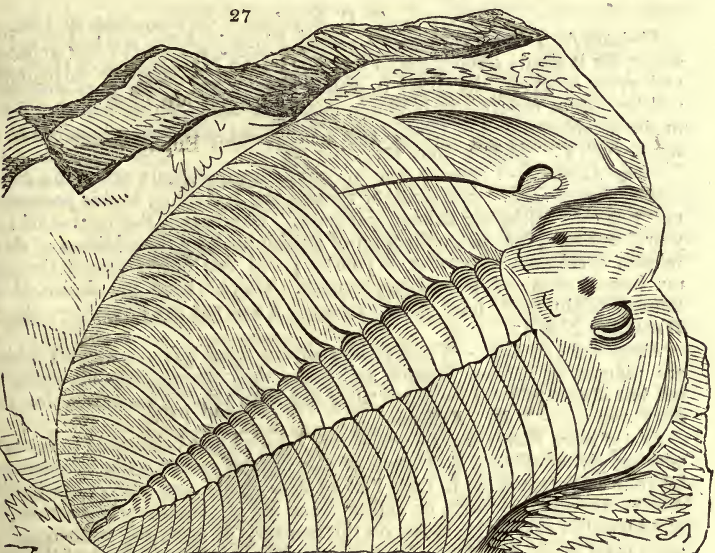

they abound. As I am but a novice in the study of natural history, and cannot inform you in what stone it is embedded, I have endeavoured to represent it as near the colour as possible. To me it is rare, never having seen a similar specimen before; and I should therefore feel obliged if you would inform me, in your next Number, what it is. The copy is the exact size of the impression. I am, Sir, &c. — *J. A. H. Kingston, Herefordshire, Sept.* 29.

The above figure represents a fine specimen of Trilobìtes (A'saphus) Debùch*ii A. Brongniart* (*Hist. Nat. des Crust. Foss.* 20. tab. 2. f. 2. *Parkinson,* iii. pl. 17. f. 13.) The stone it occurs in is either transition slate or limestone. — *J. D. C. S.*

Art. IX. *Retrospective Criticism.*

Errata.—In Vol. I. p. 242., line 25., should not the word *two* be *three?* — No; the three species enumerated are by some considered only two. *Cond.*

In p. 362. there is no reference made to figure 169. *b*; what is it? — It is Salpiglóssis pícta.

In p. 375. *for* 32 *read* 52.

In p. 375. *for* Prov. xxx. 25. *read* Prov. xxx. 28.

In p. 383., line 43, should not the word Wernerian be Huttonian? [*J. R.* says no.] — *G. M. Lynn Regis, Nov.* 17. 1828.

Errors in printing the List of the Birds of Passage in the Neighbourhood of Carlisle. (Vol. I. p. 290.): —

Line 2, *for* 1808 *read* 1828.
3, *for* Pypsètus *read* Cýpselus.
9, *for* gaisìla *read* grísola.
10, *for* vendùtie *read* Œnánthe.

— *T. C. Heysham. Carlisle, Sept.* 29. 1828.

Skeleton for Perennial Calendar.—Sir, *Pý*rus japónica is a bad plant to select, for it shows some blossom more or less in every month of the year; and every observer, delighted to vaunt the praises of his own situation, will be sure to report it in bloom in every one of the winter months. One in the neighbourhood of Bristol now (November 28th) has a hundred blossoms.— *P. T. Bristol, Nov.* 28.

P*ìcus Mìnor.*— I observe one of your correspondents notes the *P*ìcus mìnor, "*very rare;*" and another regards the individual in his possession as "the only authentic British specimen;" whereas, in the course of last year, I enriched my own collection of British birds by the addition of *three selected* specimens, all shot at Wynnstay; and two others passed through my hands, obtained from Llanymynech. Had it been my desire, their number might easily have been extended, I will not say how far. — *B. D. Wrexham, Nov.* 17. 1828.

Perennial Calendar. — Observations drawn from bulbous flowers which are planted at various seasons, and make their appearances accordingly, tell but little; nor are we much the wiser from those of annuals, for the same reason. — *J. R. Kilkenny.*

List of Rare Plants and Insects.— Sir, I hope I may be allowed to remark, without giving offence, that some of the articles occasionally enumerated by your correspondents in their lists of *rare* plants and insects are hardly worth recording as such, or rather have no pretensions whatever to be considered in that light, being, on the contrary, of every-day occurrence in most parts of the country. Thus e. g. in Mr. Babington's "list of the rare plants and insects found in the neighbourhood of Bath," (p. 392.) the following, among many other common plants, are mentioned, viz. Campánula rotundifòlia, *S*olànum Dulcamàra, *A*lísma *P*lantàgo, Epilòbium hirsùtum, *O*'xalis Acetosélla, *L*ýchnis dioíca, *S*piræ'a Ulmària, *N*ùphar lùtea, *A*nemòne nemoròsa, *O*'rchis mòrio, and maculàta, Tórtula muràlis, and *B*rỳum argénteum: and of insects, the following, viz. Dýticus marginàlis, Nèpa cinèrea, Panórpa commùnis, Póntia *n*àpi? *r*àpæ? and charicléa, Pygæ'ra Bucéphala, and A'rctia càja. Surely the above rank among our more common, not our rarer, plants and insects; and if subjects of no greater degree of rarity are worth selecting for particular notice, why not increase the lists an hundred-fold? Observe, I do not object to complete catalogues of the plants and insects to be found in any district; so far from it, indeed, such *local* Floras and Faunas would in my judgment be highly useful and interesting. I am merely urging that articles like the above are not even bordering upon rarities. The introduction of such a list into your Magazine, as that at p. 392., proposed as a dainty bill of fare to the naturalist, reminds me of an anecdote of Johnson, who, being invited to a dinner, afterwards grumbled at the fare, when some one (perhaps his friend Boswell) taking him up, said, "Now, Doctor, after all, was it not a very good dinner?" "Why yes, Sir," replied Johnson; "but it was not a dinner to *ask a man to.*" — *B. Coventry, Nov.* 9. 1828.

Jennings's Ornithology. — There are a few points to which I desire to reply in the notice of my *Ornithològia*, in the Magazine of Natural History. (Vol. I. p. 341.)

First, I wish to observe, that "the chief of my knowledge of the natural history of birds has been obtained by a long residence in Somersetshire, at Huntspile, of which place I am a native;" that the observations which I have made on the song thrush (*Túrdus* mùsicus), are particularly applicable to facts with which I have there become acquainted. I have stated also, that "we must not be in haste to condemn what we have not ourselves witnessed:" throughout my work I have, I hope, been constantly impressed with this sentiment. Now, although I am not prepared to deny that, sometimes, and in some places, the nest of the song thrush might be plastered within with *cow-dung*, yet I do strongly suspect that no *clay* enters, even as a cement, into the composition of the plaster, and I am led to this conclusion chiefly by the *lightness* of the nest. The blackbird's nest (*Túrdus Mérula*) is, I am well aware, plastered with *clay*, over which is laid dry grass or some such material; and it is, in consequence of having clay in its composition, much heavier than the thrush's nest. That I have never seen a nest of the thrush in Somersetshire, lined with cow-dung, I think, I may confidently assert. The lining of the thrush's nest, there at least, I have always found of a very light buff colour; and that it consists chiefly of *rotten wood* I am equally well assured, as pieces of this material, and those sometimes tolerably large, are frequently apparent in it.

As to the singing of the thrush while sitting on the eggs, I admit that it might, possibly, be a solitary fact, although I think otherwise; but it is one of which, however, I can entertain no doubt, as it was heard not only by myself, but by other branches of my family, the sweetness of the song having excited our particular attention; and what makes the fact still more memorable is, that the nest was a short distance from my father's house, and we afterwards took the young, one of which we raised and kept for some years in a cage, where it sang delightfully. In regard to the cuckoo's *not being a climbing bird*, which your Reviewer in a note decidedly affirms (an affirmation without any evidence, to which one scarcely knows how to reply), I can only say that, as few, if any, persons have seen that singular bird climbing trees for its food, we can only reason from the few facts which we possess concerning it. It is, we know, furnished with scansorial feet, and I have never seen it collect its food on the ground; indeed, except in its flight, have rarely seen it any where else but on *trees*, not often, if ever on bushes or near the ground. The cuckoo kept in a cage, as mentioned in *Ornithològia*, page 142, did occasionally pick up its food, but this it always did while it was on the perch; if an earthworm happened to fall from its beak, it never descended to the bottom of the cage to pick it up. I think it therefore quite fair to conclude, that it does climb about the trees which it frequents, and possibly obtains its food from them. Mr. Yarrell, than whom, perhaps, a more accurate and intelligent observer never existed, has dissected many cuckoos, and he says, that the stomach is similar in its structure to the woodpecker's, and therefore fitted for the digestion of animal food only; that the contents of the stomach invariably indicate the presence of such food, namely, the *larvæ* of some insects. Surely these facts warrant us in placing this bird among the scansors. The public papers informed us last summer of some one near Worthing having been fortunate enough to preserve a cuckoo through the winter; if this notice should meet the eye of the possessor of the bird, a communication of any facts concerning it through this Magazine will be greatly esteemed.*

The Reviewer mistakes in supposing that I might be led away by *any* authority whatever, independently of facts. I incline to think, that *scientific* naturalists, those I mean who think more of *terms* than of *facts*, will be rather disposed to find fault with me for an opposite line of conduct, for placing *terms* in the back, and *facts* in the foreground; of setting too little value upon *systems* of any kind: but while I frankly admit, that I think our system-builders have pushed, in many instances, their generalisation too far, it behoved me, nevertheless, as a faithful natural historian, to lay before the reader Ornithology in science, and in fact as it is, rather than what I could wish it to be. As to the introduction of the terms *cuculid*, *scansor*, and a few others, every one will, I hope, perceive that this has been done to show how the scientific terms may be anglicised and used; and sure I am, that, if they cannot be *anglicised*, the introduction of them, and the multiplication of *new* terms in a *learned language*, how much soever they may please the pedant, must very materially obstruct the progress of science. Learned terms may, and perhaps, always will please a few; but to the generality of persons their introduction will be disapproved, and their acquisition will be felt and deemed a wearisome pursuit. *Things* and *facts*, not *words*, are now, and, in the acquisition of all knowledge and science, ought ever to have been, the order of the day.

The Reviewer wonders, seeing I am acquainted with *Wilson's American Ornithology*, that I am disposed to echo the opinion that birds of song are scarce in the *Western World*. I am not aware that I have, in any part of my work, stated such an opinion. I have said, "It is, perhaps, true that the birds of *warm climates* do not equal those of the *temperate* ones in the sweetness and richness of their notes;" and I have also said, that "From the abundance of many of the *Picæ* tribe, such as *Parrots*, and some others of harsh note, it is probable that their sounds in the *tropical* woods often overpower and confound the more soft and sweet modulations of the warbler tribes; and hence the opinion has obtained credit, that the *tropical* regions are deficient in birds of song." But how this can be interpreted into the opinion given to me, I really cannot divine: when, moreover, I reflect that Wilson must have been most conversant with the birds of the *temperate* climates of the United States, how what I have said can be applied to the birds which he has described does, indeed, surprise me.

To write a book that should please *every body*, would not only be hopeless, but impossible; that various opinions should be entertained concern-

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* I have just been informed by a gentleman of my acquaintance, that some years since he knew of a cuckoo having been kept in a cage, after being hatched in this country, till the beginning of February in the next year; it was kept, of course, in a warm room, and fed chiefly on raw flesh; but, by omitting, one frosty night, to keep the room warm, it died.

The following is the notice alluded to above: —

A person named Moore, residing at Goring near Worthing, has in his possession a cuckoo which was taken from the nest last year, and has been kept in a healthy state in a cage since that period. During the present season, "it has poured forth its well-known call, and is a rare, and perhaps solitary instance of a cuckoo surviving in this country after the usual period at which these birds migrate, which is seldom later than August." — *Sussex Advertiser*. *Morning Herald*, June 12. 1828.

ing *Ornithològia* is what I ought naturally to expect. The value of such a work cannot immediately be known; but I feel assured, that the more it is examined, the more will its statements be found to correspond with actual facts in natural history. I shall nevertheless feel grateful to every one who will take the trouble to look into it; and should he find any error in it, none will be more ready to acknowledge and to correct it than myself.

Aware of the necessity of being careful in a selection of facts in natural history, I am persuaded that no one can accuse me justly of hastily rejecting or of heedlessly adopting whatever may be presented to my notice; but as the evidence of my own senses is to me the best of all evidence, I have, as it became me to do, laid no inconsiderable stress upon that in the composition of my work, and hence, sometimes, my observations are very different from those made by persons who have preceded me in the same path. — *James Jennings. London, Nov.* 13. 1828.

Birds forsaking their Nests. — Sir, in the Magazine of Natural History, (Vol. I. p. 496), I see another criticism about birds forsaking their nests. I will now try to set your correspondents right, by my own frequent observations. The redbreast, wren, blackbird, song-thrush, missel-thrush, and, I believe, almost every other bird, will forsake their first nest for the season, if frightened out of it once or twice, and will immediately begin to build another; but they will not forsake their nest while laying, handle the eggs as much as you please, or change them one for the other; or even if you take one out every day, the same hen will still return and lay in the empty nest. I have often tried all those sorts of experiments. As for a bird forsaking a nest through touching the eggs, I do not believe any such thing; it is the fright in driving them out that makes them forsake, and they never return to it at all: whenever they do return at all, they do not forsake. A redbreast will sit on any egg substituted for its own, even a blackbird or thrush's, and will breed up the young ones; a hedge-sparrow will do the same, and most probably any soft-billed bird. Later in the season, after a bird has made one or two nests, it will not forsake its nest when sitting, drive it out as often as you please; some will even suffer themselves to be taken out and put back again without leaving the nest. As for Mr. Anderson's nightingales, I saw the redbreast sitting on the eggs, and also saw the young nightingales after they had left the nest, and saw the redbreasts feeding them. They continued about the garden till the autumn. I have no doubt but nightingales might be made to frequent any place, where there was a good cover of underwood for them, and plenty of insects, if hatched under any of the tribe to which they are most nearly related. I think a redstart would prove the best parent. I am, Sir, &c. — *R. Sweet. Pomona Place, King's Road, near Fulham, Nov.* 28. 1828.

Birds singing while sitting on their eggs.—In the review of Mr. Jennings's *Ornithològia*, your reviewer seems disposed to doubt the fact of birds singing while sitting on their nest. I certainly have never heard a thrush sing when sitting, perhaps, for want of attending to it, but have very frequently heard and seen the male blackcap sing while sitting on the eggs, and have found its nest by it more than once; the male of this species sits nearly as much as the female. — *Id.*

Food of the Lapwing.—Your Magazine (Vol. I. p. 496.) contains an interesting communication from M. respecting the food of the *Lapwing*, in which, from an inspection of the gizzard, &c., when opened, he reasonably questioned the truth of the commonly received opinion of their feeding upon slugs. Should there still remain any doubt upon this point, perhaps the following observation, which I had an opportunity of making a year or two ago, may be the means of totally removing it. My garden being much infested with slugs, and having heard that lapwings were frequently employed for the purpose of destroying them, I obtained several young ones from the neighbouring meadows where they bred, and, considering them too young to provide for themselves, placed them in a chicken pen, in order to feed them myself. The only thing they appeared to relish was the common earthworm, which they took from the hand, and swallowed greedily: but upon offering them slugs, they would not touch them. This surprised me much, and in order to satisfy myself on this point, I gave them one unexpectedly after a worm, which, directly they touched, they invariably dropped, and shook their heads violently several times, as if even the taste of it had greatly offended them. This I repeated frequently, but never could prevail upon them to eat one either of the black or small white slug. It never occurred to me to try beetles, but even the worms (or it might be the confinement) did not seem to agree with them, as they gradually sickened and died; and having but one left, I turned it out into the garden, as the only chance of saving its life, where it immediately provided for itself, and lived till the winter, when, as is usually the case with all pets, it met with an untimely death, by falling a victim to a cat. — I am, Sir, yours, &c. *J. B. Jan.* 21. 1829.

Engravings of Birds.—I think it would be as well if your engraver, whenever he has occasion to delineate any of the British birds, were to copy Bewick's figures. If he had done so, he never could have made out such an unnatural figure of the water-rail (Vol. I. p. 289.), which is a perfect disgrace to the work. Several of the falcons, which are delineated in the same number, are also very indifferently executed; the hen harrier, in particular, is totally unlike any hawk that ever was seen in Great Britain or Ireland. — *J. G. C. Ballitore, County Kildare, Dec.* 4. 1828.

Our correspondent, we regret to be obliged to confess, is perfectly right. We were told the same thing in Paris, but hope to avoid such imperfections in future. — *Cond.*

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Pentacrinus europæus and the Star Fish.—Sir, Amongst the list of new publications in the Magazine of Natural History (Vol. I. p. 62.) is the title of a memoir, I lately published, on Pentacrinus (*pentē* five, from the pentangular stem of the genus, and *krinon* lily; lily-like) europæus (*fig.* 28.), and which requires to be emended, for from the words "*star fish*," which

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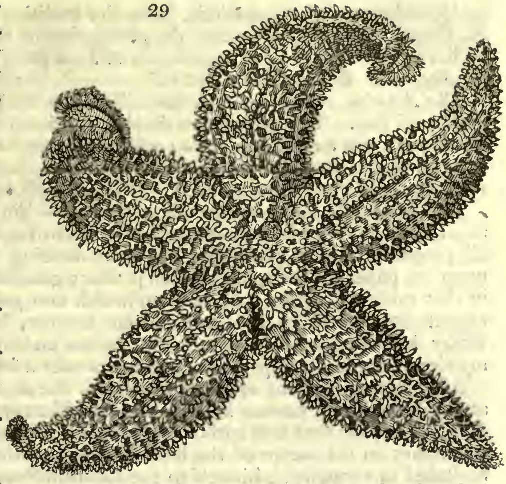

you have added to my title-page, it must appear to the generality of naturalists, as merely adding a new species of that familiar tribe to our stock of knowledge. By a reference to the memoir itself, you will perceive this error, which I do not complain of individually, but on account of the injury done to the advancement of science, by thus representing a discovery of the very first importance as the accession of a new species of *A*stèrias, star-fish. (*fig.* 29.)

The animal, which forms the subject of my memoir, although related to the *A*stèrias by analogy, belongs to what must now be considered a *very distinct tribe,* distinguished, amongst other characters, by being provided with *two openings to the alimentary canal,* that which is central being analogous to the mouth (*fig.* 28. *a.*), and the lateral one to the anus (*b*), of the *S*patángi and other *E*chìni (sea urchins): this tribe had been already designated by the term *C*rinöídea (lily-like), by Mr. Millar, in his valuable monograph on these curious and interesting animals, which, with the exception of Marsupites (*marsupium,* a purse) and Comátula (*coma,* a tuft), are all provided with a long stem, by means of which they have been permanently attached to the rocks at the bottom of the ocean. I say *have been,* because the greater part of those known to naturalists are fossils, mostly identified with the beds of limestone in which they are found.

Until the fortunate discovery of the species described in my memoir, naturalists were absolutely ignorant of the real nature of these animals, and, consequently, extremely divided as to the situation they should occupy in their systems, so much so as even to be in doubt whether they really belonged to the animal kingdom. I flatter myself, therefore, that I have set at rest all disputes upon the subject, and have, at the same time, pointed out so much of their natural history as to prevent the otherwise unavoidable multiplication of species and even of genera. My memoir goes further, and confirms the statement of Mr. Adams (*Lin. Trans.* vol. v. p. 10.) on *A*stèria pectinàta, as to Comátula possessing a similar construction of the alimentary canal; a fact which lay dormant and unnoticed by naturalists until it again fell under my observation, which I find by my journal to be dated June 2. 1823. It appears to have been again noticed by Mr. Gray, and published in the *Annals of Philosophy* for November 1826., p. 392., in an article on the digestive organs of the Comátula; that gentleman was also the first to throw out a conjecture that the *C*rinöídea were probably constructed upon the same plan. — *J. V. Thompson, F. L. S. Cork, Aug.* 10. 1828.

Derivation of the name John Dorée. — I take the liberty of suggesting another derivation than that given in your First Number, p. 89. for the John Dory or Dorée. You there state that it is called Dorée, as a corruption "from adorée, worshipped; or probably from *dorée,* gilt, in allusion to its splendid colour," &c. &c. It is universally styled "Il janitore," or the gate-keeper, by the fishermen of the Adriatic, from the tradition of its being the fish of St. Peter. It seems to me that the corruption of the above term is likely to have caused its present appellation of Jean Doré or John Dory. I am, Sir, &c. — *S. Bowdich, Jan.* 1829.

The A'nodon rugòsus of Swainson (Vol. I. p. 96.) is the Anodónta marginàta of Say. The latter described a specimen not full-grown, while Swainson's was an old one. You will remember Swainson expresses some surprise that it should have escaped Mr. Say's notice ! ! It is by no means uncommon in our rivers. — *J. L. Philadelphia, August* 16. 1828.

Mr. Murray's Paper on the Aërial Spider. — Sir, The strong disinclination I feel to enter into discussions of a controversial character would, in all probability, have prevented me from noticing Mr. Murray's remarks upon my paper on the spiders which produce gossamer, had they been made in that spirit of fairness and candour which one gentleman is entitled to expect from another; the unhandsome manner, however, in which this writer has conducted his attack (for he has endeavoured to misrepresent my views), renders it imperative upon me to offer a few observations in reply.

After stating that my opinions relative to the ascent of spiders into the atmosphere do not possess much force, Mr. Murray proceeds thus: — "It does not appear that this author had seen an account of my experimental researches on the ascent of the little aëronaut; otherwise, he might have hesitated in committing himself to the Linnean Society, in the view he has endeavoured to sustain, but which, however, I believe, is not new.

"M. Gay Lussac having found that soap-bubbles would not ascend in a room, though their ascent is rapid in the open air, unhesitatingly ascribes their ascent to warm currents emanating from the surface of the ground; rooted in this opinion, Mr. Blackwall concludes that the flight of the spider originates in a similar cause."

Now, in supposing that I had not seen his essay previously to submitting my own to the Linnean Society, Mr. Murray is completely mistaken. The truth is, I had read it with attention; but the perusal did not convince me that there existed the least necessity for retracting or even modifying a single opinion I have advanced. The term "*committing*," which Mr. Murray has employed in the passage cited above, to say the least of it, is uncourteous towards myself, and disrespectful towards the learned body alluded to, of which he is a member. With regard to the charge of want of originality, and of having borrowed my ideas from M. Gay Lussac, I may observe, that I was totally unacquainted with the experiments of that distinguished chemist upon soap-bubbles, and his mode of accounting for their ascent in the open air, prior to the publication of Mr. Murray's paper. The principle upon which I explain the ascent of the spiders which produce gossamer, I am well aware, has long been familiar to men of science. I make no pretensions whatever to the discovery of any new principle; but if the application of one already known, to the solution of an interesting and difficult problem in natural history, which, for more than a century, has exercised the ingenuity of speculative zoologists, entitle me to the claim of originality, I shall not withdraw it because Mr. Murray is pleased to insinuate that my view of the subject does not possess any novelty.

In direct opposition to the opinion I have advanced, Mr. Murray maintains that spiders have the power of propelling their lines, without any assistance from currents of air. "The aëronautic spider," he asserts, "can propel its threads both horizontally and vertically, and at all relative angles, in motionless air, and in an atmosphere agitated by winds; nay more, the aërial traveller can even dart its thread, to use a nautical phrase, in the 'wind's eye;'" and, further, he remarks that "these interesting aëronauts sometimes rise with the rapidity of an arrow in the zenith of the observer; at other times, they are seen to float parallel with the plane of the horizon; and, again, at variously inclined angles. Sometimes the ascent is extremely slow. An ascending current of warm air, it is conceivable, might effect a vertical movement; but how it could push the insect along in the horizontal plane, is an enigma of more difficult solution."

The observations and experiments which have induced me to entertain the belief that currents of air are absolutely indispensable to the propulsion of those lines by means of which spiders accomplish their aërial journeys, and effect their transit from one distant object to another, are amply detailed in the *Transactions of the Linnean Society*, vol. xv. part ii.; so that persons interested in the investigation have an opportunity of forming their own judgment respecting them. I am not aware that any objection has been, or can be, urged against my experiments. To myself they appear perfectly conclusive; and I feel thoroughly convinced, that whoever may repeat them with sufficient care, will be satisfied that the results obtained admit of no other explanation than that which I have given.

For two years past I have been extending my observations, and multiplying and diversifying my experiments. The inferences deduced from them entirely corroborate my former opinions, and I might here bring them forward in their support; but as it is my intention to lay them before the public in a more complete form than I am at present prepared to do, I shall resist the temptation; nevertheless, I may state that my recent researches clearly establish the fact that spiders, when placed upon an upright twig whose base is immersed in water, although they make every effort in their power to effect an escape, are utterly incapable of darting out a line, even through a space of two inches, without the agency of air in motion; but that, when gently blown upon with the breath, most species emit their lines without difficulty.

The various directions in which spiders move through the atmosphere (sometimes in planes parallel to that of the horizon, at others in lines more or less inclined to that plane), Mr. Murray conceives there would be some difficulty in accounting for upon the principle of an ascending current of warm air. This opinion there is no disputing; but I do not perceive what it has to do with my theory of the ascent of these animals more than with Mr. Murray's electrical hypothesis. Unquestionably, a horizontal direction may be given by a current of air moving in that plane; a vertical one, by the ascent of air highly rarefied; and directions, intermediate between these two, will generally be regulated by the laws of compound forces. When the horizontal and vertical currents are equal in force, the line of direction will describe an angle of 45° nearly with the plane of the horizon; but when their forces are unequal, the angle formed with that plane will be greater or less according as one current or the other predominates.

Mr. Murray, after professing not to understand my meaning in what I say about the electricity of the atmosphere, proceeds to express his conviction that the atmosphere "is seldom or never in a neutral state with respect to electricity," as though he would induce a belief that I have attempted to support the opposite doctrine, whereas I have not so much as hinted at it. I have merely affirmed that spiders do not select those periods for making an ascent when "the electricity of the atmosphere is remarkable for its intensity." The language in which this fact is conveyed will not, I trust, be found deficient in perspicuity by the generality of readers; notwithstanding, if I knew how to render myself more intelligible to Mr. Murray's comprehension, I should be happy to do so.

From the many hundreds of experiments which Mr. Murray informs us he has made, the following is selected as decisive of the question upon which we are at issue: — "I caught," says this author, "one of these aëronautic spiders a few days ago; the folding glass doors of the library-room leading into the garden were open, and the insect being conveniently arranged, it darted forth, from within the room, a lengthened thread diagonally upwards, and thus effected its ascent; a fact at complete antipodes with Mr. Blackwall's opinion." Here, observe, not the least notice is taken of the temperature of the external air and the air within the room, neither does it appear that any means were resorted to for the purpose of ascertaining whether there existed an outward as well as an inward current of air; yet this, let it be remembered, is a specimen of the mode of investigation pursued by one who is solicitous to impress us with the idea that he has not "ventured beyond the pale of sound and sober reasoning, in the true spirit of inductive science."

Were I disposed to retaliate, I might now proceed to a critical examination of Mr. Murray's electrical hypothesis, but recrimination I shall avoid. My object is to defend myself from an unprovoked and illiberal attack; being sensible that the fallacy of all other doctrines must be made manifest by the establishment of my own.

In concluding, I may remark that if Mr. Murray had favoured us with a few more of his numerous experiments, instead of indulging in fanciful conjectures, he would have acted in stricter accordance with the spirit of that philosophy by which he professes to have regulated his enquiries. I am, Sir, &c. — *John Blackwall. Crumpsall Hall, Dec.* 4. 1828.

The Mallow of Horace. — Sir, I would speak under correction, but it appears to me that the elegant authoress of *An Introductory View of the Linnæan System of Plants*, in the last Number of your interesting Magazine, has not been fortunate in the selection of an example, to show that we are unable to identify many plants known to the ancients. She says: "The Mallow, so important as an esculent vegetable, and mentioned as such by Horace, and in the Old Testament, is now unknown. Most probably we have the plant, but are unable positively to identify it." — We may not be able *positively* to identify it; nor, from the imperfect knowledge of botany possessed by the early writers, can we *positively* identify more than a very few of the plants they have described: but, to say the least of it, in the case before us there is as much reason to suppose that the Malva of Horace is the same as the Mallow with us, as there is that it should be any other plant.

Miss Kent calls it an *important esculent* vegetable. But I think, that, neither by Horace, who mentions it upon two occasions *, nor by any other of the ancients, is it described as an *important esculent* vegetable. It was certainly used in the preparation of their food, but then it was in the same manner as we still use certain herbs — as salutary with made dishes. Horace's description of the plant in this respect exactly corresponds with the qualities possessed by the genus *M*álva with us, at least with the natural order *M*alvàceæ, one genus of which, the *A*lthæ'a officinàlis, or Marsh Mallow, is still used in our Materia Medica as an emollient. I am happy to find that the late eminent botanist, Sir J. E. Smith, does not seem to have entertained any doubt of the identity of the ancient *M*álva with our own: speaking of Linnæus's natural order, Columníferæ, which is analogous to Jussieu's *M*alvàceæ, he says,† "This whole order contains no disagreeable or hurtful plant, *nor are they esculent.* None are fœtid, but some agreeably fragrant. Many of the flowers are beautiful. Their quality is generally mucilaginous, particularly *A*lthæ'a, *M*álva, and *A*lcèa. The ancients made considerable use of mallows in their food; but these plants are now out of use in that respect."

In the Old Testament mention is made of the Mallows only once ‡; and then not as if it were an *important esculent* vegetable.

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* Epodon. od. 2. ver. 51. — et Od. lib. 1. od. 31. ver. 16.

† Supplement to Encyclopædia Britannica, vol. ii. p. 406.

‡ Job, chap. xxx. ver. 4.

The patriarch Job is describing the former miserable lives of those who, in his affliction, had become his deriders; he says of them, "They cut up mallows by the bushes," &c. That is, such had been the wickedness of their lives, that they had been driven from society to dwell in caves of the earth, and were obliged to subsist upon roots and herbs, which were scarcely fitted to sustain life. That such is the meaning of the passage, appears from the marginal reference to Luke, chap. xv. v. 16., "And he would fain have filled his belly with the husks that the swine did eat." I am not, however, ignorant, that it has been doubted by many excellent commentators, whether the Hebrew word in the above passage from Job be rightly translated by our word Mallow: still I can see no reason why it should *not* be so. If there be, I should be very glad to be informed of it. The original word, according to Parkhurst, signifies "an herb of a brackish or saltish taste." Now I would enquire whether some of this extensive order of plants will not answer the above description. You, Sir, will know whether any of the Mallows grow in Arabia, and if so, whether they may not be impregnated with saline particles. It may here be observed, that the Hebrew word is very similar in sound to the Latin word Malva, which we translate Mallow.

What I have written is, I must confess, but little more than mere conjecture; and I shall be glad if any one of your numerous correspondents will strengthen my opinions. It is very important that the correctness of our venerable translation of the Bible should be called in question as seldom as possible, and certainly never unnecessarily so. The tendency to this evil has always been much too great: long ago, Bochart endeavoured to prove that the whale which swallowed up Jonah was a shark.* Dr. Adam Clarke has shown us that the serpent which tempted Eve was an ape; and many other fanciful opinions might be cited, which have been supported with more learning, I fear, than judgment.

To Miss Kent, I am sure, every reader of your Magazine, as well as myself, must feel obliged for the useful and interesting matter she has furnished us with. And if, on one point (which does not in the least call in question her knowledge of the subject before her), I have ventured to differ, she will, I hope, excuse me, when I assure her it is more with the wish of gaining information, than of expressing any confidence in my own opinion. I am, Sir, yours, &c. — *G. M. Lynn Regis, Sept.* 29. 1828.

Rhodìola millegràna (Vol. I. p. 437.) should be Radìola millegràna: it is a very different genus. — *R. S.*

The New Holland Anonaceous Plant (Vol. I. p. 438.) is proved by Mr. Brown, in the Appendix to Captain Tuckey's *Voyage*, not to belong to *Anonàceæ*, and is therefore left out of Decandolle's *Pródromus:* it is a species of Cargill*ia*. — *R. S.*

Geology of Palestine. — Sir, In your valuable Magazine of Natural History (Vol. I. p. 390.) I observe a notice of a paper on the geology of Palestine, in which it is stated that there are no volcanic rocks on the borders of the Dead Sea. Though these may not have been observed, yet there are traces of a volcanic neighbourhood in the sulphur found near the southern extremity of it, and in the hot springs and sulphur in the valley of Calirrhoe, near the north end; for a notice of which see the interesting *Travels* of Captains Irby and Mangles (printed for private distribution in 1823), p. 453. and 467., and at p. 373. and 377. Distinct volcanoes, some miles south of the Dead Sea, are described and laid down in the map accompanying that work, which it is to be regretted that the authors do not publish. See also a curious dissertation on the Dead Sea in Dr. Daubeny's important work on volcanoes, p. 279. — *W. C. T. Jan.* 1829.

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* So that the Rev. Dr. Scot's paper read before the Wernerian Society contained no *new thing*. — See Mag. Nat. Hist., Vol. I. p. 291.

The Granite, in Yorkshire, mentioned by your correspondent, L. E. O. (Vol. I. p. 396.), is certainly only in the form of large boulders, which are very numerous in the county of Durham and north of Yorkshire, having been carried by a strong current from the north-west. In the street at Darlington is a very large one, which the large flesh-coloured crystals of felspar it contains show to have travelled from the neighbourhood of Shap, in Westmoreland, where the same variety of granite appears in the mass. Many specimens of the same may be traced to the mouth of the Tees. For a valuable dissertation on the subject of gravel and boulders, I would refer your correspondent to Professor Buckland's *Reliquiæ Diluvianæ.* — *W. C. T. Jan.* 1829.

Art. X. *Obituary.*

Charles Peter Thunberg, M.D., Knight, F.R.S. L.S. &c., the successor of the younger Linnæus as Professor of Botany at Upsal, died on the 8th of August last, in the 85th year of his age; after having filled the botanical chair, during half a century, with indefatigable zeal. He had travelled over a great part of the world, for the purpose of extending his knowledge, and exploring nature.

Died, Nov. 24., aged 74 years, *Mr. John Ashby,* one of the Society of Friends, and a grocer and draper in Bungay for many years preceding his death. He commenced his career as a naturalist in entomology; but, however amusing the *collecting* of insects might be, the *destroying* them was too revolting for him to practise; and he then turned his attention to botany, a study which he pursued with ardour nearly to the time of his decease. In his earlier life he was acquainted with Mr. Curtis (author of the *Flora Londinénsis*), Mr. Woodward, and other distinguished naturalists. He discovered many rare plants in this neighbourhood, to which his botanical rambles were principally confined; and he is mentioned in Smith's *Flora Britannica* and *English Flora* as the finder of the Ornithógalum lùteum at Shipmeadow, about three miles from this town. Mr. Ashby formed a herbarium of British plants, in which may be found not a few of the uncommon plants of this kingdom. He did not confine himself entirely to botanical pursuits, as he also formed a very excellent collection of coins; and his specimens of fossils, &c. are also rather numerous. — *Daniel Stock. Bungay, Feb.* 4. 1829.

Died, Jan. 6., in his 79th year, *Robert Stone,* Esq. F.L.S., formerly an inhabitant of this town, but for the last twenty years he resided at Bedingham Hall, in Norfolk, the family estate. Mr. Stone was well known as a botanist. An ample testimony of his labours in the science of botany may be found by a reference to the early editions of Withering's *Botanical Arrangement,* in which Mr. Stone assisted, and in which his name so frequently occurs, that to particularise any instance would be quite useless. His herbarium of British plants is nearly complete. Having spoken of Mr. Stone as a naturalist, as a man what am I to say of him who was universally esteemed and respected by his friends and acquaintance? — *Id.*

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NATURAL HISTORY.

MAY, 1829.

Art. I. *On certain Effects produced by Fresh Water on some Marine Animals and Plants.* Read to the Belfast Natural History Society, by the President, James L. Drummond, M.D., December 30. 1828.

During the past summer, a part of which I spent at the sea-side, I was anxious to confirm, beyond a possibility of doubt, an observation which I had made several years ago, viz. that when the Squamous Sea Mouse (Aphrodìt*a* squamàta) is put into fresh water it dies almost instantaneously. I could not, however, obtain any specimens, but I am certain, at the same time, that it is a fact; for, on a former occasion, I brought from the shore seven or eight specimens of that animal alive in a phial of sea water, and I found in them all, that, although perfectly brisk and active in the sea water, the moment they were dropped into a basin of *fresh* water (and I made the trial on them one after another), they immediately sank to the bottom, and never again exhibited the slightest symptom of life or motion.

The observations I have made lately on another species of animal, of much larger dimensions, are not a little singular, and are, I apprehend, altogether new. I obtained a number of living specimens of the worm, which the fishermen call the White-worm, or Lurg, or Lurgan. It is the Nèreis cærùlea of Linnæus. These specimens were quite fresh, and were brought to me in a bowl of sea water. When handled, they moved with great vivacity, convoluting or twisting their bodies from side to side, like the larva of a gnat, or else swimming with great velocity round the basin. They were about as thick as one's little finger, and fully a foot in length.

On putting one of them into a basin containing some *fresh* water it sank to the bottom, and lay for a moment motionless, as if stunned. It then dashed here and there through the water, violently lashing its anterior and posterior ends from side to side: but this extreme agitation continued only a few seconds; when the animal subsided to the bottom, unable to exhibit any farther signs of motion than some partial convulsive twitches in different parts of its body, or a quivering here and there in its segments or articulations. The skin of the body was contracted in various places, so as to present a wrinkled or withered appearance. In six minutes from the immersion the animal seemed perfectly dead; the wrinkled appearance of the skin was gone, and not the slightest mark of irritability appeared in any part. The other specimens, eight in all, exhibited the same phenomena with little variance. None of them showed any appearance of vitality after ten minutes' immersion. Three of them protruded very slowly their remarkable ventricose proboscis (if the latter term can be at all appropriate) during their last expiring moments, and so it remained after death.

I allowed the above specimens to remain in water all night; and on the following morning, on going to put them in spirits in order to preserve them, I was surprised to find them so rotten, that they fell in pieces by their own weight, and were quite useless as specimens. They had not, however, acquired any offensive or putrid smell.

Some days afterwards I obtained a fresh supply of living specimens, some of which were entire; but a number of them were in fragments, having been cut through by the spade in digging. The latter were quite alive, and seemed to have suffered no more in point of vitality by having been cut, than the common earthworm does under similar circumstances. I had proof, too, that the being cut through does not prove fatal; for, in one of the entire specimens, about 2 in. of the tail end was a new production. The animal had, at some prior period been severed by the bait-digger, and a new portion had been restored. This portion, as is generally the case with reproductions, was smaller in diameter than the rest of the animal. It was also of a paler hue, and the line of demarcation between the old and the new parts was very distinctly marked.

The separate pieces of the cut worms, even those which wanted both head and tail, were affected by the fresh water in the same way as the entire specimens: they were first thrown into violent convulsions, then became affected with transient spasms, and, in a few minutes, all appearance of vitality was extinguished.

The first idea that struck me, as to the possible cause of these phenomena, was, that perhaps the water, from wanting the density of sea water, was unfit for respiration, and that therefore the animals had died of suffocation. Pennant states that the torpedo dies in fresh water almost as soon as in the open air; but I had already ascertained that these worms will remain in air for many hours, without seeming to suffer any inconvenience.

I had a number of specimens lying on a plate motionless; for, unless disturbed, they are little inclined to move. I dipped my hand in fresh water, and with a jerk, sprinkled some drops of it over the plate, and the specimens on it. In about two seconds the worms were all in violent agitation, rolling round on the longitudinal axis of their bodies, and writhing together in apparent agonies. After a few minutes the agitation ceased, and they again lay motionless. I now tried the effect of touching an individual with a small drop of fresh water. The part to which the latter was applied, almost immediately contracted in the manner that a leech contracts at the place where a little salt is applied to it, and then, the whole animal became agitated and dashed violently about the plate, frequently, at the same time, protruding and contracting its proboscis. Similar effects followed every trial I made, and it mattered not what part of the animal was touched: the smallest drop of water from the point of a probe produced the partial contraction at the part, and then the general convulsive writhing and agitation of the whole body. Even fragments of the worm were similarly affected. It appeared to me, however, that the mouth extremity was more sensible to the touch of the poison than any other part, as the convulsive efforts which followed seemed more violent, and longer continued than when the water was applied elsewhere.

I made similar trials on many of these animals, and invariably found the same results. The most striking way of exemplifying the virulent effects of fresh water is, when the worm is at rest to apply consecutively from the point of a probe ten or a dozen small drops of *sea water* to any part of it, this causes no alteration; the animal continues motionless. If we then change the drop to be applied from salt to fresh, the very first application of the latter immediately produces the phenomena above described.

In whatever way it is that fresh water proves so poisonous and fatal to this species, one thing is obvious, that the animal can never propagate except under the influence of sea water. It can never colonise rivers or lakes, and the subject, if farther pursued by experiments on other species, may, perhaps, throw some light on the distribution of animals. The Lurg-worms cannot even safely inhabit those parts of the shore which are long uncovered by the sea; a heavy shower of rain during ebb tide might destroy them; and it is only a casual circumstance that one of them is found in the usual place of digging for bait. They must be sought for at the verge of low-water mark, and they are only to be found in plenty, and of full growth, during the neap tides.

The common Lug (*L*umbrìcus marìnus) is, on the contrary, generally dug out of the sand at a considerable distance from low-tide mark, and where it is left dry for many hours. Showers of rain, therefore, we should suppose, can exercise no deleterious influence on it; and accordingly I found that some lug, which I kept immersed for several hours in fresh water, did not seem to be at all incommoded by it.

That fresh water has a considerable influence on the vitality of some marine plants is obvious from the following remarks. When we examine fresh specimens of *F*ùcus punctàtus, *C*onférva setàcea, or *U*'lva dichótoma, we find that they possess a very considerable degree of rigidity, or firmness. Now, I have observed that these plants, after being immersed in fresh water for a short time, lose their firmness, and become perfectly flaccid. They also change their colour in a material degree especially the first two. These, when gathered fresh, are of a garnet-red colour; but, when immersed in fresh water, the tint soon turns to orange.

These, however, are not the only changes which take place. I had long ago remarked that when recent specimens of *F*ùcus punctàtus or *C*onférva setàcea are immersed in fresh water for a few seconds, and then taken from it, they give out a crackling or crepitating noise, like that made by fine salt when thrown into a fire. I had observed, too, that during the continuance of this crepitation, *C*onférva setàcea (especially if in fruit) projected minute globules of water, or some fluid, to a distance of several inches. I last summer observed also a weak crackling noise in *U*'lva dichótoma under similar circumstances.

Now, in all these, the crepitation, when it ceases, which is in a few seconds, may be renewed by again dipping it in the fresh water, and then removing it; but at each successive time the crackling is weaker, and it ceases altogether after a third or fourth immersion. If the specimen, also, have been in the water longer than a few minutes, the crackling is very weak, or not perceived at all. The cause of it in *C*onférva setàcea I have clearly ascertained, and it may be easily seen, with the help of a common pocket magnifier, or even by the naked eye.

I poured some fresh water on a common white plate to the depth of about one twelfth part of an inch, and in this I put a portion of the plant quite fresh from the shore. It remained for several minutes quiescent, and then some of the divisions of the frond exhibited sudden startings like spasms. I had repeatedly before been amused by watching this appearance on a larger scale though with the naked eye, by putting a bunch of the plant in a basin of water. When so placed it soon assumes the appearance, to a considerable degree, of being animated; instantaneous startings are observed in the chief branches, along with lateral motions of the smaller branches, which are seen to move towards, or to diverge from, the former.

But the cause of these startings, and of the consequent motions of the branchlets, was more obvious, by observing what passed in a *portion* of the plant laid in a thin stratum of water on a plate, as above alluded to. The colour of the specimen was, when so placed, homogeneous throughout; but whenever the startings took place, a change began to take place also in the colour. The joints of the plant are filled with the coloured fluid; and while it is in the salt water the septa, or partitions between the joints, remain entire; but when the *influence* of the *fresh water* is felt, the septa burst, and the contents of one joint are exploded into the next, the colouring matter, at the same time, losing its uniform tint, and curdling into grains, or granular points of a dark hue, as if concentrating itself in order to part from the fluid through which it had been before uniformly diffused. From the violence with which the contained fluids are urged through the partitions of the joints, breaches form in the *sides*, also, of some of them, and then at every new spasm a quantity of the colouring matter is hurried through these lateral breaches into the circumambient water. The latter explosions present under a common magnifier an extremely interesting appearance. They are instantaneous; and when the projected fluid has attained its extreme distance, the colouring matter suddenly settles in a cloud of dark grains, so as to give not an unlively idea of a bomb-shell in the act of bursting. Repeated explosions take place from the same breach, but at very uncertain intervals. Sometimes several occur in rapid succession, and again half a minute or more intervenes between them. It appeared to me that each explosion from the lateral breaches was caused by a new rupture between some two joints.

These observations I repeated many times, and I here state what I remarked as exactly as is in my power. They are only, however, what I observed with a common magnifier, or with the naked eye; but, perhaps, a more patient research, assisted by a good microscope, may open up still more satisfactory views of the subject.

With respect to the other two species, I can speak with less precision; I shall state, however, what I believe to have ascertained, though I shall not venture to speak undoubtingly. The *U*lva dichótoma has a reticulated texture, which, as Lightfoot observes, gives it the appearance, when magnified, of belonging to the genus *Flústra* of corallines. Now it appeared to me, when examining portions of this plant under the influence of fresh water, and in the field of an Ellis's microscope, that each of the cells which cause the reticulated appearance was covered by a membranous lid, which, from the presence of the fresh water, burst up with violence. On examining *F*ùcus punctàtus in the same way, soon after its first contact with fresh water, I could perceive a very evident jerking motion occurring here and there over its surface, with an appearance as if little facets or scales had been suddenly let loose, like the lid of a hunting watch when the spring is pressed. I must observe, however, that what I have stated of these last two plants is to be considered as only an introductory view of the subject, and that farther investigation will be necessary to give absolute certainty. At the same time the analogy between the phenomena presented by the three species mentioned is so strong, that there can be little doubt of their being regulated by the same law. I believe the *U*lva dichótoma gets paler by immersion in fresh water; but of this I am not prepared to speak positively. Respecting the other two species there can be no hesitation, they both give out their colouring matter *copiously* to the fresh water in which they are placed, and that in a very short time. If the *C*onférva setàcea be spread on paper in sea water, it retains its original hue; there is no bursting up of its septa, nor breaches in its sides, and it does not tinge the paper on which it is spread. I have preserved a number of specimens in this way. *F*ùcus punctàtus, when preserved in the same manner, retains its original deep hue, and does not tinge the paper. The flaccidity which takes place in them all is scarcely to be accounted for, except on the principle that their texture is in some respect broken up, and we may presume also that, as in *C*onférva setàcea, both the other species explode the contents of their cells or cavities.

The circumstance of these plants giving out their colouring matter to the paper on which they are spread has been often remarked, but has never before, I apprehend, been suspected of being connected with their vitality. That it is so, however, the observations made above clearly demonstrate. For it is not because the plant is dead that the colouring matter is given out, but, on the contrary, because it is living; and it appears to me that the phenomena exhibited by the *Conférva setàcea*, when immersed in fresh water, are very analogous to those of the Lurg-worm. It is a living body labouring under the effects of poison; and the bursting up of its septa, the breaches formed in its sides, the curdling, and spasmodic explosion of its colouring matter, are, like the convulsions of the worm, the symptoms which characterise its expiring struggles in the arms of a deadly foe.

It is obvious that what I have said respecting the dissemination of the Lurg-worm will equally apply to these plants. The ocean is their prescribed element, and they can never appear under any form or variety in lakes, rivers, or any collection of fresh water whatever.

How extensive the field may be which these remarks are calculated to lead to I cannot conjecture: but I apprehend there can be little doubt that many interesting facts of an analogous kind remain in store for future observation; and I hope that I may again have an opportunity of laying before the Society farther information on this subject.

Art. II. *Indications of Spring.* By Robert Marsham, Esq., and Lord Suffield. Communicated by R. C. Taylor, Esq. F.G.S.

The following Table of the "indications of spring" contains the result of more than sixty years' observation, by Robert Marsham, Esq., of Stratton Strawless, in the county of Norfolk; a gentleman of whom it need scarcely be premised that he was an attentive and accurate observer of the phenomena of nature. In this work he probably derived some assistance, latterly, from his neighbour Lord Suffield. Stratton Hall, where Mr. Marsham recorded his remarks, is nearly in the centre of Norfolk, and its neighbourhood was greatly embellished by the judicious skill which he exhibited in the rural art of planting. The Table was printed for private distribution many years ago, but I am not aware that it was otherwise published. At all events the register is so curious and so appropriate to the design of your Magazine, that it well deserves an early place in its pages. I have introduced an essential alteration in the arrangement, for the sake of a better classification of the indications. To the meteorologist, also, this document cannot fail to be acceptable, since it marks the range of variation in the climate of the eastern part of the kingdom. The earliest date recorded is the year 1735, and the latest observation appears in 1800. The *least* variation is in the time of the appearance of the migratory birds, and the hatching of young rooks. The *greatest* range is in the blossoming of the turnip, the appearance of the yellow butterfly, and the singing of the thrush.

INDICATIONS OF SPRING.

	Earliest.	Latest.	Greatest Difference observed in	Medium Time.
Thrush sings	1735, Dec. 4.	1766, Feb. 13.	56 years — 81 days.	1747, Jan. 14.
Nightingale sings	1752, April 7.	1792, May 19.	59 years — 42 days.	1784, April 28.
Churn Owl sings	1781, April 29.	1792, June 26.	46 years — 58 days.	1760, May 29.
Cuckoo sings	1752, April 9.	1767, May 7.	51 years — 29 days.	1789, April 23.
Ring Doves coo	1751, Dec. 27.	1761, Mar. 20.	47 years — 83 days.	1750, Jan. 22.
Rooks build	1800, Feb. 2.	1757, Mar. 14.	53 years — 40 days.	1744, Feb. 21.
Young Rooks	1747, Mar. 26.	1764, April 24.	52 years — 29 days.	1789, April 14.
Swallows appear	1736, Mar. 30.	1797, April 26.	62 years — 27 days.	1777, April 13.
Frogs and Toads croak	1750, Feb. 20.	1771, May 4.	57 years — 73 days.	1763, Mar. 30.
Yellow Butterfly appears	1790, Jan. 14.	1783, April 17.	36 years — 93 days.	1773, Mar. 3.
Snowdrop appears	1778, Dec. 24.	1795, Feb. 10.	65 years — 48 days.	1750, Jan. 15.
Turnip flowers	1796, Jan. 10.	1790, June 18.	55 years — 129 days.	1742, April 15.
Wood Anemone blows	1790, Mar. 16.	1784, April 22.	30 years — 37 days.	1778, April 5.
Hawthorn leaf	1759, Feb. 11.	1784, April 22.	59 years — 70 days.	1758, Mar. 19.
Hawthorn flowers	1750, April 13.	1799, June 2.	59 years — 50 days.	1744, May 12.
Sycamore leaf	1750, Feb. 22.	1771, May 4.	57 years — 71 days.	1744, Mar. 30.
Birch leaf	1750, Feb. 21.	1771, May 4.	52 years — 72 days.	1745, Mar. 29.
Elm leaf	1779, Mar. 4.	1784, May 6.	47 years — 63 days.	1773, April 6.
Mountain Ash leaf	1779, Mar. 5.	1771, May 2.	43 years — 57 days.	1773, April 6.
Oak leaf	1750, Mar. 31.	1799, May 20.	54 years — 50 days.	1757, April 26.
Beech leaf	1779, April 5.	1771, May 10.	53 years — 35 days.	1785, April 23.
Horsechestnut leaf	1763, Mar. 10.	1771, May 2.	47 years — 52 days.	1784, April 23.
Spanish Chestnut leaf	1794, Mar. 28.	1770, May 12.	36 years — 45 days.	1776, April 21.
Hornbeam leaf	1794, Mar. 7.	1771, May 7.	40 years — 61 days.	1789, April 9.
Ash leaf	1779, April 2.	1772, May 26.	36 years — 54 days.	1787, April 29.
Lime leaf	1794, Mar. 19.	1756, May 7.	43 years — 49 days.	1796, April 13.
Maple leaf	1794, Mar. 15.	1771, May 7.	34 years — 53 days.	1788, April 12.

Art. III. *The Cuvierian, or Natural, System of Zoology.*

Essay 3. *The Characters of Vertebrated Animals, and their Division into Four Classes; Mammiferous Animals, Birds, Reptiles, and Fishes. Distinctive Characters of each Class.* By B.

Having given in the preceding essays Baron Cuvier's general view of animal physiology, and stated the principles on which he establishes four grand divisions of the animal kingdom, I shall, in the present essay, comprise his more ample description of the characters of the first division, Vertebrated Animals; also the distinctive characters of each of the four classes into which they are divided. It will be shown that this division into four classes is justly founded upon the internal organisation, and not upon the external forms, of animals; and the reader will not fail to perceive the importance, indeed the absolute necessity, of an acquaintance with the leading facts in animal physiology, if he would obtain a correct knowledge of zoology as a science.

Vertebrated animals form the most important division of the animal kingdom. Their bodies and limbs being supported by a framework (*charpente*) or skeleton, composed of pieces which are connected or movable; their motions have more strength and precision than those of animals in the other divisions, and the solidity of their supports permits them to attain a great size: the largest animals are found in this division. The nervous system of vertebrated animals being more concentrated, and the central mass or brain more voluminous, than in animals in the other three divisions, their sensations (*sentimens*) have more energy and duration, hence they possess superior intelligence and greater perfectability.

The body of vertebrated animals is composed of a head, a trunk, and limbs.

The head is formed of the skull which encloses the brain, and of the face which is composed of two jaws, and the receptacles of the organs of sense. The trunk is supported by the backbone and the ribs.

The backbone, or spine, is composed of numerous bones called vertebræ, moving upon each other; the first supports the head. All the vertebræ are perforated, and together they form a bony channel or tube, in which is lodged that trunk of the nervous system called the spinal marrow.

The backbone is most frequently prolonged beyond the lower limbs, and forms a tail.

The ribs are semicircles, which protect the sides of the cavity of the body; most frequently they are articulated at one end to the vertebræ, and at the other to the breastbone or sternum; sometimes they are scarcely visible.

Vertebrated animals have never more than two pair of limbs; sometimes the hind limbs, and sometimes the fore limbs, and sometimes both pairs are wanting, and take other forms relating to the motions they have to perform. The fore limbs may be converted into hands, or feet, or legs, or fins; the hind limbs into feet or fins.

The blood of vertebrated animals is always red, and has a composition proper to maintain the energy of feeling, and the muscular vigour which exist in different degrees in the animals belonging to this division, and which correspond with the quantity of respiration.

The organs of the external senses are always two eyes, two ears, two nostrils, the teguments or covering of the tongue, and those of the whole body. There are always two jaws: the principal motion is in the lower, which rises and falls; the upper is sometimes entirely fixed. Both jaws are most frequently armed with teeth, excrescences of a peculiar nature, very similar to bone in their chemical composition, but which increase by layers (*couches*) and by transudation. But one entire class, namely, birds, have their jaws covered with horny beaks, and this is the case with the genus tortoise in the class of reptiles. The above characters, which are chiefly external, would enable any person unacquainted with physiology to distinguish vertebrated animals from those in the other divisions. Some orders of articulated animals approach in form the nearest to vertebrated animals, but they have no internal skeleton.

The characters derived from the internal structure and organisation are strictly physiological, and the learner must refer to what has been stated in the first and second essays respecting them.

In the division of vertebrated animals, the nerves unite with the spinal cord through passages in the vertebræ, or in the skull: they appear all to unite into a double bundle (*faisceau*) which forms this spinal cord, and which, after having crossed its filaments, spreads and swells out to form the divers tubercles of which the brain is composed, and terminates in two medullary masses called hemispheres, the relative volume of which corresponds with the extent of intelligence.

The intestinal canal extends from the mouth to the anus, undergoing, in its course, various expansions and contractions: it has different appendages, and receives different dissolving fluids. That which pours into the mouth is called the saliva; other fluids which enter the intestines have received different names; the two principal are the secretion from the gland called the pancreas, and the bile which is secreted by another very considerable gland called the liver.

While the digested aliments traverse the alimentary canal, the part proper for nutrition, called the chyle, is absorbed by particular vessels called lacteals, and is carried into the veins; the residue of the nutrition is also carried into the veins by vessels analogous to the lacteals, forming with them one system, called the system of the lymphatic vessels.

The veins bring back to the heart the blood which has served to nourish the different parts, and which has been renewed by the chyle and the lymph; but this blood is obliged to pass wholly, or in part, into the organ of respiration, to regain the nature of arterial blood by the absorption of oxygen, and by exhalation, before it is carried back into the arteries. In the first three classes of animals, the respiratory organs are lungs, an assemblage of cells into which the atmospheric air penetrates. In fishes the respiration is performed by gills, a series of laminæ between which the water passes.

In all vertebrated animals the blood which supplies the liver with the matter that forms the bile, is veinous blood which has circulated in the intestines, and which, after reuniting in one trunk, called the *vena porta*, is spread again through the liver. All vertebrated animals have a particular secretion from two large glands attached to the sides of the backbone called the kidneys; this liquor, denominated urine, generally remains sometime in a reservoir called the bladder.

The sexes are always distinctly separated; but the mode of impregnation varies very much. The eggs of some reptiles, and of almost all fishes, are impregnated by the male after they are spawned.

We may perceive in the above characters, how far all vertebrated animals resemble each other: nevertheless they admit of four grand subdivisions or classes, characterised by the kind or strength of their motions, which also depend on the quantity of their respiration; since it is from the respiration that the muscular fibres derive their energy, and their irritability.

The quantity of respiration depends on two conditions: the first is the relative proportion of blood which is presented to the respiratory organs in a given time; the second, the relative proportion of oxygen which enters into the composition of the fluid in which the animal lives, whether water or air.

The quantity of blood which is acted on by respiration, depends on the structure and disposition of the organs of respiration and circulation. The organs of circulation may be double, so that all the blood which is returned by the veins is obliged to circulate through the respiratory organs, before it is carried again to different parts by the arteries; or these organs may be simple, so that only a portion of the blood returned from the body to the heart is obliged to pass through the respiratory organs, and the rest circulates again through the body, without having been subjected to the effects of respiration. The latter is the case with reptiles; their quantity of respiration, and all the qualities that depend on it, vary according to the proportion of blood which enters the lungs at each pulsation. From these characters Cuvier forms the four subdivisions or classes of vertebrated animals, which are, —

Class 1. *Mammiferous Animals*, which bring forth their young alive and suckle them, being provided with teats (Lat. *mammæ*), whence the name is derived.

Class 2. *Birds*.

Class 3. *Reptiles*.

Class 4. *Fish*.

The general plan of the skeleton is the same in each class, though it admits of considerable modifications, as may be per-

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ceived by the annexed figures. *Fig.* 30. *a* represents the human skeleton, man being placed at the head of the mammiferous class; *b*, the skeleton of a bird; *c*, that of a frog; and *d*, the skeleton of a fish. Man is preeminently gifted by his Creator with superior intellectual powers, he is distinguished also by his erect posture, which required a structure varying considerably from that of mammiferous quadrupeds: had we chosen the skeleton of any of the lower orders of this class, the form would have approached more closely to those of the other classes, but taking the extremes of the grand division of vertebrated animals, we still perceive the leading characters of the osteology to be the same. Namely, a skull containing the brain, supported by the vertebral column which contains the spinal cord, and to which the ribs are attached. With respect to the limbs, they admit of a great variety of form suited to the wants of the animal, and in the lowest order of the mammiferous class, which comprises dolphins and whales, we find only one pair of limbs, and in the latter, they are so concealed in the flesh, as not to be visible. The upper limbs of birds do not terminate in toes or claws. Some reptiles have only one pair of limbs, others, as serpents, have none.

The distinctive characters of the four classes above enumerated founded not on the form of the skeleton, but on the circulation and respiration, are thus given by Cuvier.

Mammiferous Animals have a double circulation, and the aërial respiration is simple, viz. it is effected by the lungs only.

Birds exceed mammiferous quadrupeds in the quantity of their respiration, for they have not only a double circulation, and an aërial respiration, but they respire also through other cavities besides the lungs, the air penetrating through the whole body, and bathing the branches of the aorta or great artery of the body, as well as those of the pulmonary artery.

Fishes have a double circulation, but their respiratory organs (the gills) are only formed to respire by the intervention of water, and their blood only receives the portion of oxygen dissolved or mixed in the water, so that the quantity of respiration is, perhaps, less than that of the next class, Reptiles.

Reptiles. The organs of circulation are simple, and only a portion of the blood brought back by the veins passes through the organs of respiration. Their quantity of respiration, and all the other qualities that depend on it, vary according to the proportion of blood which enters the lungs at each pulsation.

In mammiferous quadrupeds the quantity of respiration is less than that of birds; but it is greater than that of reptiles, on account of the structure of the respiratory organs; and exceeds that of fishes, on account of the different elements in which they live. Hence result the four kinds of movements, which the four classes of vertebrated animals are particularly destined to exert.

Mammiferous animals, in which the quantity of respiration is moderate, are generally formed to develope their strength in walking or running. Birds, which have a larger quantity of respiration, have the activity and strength of muscles necessary for flying. Reptiles, in which respiration is more feeble, are condemned to crawl; and many of them pass a part of their lives in a kind of torpor. Fishes require to be supported in an element nearly as heavy as themselves, in order to exert their proper motions in swimming.

All the circumstances of organisation proper to each of the four classes, and particularly those which regard their movements and exterior sensations, have a necessary relation with their essential characters; nevertheless, the class of mammiferous animals has particular characters belonging to their viviparous generation, the manner in which the fœtus is nourished in the womb by means of the placenta, and the teats with which they suckle their young. On the contrary, the other three classes are oviparous; and if we contrast them together with the first class, we shall find certain resemblances which indicate in the three classes, birds, fishes, and reptiles, a special plan of organisation, comprised in the general plan of all vertebrated animals. B.

Art. IV. *Observations on a preternatural Growth of the Incisor Teeth, occasionally observed in certain of the Mammàlia rodéntia.* By the Rev. Leonard Jenyns, F.L.S.

Instances of the wild rabbit have occasionally been met with in Cambridgeshire, in which the fore-teeth had grown to so great a length, as to be rendered wholly unfit for the purposes they are intended to serve.

This disease, as, in truth, it may be strictly called, has been often observed before *, both in these, and, I believe, also in other animals of the order Rodéntia (les Rongeurs *Cuv.*), whose incisors are all constructed on the same, or nearly the same, plan. Nor is it for the novelty of the occurrence that the following remarks are offered: my present object is merely to draw attention to the circumstances of at least two cases, that were not attended by that accident which is usually supposed to produce the singularity in question.

It appears to be the statement of some authors, that, in order to occasion this anomaly, it is necessary that one pair of incisors, or one single incisor, be either broken or fallen out †; and that it is for want of the accustomed attrition against the teeth which are deficient, that the opposite pair grow to an unusual extent. This is so far true, that, I believe, in all cases, it is in immediate consequence of the cutting edge not being worn away, or at least to that degree that it is in healthy individuals from constant use, and to supply which loss these teeth are provided with the power of growth ‡, that this irregularity shows itself: but I would observe that the

* See Plott's *Natural History of Staffordshire*, p. 252. tab. 22. fig. 6.; also Morton's *Natural History of Northamptonshire*, p. 445.

† Cuvier, speaking of the incisors of the Rodéntia, observes, "Leur forme prismatique fait qu'elles croissent de la racine à mesure qu'elles s'usent du tranchant, et cette disposition à croître est si forte, *que si l'une d'elles se perd ou se casse*, celle qui lui était opposée n'ayant plus rien qui la comminue, se développe au point de devenir monstrueuse." — *Règne Animal*, tom. i. p. 187.

‡ It is well known to comparative anatomists, that the incisors of the Rodéntia, like the tusks of the elephant and hippopotamus, are in a constant state of growth, and that they are furnished with roots which in length nearly equal the jaw itself, curving back underneath the grinders, and extending in some cases as far as the coronoid processes. In consequence of this singular provision of nature, so admirably adapted to the habits and economy of this tribe, there is a constant, yet gradual, advancement of the interior part of the tooth, to supply the place of the portion worn down in feeding, &c.; and, under ordinary circumstances, this increase is so nicely regulated, that the cutting edges of the two pairs of incisors always preserve the same relative situation with respect to each other. A good description and representation of this contrivance may be seen in Blake's *Essay on Teeth.* (*Disputatio med. inaug. de Dentium Formatione*, &c., p. 88—91., tab. 3. fig. 9.)

ultimate cause of the evil may arise from other accidents besides those above mentioned. Thus, it may originate from too soft food; from a morbid and too rapid secretion of the osseous matter of the tooth, which is constantly being deposited at its root, or from some slight derangement of the under jaw; such as, for instance, a dislocation of one of its condyles, whereby the incisors of that jaw would be thrown out of their proper position, and their cutting edges could not be brought fairly into contact with those of the opposite pair. In either of these cases, the growth of the teeth will be over-proportioned to their abrasion by the acts of gnawing and feeding, and a preternatural elongation of that part which is above the gums will immediately take place. It is obvious that this diseased growth will be more or less rapid according to the degree of influence exerted by the predisposing cause, and the length of time it has operated. Perhaps, in the first stage of the malady, its progress may be very gradual, and not much interfere with the usual habits of the animal; but the teeth having once attained such a length that, under any circumstances, their edges cannot be brought to act upon each other, their growth must be much more rapid, and ultimately prove such an inconvenience, as must often terminate in the starvation of the sufferer.

It is to one of the above causes that I would attribute this singular accident in the two following instances, in neither of which was there any deficiency in the proper number of teeth, or appearance of their having been broken.

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In the first of these rabbits, which is preserved in the museum of the Cambridge Philosophical Society, and is a remarkably fine example of the anomaly in question, the lower incisors are the pair chiefly elongated (*fig.* 31.); and they are here so prodigiously developed, as to turn completely over the nose, measuring in length, from the surface of the gum to their cutting edges, no less than two inches and one eighth.* I am inclined to suggest, that, in this case, it was a too rapid secretion of the osseous matter

* The usual length of this portion of the incisor in the wild rabbit is only three lines, or a quarter of an inch.

of the tooth in the lower jaw that led to the disease; because, under any other circumstances, it seems probable that both pairs of incisors would have been equally elongated; whereas the upper pair were, comparatively speaking, but little affected. In the second rabbit that occurred this was found to be the case, and both pairs were observed to have very much exceeded the usual length; but then, in this instance, there was such an irregularity in their mode of growth, that we may, perhaps, find a better explanation of the anomaly in some derangement of the jaws, the result either of natural constitution or of accidental injury. Whatever this might have been (for I regret that this rabbit was not preserved, and no examination of the jaws made at the time), the effect was that of causing the lower pair of incisors, when viewed together, to assume the shape and appearance of the letter V, diverging from one another at the surface of the gum, and extending in opposite directions, to the length of nearly an inch and a half. The degree of divergency observed in the upper pair was nearly as great as this in the lower, and their length about the same; but their curvature very much greater; as, indeed, would necessarily result from the greater bend of that portion of the jaw in which these incisors are formed. In this instance, the portion without the gums had completed three parts of an exact circle, and their cutting edges were in close contact with the roof of the mouth.

Both the above rabbits, when taken, exhibited the appearance of being nearly starved to death, through an inability of procuring their usual food. In the first case, life had been sustained solely by the small quantity of herbage which the animal, was enabled to crop with its lips at the side of the mouth, which appeared to have been used for that purpose. In the second instance, even this method of feeding could scarcely have been resorted to with success, the rabbit being absolutely unable to close its mouth, from the pressure of the lower portion of the curve, formed by the upper incisors upon the surface of the tongue.

The individuals to which the foregoing observations relate occurred in the neighbourhood of Cambridge. I have since then being favoured by a friend with a third example of this monstrosity, in a rabbit killed in Lincolnshire, one of whose upper incisors was even longer than in the case last mentioned, having actually grown into the palate, and reentered that portion of the jaw from whence it originally sprung. This appeared to be the result of some local disease, affecting, in the first instance, that single tooth, which was also much twisted in its direction; but, as in process of time the growth of this tooth became so great as to interrupt the operation of feeding, and thereby to diminish the ordinary friction upon the edges of the other three incisors, these likewise ultimately became preternaturally elongated, though to a much less degree.

Art. V. *On the Kath of the Ancient Hebrews, considered as the Pelican of the Moderns.** By David Scot, M.D. M.W.S. F.H.S.E.

Kath is a species of bird reckoned unclean by the law of the Hebrews, and mentioned five times in their writings. In three passages †, it is rendered pelican by the Sept. Why it should not be so rendered in the other two passages ‡, it is not easy to discover. Perhaps the translators of these were not the same as the translators of the former; and what not a little favours this conjecture, the translators of the prophets are observed to be inferior to those of the law.

It is rendered pelican by the Vulg. in one passage §, but onocrotalus in three passages.‖ Nor is the Vulgate to be charged with inconsistency in so doing; for onocrotalus is understood to be the same bird as the pelican. Formerly naturalists were not agreed upon this point; but, latterly, the number of dissenting voices has been on the decline. The arguments for and against it have been stated by Professor Cyprian, in his enlarged edition of Franzius's *History of Animals.*

Onocrotalus is properly a creature that brays like an ass, and the pelican is thought to have got that name from the harshness of its cry. This it chiefly utters when on the wing. In this respect it imitates those birds which approach it in size; such as the heron, the wild swan, and the crane.

Some say that the cry of the pelican resembles the complaint of a man in distress, and that David compares himself to it on account of his moaning.⸸ "By reason of the voice of my groaning my bones cleave to my skin. I am like a pelican of the wilderness: I am like an owl of the desert. I watch, and am like a lonely bird on the house top."

Of this passage the points of comparison may be disputed,

* Read before the Wer. Nat. Hist. Soc. 31st Jan. 1829, and communicated to the Magazine of Natural History, by Dr. Scot, Feb. 25.

† Levit. xi. 18. Deut. xiv. 17., and Psalms cii. 7.

‡ Isa. xxxiv. 11., and Zeph. ii. 14.

§ Psal. cii. 7.

‖ Levit. xi. 18. Isa. xxxiv. 11., and Zeph. ii. 14.

⸸ Psal. cii. 5, 6, 7.

Whether does the Psalmist compare himself to those birds from his moaning, his leanness, or his solitude?

There is no idea intimated in the psalm that the Psalmist was in solitude, farther than that the birds with which he compares himself were solitary. They are called the pelican of the wilderness, the owl of the desert, the lonely bird on the house top. In all probability these birds are said to be solitary, because they cry when they are in that state.

If it be said that the Psalmist compares himself to these birds on account of his leanness, the comparison will only hold betwixt himself and the pelican. This bird is always lean, and so are most birds which live upon fish, particularly the gull tribe; but the owl is not mentioned for its leanness, nor the lonely bird on the house top.

If it be argued that he compares himself to these birds from the resemblance of his moaning to their cry, we are disposed to acquiesce. The cry of a man in grief is very disagreeable to the ear, and the cry of the pelican has always been reckoned such.

When David compared his moaning to the cry of the pelican, the comparison cannot be termed more improper than that of Hezekiah, when he compared his *chattering*, as the English Bible calls it, to that of the swallow and the crane, which they utter on the wing, whether they be moved with grief or not.

Some other birds, which make a disagreeable noise, have also been thought to be called onocrotali, particularly the bittern and spoonbill. The noise which the bittern makes is horrible and loud, and there have not been wanting some who believe onocrotalus to be the bittern. Others reckon it to be the spoonbill; and it seems to be agreed upon that the spoonbill makes more noise than the pelican, but that it is not so harsh. We agree with those who think the onocrotalus to be the pelican, rather than the bittern or spoonbill; though, at the same time, it must be confessed that it is not very clear what bird the ancients meant, either by the pelican or the onocrotalus.

Onocrotalus, if the etymology be considered, is any bird whose cry is so harsh as to suggest the braying of an ass, whether the bittern, spoonbill, or pelican of the moderns be understood. Pelican, pelicanos; or, with the moderns, pelicanus pelicani; is still more uncertain in its application. Some derive it from *pelekan*, to cut with an axe; and Aristophanus calls the *P*ìcus mártius the pelican, "*apo tou pelekan ta zula*," from cutting trees with its bill. Aristotle, Cicero, and Pliny, however, seem to derive the word *apo tou plateos*, from the breadth of the bill, and certainly mean either the spoonbill, or the pelican of the moderns; or, at least, a bird that frequents the waters and lives on fish. If we could satisfy ourselves that the word pelican came from *pelat*, a verb in Chaldee to vomit, the pelican of the Greeks, and the kath of the Hebrews, would have precisely the same meaning.

While the Septuagint and Jerome have occasionally rendered the kath of the Hebrews the pelican, the critics on the Continent are for rendering it the spoonbill; though we have not heard by what arguments that rendering is supported. We know that Bochart was inclined to translate kath the *heron* or *bittern;* or rather the *pelican*, *heron*, or *bittern;* because he had taken up the idea that *cos* standing next to *kath* in the two lists of birds, given in Leviticus and Deuteronomy, was the pelican; but it did not occur to him that kath was the spoonbill.

As the ancient Greeks seem to have given the name of onocrotalus to the white pelican from its disagreeable cry, so the Arabians for a similar reason call it the water camel.

In the English Bible *kath* is translated pelican in Leviticus, Deuteronomy, and Psalms, but with an inconsistency not easy to account for, cormorant in Isaiah and Zephaniah. The cormorant is a sea bird, living entirely by the fish which it catches in the ocean; and there is a manifest absurdity in making it dwell in the ruins of a great city, among houbaras*, owls, and ravens.

Both Isaiah and Zephaniah say that the kath was to take up its abode in the ruins of Babylon and Nineveh, and this is a very intelligible and probable account when spoken of the pelican. Babylon stood upon the Euphrates, and Nineveh upon the Tigris, and pelicans fed on the fishes of those rivers, and when their hunger was appeased, retired to the ruins to rest, whether during the night or the day.

In habits, however, whatever may be the size, there is not a great difference between the pelican and cormorant. Both of them have a pouch below the chops, though that of the cormorant is but small, and this circumstance makes the resemblance still more striking. While Linnæus has called the former *P*elecànus *O*nocrótalus, he has given to the latter the name of *P*elecànus Cárbo. The name of *P*elecànus *O*nocrótalus was given to the white pelican by Hasselquist the Swedish traveller, and from him, we believe, introduced by Linnæus into his system.

* See the author's dissertation on the kephud of the Hebrew Scriptures, considered as the houbara of the Arabs, and not the hedgehog of the English Bible.

Kath, the original term for pelican, is taken from *kae*, to vomit, and it is undoubtedly given to this bird, from its throwing up the food, which it has lodged in the large pouch under the lower mandible. This can be distended so much as to admit the heads of two men; and it is found to be a most convenient receptacle for the food which this bird collects for itself and its young.

Many of the ancients have said that the proper food of this bird is shellfish, which it swallows, and throws up when the heat of its stomach has opened the shells.

In all probability, however, what it collects of shellfish goes no farther than the pouch; and continues in the pouch till the seams are opened with its heat. Then the fishes are thrown out, and the bird picks out the flesh, and leaves the shells.

That shellfish is its food is somewhat questionable. As it seeks its food over the sea, far from the shore, and also frequents rivers and fresh-water lakes, it is more likely that fish without shells is its ordinary food; and this certainly will be more easily managed, if not more quickly digested.

When it wants to dislodge what is laid up in the pouch, it presses its bill against it, and part or all of what it contains is brought out. To accomplish this purpose considerable effort is required, but to this the bird is accustomed.

From this striking action has arisen the fable among the ancients, that the pelican pierced her own breast, and nourished her young with her blood, and on that account it became as celebrated for maternal, as the stork for filial, affection.

This story, like many others, rests upon no solid foundation; but the idea was natural enough to imperfect and astonished observers; and such, we suspect, has been the character, more or less, of all the ancient naturalists.

The action, however, which is so remarkable in this bird, shows the propriety and force of the Hebrew term by which it is named, *kath* being the vomiter or vomiting bird.

The action of vomiting, or throwing up the contents of the pouch or gizzard, &c., is common to this bird, and most of the gull tribe, when they are pursued; but, as the pelican does so of its own accord, it more strictly deserves this title than any of the gulls.

The pouch in question is not only to be considered as a repository for the fish caught, but as a net for catching it. The remark is made by Shaw the traveller, and if true the bird must have the art of dilating, as well as placing it in such a manner as to intercept the fish swimming around it.

The manner, however, in which the pelican fishes, does not render this account very probable. For this purpose the bird raises itself above the surface of the sea, and then flies along, with one eye towards the water, till it sees a fish near the surface. Instantly it darts down upon it with astonishing swiftness, "seizes upon it with unerring certainty, and stores it up in its pouch." It rises again as before, and repeats the same manœuvres, till it has got a sufficient quantity. It now retires to the shore, and at leisure devours the fruits of its industry. As it digests quickly, it has generally to fish more than once in the course of the day. At night it rests a little way from the shore, its head being supported by its breast. In this posture it remains, till hunger prompts it to break its repose.

Thus it passes its life in a kind of dozing indolence when not fishing. Nothing but the call of hunger can rouse it into action: and as from its size it mounts into the air with difficulty, it would never make the attempt but for the removal of its hunger.

Altogether the pelican is very stupid. When sitting on its eggs, it suffers them to be taken from under it without making opposition. At least it manifests no other concern than merely pecking the person that removes them.

To the kath being the pelican, in Psal. cii. 7., Shaw objects that it is described as a bird of the wilderness, and that being a water fowl, it would starve in a wilderness in which fish was not to be found. To this objection it may be answered, that what are called wildernesses, in Asiatic and African countries, are destitute neither of rivers nor lakes. Ptolemy places three lakes in Marmarica, which is an extremely desert region; and the Israelites, when marching through the deserts of Arabia, met with the waters of Marah, and the fountains of Elim.

It, indeed, may be laid down as an established fact, that however desert any region may be, if it have mountains, it will have lakes and rivers. To this purpose may be quoted a very pertinent passage from Jerome, noticed by Martinius and Merrick, in which the pelican is said to live "in solitudine Nili fluminis," in the solitude of the river Nile; and as this river winds through desolate tracts the prophet Amos is perfectly justified in calling it "the river of the wilderness."

It may be remarked that Damir, quoted by Bochart, asserts that the onocrotalus does not always remain in the water, but often flies far from it, and might not its monstrous pouch be given for this among other purposes, that neither itself nor its young ones might want food, when it was at a distance from the water?

Hence has arisen among naturalists the supposition of two species, or rather varieties, of white pelican, the one living in deserts, and the other on the banks of rivers, or the margin of lakes; but now it seems to be the general opinion that there is no ground whatever for such a supposition.

The pelican is large among the feathered race, greatly exceeding the ordinary goose in size, or, as Edwards, in his *History of Birds*, asserts "it is double the bigness of the largest swan." Its bill is long, and hooked at the end; its colour white, inclining to yellow on the neck, with black feathers along the middle of the back; its voice harsh and disagreeable; and its toes connected with a web.

From the same respectable authority we learn that the pelican inhabits the greatest part of the old world; that it is found in climates far north and south, as well as in all the intermediate latitudes; that it is not uncommon in Russia, abounds in Egypt, and even reaches the Cape of Good Hope. It has been seen, though very rarely, in Great Britain. That it was to be met with in the land of Canaan, the authority of holy writ declares, and modern travellers still bear witness that it is very frequent in Western Asia.

We have not heard what kind of flesh this bird possesses, nor whether any use has been made of its feathers. In the absence of correct information, the flesh and feathers of the heron and crane, or rather of the gull or gannet, will afford a good criterion for judging of the flesh and feathers of the pelican.

Being a large bird, and requiring much range of water to supply its food, it is probably rather scarce, and by many people must be viewed rather as a curiosity than put to any use. Of course it will be oftener found in a menagery than seen flying over our heads, or rising from the fens or lakes.

A print of it may be seen in Scheuchzer's *Physica Sacra*, plate ccxlvi., and we have ourselves seen the original in a collection of live animals, carried through the country for show.

It belongs to the order Palmípedes, or birds that are web-footed, frequent the waters of the ocean, as well as rivers and lakes, live on fish, and are good at swimming.

The nest of the common pelican is deep, and a foot and a half in diameter. It consists of sedges, but is lined on the inside with soft grass. The bird builds it in the marshy and uncultivated places of islands rather than of continents, and lays two or more white eggs.

Art. VI. *Descriptive and Historical Notices of British Snipes.* By H. V. D.

Sir,

I highly approve the plan of your Magazine, and regard it as a useful medium of collecting and recording the observations and intelligence, both of scientific naturalists, and observers of nature, in various parts of the kingdom. By these means the science of natural history may be much benefited, and the researches of the naturalist much promoted; many errors may thus be corrected, and valuable facts established. The particular kind of communication I should recommend in the zoological department of your undertaking would be complete natural histories of particular species or families of animals. The accurately noting down the arrival and departure of the migratory birds (as proposed in your Perennial Calendar of Nature, p. 80. of your First Number) will help to elucidate the mystery attendant upon our periodical visitants. In aid of your useful plan I will now proceed to offer you an attempt at the history of the Common Snipe, and its two congeners, the Jack and Solitary Snipe, according to my observation and experience, as a naturalist and sportsman, in the eastern part of the county of Norfolk. The plan I propose to pursue, in this communication, is to begin with their first arrival here in the spring months; then to trace them through the breeding season, to the arrival and departure of the multitudes which cover our marshes in the latter part of autumn.

Some few individuals remain with us during the winter months, if unaccompanied with severe frosts, in which latter case they all invariably quit our extensive tract of marshes to find food and shelter in warmer climes and open springs. In the early part of February a few return to this district, being regulated in their emigration by the state of the temperature, and by the quarter whence the wind blows. Their arrival is delayed by the prevalence of east and north-easterly winds; but should warm genial air, accompanied with south-west winds, at this time prevail, they will arrive in greater numbers, and at an earlier period. I am convinced, from the observation of several years, that their return is much regulated by the state of the atmospheric temperature, inasmuch as that return is consistent with the flowering of certain wild plants, which is retarded or forwarded precisely as the spring happens to be cold or warm. For instance, in the latter parts of the month of February the little *D*ràba vérna is seen opening its flowers on old walls and banks with a southern exposure; at that time I have invariably observed that a few snipes (the advanced guard of the main body) are to be found in our marshes.

When I notice (about the second week in March) the *Ranúnculus* Ficària, and the *Viola* odoràta in blossom, I am then confident of finding diversion in the pursuit of snipe-shooting, By attending to these coincidences, a Norfolk sportsman will rarely be disappointed in his expectation of amusement at this time of the year, if (as before observed) a west or south-west wind should prevail. I have noted their return, in some years (as in 1825), as early as the last week in February; and, in some years (as in 1826), the arrival of the greater body has been as late as the last week in March. The usual time, however, for their principal remigration may be stated to take place from about the 14th of March to the end of the month.

The greater proportion of these spring visitants soon take their departure for the more northern latitudes, which is expedited by the same south-west wind which brought them here, and equally retarded by a wind blowing from the opposite quarter. Many remain to breed upon our Norfolk marshes, for which purpose they select such as cattle have been depastured upon, in preference to those marshes which are reserved for mowing. The period of pairing commences early in April, at which time the male snipe serenades his mate with two distinct notes, differing as widely from each other as from the cry they utter at other times. The one note may be compared to the repetition of the word "tinker, tinker," uttered in a sharp shrill tone, as the bird ascends in his flight: the other, uttered as he descends, is somewhat similar to the bleating of a lamb, only in a deeper tone, and accompanied with a violent vibration of the wings.

The nest is formed not unlike that of the lapwing, being composed of coarse grass. The female generally lays four eggs (rarely five), placed with their small ends together in the centre of the nest. The eggs are smaller than those of the lapwing, of a green colour, marked with spots of light and darker brown. I cannot state with accuracy either the period of the incubation of the common snipe, or the exact time when the young are excluded from the egg. As a sportsman, I can only inform you that I have this year killed young snipes, strong upon wing, as early as the last week in May; but in other years seldom before the 6th of June.

The Jack Snipe has been known (though very rarely) to breed on our marshes. I have not had an instance of the Solitary Snipe's nest being found in this county.

In the latter part of July, or early in August, the snipes, old and young, quit their breeding marshes in common with other fen birds, and betake themselves, in family parties of six or seven in a flock, to marshes which have been recently mown. In the latter part of August, we have a much greater number of snipes on our marshes than were bred in the neighbourhood. This I have constantly regarded as a congregating and migration of the snipes bred in the northern part of this kingdom.

On the 26th of August 1825, the writer of this article killed a specimen of the *S*cólopax màjor, and last year he killed one on each of the following days in September, namely, 17th, 24th, and 27th, and on the latter day he killed a Jack Snipe, the first he had seen in the season. With regard to the habits of the *S*cólopax màjor, I have to observe, that, in the language of sportsmen, it lies closer than the common snipe, being difficult to flush, and, in rising, rarely emits any cry; its flight is heavy, resembling that of the woodcock, and is continued for a short distance only. The early arrival of the *S*cólopax màjor has sometimes induced me to imagine that this species may breed in our island, although I have never heard of an instance recorded of its nest having been found.

The first arrival of the snipes, as I have before observed, I regard as the emigration of our home birds. During the last week in September and the first in October (especially if attended with strong gales from the east and north-east), we expect the second arrival. These I have always considered as bred in foreign countries. At this period they sometimes come to us in vast quantities, but are wary and difficult of approach. They rise in flocks, emitting their shrieking cry, and alarming others in their flight. The marshes they mostly frequent at this time, are those on which neat stock or bullocks have been feeding during the summer months; the grubs of *S*carabæ̀i, and other insects bred in the dung of cattle, affording them abundant supply of their favourite food. At this time they are accompanied by the Jack Snipe, whose haunts are wet marshes, with uneven and mossy bottoms, and the borders of alder rows.

In the latter end of October, and during the month of November, great numbers frequent the broads (or river lakes) with which this country abounds. They rest on beds of watercresses, and the broken remains of the *S*círpus lacústris (which had previously been cut by the marshmen, under the name of bolders, for chair bottoms), and the *T*ỳpha latifòlia (*vulgo* Gladdon), and *S*pargànium ramòsum (*vulgo* Blackweed), which are used by coopers to put between the staves of casks. On the floating remains of these and other aquatic plants they lie in great numbers, and are to be approached only by the means of a boat. In the early part of a morning, when the whiteness of a hoar frost renders the snipes visible, the marshmen secrete themselves in a small boat, behind a neighbouring reed bush, and shoot at them sitting upon these broken weeds, and have sometimes the good fortune to kill many at a shot. In the latter part of November they gradually take their departure, and, except a few stragglers, are not to be met with before the months of February and March in the following spring.

I cannot give you much certain information respecting the food of snipes. I have killed them with small red worms, with grubs of beetles, and small shell snails in their mouths. On examining the contents of their gizzards, little is to be discovered of their food, which is speedily comminuted by the powerful operation of that muscle. Pebbles, sand, and small dark seeds (apparently of a *Júncus*), are usually found in the gizzard. The seeds are probably intended to break the food, more than to constitute nourishment. There is likewise vegetable fibre contained in the stomach.

Here, Mr. Editor, my narrative must close, and I invite naturalists and sportsmen in the southern and western parts of this kingdom, to take up the history of the genus, where I am under the necessity of closing it, and communicate it through the medium of your Magazine.

I shall conclude these observations with some useful remarks, external and anatomical, which a medical friend of mine has furnished me with, regarding the specific differences of this natural family.

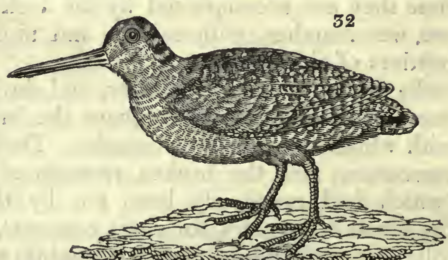
SCO'LOPAX.

Anatomical Character. — Each species has a gall bladder, two cæ`ca (*fig.* 33. *a a*), and an appendix (*b*) situated a little higher up the intestines.

Tíbia feathered to the Knee.

Sc. *rusticola* (*Woodcock*). (*fig.* 32.)—Tail feathers 12, four transverse black marks at the back part of the head, with three paler ones.
Length, $13\frac{3}{4}$ in.
Length of bill, 3 in.
Extent, 25 in.
Weight, 12 oz.

32



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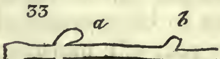


Anat. Char. Cæ`ca two eighths of an inch long. The gizzard contained vegetable fibres of a green colour (very much resembling moss), small black flat seeds, a pebble, and sand.

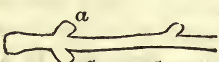
Lower Part of the Tibia naked.

Sc. *màjor* (*Solitary Snipe*). (*fig.* 34.) — Tail feathers 16; the five outermost white, barred wtih black. Belly, sides, and thighs barred with triangular black markings.

34

Length from the tip of the bill to the end of the tail, 11½ in.
Length from the tip of the bill to the end of the toes, 14½ in.
Length of bill, from 2½ in. to 2⅜ in.
Extent, 19 in.
Weight from 7 to 7½ oz.

Anat. Char. Cæ`ca (*fig.* 35. *a a*) one eighth of an inch long. In the gizzard were skins of very small grubs and fibres of roots; in that of another, which had no food in it, the inner membrane was lying in longitudinal rugæ, each of which was thickly beset with conical papillæ, resembling rows of teeth.



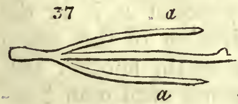
35

Sc. *Gallinàgo* (*Common Snipe*). (*fig.* 36.) —Tail feathers 14. Belly, sides, and thighs pure white, on the centre of the head an orange-coloured stripe, bordered on each side with a black one.

36

Length to the end of the tail, from 10¼ in. to 11½ in.
Length to the end of the toes, 14 in.
Length of bill, from 2½ in. to 3⅛ in.
Extent, from 16 in. to 17½ in.
Weight, from 4 to 4½ oz.

37



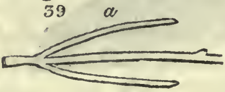
Anat. Char. Cæ`ca (*fig.* 37. *a a*) one inch and a half long. The gizzard contained small seeds, fibres of roots, and pebbles.

Sc. *Gallínula* (*Jack Snipe*). (*fig.* 38.) — Tail feathers 12. On the centre of the head a black stripe, bordered on each

side with an orange-coloured one.
Length to the end of the tail, 9 in.
Length to the end of the toes, 10 in.
Length of bill, $1\frac{5}{8}$ in.
Extent, $14\frac{1}{2}$ in.
Weight, 2 oz. 3 dr.

38

39



Anat. Char. Cæ`ca (*fig.* 39. *a a*) one inch and three eighths long. The gizzard contained small shells, vegetable fibres, and pebbles.

It is by such communications as the above, that in my opinion your Magazine may be rendered most valuable.

I am, Sir, &c. H V. D.

Art. VII. *The Natural History of Molluscous Animals.* In a Series of Letters. By G. J.

Letter 2. *Indirect Benefits.*

Sir,

You may often have heard it observed that living beings form a continuous and uninterrupted chain,

> ——— " lessening down
> From Infinite Perfection to the brink
> Of dreary nothing,"

from which no link can be removed without disordering the uniformity of the whole. If applied, as is usually done, to the external appearances or internal organisation of animals, the comparison is not altogether correct; but none can be more so if it is intended merely as an illustration of their mutual dependence upon one another. This is so close and intimate that we cannot calculate the probable effect of the annihilation of even the most insignificant species. It might involve the destruction of some other immediately dependent on it for the supply of a necessary want; the extermination of this again would be but the precursor of another's death, another still would succeed and ruin would spread around until man himself fell in its embrace. In this view it may with great propriety be said that

> " Each shell, each crawling insect holds a rank
> Important in the plan of Him, who framed

> This scale of beings; holds a rank, which lost
> Would break the chain, and leave a gap behind
> Which Nature's self would rue."

One, and indeed the chief, circumstance which binds animals so closely is, the dependence each has upon another for a supply of necessary food. On contemplating this part of creation we behold a scene of havoc and devastation perpetually and every where going on, so that " there is not," as Smellie has remarked, " perhaps a single species of animated beings, whose existence depends not, more or less, upon the death and destruction of others." That this order of things, however cruel it may appear to us, is subservient to the good of the whole, cannot admit of any doubt; and it is my purpose, in the present letter, to convince you by some detail of facts, that molluscous animals in this relation play a not unimportant part. But, as it would be tedious to enumerate all or the greater portion of the animals to which they furnish nutriment, we shall confine ourselves to those which possess some peculiar interest, or which minister directly to the luxuries or necessities of man.

To commence with quadrupeds. It is nothing surprising that the different species of walrus, inhabitants of ocean, should feed partly on shellfish, but perhaps you would not expect to find among their enemies animals strictly terrestrial. Yet the oran otang and the preacher monkey often descend to the sea to devour what shellfish they may find strewed upon the shores. The former, according to Carreri Gemelli, feed in particular on a large species of oyster, and fearful of inserting their paws between the open valves, lest the oyster should close and crush them, they first place a tolerably large stone within the shell, and then drag out their victim with safety. The latter are no less ingenious. Dampier saw several of them take up oysters from the beach, lay them on a stone, and beat them with another till they demolished the shells. Wafer observed the monkeys in the Island of Gorgonia to proceed in a similar manner *; and those of the Cape of Good Hope, if we are to credit La Loubere, perpetually amuse themselves by transporting shells from the shore to the tops of the mountains †, with the intention undoubtedly of devouring them at leisure. Even the fox, when pressed by hunger, will deign to eat muscles and other bivalves; and the raccoon, whose fur is esteemed by hatters next in value to that of the beaver, when near the shore lives much on them, more

* Bingley's Animal Biography.

† Buffon's Nat. Hist. i. 221. English translation.

particularly on oysters. We are told that it will watch the opening of the shells, dexterously put in its paw, and tear out the contents. Not, however, without danger, for sometimes, we are assured, by a sudden closure, the oyster will catch the thief, and detain him until he is drowned by the return of the tide.* The story, I regret to say, appears somewhat apocryphal, for,

——— " nec lex est justior ulla,
Quam necis artifices arte perire suâ." †

These are amusing facts; the following, to the epicure at least, may be equally interesting. In some parts of England it is a prevalent and probably a correct opinion, that the shelled-snails contribute much to the fattening of their sheep. On the hill above Whitsand Bay in Cornwall, and in the south of Devonshire, the Bùlimus acùtus *Drap.* (*fig.* 40. *a*) and the Hèlix virgàta (*b*), which are found there in vast profusion, are considered to have this good effect; and it is indeed impossible that the sheep can browse on the short grass of the places just mentioned, without devouring a prodigious quantity of them, especially in the night, or after rain, when the Bùlimi and Hélices ascend the stunted blades.‡ "The sweetest mutton," says Borlase, "is reckoned to be that of the smallest sheep, which feed on the commons where the sands are scarce covered with the green sod, and the grass exceedingly short; such are the towens or sand hillocks in Piran Sand, Gwythien, Philac, and Senangreen, near the Land's End, and elsewhere in like situations. From these sands come forth snails of the turbinated kind, but of different species, and all sizes from the adult to the smallest just from the egg; these spread themselves over the plains early in the morning, and, whilst they are in quest of

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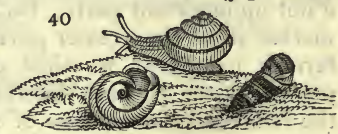

* The following note is taken from Bell's *Weekly Messenger*, for Jan. 7. 1821. A tradesman of Plymouth, having lately placed some oysters in a cupboard, was surprised at finding, in the morning, a mouse caught by the tail, by the sudden collapsing of the shell. About forty years since at Ashburton, at the house of Mrs. Allridge, known by the name of the New Inn, a dish of Wembury oysters was laid in a cellar. A large oyster soon expanded its shell, and at the instant two mice pounced upon the " living luxury," and were at once crushed between the valves The oyster, with the two mice dangling from its shell, was for a long time exhibited as a curiosity. Carew, in his *History of Cornwall*, tells of an oyster that closed on *three* mice. An apposite instance is also epigrammatically recorded in the *Greek Anthology*.

† [" There is no juster law, than that the contrivers of death should perish in their own devices."]

‡ Mont. Test. Brit. p. 347. and 417.

their own food among the dews, yield a most fattening nourishment to the sheep." (*Hist. of Cornwall*, p. 286.)

Among birds the Mollúsca have many enemies. Several of the duck and gull tribes, as you might anticipate, derive at least a portion of their subsistence from them. The pied oyster-catcher receives its name from the circumstance of feeding on oysters and limpets (Patélla vulgàris), and its bill is so well adapted to the purpose of forcing asunder the valves of the one, and of raising the other from the rock, that "the Author of Nature," as Derham says, "seems to have framed it purely for that use." Several kinds of crows likewise prey upon shellfish, and the manner in which they force the strong hold of their victims is very remarkable. A friend of Dr. Darwin's saw above a hundred crows, on the northern coast of Ireland, at once, preying upon muscles. Each crow took a muscle up in the air twenty or forty yards high, and let it fall on the stones, and thus broke the shell. Many authorities might be adduced in corrobation of this statement. In Southern Africa so many of the Testàcea are consumed by these and other birds, as to have given rise to an opinion that the marine shells found buried in the distant plains, or in the sides of the mountains, have been carried there by their agency, and not, as is generally supposed, by eruptions of the sea. Mr. Barrow, who is of this opinion, tells us, in confirmation of it, that "there is scarcely a sheltered cavern in the sides of the mountains that arise immediately from the sea, where *living* shellfish may not be found any day of the year. Crows even, and vultures, as well as aquatic birds, detach the shellfish from the rocks, and mount with them into the air: shells thus carried are said to be frequently found on the very summit even of the Table Mountain. In one cavern at the point of Mussel Bay," he adds, "I disturbed some thousands of birds, and found as many thousands of living shellfish scattered on the surface of a heap of shells, that for aught I know, would have filled as many thousand waggons." * The story, therefore, of the ancient philosopher whose bald pate one of these unlucky birds mistook for a stone, and dropped a shell upon it, thereby killing at once both, is not so tramontane as to stumble all belief.

Land shells furnish a few birds with part of their sustenance, and the principal of these are two well known songsters, the blackbird and the thrush. They,

——— "whose notes
Nice finger'd Art must emulate in vain,"

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* Travels in Southern Africa, i. 8. 4to. 1806.

depend in great measure, when winter has destroyed their summer food, on the more common species of Hélices, especially on H. nemorâlis. These they break very dexterously by reiterated strokes against some stone; and it is not uncommon to find a great quantity of fragments of shells together, as if brought to one particular stone for this very purpose. *

Fishes are stupid animals, and incapable apparently of planning any stratagem by which they might surprise the unheeding conch. You might imagine, therefore, that our favourites, "in their grotto works enclosed," were sufficiently secure from their hostile attempts. It is not so. They are the frequent victims, not indeed of the cunning, but of the indiscriminating and almost insatiable appetite, of fishes; and from the stomach of a cod or flounder you may procure many a shell, not otherwise so easily attainable. When indeed we call to recollection the vast and incalculable numbers of molluscous animals which crawl on the bottom, or swim in the bosom, of the ocean, and the voracious habits of the swarms of fish which every where traverse it, we may reasonably conclude that their utility in this respect in the economy of nature is very great, and beyond human ken. And not only do the shellfish nourish, but it has been presumed, or perhaps proved, that they impart a peculiar flavour to at least some of their devourers, which greatly enhanced their value in the esteem of Roman epicures. Thus Martial sings

> "No praise, no price a *gilthead* e'er will take,
> Unfed with *oysters* of the Lucrine lake:" †

and, according to Pliny, the mullets which savoured of their food were the most prized — "laudatissimi conchylium sapiunt ‡;" and these, as saith honest Izaak Walton, "they would purchase at rates, rather to be wondered at than believed."

I must here digress a little, to advert to the more direct utility of the Mollúsca in furnishing to the fisherman the means of enticing to his snare the hapless victims of his art. On every coast the shellfish peculiar to it are extensively employed for this purpose, but we may confine ourselves to those used by our own fishermen. At Salcomb on the coast of South Devon the Phòlas dáctylus is found in great abundance, and is used

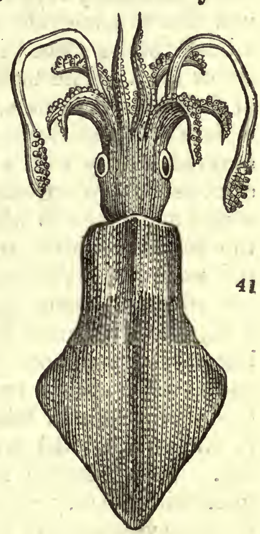
* Montagu, Ornithological Dictionary.

† Hence Pope in his *Satires*,

> "Let me extol a cat on oysters fed;
> I'll have a party at the Bedford-head."

‡ [" The most prized savour of shell-fish."]

with success. Many boat-loads of a river muscle (U`nio margaritífera *Turton*) are taken from the mouth of the Ythen, a river not far from Aberdeen, and employed in the fisheries of cod and ling established near Peterhead. The clam (*P*écten opercularis) and the great muscle (Modìola vulgàris) are resorted to in other parts of the kingdom, and are eagerly sought after as a bait for cod; and you are aware that many thousands of limpets (Patélla vulgàris) and of the common muscle (*M*ýtilus edùlis) are daily torn from the rocks, to ensnare the common fishes of our coasts, and thus contribute materially to add one more luxury to the tables of the rich, and to give to the poor a cheap and wholesome diet. The large whelk (*B*úccinum undàtum) and a species of rock-shell (*M*ùrex despéctus *Mont.*) may likewise be enumerated among our ordinary baits; but the most valuable of the class is certainly the *L*olìgo vulgàris (*fig.* 41.), or, as it is called by our fishermen, the sleeve or hoe-fish. With this animal one half of all the cod taken at Newfoundland is caught. It appears there in throngs about the beginning of August, and seems to succeed to the capelin (the fish with which the other half is taken), as if to supply, immediately, provision to the cod, the traffic in which "brings wealth to individuals and strength to the state." It begins to retire from the coast in September. "During violent gales of winds, hundreds of tons of them are often thrown up together in beds on the flat beaches, the decay of which spreads an intolerable effluvium around. It is made no use of except for bait; and as it maintains itself in deeper water than the capelin, instead of nets being used to take it, it is *jigged*, — a jigger being a number of hooks radiating from a fixed centre, made for the purpose. The cod is in best condition after having fed on it." *



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* Edin. New Phil. Jour. No. i. p. 37. The editor remarks: "The cuttle-fish occurs in abundance in many of our estuaries and coasts, but has hitherto been considered as of no value. Now that it is known to form an excellent bait for cod, and even for other fishing, it is not to be doubted that it will in future, in this country, be used with equal advantage and profit as a bait for the capture of our cod, ling, &c."

Crowds of the inferior animals certainly feed on the Mollúsca, but as there is little interest in the detail, a very few examples will here suffice. Two small leeches (*H*irùdo bioculàta and complanàta) often wage successful war against the fresh-water snails so abundant in our ditches; and another species (*H.* hyálina), not so cruel in disposition, draws its nourishment from the sanies which flows from the Planórbis carinàtus. Its calcareous envelope is no protection to the muscle against the wiles of the Nýmphon gróssipes; thousands of littoral shells are devoured by the sea anemones (Actíniæ); and the common star-fish knows so well how to force the oyster from his close retreat *, and destroys such numbers of them, that every dredger who observes one of their enemies, and does not tread on and kill it, or throw it upon the shore, is liable to some penalty.

As ultimately connected with our subject, I must now inform you that to some animals among the inferior tribes, shells afford a house and a place of refuge, as necessary to them as either air or food. The turbinated univalves become, after the death of their proper owners, the habitations of the soldier or hermit crabs (*P*agùrus *Leach*), whose naked and slender abdomens, covered merely with a skin of a delicate texture, would, without this foreign covering, be crushed to pieces in the strife of waves and rocks to which they are exposed, or devoured by the enemies which surround them. A singular species of soft worm, or Siphúnculus, discovered by Mr. Montagu, inhabits old and worn specimens of the *S*trómbus pès *P*elecàni *Lin.*, whose aperture it closes up with agglutinated sand, leaving only a small round hole, within which it lives in security; and another species not yet described, though common on the coasts of Scotland, takes possession of the common tooth-shell (Dentàlium entàlis), and secures the aperture in the same manner. The beautiful and delicate Paper Nautilus, with whose interesting history you must be, at least, partially acquainted, is not navigated over the surface of its native ocean by its own architect, but by a species or Ocýthoe, or cuttle-fish, its parasitic inhabitant. This surprising fact was long disputed amongst naturalists; but the specimens brought to England by the gentlemen of the unfortunate Congo expedition, have enabled Dr. Leach and others to give it very great probabi-

* "The prickly star creeps on with fell deceit,
To force the oyster from his close retreat.
When gaping lids their widen'd void display,
The watchful star thrusts in a pointed ray,
Of all its treasures spoils the rifled case,
And empty shells the sandy hillocks grace." *Jones.*

lity, if not to demonstrate its truth. Mr. Cranch tells us, that, having placed two living specimens in a vessel of sea-water, the animals very soon protruded their arms, and swam on and below the surface, having all the actions of the common cuttle of our seas. By means of their suckers they adhered firmly to any substance with which they came in contact, and when sticking to the sides of the basin the shell might easily be withdrawn from the animals. They had the power of retiring completely within the shell, and of leaving it entirely.* One individual quitted its shell, and lived several hours, swimming about, and showing no inclination to return into it; and others left the shells as they were taken up in the net. The observations of Sir Everard Home are, perhaps, no less decisive, confirmed, as they have been, by subsequent naturalists. He found the ova of the animal caught in the Argonaúta (so the shell is known in science) to differ from those of every other testaceous animal that lives in water, in having a very large yolk to supply the young with nourishment after they are hatched, and in not being enclosed in a camerated nidus, or chambers of a peculiar kind, which are a necessary defence in the period between the egg being hatched and the young acquiring its shell.† I shall leave you to your own reflections upon this fact. It is not the least remarkable of the marvellous works with which Infinite Wisdom has stored this world.

> "Wonderful, indeed, are all His works,
> Pleasant to know, and worthiest to be all
> Had in remembrance always with delight."

I am, &c. G. I.

Art. VIII. *An Introductory View of the Linnean System of Plants.* By Miss Kent, Authoress of *Flòra Doméstica, Sylvan Sketches,* &c.

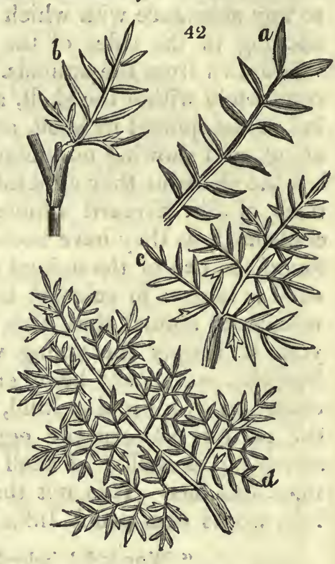
(*Continued from* Vol. I. p. 436.)

Leaves assume an endless variety of forms and combinations; some are shaped like an egg, some like a heart, some like a fiddle, some like a hatchet, &c. Others are compound; composed of many small leaves called leaflets, which,

* Aristotle knew that the animal of his *Naútilus* was not naturally connected with the shell. (*De Nat. Animal.*, lib. iv. cap. ii. sect. 54.)

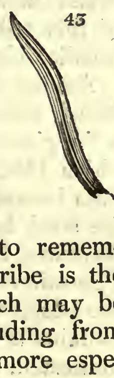
† Tuckey's *Narrative of an Expedition to the Zaire,* appendices ii. and iii. Mr. Broderip, in an interesting essay on this subject in No. xiii. of the *Zoological Journal,* considers the question still undecided; but his observations upon the whole, in my opinion, support the view I have taken.

being arranged in various ways, form the pinnate leaf, the ternate leaf, the quinate, the stellate or verticillate, &c. &c. Suppose a stalk to have several leaves at each side, growing at regular distances, in pairs, this is a *pinnate* (winged) leaf (*fig.* 42. *a*); if the stalk terminate in a leaflet, it will be termed *pinnate with an odd leaflet* (*b*). Imagine one of the latter leaves to have a very long stalk, with similar pinnate leaves set on each side of it (*c*), this is a *bipinnate* (twice-winged) leaf; these being again arranged in the same manner, upon a third stalk, form a *tri-pinnate* leaf (*d*); and, in proportion as this is repeated, the leaf will become compound, decompound, superdecompound, &c. &c. It frequently happens (as in *fig.* 42. *b*) that the leaflets towards the end of the leaf are smaller than those at the base, which gives the leaf somewhat of a triangular appearance; the more conspicuous in proportion as it is more compound. The *umbelliferous* (umbel-bearing) plants, which compose nearly the whole of the second order of the class Pentándria, have, with few exceptions, *pinnate* leaves, more or less compound.



The British Flora possesses only eight genera in this order, that are not included in the natural family called Umbellíferæ or Umbellàtæ. Of this number are the beet (*B*èta), of which the root is eaten in salads (it contains a great quantity of sugar, which may be extracted and manufactured for use); the glasswort (Salsòla), used in the manufacture of glass; the elm (*U*'lmus); and the gentian (*G*enti*àna*), a genus remarkable for the brilliant blue colour of its flowers, and the bitterness of its roots. "As bitter as gentian," is a common phrase. The root of a species of gentian growing on the Alps, and other mountains on the Continent (*G.* lùtea), is the bitter chiefly used in medicine.

The *umbelliferous* plants agree in having their flowers *superior* and *pentapetalous,* and in producing a naked fruit of two seeds slightly attached together. Many of them are so much alike in their general character, as not easily to be distinguished. Hence mistakes have occurred; the more important, as some of the plants are aromatic and edible, others fetid and poisonous. It is given as a general rule, that such as grow in high dry situations are wholesome, while those growing in low and marshy situations are poisonous; but this rule is by no means to be depended upon as infallible, though it holds good in nine cases out of ten. As this is a subject of no small importance, I shall speak at some length of the more dangerous among them, and of the characters by which they may be distinguished. Several of the *umbelliferous* plants have a few leaves at the base, either of the *partial* or the *universal umbel*, or sometimes of both. Some botanists call these leaves *bracteas*, a name given to a leaf differing from the general foliage of a plant, and attendant upon the flowers; but Linnæus considered them, collectively, as a species of calyx, and called it an *involucrum*, from the Latin *involvo*, to wrap. By the presence, or absence, the number, form, and situation of these leaves, several of the plants may be distinguished. There are three genera, one aromatic, and two extremely virulent; of which the *partial umbels* have three bracteas, *on one side only*. In one of these, named fool's parsley (Æthùsa Cynàpium), because, not very wisely, mistaken for the true parsley, they are long and pendulous; in hemlock (Cònium maculàtum), they are short, narrow, and spreading outwards, while the *bracteas* of the *universal umbel* bend downwards; in coriander (Coriándrum satìvum), they are *linear lanceolate* (*fig.* 43.), and those of the *universal umbel* are very few, if any. The first two of these plants are deadly poison; the latter, though the fresh plant is fetid, and probably deleterious, produces an aromatic and wholesome seed, which is well known. I might mention other distinctive characters; but, as these are quite decisive, it is better not to oppress the memory with others, which might rather tend to confuse than to enlighten those who desire to remember them. Another very deadly plant of this tribe is the hemlock water dropwort (Œnánthe crocàta), which may be known by a poisonous orange-coloured juice exuding from every part of it, when bruised; from the root, more especially. Even the scent of this plant has been known to occasion a sense of giddiness in the head. Water hemlock (Cicùta viròsa) grows in ditches, and on the banks of rivers. The *universal umbels* have but one or two, seldom any, *bracteas*; the *partial umbels* have several, narrow, taper-pointed, and of unequal size; the leaves are *biternate*, and the leaflets *serrated* (notched like a saw) at the edges, the points appearing somewhat white and withered. Before we proceed, it may be well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to observe that a *ternate* leaf is composed of three leaflets set together, usually at right angles (*fig.* 44. *a*); a *biternate* leaf, of three ternate leaves, disposed in the same manner (*b*). Another dangerous plant of this order is the water parsnep (*Sium* nodiflòrum), which grows in close companionship with the watercress; and, when not in flower, so nearly resembles that plant, as to have been frequently mistaken for it. It is not a week since I detected this poisonous herb in fellowship with the watercress, in a quantity purchased for a family of children. The watercress is of a darker green, and sometimes dashed with brown; the leaflets are of a rounder form, more especially the odd one at the end, which is larger than the rest, and their edges are irregularly waved. The water parsnep is of a uniform light green, without any tinge of brown; the leaflets are longer and narrower than those of the watercress, tapering at each end, and serrated at their edges. The best way to become acquainted with the difference, and to obtain a confident knowledge of them, is to examine them in the month of July, when the flowers of both are present to decide between them. I have not specified all the dangerous plants of this tribe; our limits will only admit of my noticing the peculiar characters of the most dangerous.

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Among the edible plants of this tribe are the carrot, parsnep, fennel, caraway, parsley, celery, &c. A foreigner of the family, is the giant fennel, or *F*érula, of high renown as the vehicle in which Hesiòd records Prometheus to have brought down fire from heaven. He is said, too, to have been the inventor of the steel by which fire is struck from flint; metaphorically, therefore, he might be said to have brought fire from heaven. The sailors of the Levant frequently convey this element, from one island to another, in the stem of the *F*érula. The pith it contains is used by the Sicilians as tinder; and all these facts connected, give a sort of poetic truth to Hesiod's story.

The very nauseous but useful drug, Assafœtida, is a resinous exudation from a species of *F*érula, growing among certain mountains in Persia; and, fetid as this drug is, it is much esteemed, in many parts of the East, as a seasoning for various dishes. It is said that the Banian Indians, who eat no animal food, scarcely eat any thing that is not seasoned with it; and even rub their mouths with it, as a provocative to the appetite. If it were done as a mortification and a penance, we could readily conceive why this delicate drug was used in preference to the fine aromatics of the East; but it is not much more extraordinary than that the Cossacks should drink train-oil; and, after all the astonishment we feel at the strange taste of these Indians, what shall we say to the fact, that this very drug, which has the scent and the flavour of putrid onions mingled with soot, is used by *British* cooks, occasionally, as a substitute for garlic! — in very small quantities, it is true; but still it *is* used.

Of the third order, Trigýnia, we have five British genera; among which we may reckon the elder tree (*S*ambùcus nìgra), a tree of infinite value to the peasantry of some remote country-places: it supplies the place both of the surgeon and the druggist; it furnishes ointments, infusions, and decoctions, for all ailments, cuts, or bruises. Every part of it serves some useful purpose: the wood, pith, bark, leaves, buds, flowers, and fruit. Its narcotic scent makes it unwholesome to sleep under its shade; and if corn or other vegetables be smartly whipped with the branches, they will communicate a sufficient portion of this scent to keep off the insects by which so many plants are frequently blighted. An infusion of the leaves, poured over plants, will preserve them from caterpillars also: so that this tree does as much good by its noxious, as its agreeable, qualities. The wine made from the berries is well known; but, perhaps, it may not be so generally known that the buds make an excellent pickle. A water distilled from the flowers rivals buttermilk itself as a rural cosmetic. There is another species, the dwarf elder (*S*ambùcus *E*'bulus), which possesses, in a heightened degree, all the noxious qualities of the common elder, without any of its virtues, but that of keeping other nuisances at a distance. This fetid plant was supposed, by our ancestors, to have sprung from the blood of their enemies, the Danes, whence it obtained the English name of Danewort.

The bladder-nut (Staphylèa pinnàta) belongs to this order. It is an elegant shrub, by no means justly appreciated. It is called bladder-nut, from the hard fruit, which is contained in a large inflated capsule. The nuts were formerly used by the monks, as beads to count their prayers by.

The French tamarisk (*T*ámarix gállica), a delicate shrub, with pink flowers, is, notwithstanding its specific appellation, a native of England, growing chiefly on the southern coast. The salt flavour of its leaves renders it a grateful food to sheep; but we would not willingly bestow it upon them, for it is not sufficiently common to admit of so lavish a use of it. The genus *V*ibúrnum is better known by a foreign species, than by those which are indigenous of the country. We allude to the laurustinus (*V. Tìnus*) of the south of Europe, which displays its white flowers even amid the whiter snow. One of the British species, too, is known rather by a variety than by its common mode of growth: the Guelder rose (*V. O'pulus*) bears its flowers in cymes, like the elder tree; but the flowers are larger, and those in the outer part of the cyme are larger than those in the centre: the variety usually cultivated, and called the snow-ball tree, has the whole cyme composed of the larger flowers (which are barren), and crowded so close, as to form a round ball. We should hesitate whether to prefer this variety when in blossom; and certainly, when the blossoms fall, it is inferior to the common Guelder rose, since it wants the bright red berry, which is as handsome to the eye, as it is nauseous to the taste. There is another native species, called the wayfaring tree (*V*ibúrnum *L*antàna). The leaves of both assume a deep red colour in the autumn; and it has been observed that this change is very common in the British species of such genera as are chiefly American.

The sumach, or poison oak (*R*hús), is a large foreign genus of this order, powerfully poisonous. From the *R*hús vérnix, or varnish tree, is obtained the fine varnish of the Japanese; and another, well known in England by the name of copal varnish, is produced by the *R*hús copallìna. The smooth sumach (*R*hús glàbra) is common in our shrubberies: the stem and branches are clothed with a thick and soft scarlet down; the leaves are *pinnate*; the leaflets large, *serrated*, and elegantly graduated, from the length of four inches at the base, to two inches, or less, at the apex; in the autumn they assume a fine crimson. Several of the species are so poisonous as to be very dangerous neighbours; and it is asserted that a swarm of bees, alighting upon a branch of the varnish tree, was instantly destroyed by its effluvia only.

Of the fourth order there are but two genera; of the first of which, Britain possesses one species; the grass of Parnassus. The fifth order also is a small one, of which there are but three genera in the British Flora: but among them is one species worth whole genera of common plants. It is a slight little plant, about two feet high, with lanceolate leaves, and bearing a panicle of very pretty, blue, veiny flowers. To this plant we are indebted for that most exquisite of luxuries, linen, and for an article perhaps yet more valuable, paper. It is the *L*ìnum usitatíssimum, the common flax. An oil is pressed from the seeds (called *line* or *lin seed*), which is used by artists; and the seeds themselves are applied to many medicinal purposes; but the plant is chiefly cultivated for the bark. In the preparation of flax it is necessary to macerate and steep it in water; which renders the water so poisonous to cattle, that an act was passed, in the reign of Henry the Eighth, prohibiting the steeping of flax in any public stream or pond.

The sixth order, Hexagýnia, contains only one genus, sundew (Drósera); formerly ranged, very improperly, in the fifth. The leaves of this plant are set with a number of red hairs, bending inwards, which discharge each a drop of viscid acrid fluid: these little globules, shining in the sun, explain the appellation of *sun-dew.* Insects are frequently imprisoned by these hairs, and by their juice. Some persons believe that they are irritable, and contract when touched, so as to hold their little prisoners more securely.

The seventh order, Polygýnia, consists of three genera, plants of no great note, of which Britain furnishes one species, the mousetail (Myosùrus mínimus). It may generally be observed, throughout all the classes, that the *pistils* seldom exceed the *stamens* in number.

Having thus cursorily considered the fourth and fifth classes, we will examine one or two plants attentively, before we proceed further. *Fig.* 45. represents a sprig of a plant in its perfect state, together with the several parts of the dissected flower; and I beg of the reader to compare these parts with the passages referring to them. Let us suppose that we have just gathered this plant; how shall we ascertain what it is? The first thing to be considered is the class; and, to find this, we must count the stamens: there are four; the class is *Tetrándria.* We must now see how many pistils there are; and as the pistils usually remain in the calyx, and the stamens are attached to the corolla, we will remove the corolla, that we may not confuse them together. The corolla comes off in one piece, bringing the stamens with it (*b*): the flower is *monopetalous.* There is one *style* remaining in the calyx: it has two *germs* (below the calyx), between which the style is inserted (*c*); but this, we are to remember, is but one *pistil,* since we reckon from the *base* of the *style,* and many pistils have a plurality of *germs:* the order, therefore, is *Monogýnia.* We will now turn to this class and order in the *English Flora* (a book which no botanist or botanical student should be without), and we shall find there twenty-three genera; but these

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are ranged under five different heads, or sections, by which our enquiry will be greatly facilitated. The first section has "flowers, *monopetalous*, *superior*, and single-seeded." Our plant, as we have seen, has two seeds. The second section has "flowers *monopetalous*, *superior*, and two-seeded." The plant is in this section; and, by attention to these characters, we have reduced the number of genera, in which we have to seek it, from twenty-three to four. We had before us one plant, the name and character of which was to be discovered among fifty thousand; and, within a few minutes, we have (thanks to the illustrious Swede) been able to reduce that number within this small compass! When we think of this, we cannot sufficiently admire the accurate judgment and patient investigation which earned for us this power. Nor is it to Linnæus alone that we are indebted, since, though he was the founder of this admirable system, the number of plants classed by him has been quadrupled since his time; and many zealous naturalists have devoted their time, health, and money to the discovery of the natural productions of foreign countries. But we are leaving our plant to wither; and we have yet to learn to which of these four genera it belongs. — "*Rubia*. Corolla bell-shaped," &c. We need not proceed with this, for it cannot be the right; we will try the next.—"*Galium*. Corolla flat, fruit dry." This answers to it very well. We will turn to the full description of this genus, and compare it further. "Calyx superior, very minute, with four teeth (*d*); *corolla* monopetalous, wheel-shaped *, in four deep, acute, often long-pointed segments, without a tube (*b*); filaments, from the base of the corolla, awl-shaped, shorter than the limb † (*e*); anthers of two round cells (*f*); germs inferior, of two combined globes (*c*); style thread-shaped, the length of the stamens, cloven at least half way down (*g*); stigma capitate ‡ (*h*); seeds two, naked, combined, globular, not crowned by the calyx (*i*); flowers terminal or lateral; the skin of the seed either smooth, granulated, or bristly."

These characters perfectly describe the plant before us; it is a Gàlium. But there are seventeen British Galiums. We must next ascertain the species. The genus is ranged under two divisions; the species which have smooth, and those which have bristly, fruit. Of the latter there are but two; and as

* A *wheel-shaped* corolla is monopetalous, with little or no tube, and the limb spreading horizontally.

† The *limb* is what is sometimes called the border, or margin: it is the spreading part of a flower, above the tube, cup, or bell, which composes the lower part.

‡ *Capitate* signifies *headed*; having a little head, or knob, like a pin.

our plant is one of them, we shall have but little difficulty, for we begin with the sixteenth species. " *Galium boreale.* Leaves four in a whorl," &c. Our plant has eight leaves in a whorl: it is the next species, *Galium Aparine,* goose-grass, or cleavers; so called because the bristles, which cover every part of the plant, *cleave* to every thing that comes near it, and rend the down from *geese* as they pass. Some persons refer the name of goose-grass to geese feeding upon the herb. The seeds of this plant, when roasted, are a tolerable substitute for coffee; and, as Sir J. E. Smith justly observes, "if raised for a crop, they might have the additional recommendation of being much dearer."

We have another plant to study yet: this pretty, delicate, blue flower, so closely buried in coarse, rough, bristly leaves, that they seem as though they must wound its tender sides. (*fig.* 46.) We will split open the corolla (*b*), and within the tube we shall find five stamens, which were before concealed from view by five little valves in the mouth (or, as some call it, the throat). The plant is in the class *Pentándria.* We find one pistil remaining in the calyx: it has four germs; in the midst of which the style is inserted (*c*). It belongs to the first order, *Monogýnia.* The first section of this order contains the *Asperifòliæ* before mentioned. The flowers are *monopetalous, inferior,* with two or four naked seeds: there are ten genera, and to one of these our plant belongs.

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" *Echium.* Throat of the corolla dilated, naked," &c. The throat of this plant is *not* naked; therefore it cannot be an *E*chium.

" *Pulmonaria.* Corolla naked in the throat," &c.

" *Lithospermum.* Corolla naked in the throat," &c.

" *Symphytum.* Corolla closed with awl-shaped converging valves," &c. The valves in our specimen are roundish and blunt; therefore it cannot be a *S*ýmphytum.

" *Borago.* Corolla closed with awl-shaped or notched valves," &c.

" *Lycopsis.* Corolla closed with concave obtuse valves, funnel-shaped, with a doubly bent tube; seeds concave at the base."

Yes, these valves answer the description (*d*), and the tube is bent two different ways (*e*). Let us compare the plant with the full description of the genus *L*ycópsis. " *Calyx* inferior, of one leaf, in five deep, oblong, acute, erect, or somewhat spreading segments; permanent (*f*). Corolla of one petal, funnel-shaped; tube cylindrical, curved to one side just above the base, and recurved towards the summit (*e*); limb in five rather deep rounded segments, sometimes oblique, and slightly irregular (*g*); mouth closed with five rounded, concave, hairy, converging valves (*d*). Filaments very small, within the tube, at the uppermost curvature. Anthers oblong, incumbent (*h*). Germs four (*c*). Style thread-shaped, half the length of the tube (*i*). Stigma obtuse, notched (*k*). Seeds four, ovate, angular, with a bordered scar, attached to the base of the enlarged swelling calyx (*l*)." All these characters correspond with the plant before us. If we observe a calyx from which the corolla has fallen, and the seeds grown to a tolerable size, we find that the calyx also has grown larger than when it supported the flower; and if we take one of the seeds out of it, we may see that the part by which it was fastened is a little hollow in the centre, so that the circumference of the seed forms a border round it. The part by which a seed is fastened is called the *scar*, or *hilum*: this may be seen in the broad bean, and in many other seeds; and is the part which we turn downwards when we sow them. But for our plant: we have ascertained it to be a *Lycópsis*; and as there is only one British species, it must, of course, be that one. Let us see if it agrees with the description of that. "Whole herb very bristly and prickly. Stem erect, branched, slightly angular, leafy, one or two feet high. Leaves light green, single-ribbed (*m*); the lower ones bluntest, and tapering down into foot-stalks (*n*); the rest sessile, or clasping the stem. Clusters in pairs, forked (*o*), revolute (*p*); erect when in fruit, displaying their enlarged bristly bracteas (*q*). *Partial* * stalks shorter than the calyx, erect, especially in fruit. Calyx very bristly. Corolla bright blue; tube and valves white; limb a little irregular, and inclining. Seeds hard, grey, ovate, pointed, wrinkled, and granulated."

Our plant is the small Bugloss (*Lycópsis arvénsis*), a very common annual weed, flowering in June. Having so accurately examined this plant, and confidently ascertained it, I will now take leave, for the present, of the fifth class; and, in my next, shall invite your readers to admire with me the beautiful class Hexándria.

* The partial stalk is that which actually bears the flower, and connects it with the larger, which is called the *common* flower-stalk. Botanically, a flower-stalk is called a *peduncle;* and when there are both *partial* and *common* flower-stalks, the former are termed *pedicles* (from *pediculus*, dim. of *pes*, a foot or prop). A leaf-stalk is distinguished by the term *petiole*.

ART. IX. *On the Natural History of Vegetables.* By MENTOR.

Sir,

As the names, qualities, and peculiarities of plants, both indigenous and exotic, will frequently occupy your pages (and which will be highly useful and pleasing to your young readers who may be fond of plants), it has occurred to me that a short series of papers on vegetable physiology will not be altogether unsuitable for your work. In doing this, I do not mean to keep the old beaten track of scientific physiology, which would only be a kind of transcript of books of far higher authority than any thing that I dare pretend to bring forward on the subject. But in thus leaving the old road, I shall not be misled by the hand-posts of theoretic directors, but be at perfect liberty to follow where Nature leads; and, as she appears divested of the verbiage and trappings of science, plainly describe what long experience has acquired, and extensive practice has confirmed.

I am far from inferring from this that scientific terminology should be banished from your periodical. This would be Vandalism indeed; and would detract from its merits as well as contract its circulation. But in the case of botanical physiology, a science which every young countryman (many of whom will be your readers) should thoroughly understand, the subject is often obscured by a redundance of terms, and the abstruse language in which it is described. I intend, therefore, in these papers to use the plainest language I can: it will be most natural to myself, and I hope will be sufficiently clear to the reader.

It will be a kind of natural arrangement to begin with a description of the

Root.—When a seed is placed in the soil in a favourable situation, it swells, bursts its shell, if it has one, and its skin, and protrudes its radicle spur in a downward direction. Its first shape, if that of a tree or other large seed, is a blunt cone. The centre progressively protruding, becomes more taper, till the point ends in a slender and very delicate thread; and continues to extend itself in a direction which the constitution or quality of the soil allows. From other seeds, especially those of herbaceous plants, not one, but a tuft of slender fibres is produced from the under side of the heart, or vital point of the seed; these extend themselves in all directions, and also tending downwards. All underground roots are composed of, or are furnished with, slender fibres. They are the organs by which the principal part of the watery and aerial nourishment of the plant is received. To be capable of this function, they must be extremely susceptible, and consequently of the most delicate structure. This is obvious enough to the naked eye, but much more so when assisted by the microscope; such sensitive organs are not fitted to bear the influence of light, unless submersed in water, or in a very humid state of the air, as we often witness in a hot-bed, or other confined place. Darkness, therefore, is necessary for the natural action of fibres; and this, together with a certain degree of heat and humidity, accounts for their prone direction in ordinary cases, or for their taking any other direction if unnaturally situated by art or accident.

When the root of a seedling tree has descended an inch or two into the soil, it is in shape a lengthened cone; its exterior becomes of a darker colour, and beset with transverse indented marks, or minute tubercles; from the former issue fibres, which gradually increase in length, and become branching radicles, which in time take all the appearance and offices of the first; these in their turn are marked, and become divided in like manner. This progressive division and subdivision continues in all directions: first downwards, and afterwards horizontally, according to the distance from the surface, which is suitable to the nature of the plant, and always in proportion to the extent of the head which it is called upon to supply.

These fibres, whether they form the advancing points of the roots and their branches, or as they issue from the exterior of the parts previously formed, are, as has been already noticed, exceedingly sensitive; suddenly extending themselves into water, or into the humid cavities of the soil; and on a change of these exciting circumstances, as suddenly shrinking back to the place whence they issued, or if exposed to dry air withering away. That this excitement is caused by an impulse of the vital principle within, as well as favoured by the propitious elements without, is sufficiently obvious; because they are only active simultaneously with the other growing efforts or expansions of the plant, and remain inactive when these are at rest. If, however, they continue to advance, the bases, or first formed parts of the leading ones, gradually change, by enlargement of their diameters, and instead of delicate transparent processes, become hardened tenacious fibres, thus extending the points and ramifications of the roots on all sides.

When a root has become as thick as a finger, a transverse section thereof shows, that it is composed of four very distinct parts. First, a central pith, consisting of a spongy, soft, and light substance. Second, a circular body of tough, woody threads; each forming in the first stage of its existence, a longitudinal sap-conducting tube, either individually, or afterterwards forming during induration interstices of various figure and capacity for the same purpose. The various attachments, contortions, and structure of this woody cylinder, are curious objects for the microscope; and have been fertile sources of conflicting opinions among men of science. Of this cylinder the interior part next the pith is first formed, and is always more compact in its texture than the exterior side or surface, which has been recently, or is in the act of being, formed. Third, the inner bark, which is visibly composed of longitudinal fibres or threads, variously attached to each other; and when detached, presenting a kind of network similar to the recent fibrils which insert themselves between two tiles, or other smooth surfaces closely laid together. Fourth, the bark; the inner surface of which is partly composed of longitudinal threads, resembling closely those of inner bark, and from which there is no very distinct separation; but its exterior surface presents a very different structure, being composed of parts both longitudinally and transversely divided and subdivided, and appearing to the eye a spongy cork-like mass, coloured by the qualities of the air residing in the earth, without which all roots die or remain dormant. Besides those longitudinal layers, which form the structure of a root, and which are so visible on the transverse section, there are other woody rays which diverge from the exterior of the pith, and terminate on the interior verge of the inner bark.

The uses and office of the root are to fix the plant in the soil, and to extract or receive therefrom the various qualities necessary to the developement of itself and the other parts of the plant. The fibres, which have been already described, are the agents which visibly receive those qualities, which are the food of the plants; but a conjecture is admissible, whether the tubercles on the bark be not also recipients of some quality or other. Of the use of the fibres, however, there is no doubt: we see them in full exertion while vegetation proceeds, and languid or inert when growth is stationary. From every observation which practical attention has been able to make, whether from the stump of an amputated root, or from the end of a cutting placed in favourable circumstances in the soil, they appear to originate from the interior edge of the inner bark; and, in fact, are nothing else than elongations of the extreme, or lower, ends of the fibres, which compose that organ. When they issue from a layer, they may be traced to the same part of the vegetable structure, not as originating there, because this would be supposing an entity to proceed from a nonentity, which is impossible: no; their origin is the vital heart or corculum, whence they and all the organisation sprang. When, therefore, these descending vessels are lowered from their aerial station, and placed in immediate contact with the objects of their search, viz. darkness and humidity, they are impelled, or invited to burst through the bark the nearest way to find them.

Whether the powers of a root exist in its formation, or from some internal faculty, which by expansion forms a vacuum for the admission of extraneous qualities, is a curious question. When considered as a member of a living being, whose head elevated in the air, is constantly expanding and perspiring, there is no great difficulty in comprehending how the fluids of the root ascend to the head, and also how the vessels of the root may be replenished. In this view, the fibrils and other recipients of the roots may with propriety be called *absorbents;* which implies, that there is a redundance of the necessary quality without, and a want of it within, hence its absorption. But this is not generally adopted; some attributing the inhaling power of the roots to a peristaltic motion of the vessels, and the vitality of the plant, though we see the same effects produced by a piece of lifeless sponge, or a bundle of unorganised threads. It is necessary, therefore, to be cautious in attributing to vegetable organisation, or any combination of matter, self-agency. We are surrounded by the powers of nature, mighty though invisible. The pressure of the atmosphere and its constituent properties, the expanding force of heat, the subtile effects of electricity, all more or less influence vegetation, and unite with its own powers in its motions and developement.

Another circumstance, connected with the powers or susceptibilities of roots, deserves notice: this is, their invariable tendency to the place of their favourite or richest food. Whether this be heat, moisture, or manure, thither will all fibrils advance, though placed at the distance of several feet. This is explained, by supposing that the qualities mentioned are surrounded by a little atmosphere carrying their specific properties, which reach, and in course attract, the fibrils.

Of the Crown, or Vital Principle of the Root.—There is attached to all roots what, from its position, is called their crown: it divides them from the stem or stems, and consequently forms a base to the latter. In the seed it was the heart or radius, from whence arose, as has already been noticed, all the various organisation of the plant. It is the seat of life in all trees, especially when young, and remains long visible in some kinds (the Spanish chestnut, for instance), even after the pith and heart of the stem is gone to decay. It is always existent in herbaceous plants, but becomes undistinguishable in most trees. In individual plants, as most of the palms, it remains stationary; no part of it being detached into either roots or stem, but only small portions of it into each seed. All jointed stems, whether herbaceous or ligneous, contain a portion of the crown at each joint; and all plants which increase themselves by runners, as the strawberry, being the living progeny of the crown, are furnished with portions thereof. In all annual plants the principle of the crown is perpetuated by being conveyed to the seeds, as in wheat; into the stem and seeds, as in the balsam; and into the stem, seeds, and tubers, as in the potato. In the generality of trees and shrubs the crown is fugitive, and diffused over the whole plant, roots, stem, branches, shoots, and seeds. An exception to this exists in the pine or fir tribe, which (save one) never are furnished with any portion of the crown to throw up suckers from the root.

On many plants the crown shifts its place annually. In the tulip, narcissus, &c., it is a thin plate, which forms at the base of the bulb, discharging the last year's crown and roots below. In the strawberry, asparagus, &c., the new crown is formed at the side of, and rather above, the old one. In some plants it is constantly rising from a lower to a higher station on the stem, as appears on the annona; on which plant, it also may be observed, portions of it are detached to the base and crown of the fruit as well as into the seeds. Other plants are endowed with the property of removing from their old to new stations by the lateral progress of the crowns of the roots, as the water lily, and all those called "walking plants."

Even the leaves of some plants partake so much of the structure of the branches, as to have portions of the vital crown lodged in them, as Zygophýllum; others in the petiole of the leaf, as Cob*æ̀a*; and in one genus detached parts of it are found in cup-like appendages on the surface of the plant, as in *L*ichen.

There is a curious instance of the motability of the crown observable in cereal plants, and probably all those having jointed stems; viz. if a seed of wheat happens to be buried too deep, the seed vegetates, producing roots and a stem, with its leaves appearing above ground; but the first crown being farther from the surface than is proper for the nature of the plant, the second and third joints are substituted in its stead, they throwing out the coronal roots to perfect the plant, while the seminal roots and first interjoint of the stem are left to perish.

All these different dispositions of the crown of the root occur in the vegetable kingdom, and, wherever they exist, they are capable of emitting roots and stems like the parent crown from which they have proceeded: those located in or upon the ground soon strike root; others in the air protrude roots also, which are fitted for their situation by their indurated texture and strength: the air plant and banyan tree are instances; and not only of the principle and origin of roots, the roots being dispersed so far over the tree, but also, wherever existent, their natural tendency is towards the earth.

It has already been noticed, that the fibrils on the roots of trees, shrubs, and strong-rooted perennial plants, are annual productions, or at least only in action during the growth of the plant: but in other individual-stemmed perennials, as the tulip, the roots as well as the fibrils, like the leaves and stem, are annual; that is, they are produced from the radical crown, on which are seated the abbreviated leaves, future stem, flower, and fruit, which compose the bulb; and when these last are perfected, the whole, with the roots also, perish, and are succeeded by a new crown, bulb, &c.

The different ways which nature has assigned for the perpetuation of the radical crown, have given rise to distinguishing characters of roots; viz. the fibrous, as in wheat; the bulbous, as in the tulip; the tuberous, as in the potato; the globular, as in the turnip; the truncated, handed, beaded, &c., all which are appendages of roots, rather than roots themselves; and in fact are only motations, or provisional efforts, of the crown for multiplying or protecting itself.

Although the crown may be only deemed as one of the essentials of a plant, and that it only performs, in connection with the others, its part of the vegetable economy; yet it is necessary to remark that it has special powers possessed by no other organ, except the seed, which is the essence of all. As proof of this, we may observe, that, if the crown be so placed as that it has not a suitable share of the necessary elements for its natural developement, it will produce lateral progeny from itself, without assistance from any other organ; witness the production of young tubers in a pit, or young bulbs in a drawer of the seed-room.

Such is the natural history of the Root: it is divested of almost every term of science, but it is hoped it will not be the less intelligible, by being described in the language of a practical man. The student may easily apply the proper terms, when so far initiated in the study, as the foregoing may lead him; and, as some other papers on the same subject, and couched in the same style, will follow, it is presumed they will not be altogether unworthy of the young reader's notice.

MENTOR.

February, 1829.

Art. X. *On some Phenomena attending Sphæ`ria fraxínea.* By Electricus.

Sir,

The specimen which I enclose for your inspection, I believe to be one of the Sphæ`ria *f*raxínea (*fig.* 47.), class Cryptogàmia, order *F*úngi, *L.* Unfortunately, I have not turned my attention to this tribe of plants; and I possess only the edition of 1792 of Withering's *Botanical Arrangement;* I am therefore unable to determine whether this subject has now another generic name. Be this as it may, the annexed description is decisive, I think, of the identity of the fungus.

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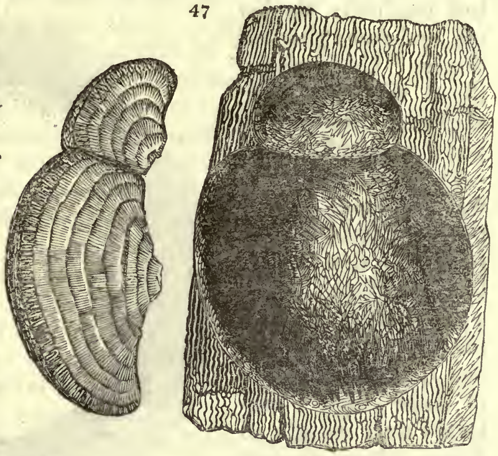

" Sphæ`ria *f*raxínea. — Roundish, convex, black, dotted, nearly sitting, pustular. 'Convex without; substance within consisting of a number of concentric layers, composed of minute tubes, or threads, pointing from the centre. Substance hard; covered with a thin bark, of a brownish black, somewhat wrinkled and rather glossy, grey within.' (*Ray.*) 'Very irregular in shape, from one half to more than an inch in diameter. *Pustules* scarcely visible to the naked eye.' (*Rehl. Supp.*, i. 34.) This, which is very common, differs from the S. máxima, in being more woody, and showing concentric circles when cut. It is generally more completely sessile than it is represented in the figures.

" Lycopérdon *f*raxíneum of *Huds.*, &c. Sphæ`ria concéntrica *Bolt.* — On ash trees when rotten, or in a decaying state, and observed on no other tree." (*Ray.*) — *With.*, vol. iii. 475.

It is not on account of the mere curiosity of the species that I now send it to you, Sir, although I am acquainted with but *one* little, old, ash tree, in a state of decay (and that nearly four miles from my residence), which produces these Sphæ`riæ from between the interstices of the bark; but from the singular phenomena which it exhibited during eight or ten nights successively. Three or four of these Sphæ`riæ were brought home one morning, and placed on the mantle-shelf:

they were regarded at first as curious, and somewhat ornamental productions of nature; but when I entered the parlour on the following morning, I was struck with surprise at finding each of them surrounded with a black powdery efflorescence (*fig.* 48.), dense edges well defined *near* the fungus, but gradually shaded off, and somewhat radiated. Underneath, there was not the slightest particle of powder; but the whole convex surface of each was covered with a powdery mass, or stratum, of a fine bluish-black colour, which was readily brushed off with a feather; in fact, from ten or twelve of these fungi, I collected dust enough to form, when ground up with mucilage of acacia gum, a small cake of colour, with which the accompanying specimen was etched with a crow-quill. By repeated observations, I found that the radiation took place only in the night; never between the hours of 10 A.M. and 5 P.M., but constantly after the evening had closed. Connecting this fact with other natural phenomena, I am inclined to ascribe the process to electrical agency; I believe it to depend upon that ascending current of electricity, which is evidently in a state of peculiar activity during the night, and is the origin of several marked phenomena; among others, I little doubt, that of the diffusion of odour from the corollas of night-smelling plants. I hope soon to invite your attention to the phenomena of the descending day-current of solar electricity, and the ascending night-current, just alluded to; but the subject would be premature on the present occasion.

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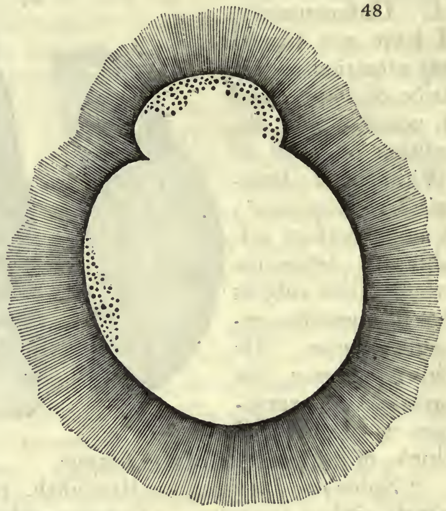

In the instance of this curious fungus, I think it philosophically just to enquire, whether or not the peculiar season of the last year, 1828, might not produce effects very different from those attendant upon ordinary seasons. From the 18th or 19th of March, the whole spring and the greater part of the summer appeared to be governed by electrical inductions; and it is possible that many phenomena may have depended solely upon those inductions, and therefore may not occur again. If I live, I mean to pay close attention to this fungus, and report the result faithfully and particularly, should you see fit to honour this communication so far, as to insert it in your Magazine. In the meantime, I state the following general facts. The specimens now sent were gathered about the middle of May; the one which much resembles an insect of the coleopterous tribe, was that which produced the efflorescence on the piece of paper accompanying it; it had been at work several nights before I laid it on the paper, and the writing was added at the very time stated. The other two specimens are sent merely as such; and one is divided to exhibit the concentric layers and radiations of the internal structure. No efflorescence proceeded from these layers of the inside, nor was *that* from the exterior surface much disturbed or prevented by the section. I am inclined to ascribe the effect to electricity as its ultimate cause, in this particular instance; because, I think, the separation of the fungus from its natural bed (the bark of the ash) might interrupt the regular current, and produce anomalous effects. Nevertheless, as vegetable electricity is governed by specific laws, which exert different energies at different periods, I conceive, that, although the ascending night-current might be thus interrupted, the state of the atmosphere might induce chemical affinities, by which the aqueous juices of the fungus were decomposed, and sufficient heat developed to produce radiation. Some such internal action must have been induced, and that, too, by an energy which was not in action during the day. Light must have been antagonist to it; for the effect was never discerned till towards the hour of sunset, and it ceased with the return of day. I am inclined to ascribe the phenomenon secondarily to the decomposition of water; because the radiation ceased when the fungus became dry, and was renewed, though only in a very slight degree, by immersion in water. I am, Sir, &c.

Grove House, Dec. 26. 1828. ELECTRICUS.

ART. XI. *Some Account of a remarkable Spruce Fir Tree in the Woods at Braco Castle, Perthshire.* By Mr. ARCHIBALD GORRIE, C.M.H.S.

Sir,

THE luxuriance of the Indian banyan tree (*Ficus indicus*) attracts the notice, and excites the astonishment, of European travellers. This plant, in common with many of the genus *Ficus*, readily emits roots at the joints of the young wood; the young side-shoots are pendulous, and on reaching the ground they readily strike root under the genial climate, and in the rich soil, of Hindoostan. The plants which compose the genus *Pinus* are, for the most part, more difficult to raise by layers or cuttings than those of any other genus of trees which abound in our northern forests; and yet it is among the pine tribe that the nearest approach is made to the Indian banyan. A beautiful tree of the black American spruce (*Abies nigra*),

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about forty years old, stands in the woods at Braco Castle, Perthshire, the property of James Masterton, Esq., of Braco; from its side-shoots a number of young trees have sprung up of different altitudes around the mother-plant. The circumference is regularly and gradually extending, and fresh shoots strike root and grow perpendicularly all around the original plant. Should this beautiful assemblage of evergreen spires be allowed to extend, and be protected from the inroads of cattle, it may be difficult to assign limits to the beautiful mass of vegetation which time may form. The above sketch (*fig.* 49.) will give some idea of its present appearance. It may be proper to add that a natural seedling from this tree, standing not far distant from the mother-plant, apparently about twelve years of age, is also in its turn already surrounded by a numerous and healthy rising family. Both these trees were pointed out to me by Major F. H. Elliot, Royal Engineers, and the proprietor, Mr. Masterton, as natural curiosities. I am, Sir, &c.

ARCHD. GORRIE.

Annat Gardens, near Errol, Perth, March 10. 1828.

ART. XII. *Of Winds, and the Causes of their different Kinds.* By Mr. MAIN.

IT has been stated by Dr. Birkbeck as his opinion, that not only the causes of wind will be better understood, but also the time of its happening in any particular place be predicted with certainty. This would be a wonderful, as well as useful, portion of human knowledge. Such foresight would regulate much of the open-air business of life; in assisting to preserve the fruits of the earth; and, in an infinite degree, to influence the movements of the mariner.

Considerable advances have been made in this science in intertropical climates, where the sun exerts so much power. There the prevailing winds are generally, or partially, periodical. In the central parts of the Atlantic, Pacific, and Indian oceans, where the currents of the atmosphere are not disturbed by the influences of land, the winds, if any at all, blow constantly from east to west, or from the collateral points. This is caused by the cooler air of evening pressing westward upon the heated air of mid-day; in other words, the lower temperature of the air in the place to the eastward of the sun, causes it to press westward upon the rarefied air at the place over which he is vertical.

This general breeze, in that part of the Indian ocean which washes the southern shores of Asia, is broken into varying, though nearly periodical currents, called monsoons. These winds, and their changes, have been rationally accounted for, by attributing their deviations from the general current met with ten degrees to the southward of Ceylon, to the influences of the more rarefied state of the air, over the peninsulas of hither and farther India; and also to the sun's motion in the ecliptic, which, in some measure, causes those seasonal influences.

It is now a well established fact, that the exciting cause of all currents of air is *before*, and not behind, the blast. This is daily exemplified in warm countries on the sea-shore; for when the unclouded sun has risen about four hours, and has heated the land to a higher temperature than the sea, immediately the sea-breeze sets in; and during the night, the land becoming cooler than the sea, from radiation of its solar heat and evaporation, a contrary current, called the "land wind," takes place. An easy experiment satisfactorily explains this phenomenon: — "Take a large flat vessel, fill it with cold water, and into the middle of this put a water-plate filled with warm water: the first will represent the ocean, the latter an island rarefying the air above it. Blow out a wax candle; and, if the place be still, on applying it successively to every side of the vessel, the fuliginous particles of the smoke, being visible and very light, will be seen to move towards the plate, and, rising over it, point out the course of air from sea to land. If the ambient water be warmed, and the plate filled with cold water, when the wick is held over the centre of the plate, the contrary will happen, and show the course of the wind from land to sea." (*Clare, on Fluids.*)

The general breeze, or "trade wind," has been known to bring ships sailing from the equator as far north as the English channel. But this seldom happens; because the vast continent of Europe being generally warmer than the Atlantic ocean, the prevailing winds set the contrary way. Hence our equinoctial gales in the month of March, as well as winds from that quarter the greater part of the year. The gales at the vernal equinox may be accounted for thus: —

The power of the sun is daily increasing; which, in conjunction with the *agricultural face* of Europe, ploughed, harrowed, and rolled down to a smooth, naked, and reflecting surface, so rarefies the air, that the cooler, and, consequently, denser air over the western ocean rushes furiously eastward in violent gales. These continue usually four or five days, or till the aerial ocean attains an equilibrium. After this, the surface of the earth is soon clothed in verdure, and no longer so reflective; the currents of air become variable, according to circumstances near or remote, till the fields are shorn of their vegetable covering, and the exposed summer-dried surface again attracts the cooling gales from the westward at the autumnal equinox.

Different currents of air, in both hemispheres, are caused by accidental and local rarefactions thereof, either from heat or sudden and heavy falls of rain, and sometimes from volcanoes. These phenomena, wherever they happen, produce a sort of vacuum, of less density than the surrounding atmosphere; which, closing to fill up the unoccupied or rarer space, generates those streams of air, which, according to their force, are called breezes or gales; or, from their whirling direction, hurricanes or tornadoes.

The atmosphere, being a fluid of different densities, must necessarily be almost always in motion; it is expanded by evaporations of water raised into it, and decreased in volume when these are withdrawn. One, perhaps never-ceasing, motion it must necessarily have, though not usually perceptible near the surface of the earth; viz. currents of cold air from the poles to the equator, and contrary currents above, of warmer and lighter air, from the equator to the poles.

Art. XIII. *On the Art of deriving Interest from the Study of the Weather.* By Mr. A. Gorrie, C.M.H.S.

Sir,

There are few sciences more imperfectly understood, and, I believe, there are few more generally interesting, than meteorology, as far as it relates to temperature, moisture of the atmosphere, and their effects on vegetation as well as on the health and comfort of the human species. So generally operative are these effects on the animal spirits, that every man is more or less a meteorologist; even the lower animals, in many instances, afford sufficient evidence of their being instinctively prognosticators of approaching changes in the state of the atmosphere; vegetables too, by the contraction and expansion of their foliage and flowers, have in the absence of more scientific criteria been referred to for the same indication; and it may not be altogether out of place here to submit a few of these popular indications in the shape of queries, conceiving that the Magazine of Natural History is the proper channel through which their solution may be obtained.

Why is the awn of the wild oat and of the sweet-scented spring grass more straight when the hygrometer indicates saturation, than when the air contains less moisture?

Why do the convolvulus, the anemone, and anagallis shut up their flowers, and many species of trefoil shut up their leaves, and why does the Porlièr*a* hygrómetra contract its foliage, before rainy weather?

Why does the mole send up earth, why do earthworms appear on the earth's surface, and why are toads seen to move more than usual, when dry weather is to be succeeded by rain?

Why are the summits of some lofty mountains covered with a cap of mist, when there is none in the adjacent valleys, about twenty-four hours before rain?

Why do sheep, cattle, and fowls eat more voraciously, and why is the sound of the distant bell and waterfall more distinctly heard, before rain?

Why do crows (rooks) fly aloft in wild disorder, why do pigs make an unusual noise, and why do the dolphin and porpoise approach the shore, before a tempest of wind?

Why do cattle snuff the air, roar, and appear frantic, before thunder?

Why do the joints of the aged feel painful before the approach of what is vulgarly termed "rough weather," and why is the hypochondriac depressed when the mercury in the barometer is low?

These are a few, and only a few, of the popular indications of atmospherical changes: and though they may exhibit an appearance of rural simplicity, yet as they are facts which have evidently been taught "in Nature's school," and which have obtained the sanction of ages; connected too as they are with a science which, notwithstanding its claims to antiquity, may still be said to be in its infancy; the philosopher will allow that they come within the legitimate range of his investigation. Such natural phenomena, it may be safely inferred, attracted the observation of mankind in the earliest ages: we know that the Greeks and Egyptians wrote on the subject; the Jews too, a pastoral people, "could discern the face of the sky;" and, even in our day, shepherds may be ranked among the "weather wise;" nor is there any thing more common amongst country people at meeting than a pinch of snuff, and some sage remarks on the state of the weather; indeed, the universal mode of salutation in this country used by strangers, or by such as wish to treat one another as strangers, is uniformly a remark on the weather. "There is a fine morning, a soft day, or a cold evening," are modes of salutation with us, as common as is the "Salem Alikem" (Peace be with you!) amongst the inhabitants of the more serene countries of the East: and where familiarity is not intended, if opportunity serves, more lengthened remarks are introduced, such as "Do you think we shall have rain? What is the age of the moon? Do the clouds betoken wind? What effect will the late rain have on the crops?" &c.; till the conversation is sufficiently extended to become a stepping-stone to the discussion of politics. That this should be the case where the climate is so variable is not at all surprising; the wonder is, that a subject so intimately connected with the comforts of man, and which daily presses itself on his observation, should remain (notwithstanding the facilities which modern science affords for the study) not only unpopular, but to many fatiguing and revolting. In our researches we are not now confined strictly to the appearances of the sky, or the class of phenomena noticed above; the properties of air and other bodies are now better understood. The barometer, thermometer, the hygrometer or differential thermometer of Lesley, serve to inform us of the fluctuations in the pressure of the atmosphere, its temperature, and the moisture it contains; and yet, with all these advantages, the science of meteorology seems to excite less interest in our day than at any former period: and wherefore is this the case? We see meteorological tables that have been extracted from registers, where the observations have been made with due care no less than 730 times in one season; but then these tables present a mass of figures, and, notwithstanding the trouble the writer had in furnishing that mass, sheer laziness will not allow us to be benefited by his labours. To render these tables palatable, they must come in a more fascinating form, and associated with practical remarks.

Applying these remarks to the purposes of common life, a particular reference to the relative progress of vegetation in different seasons, as acted upon by temperature, moisture in the atmosphere, and moisture in the soil, ought to form an accompaniment of every such table. Meteorological writers are therefore to blame for serving up their tables in such uncouth and forbidding shapes: let them connect their observations on the state of the atmosphere with its effects on the vegetable, and, if they please, on the animal, kingdoms; and if this is done with accuracy and any degree of judgment, it is hardly possible to conceive a mind so entirely divested of curious research as to be prevented from comparing the present with the past, in all its bearings, and from forming just deductions from the comparison. For instance, in looking over a calendar of nature (p. 205.) for the spring months of this year, the reader will find that vegetation is from 16 to 20 days later in March than in the corresponding month of last year; and, on looking to the table, he will find the mean temperature to be 2° 4′ less, and the supply of moisture to be $2\frac{3}{10}$ inches less. He will therefore conclude that a recurrence of the same or similar circumstances which happened in either season, will be followed by similar effects; and this novel investigation will open to his mind a new source of pleasure.

I am, Sir, yours, most respectfully,

A. Gorrie.

Annat Garden, January 15. 1829.

PART II.

REVIEWS.

Art. I. *The Journal of a Naturalist.* London. 12mo, pp. 403.

Sir,

You have, no doubt, met with a grass-green volume, of very sufficing plumpness, and flourishing appearance, lately produced under the title of *The Journal of a Naturalist.* Both the name and the aspect are inviting; the author, at our first meeting, offers us the shade of a noble tree to repose under, and at once bespeaks our good will, and disposes us to listen to his communications. We set out with him on his rambles; and, though the commencement of our journey presents nothing very interesting, we still proceed. The prospect becomes promising: beyond the downs, grass lands, and potato fields, we behold a clump of fine old trees, a pretty sprinkling of flowers, and a sprightly assemblage of singing-birds. We sometimes incline to be weary of the repeated delays of our companion, who seems disposed to devote more time and attention to some objects than we are inclined to grant; and misled, perhaps, by a love of home and its vicinity, to place too high a value on some of its commonest productions. At last, however, having settled the merits of the limestone rocks, the shells, and flints, and happily consigned the fate and fame of strontian to the justice of time, we flatter ourselves that we have passed all obstacles to our progress towards a more pleasing part of the country; when suddenly we are requested to pause by the side of a limekiln, to give ear to a tale that requires all our powers of belief. We are informed that, some years since, a man oppressed with fatigue, and benumbed with cold, laid himself down, with his feet upon the stones placed in the kiln to burn throughout the night, and there fell asleep. The limestones becoming gradually heated, the man still sleeping and unconscious, one foot, with the lower part of the leg, was entirely consumed. When the kilnman awakened the man in the morning, and he attempted to rise, he missed — not his foot, reader — but — his shoe, and begged it might be found. The leg-bone no sooner touched the ground than it crumbled away, "*having been calcined into lime;*" yet the man seemed unconscious of his loss; "he expressed no sense of pain, and probably experienced none, from the gradual operation of the fire, and his own torpidity, during the hours his foot was consuming." Might we be permitted to doubt of the attempt to rise, and the missing of the shoe, we should believe that his not expressing any sense of pain was attributable to that beneficent law of nature which decrees that extreme suffering shall produce insensibility. We will venture upon no further comment on this story; some things are possible that are passing strange.

Our author then proceeds to expatiate upon the successive employments afforded to the labouring classes of the district; such as potato-setting, hay-making, teasel-gathering, corn-reaping, &c., until the approach of winter, when comes the time for "breaking the limestone for the use of the roads." And here we see an instance of the powerful effect of habit: here is a man, apparently amiable and kind-hearted, whose leisure is devoted to the contemplation of nature, and whose pursuits have taught him that the meanest worm, the pettiest insect, holds its station as a link in the great work of creation, yet so little acquainted with the necessities and feelings of his own species, as to believe that he is describing prosperity and comfort in a passage like the following: —

"The rough material costs nothing; a short pickaxe to detach the stone, and a hammer to break it, are all the tools required. A man or a healthy woman can easily supply about a ton in the day; a child *that goes on steadily*, about one third of this quantity; and, as we give 1*s*. for the ton, a man, his wife, and two tolerable-sized children, can obtain from 2*s*. 8*d*. to 3*s*. per day, by this employ, during the greater part of the winter; and, should the weather be bad, they can work at intervals, and various broken hours, and obtain something; and there is a constant demand for the article."

By what process of reasoning, or by what want of reasoning, is it, that a man, apparently in the enjoyment of the comforts of life himself, yet not sufficiently affluent to be ignorant of the value of money, can persuade himself that this is well-doing? Most probably from a habit of enjoying his own ease, without thinking of others; and of looking upon the poor (perhaps unconsciously to himself) as an inferior race of beings. How is it that a man, evidently leading a life of ease; with leisure to enjoy his speculative rambles, in the finer seasons; a sufficiency of food to satisfy his appetite, sharpened by exercise; an easy bed to repose on after his fatigue; clothing to cover him at all seasons; a sound roof to shelter him from the inclemencies of winter, and a snug fireside at his command (and these comforts, at least, we must suppose him to enjoy); — how is it that a man so circumstanced should be so utterly insensible to the misery of the condition he describes, that he should think it much that "a man or a healthy woman" may, by continued labour throughout a winter's day, *earn one shilling?* — that a family of four, if the *children go on steadily*, may, by their united labours, obtain from 16*s.* to 18*s.* in a week, to provide them all with lodging, firing, food, and clothing? — and this, too, only if the weather be favourable. If there be bad weather (and how much bad weather usually occurs in the winter season we need not say), "they can work at intervals, and various broken hours, and *obtain something!*" They have actually a chance of avoiding utter starvation, even in bad weather! — if they cannot get two meals in a day, they may possibly get one; and if bread be too dear, they may yet procure a potato! — that is, indeed, provided they be all healthy. Let us suppose this poor family, by the industry of the parents, and the continued labour of the children, to earn the enormous sum of 18*s.* in the week: deduct two for rent, and one for firing, and 15*s.* will remain to clothe and to feed them, and to supply such occasional expenses as must sometimes occur; as the purchase of any articles of furniture, tools, &c., 3*s.* 9*d.* for each individual. Were the author of this volume, but for one week, to make the experiment of living within such an income, I am persuaded he would read the passage in question with very different feelings and opinions of the "well-doing" of the villagers of that "favoured district." Much may be done with sobriety, industry, and hope, it is true; and 18*s.* or even 16*s.* a week is more than many poor families subsist upon; but let us not affect to look with admiration upon the happy condition of a poor family who can "obtain something" by hard labour, in broken hours, even in bad winter weather!

This gentleman's ideas of good living, when speaking of the peasantry, may be seen in other passages of the work. Potatoes, he tells us, form their chief food. "Every labourer," continues he, "rents of the farmer some portion of his land, to the amount of a rood or more, for this culture; the profits of which enable him frequently to build a cottage, and, *with the aid of a little bread*, furnishes a regular, plentiful, and nutritious food for *himself*, *his wife*, and *his children*, within, and *his pig*, without doors; and they all grow fat and healthy upon this diet." The population of England, our author observes, is fast increasing, in consequence of the cultivation of this vegetable; and that it is the only earthly production of which the cultivation may be so extended as to meet every demand.

The story of Sir Walter Raleigh having first introduced this useful root into Ireland, he is disposed to treat as fabulous; because, he says, it was not generally known in Ireland until fifteen years after Sir Walter's return from his last voyage; but, in the next page, he goes on to say that the first mention made of the potato, in England, as possessing any kind of virtue, was by Sir Francis Bacon, four-and-twenty years after Gerarde's mention of it in 1597 (when he received some of the roots from Virginia, and planted them); and further adds, that it was not grown in gardens until forty years afterwards; nor to any extent in the field, until the middle of the last century. Sir Walter Raleigh has long been considered as the first introducer of this valuable root into Ireland, where it is peculiarly good and valuable; and he should not, on slight grounds, be deprived of that reputation.

But we have travelled in a circle, and returned to the spot whence we started — to the Shellard's Lane Oak. Our author takes this opportunity of calling to mind many of the magnificent trees that have, at different periods, been celebrated in this country. He observes that trees have the same power of collecting moisture about them, in the winter, when bare of leaves, as in the summer, when full-clothed; and mentions, as an instance, an ash tree which he saw dripping with water, in a fog, when every thing around appeared perfectly dry. This he accounts for, by considering the tree rather as a condenser than an attractor. In the beginning of the present year I observed a similar circumstance with regard to a jessamine, which dripped with water after a morning fog, while other objects remained dry. The same thing, says the writer, may be observed on a post or a gate, on the side exposed to the passage of the fog. To this condensing of fogs and mists, causing a frequent fall of water from trees, he attributes, in a great measure, the luxuriant appearance of the herbage beneath them. A variety of causes may occasionally produce such luxuriance; but it is a well-known fact, that comparatively few plants will thrive under the dripping of trees; a fact, the knowledge of which has compelled many a husbandman to lop from his trees some of their finest branches.

I am sorry so frequently to differ from this naturalist; but what does he mean by saying that the "utility of the blossom of flowers is by no means obvious?" He follows up this assertion by admitting its use in the preservation and perfecting of the germen, the food it affords to multitudes of insects, &c. &c.; and is this nothing? Not to dwell upon the many chemical and physical uses of blossoms, those here admitted are quite sufficient to rescue them from the charge of inutility: but these the author overlooks, as well as the delight afforded to man by their beauty and perfume; because he sees "the whole race of creation, *with the exception of man*, utterly regardless of them:" and even this is an assumption. How do we know that the bee and the butterfly, while extracting the honey of flowers, may not also be engaged in admiring their hues and odours? — how do we know that the carpenter-bee has no eye for the blushing red of the petals of the rose, because she chooses to line her nest with the green leaves? — or, if this preference be decisive against such admiration, what says he to the fact, that a very near relative of this bee, hangs her apartments with the bright scarlet petals of the poppy? "I would not," says he, "arrogate for man an exclusive right, or make him generally the sole consideration of the beneficence of Providence; but there are influences which his reason alone can perceive, incitements to good thoughts, and worthy actions." Yet, surely, man may be considered of some little importance in the scale of creation; and *that* from which he derives pleasure, and "incitements to good thoughts," need not necessarily be pronounced useless, because (even admitting the fact) other creatures do not partake of that pleasure! Neither, on the other hand, let us be too sure that these influences and incitements *are* exclusively peculiar to man. Knowing the little that we do know of the bee, the ant, and the beaver (to say nothing of an infinity of other creatures remarkable for what we call instinct), how can we venture upon such an assertion? While we admire what we see and know, it becomes us humbly to doubt of that which is hidden from our knowledge.

In his passion for flowers, I warmly sympathise with the writer; and in his preference for those of spring. Perhaps, says he, it is from the early flowers of spring that we derive the greatest degree of pleasure; "and our affections seem immediately to expand at the sight of the first opening blossom under the sunny wall or sheltered bank, however humble its race may be." Again, he says, "With summer flowers we seem to live as with our neighbours, in harmony and good-will, but spring flowers are cherished as private friendships." Let not private friends despise the comparison; for those who feel it, will not be among those who are least susceptible of friendship, or who attach a slight meaning to the term.

"It is a perplexing matter," says our author, in another passage, "to reconcile our feelings to the rigour, and our reason to the necessity, of some plants being made the instruments of destruction to the insect world." Danger often lurks amid flowers, as we all know; and it is not exclusively to insects that they prove fatal; many animals, men included, have been destroyed by their poisonous juices: it has even been asserted that human life has been cut off by their perfume only; and in cases of infection, as the plague, flowers have been supposed active in conveying its evil influence. Yet we do not the less look upon them as emblems of purity and innocence. The flowers (more especially alluded to in this passage) which, by their construction, make captive or destroy the insects attracted by their honey, are few; we may rejoice that they are so, for, although we may acquit them of any "wanton cruelty," and, remembering the distinction of Shakspeare's grave-digger, admit that the insects went to the flower, not the flower to the insects; yet it is not pleasant to see a flower covered with its little victims. I do not, however, consider the matter in so serious a light as this gentleman appears to do. All creatures were born to suffer death; and I rather incline to pity the flower, that it is doomed to become the unsightly agent of their destruction, than the little flies that escape the spider's net to be smothered in a blossom. Some persons believe that their destruction is necessary to the wellbeing of the plant, but there seems little ground for such a notion.

The greater part of the volume is devoted to birds, treating of their songs, nests, migrations, food, and various habits; and this we suspect to be the portion which the author has written with the most pleasure to himself. He evidently speaks from his own personal observation; and, though he tells us little that is new, the nature of the subject, and his evident interest in it, beguile us into more pleasure in his companionship than we can account for, in reviewing the matter of his discourse.

In speaking of the rook as the only bird that returns to the nest it has once forsaken, I conjecture the writer must mean to except the season of incubation. The rook revisits its old nest at a season of the year when it has no young family to shelter there, but is not the only bird that revisits its nest at other seasons. The marten will frequently rear its young in the nest of the former year; and if the custom be not more general, it appears to arise from the injury these frail habitations may have received from time and the elements; which makes the building of a new one the less trouble of the two. The swallow commonly returns to its old haunts; and, though it builds a new nest, frequently contrives to save labour, by placing it so immediately above the former one as to be supported by it, and, consequently, to require less work and slighter materials. The flycatcher, and, indeed, a variety of other birds, will build in the same spot for many years in succession, as he himself admits in another part of the volume; and particularly instances the flycatcher (Muscícapa *grísola*) as frequenting the same hole in the wall for several years. If my memory does not deceive me, White makes a similar remark, though, I think, of a different species.

It is remarkable that a person so much accustomed to observe the proceedings of birds, insects, and other diminutive creatures, and who must, consequently, be aware of the many dangers by which almost every species is surrounded, should express himself in this manner, in speaking of the blackcap:— "This exceeding dislike of man is very extraordinary; larger or more important birds might have an instinctive fear of violence, but this creature is too small and insignificant to have ever experienced or to apprehend injuries from him." Too small! — how many small birds are annually destroyed or imprisoned by hundreds, either on account of their beauty, their flavour, or their music; and what should exempt this little creature from the same fate, or fear of the same fate? — having, too, so sweet a note, as to be compared with the nightingale itself. This fear he attributes to the divine ordination, which has declared "that the fear of man shall be upon every beast of the field, upon every fowl of the air, and upon every living thing that moveth upon the face of the earth." There are few, I believe, who will not readily admit that it is not "his sublime countenance, contemplative of the heavens," that produces this awe of man; nor does the question, by what it *is* produced, appear very difficult to solve, even without the aid of revelation. Is there a creature, however minute, that is not an object of destruction or persecution to man, throughout its existence? Many are killed in self-defence, many for food, many for sport, and but too many in mere wantonness. Such creatures as have no weapons of defence are mostly timid, and they have cause to be so. Suppose this little bird to have wanted this its only defence, to have had no security but in its smallness and its insignificance, and how many of its race would have been likely to escape destruction, captivity, or the loss of their young? Birds have been found in desert islands that have met "the sublime countenance" of man without alarm; and have displayed no signs of fear or shyness, until taught by experience to fly the dangers that invariably accompanied him.

The artifice of counterfeiting death, when captured, observed by the writer to be practised by the dorr beetle

(*Scarabæ̀us stercoràrius*) and some other insects, has also been attributed, in some few instances, to birds; but the fact appears very liable to misconception, that which has been taken for art, may be merely the paralysing effect of fear. How are we to ascertain that it is not so?

Perhaps there are few persons, who ever think upon such subjects at all, that have not, at one time or another, been struck with the numberless dangers that beset the earthworm (*Lumbrìcus terréstris*). "Eminently serviceable as this worm is," says the writer, "it yet becomes the prey of various orders of the animal creation, and perhaps is a solitary example of an individual race being subjected to universal destruction. The very emmet seizes it, when disabled, and bears it away as its prize: it constitutes, throughout the year, the food of many birds; fishes devour it greedily; the hedgehog eats it; the mole pursues it unceasingly in the pastures, along the moist bottoms of ditches, and burrows after it through the banks of hedges, to which it retires in dry seasons; secured, as the worm appears to be by its residence in the earth, from the capture of creatures inhabiting a different element, yet many aquatic animals seem well acquainted with it, and prey on it as a natural food, whenever it falls in their way; frogs eat it; and even the great water-beetle I have known to seize it, when the bait of the angler; and it has been drawn up by the hook. Yet notwithstanding this prodigious destruction of the animal, its increase is fully commensurate to its consumption, as if ordained the appointed food of all; and Reaumur computes, though from what data it is difficult to conjecture, that the number of worms lodged in the bosom of the earth exceeds that of the grains of all kinds of corn collected by man." These observations carry us yet a little further: we remember that, various as are the creatures that feed upon the worm, the food which sustains that reptile, in its turn, is equally miscellaneous. The creatures that eat the worm, while living, are eaten by it when they are dead; and it is possible that, in the never-ceasing change of things, the particles of which every living creature is composed may be destined to undergo these numerous dangers in the form of the worm. The thought is not a proud one, perhaps not a pleasing one; —but we stay not here—change still proceeds—and by this process the self-same atoms may, in turn, compose a lily or a lark.

The author speaks, perhaps, somewhat too strongly in asserting that winter is "the time in which nature is most busily employed;" and that all the fruits and flowers of the summer are only the advance of what has been ordained and fabricated in these dull months." Naturalists in general consider winter rather as a nurse to the young buds formed before its commencement; and admit it to be, in some degree, a season of rest.

Upon the whole, though the volume before us contains little that is new, and bears no competition with the simplicity, the cordial vivacity of White; yet I have read it with much pleasure, and return thanks to the author for entertaining me on a subject over which I could willingly linger with him as long as he had any thing to say. Books offer various sources of pleasure as well as of profit; a volume which gives us but little original information, may still have its value as a remembrancer of agreeable subjects and useful truths. I would willingly see this writer's example followed by others who take interest in similar pursuits, and have similar opportunities of observation; and though journals of this nature should be multiplied *ad infinitum*, I should be among the first to welcome and to read them. K.

ART. II. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

BRITAIN.

Stark, John, F.R.S.E., Member of the Wernerian Natural History Society of Edinburgh, &c.: Elements of Natural History, adapted to the present state of the Science, containing the Generic Characters of nearly the whole Animal Kingdom, and Descriptions of the principal Species. Edinburgh. 8vo, pp. 1044, with plates.

We have delayed noticing this volume, hoping to be able to review it at length; and the same cause has prevented our hitherto recording the title of the excellent work of Dr. Fleming, *A History of British Animals.* Both works are highly spoken of by those who are considered competent judges. Of *Stark's Elements* a reviewer in *Brewster's Journal* observes, "the technical arrangement is judicious, the style simple and perspicuous, and a right tone of feeling pervades the whole work."

The Menageries: Quadrupeds, described and drawn from Living Subjects. Forming the commencement of the Library of Entertaining Knowledge, and published under the superintendence of the Society for the Diffusion of Useful Knowledge. London. 12mo. Vol. I. Part I. 2*s.*

This is the first of a series of intended publications on natural history, in which it is proposed to proceed in describing individual animals, "without following exclusively an arrangement depending upon what zoologists call the order, the family, or the genus to which they belong. . . . . We are not about to write a systematic work on zoology, which shall comprise every specimen of the animal kingdom; but with especial reference to the plan of diffusing *entertaining* knowledge, we shall rather attempt to lead the reader to a gradual acquaintance with the science, by instructing him in the peculiarities of individual animals, than to make these peculiarities subordinate to classification. We apprehend that, in adopting this course, we pursue a natural and interesting mode of communicating a popular knowledge of the subject. It is frequently better to lead men from the example to the principle, than from the abstract principle to the example. This is the mode in which a *practical* knowledge is best attained, in all things."

The introduction contains some important remarks on what may be called the art of deriving enjoyment from subjects of natural history, or indeed from any subject; and that is, the art of awakening attention to it. "Without a habit of attention to the things around them, men walk about in the world with their eyes half shut; for they are insensible to all but the commonest external appearances, and have no perception of the minuter peculiarities which distinguish one class of objects from another, of the beauties of their structure, or of the harmonies of their arrangement." Hunger and cold are the primary causes of attention to food and dress; but there is no natural stimulus equally powerful to the acquisition of general knowledge. How is this stimulus to be given? By pointing out its pleasures and advantages; the curiosity which it gratifies, and the distinction which it confers. To fix the attention of young people it is good to limit it to one thing at a time. How many boys arrive at the condition of manhood without knowing any thing more of a spider than that such an insect exists; but let the boy be confined for a week in a naked room, with no other companion than a spider, and how different will be the interest he will take in the insect, and the knowledge he will acquire of its habits! This knowledge will recur to his memory every time afterwards when he sees any individual of this family of insects, and having derived pleasure from them, he will desire to increase this pleasure by further observation, and by research into every thing connected with spiders. "It is the distinction between the savage and the civilised man, that the one has no respect for the qualities of the living beings or inanimate substances amongst which he is placed, except as they minister to his physical wants; whilst the other, without neglecting their subservience to his necessities or comforts, views them likewise with reference to all the conditions of their existence; considering each variety of the whole world of nature, whether separately or in groups, whether individually perfect or in parts, as affording the most striking illustrations of the extraordinary adaptation of every existing thing to the purposes for which it was created."

Whatever makes a vivid impression on the senses excites attention, and in this view the engravings which illustrate the menageries, and other modern works on natural history, will not be without their use. They are, in the little book before us, very well executed, as is the literary part of the work; and, from its low price, there can be no doubt of its extensive diffusion, and beneficial influence on those for whom it is intended.

Goring, C. R., M.D., and *Andrew Pritchard:* The Natural History of several New, Popular, and Diverting Living Objects for the Microscope, with the Phenomena presented by them under Observation, &c. &c.; conjoined with accurate Descriptions of the latest Improvements in the Diamond, Sapphire, Aplanatic, and Amician Microscopes; and Instructions for Managing them, &c. &c. To which is added, a Tract on the newly-discovered Test Objects. Illustrated by very highly finished coloured Engravings, from Drawings of the actual Living Subjects. No. I. London. 8vo, pp. 32, coloured plates.

In the preface microscopic science is ably vindicated from the sarcasms of the ignorant. The first chapter contains practical remarks on microscopes; the second, on the larva and pupa of a straw-coloured plumed Cùlex or gnat; and the third, on the larva and chrysalis of the Ephémera marginalis. The drawings to illustrate these chapters are most beautifully engraved and coloured.

The following is a description of the larva and pupa of the plumed gnat: "The transformation," says Mr. Pritchard, "of this animal from the larva to the pupa is one of the most singular and wonderful changes that can be conceived; and, under the microscope, presents to the admirer of nature a most curious and interesting spectacle. Although the whole operation is under the immediate inspection of the observer, yet so complete is the change, that its former organisation can scarcely be recognised in its new state of existence.

"If we now compare the different parts of the larva with the pupa, we remark a very striking change in the tail, which, in the previous state of being, was composed of twenty-two beautifully plumed branches; while, in the latter, it is converted into two fine membranous tissues ramified. This change appears the more remarkable, as not the slightest resemblance can be discovered between them; nor can any vestiges of the former tail be found in the water. The partial disappearance of the shell-like bodies is another curious circumstance. The two lower of them, it may be conjectured, go to form the new tail, for if the number of joints be counted from the head, the new tail will be found appended to that joint which was nearest them in the larva state. The two small horns which form the white-plumed antennæ of this species of gnat, when in its perfect state, are discernible in the larva folded up under the skin near the head. The alimentary canal appears nearly to vanish in the pupa, as in that state there is no necessity for it; the insect then entirely abstaining from food; while, near this canal, the two intestinal blood-vessels seen in the larva have now become more distinct, and are supplied with several anastomosing branches.

"During the latter part of the day on which the drawing was taken, the rudiments of the legs of the perfect insect might be seen, folded within that part which appears to be the head of the pupa; and several of the globules had vanished, those remaining longest that were situated nearest the head. It may be necessary to observe that the head of the pupa floats just under the surface of the water; and the insect, in this state, is nearly upright in that fluid, while the larva rests its belly or sides at the bottom of the pond or vessel in which it is kept.

"The circuitous manner in which the Creator appears to form this species of gnat, and many other of his smaller productions, is truly wonderful. Other creatures are formed directly either from the egg or the natural womb. As, however, the Deity does nothing in vain, it may be presumed that He must have had in view some important object in the preliminary steps through which these beings have to pass, as from the *egg* to the *larva*, *chrysalis*, and perfect insect; and, however low these minutiæ of nature may be held in the estimation of the unthinking mass of mankind, this most elaborate proceeding renders it not improbable that they may be deemed by Him the choicest and most exquisite of His productions. These mysterious creative operations of nature, as detected and unravelled by microscopes, are surely grand and capital subjects for observations. I should pity the spirit of the man who scorned to be amused by inspecting these marvellous metamorphoses, and disdained to be informed of the manner in which they are effected."

Lindley, John, Esq. F.R.S. L.S. and G.S.; Member of the Imperial Academy Naturæ Curiosorum of Bonn, of the Botanical Society of Ratisbon, and of the Physiographical Society of Lund; Corresponding Member of the Linnean Society of Paris; Assistant Secretary of the Horticultural Society; and Professor of Botany in the University of London: A Synopsis of the British Flora, arranged according to the Natural Orders; containing Vasculares, or Flowering Plants. London, 8vo. 10*s*. 6*d*.

The reasons that have led to the preparation of this book are thus given in the preface: — "All the British Floras, with the exception of the *Flora Scotica* of Dr. Hooker, have been arranged upon the principles of a system, which, whatever popularity it may, from particular circumstances, have acquired, and however useful it may have been found in communicating a knowledge of the names of things, does certainly not now tend to the advancement of science, or to an accurate knowledge of things themselves. Of course I allude to the system of Linnæus; a system which has almost disappeared from every country but our own, and which ought now to find no other place in science than among the records of things whose fame has passed away. Hence all our British Floras are, in this view of the case, essentially defective, with the exception already made." Another objection is the inaccuracy of the technical language of the British Floras; objections, however, to which "the *Flora Scotica* of Dr. Hooker, and the *Flora Edinensis* of Dr. Greville, are honourable exceptions." Finding no work, therefore, suitable for recommending to the botanical class of the London University, Mr. Lindley "determined upon preparing a work upon those principles, of which the greater part of Europe has now become the advocate, and which might, if destitute of all other merit, at least possess the recommendation of being commensurate with the present state of botanical knowledge." After noticing the attempt which he has made in this work to reduce the language of botany to a uniform standard, "to render the nomenclature of genera and species conformable to that of Continental writers of the highest authority;" to introduce some new genera and species; and, above all, "to remove the difficulties which at present attend the study of the natural affinities of plants," he adds, "but after all that has been effected in the present case, or that is likely to be accomplished hereafter, there will always be more difficulty in acquiring a knowledge of the natural system of botany than of the Linnean. The latter skims only the surface of things, and leaves the student in the fancied possession of a sort of information which it is easy enough to obtain, but which is of little value when acquired; the former requires a minute investigation of every part and every property known to exist in plants; but, when understood, has conveyed to the mind a store of information of the utmost use to man in every station of life. Whatever the difficulties may be of becoming acquainted with plants according to this method, they are inseparable from botany, which cannot be usefully studied without encountering them." A second volume is promised on the cellular plants, but is deferred "in the hope that, ere much time shall have elapsed, some of the uncertainty which now exists respecting the lichens and fungi will be removed. It may be at present safely affirmed, that we know nothing of the limits of the genera and species of either of these extensive orders."

We shall not enter into the details of this *Synopsis*, because, after Miss Kent has completed her introduction to the Linnean System, it will be followed by a corresponding introduction to the Jussieuean System; but to those who are already prepared for this system, we may safely recommend Mr. Lindley's book as by far the best, or rather almost the only book the English reader could resort to for a knowledge of that system.

We have only one little fault to find with the author, and two of our correspondents are of the same opinion on the subject as ourselves, viz. that he has taken no notice of Gray's *Natural Arrangement of British Plants*. This work may not be perfect; but no man can deny that it is elaborate, and contains a good deal of originality. It includes both Vasculàres and Cellulàres; and when the botanical world are informed that a great part of it was prepared by the late R. A. Salisbury, one of the earliest promoters of the study of the Jussieuean System in this country, and one who, in 1819, was, both in France and Italy, held next in rank among British botanists to Mr. Brown, they will agree with us in thinking that Mr. Lindley ought not to have passed it over as though it did not exist. We insert some of the remarks of two of the correspondents alluded to: —

" Mr. Lindley, in the first page of his preface, asserts that *all* the works in illustration of the Flora of Great Britain (except the *Flora Scotica* of Dr. Hooker) have been arranged according to the Linnean System; and at p. 9. he says ' *Many* genera appear *now,* for the *first time,* in an English Flora.'

" Now taking the English Flora of Smith as the standard, the following are the genera introduced by Mr. Lindley: but those against which I have put a * had already been published in the work of Gray with the same appellation; and most of the others, as you will see, have only received from Mr. Lindley another name. Gray's work was published in 1821.

A'chnodon	Chilóchloa *Gray.*
* Agrópyrum	
Airóchloa	Koelèr*ia* Gray.
* Alliària	
Ammóphila	Psámma *Gray.*
* Anacámptis	
Anemagróstis	Apèra *Gray.*
* Antennària	
Arctostáphylos	U'va-U'rsi *Gray.*
Armèria	
* Arrenathèrum	
* Barbar*ea*	
Blýsmus	Chætóspora *Gray.*
* Brachypòdium	
* Calamagróstis	
* Calystègia	
Capsélla	
Carrichtèra	*V*élla *Gray.*
* Catabròsa	
Catopòdium	
* Centránthus	
* Chamagróstis	*Mibòra* Gray.
* Chondrílla	
Condylocárpus	
* *C*orýdalis	
* Corynéphorus	
Cotoneáster	
*C*ýtisus	
* Deschámps*ia*	
Dígraphis	
Diplotáxis	
* Echinóchloa	
Eróphila	
* Filàgo	
* *F*œnículum	
* Gàge*a*	
* Gastrídium	
Glýce	
* Gymnadènia	
Heleócharis	
Heleogìton	
Helosciàdium	
*H*írculus	Kingstòn*ia* Gray.
Holoschœ'nus	
Hydróchloa	
* Isólepis	
Knaút*ia*	
* Larbrè*a*	
Leiógyne	
Limbárd*a*	
* *Marùta*	
Meconópsis	
* *M*elilòtus	
* Molín*ia*	Monília *Gray.*
* Muscàri	
* *O*nobrýchis	
* Ophiùrus	
* Oxycóccus	
* Oxýtropis	
* *P*etroselìnum	
Physospérmum	Pseudospérmum *Gray.*
* Platanthèra	
Prismatocárpus	*Legouìsa* Gray
* Pulicària	
* Robertsòn*ia*	
Römèr*ia*	
* Schenodòrus	
* Scleróchloa	
*S*éseli	*L*ibanòtis *Gray.*
* Setària	
* *S*ìlaus	
* *S*ílybum	
Trichòdium	Agraúlus *Gray.*
* Trigonélla	
* Trínia	
* Trisètum	
* *Valerianélla*	
Villárs*ia*	Limnánthes *Gray.*
* *Vúlpia.*	

" In making these remarks I wish it to be clearly understood that I consider Mr. Lindley has much improved the language; and that even after deducting much of the originality which he claims, the book, from various circumstances, must be acceptable to the botanists of this country.—*C. K.*"

"Decandolle has adopted Gray's order Ceratophýlleæ, and acknowledged it as Gray's; Mr. Lindley has adopted the order Ceratophýlleæ, and given, as an authority for it, Decandolle: as well might he have quoted from Decandolle one of Robert Brown's orders, and given Decandolle as an authority. — *D.*"

Hooker, W. J., L.L.D. F.R.S. and L.S. &c. &c. and Regius Professor of Botany in the University of Glasgow: Botanical Miscellany, intended to comprise Figures and Descriptions of new, rare, or little-known Plants, from various Parts of the World, particularly of such as are useful in Commerce, in the Arts, in Medicine, or in Domestic Economy. London. No. I. 8vo, 24 pls. 10*s.* bds.

A slight glance at this work enables us to say that the plates are beautifully drawn and coloured; when No. II. appears we shall enter into details.

Hinton, John Howard, M.A.: Elements of Natural History, or an Introduction to Systematic Zoology; chiefly according to the Classification of Linnæus, and aided by the Method of Artificial Memory. London. 4to, 5 plates.

A very curious and clever work, in which an attempt is made to impress the Linnean classes and orders of the animal kingdom on the memory, by the application of the system of mnemonics of Feinagle (Jackson's we think better). It is a praiseworthy attempt, and will be useful for children.

Johnston, George, M.D.; Fellow of the Royal College of Surgeons; Extraordinary Member of the Royal Medical, and Corresponding Member of the Medico-Chirurgical, Societies of Edinburgh; and Corresponding Member of the Zoological Society of London: A Flora of Berwick upon Tweed. Vol. I. Phænogamous Plants. Edinburgh. 8vo.

The arrangement is that of Linnæus, and the nomenclature that of Smith's *British Flora;* there are plants of each of the 23 classes of flowering plants, and of 286 genera; and the work, as far as we have had leisure to look into it, is at once scientific and interesting from local remark. When the second volume appears, we hope the author will throw the genera together in tables, according to the natural system, and in other tables according to their geological relations.

France.

Saigry et *Raspail,* MM., distinguished naturalists: Annales des Sciences d'Observation, comprénant l'Astronomie, la Physique, la Chimie, la Minéralogie, la Géologie, la Physiologie et l'Anatomie des deux Règnes, la Botanique, la Zoologie; les Théories Mathématiques, et les principales Applications de toutes ces Sciences à la Météorologie, à l'Agriculture, aux Arts et à la Médecine. Tome I. Paris, 1829.

This is a new periodical of great promise.

Art. III. *Literary Notices.*

The Gardens and Menagerie of the Zoological Society delineated, being descriptions and figures in illustration of the natural history of the living animals in the Society's collection, is announced to be published with the authority of the Council, under the superintendence of the Secretary and Vice-Secretary of the Society. The engravings will be executed on wood by Branston and Wright, from drawings by Harvey.

A Picturesque Guide through the Regent's Park, with a description of the Colosseum, the Zoological Gardens, engravings of the most curious animals, &c. in a pocket volume, with a plan and thirty other engravings, is announced.

PART III.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Natural History in Foreign Countries.*

FRANCE.

Reproduction of Leeches. — It has been found by M. Pallas, that after leeches have been used for medicinal purposes, they are most reproductive. He puts them into a box with argillaceous earth, six inches deep, at any time from the middle of August till the end of September. In five months cocoons will be found, each containing twelve individuals. The cocoons are, on the outside, light, porous, and woolly, to keep out moisture and regulate the temperature; on the inside they are fibrous and dense, enclosing a thin multilocular pellicle, which contains germs. —*Bulletin des Sciences Naturelles.*

As the medicinal leech is a native of Britain, and by no means uncommon in lakes and pools in marshes, the preceding experiments of M. Pallas might, perhaps, be turned to profitable account in the breeding of animals in such extensive demand as leeches. The greater number, it may be supposed, of the leeches which have been used, die soon afterwards; but if they were employed as breeders, and since M. Pallas says they are the best breeders, it would be turning a loss into a considerable profit. — *J. R.*

Nature of Vegetation at different Epochs of the Crust of the Globe. — M. Adolphe Brongniart has published an interesting paper upon this subject in the *Annales des Sciences Hist. Nat.* for November, in which he divides the time of the formations into four periods; viz. —

1. The immense numerical predominance of vascular Cryptogàmia, that is to say, *F*ílices, Charàceæ, and Lycopodiàceæ, and the great developement of these plants, are the essential characteristics of the first period.

2. The numerical equality of vascular Cryptogàmia, of gymnospermatic Phanerogàmia represented by the Coníferæ and Monocotylédones, as well as the least developement of the vegetables of the first of these classes, appear to be the essential marks of the second period.

3. The third period is particularly distinguished by the predominance of gymnospermatic Phanerogàmia, and particularly of *C*ycàdeæ; the vascular Cryptogàmia hold the second rank, and then an inconsiderable number of Monocotylédones succeed.

4. Lastly, the fourth period presents us with the vegetables of all the classes at present existing; among which, as at this epoch, Dicotylédones are by far the most numerous; then Monocotylédones, gymnospermatic Phanerogàmia, and, last of all, Cryptogàmia and Agàmia. The following Tables, however, will exhibit these interesting views more distinctly: —

Number of Species of each Genus and Family peculiar to the Four Periods.

Names of the Classes, Families, and Genera.	1st.	2d.	3d.	4th.
CLASS I. AGA'MIA.				
*C*ONFE'RVÆ.				
Confervìtes	-	-	2	1
*A'*LGÆ.				
*F*ucöìdes	4	5	16	12
CLASS II. CRYPTOGA'MIA CELLULO'SA.				
*M*U'SCI.				
Muscìtes		-	-	2
CLASS III. CRYPTOGA'MIA VASCULA'RIA.				
*E*QISETA'CEÆ.				
*E*quisètum	2	-	2	1
Calamìtes	14	3		
*F*I'LICES.				
Pachýpteris	-	-	2	
Sphenópteris	21	2	6	
Cyclópteris	3			
Neurópteris	12	2	1	
Glossópteris	1	-	1	
Pecópteris	46	-	12	
Lonchópteris	2	-	1	
Odontópteris	5			
Anomópteris	-	1		
Tæniópteris	-	-	2	1
Clathrópteris	-	-	1	
Schizópteris	1			
Sigillària	44			
MARSILIA'CEÆ.				
Spheriophýllum	7			
CHARA'CEÆ.				
Chàra	-	-	-	4
LYCOPODIA'CEÆ.				
Lycopodìtes	10	-	3	
Selaginìtes	2			
Lepidodéndron	30			
Lepidophýllum	5			
Lepidóstrobus	4	-		
Cardiocárpon	5	-		
Stigmària	8	-		
CLASS IV. PHANEROGA'MIA GYMNOSPE'RMIA.				
*C*YCA'DEÆ.				
Cycadìtes	-	-	1	
Zàmia	-	-	15	
Pterophýllum	-	-	8	
Nilsòn*ia*	-	-	2	
Mantéll*ia*	-	-	3	
CONI'FERÆ.				
*P*ìnus	-	-	-	9
Taxìtes	-	-	1	5
Vóltz*ia*	-	4		
Juniperìtes	-	-	-	3
Cupressìtes	-	1		
*T*hùya	-	-	-	3
*T*huỳtes	-	-	4	
Brachyphýllum	-	-	1	

Names of the Classes, Families, and Genera.	1st.	2d.	3d.	4th.
CLASS V. PHANEROGA'MIA MONOCOTYLE'DONES.				
NAI'ADÆ.				
*P*otamophillìtis	-	-	-	1
Zosterìtes	-	-	5	2
Caulinìtes	-	-	-	1
*P*A'LMÆ.				
Palmacìtes	-	-	-	1
Flabellària	1?	-	-	3
Phœnicìtes				1
Zeugophyllìtes	1			
Còcos	-	-	-	3
*L*ILIA'CEÆ.				
Bucklánd*ia*	-	-	1	
Clathrària	-	-	1	
Smilacìtes	-	-	-	1
Convallarìtes	-	2		
Antholìtes	-	-	-	1
*C*A'NNEÆ.				
Cannophyllìtes	1			
Monocotylédones of doubtful Family.				
Endogenìtes	-	-	-	several.
Culmìtes	-	-	-	3
Sternbérg*ia*	3	-	-	
Poacìtes	3	-	1	several.
Palæóxyris	-	1		
Echinóstachys	-	1		
Æthophýllum	-	1		
Trigoncárpum	5			
Amomocárpum	-	-	-	1
Musocárpum	2			
Pandanocárpum	-	-	-	1
CLASS IV. PHANEROGA'MIA DICOTYLE'DONES.				
AMENTA'CEÆ.				
*C*árpinus	-	-	-	1
*B*étula	-	-	-	1
Comptòn*ia*	-	-	-	2
*J*UGLA'NDIÆ.				
*J*úglans	-	-	-	3
*A*CERI'NEÆ.				
A'cer	-	-	-	1
*N*YMPHEA'CEÆ.				
*N*ymphæ'a	-	-	-	1
Dicotylédones of doubtful Family.				
Exogenìtes	-	-	-	many.
Phyllìtes	-	-	-	many.
Antholìthes	-	-	-	several.
Carpolìthes	-	-	-	many.
Vegetables of doubtful Class.				
Phyllothèca	1			
Annulària	7			
Asterophyllìtes	11			
Volkmánn*ia*	3			

Table exhibiting the Number of the Species of each Class during each Period.

	1st.	2d.	3d.	4th.	Present.
I. AGA'MIA	4	5	18	13	7,000
II. CRYPTOGA'MIA CELLULO'SA	-	-	-	2	1,500
III. CRYPTOGA'MIA VASCULA'RIA	222	8	31	6	1,700
IV. PHANEROGA'MIA GYMNOSPE'RMIA	-	5	35	20	150
V. PHANEROGA'MIA MONOCOTYLE'DONES	16	5	3	25?	8,000
VI. PHANEROGA'MIA DICOTYLE'DONES	-	-	-	100?	32,000
Vegetables of doubtful class	22	-	-	-	-
Total of each Flora	264	23	87	166	50,350

Art. II. *Natural History in London.*

Zoological Society. — A catalogue of the members has been published, which includes 1291 names, besides corresponding members. The museum in Bruton Street has received, and is daily receiving, valuable additions, as is the garden in the Regent's Park. The extent of this garden has been, in consequence of the various donations and purchases, considerably increased, and several neat and appropriate structures are now erecting for the abode of different specimens. It is a gratifying circumstance that these specimens are, for the most part, clearly and distinctly named, with the native country of the animal added. We could wish to see a greater variety of trees, shrubs, and herbaceous plants introduced, and equally clear names and geographical indications placed at them also. Why should it not, as far as practicable, be a botanic garden as well as a zoological garden? It is much to be regretted that those who first designed the plantations of the Regent's Park seem to have had little or no taste for, or knowledge of, hardy trees and shrubs; otherwise, as we have before remarked, this park might have been the first arboretum in the world. Instead of the (about) 50 sorts of trees and shrubs which it now exhibits, there might have been all the 3000 sorts, now so admirably displaying their buds and leaves, and some of them their flowers, in the arboretum of Messrs. Loddiges at Hackney. A walk round that arboretum, at this season, is one of the greatest treats which a botanist can enjoy, and a drive round the Regent's Park might have been just as interesting. It is not yet too late to supply this defect, and the expense to Government would be a mere bagatelle. The Zoological Society, in the mean time, might receive contributions of herbaceous plants, and be at the expense of planting and naming them.

Linnean Society. —*March* 3. Read. A continuation of Mr. Don's paper on the Compósitæ of South America.

March 17. Read. A paper on the fig trees of Jamaica, by James Mac Fadyen, Island Botanist: communicated by H. T. De la Beche, Esq. F.R.S. &c. This paper describes six species indigenous to Jamaica. The genus is divided into two sections, accordingly as the fruit is sessile or pedunculated. Under the first are enumerated *F.* Simpsòni and *F.* cordifòlia; under the second, *F.* jamaicénsis, *F.* víridis, *F.* americàna, and *F.* lentiginòsa. The author states that the four species are new, and that the characters of the rest had never before been properly investigated.

Some remarks by Mr. Bicheno on the geographical and geological distribution of the plants of Britain were also read: and the reading of Mr. Don's paper was continued. The head and horns of a remarkable species of the buffalo (*Bós A'rni*) from India, and also a variety of the fallow deer (*C*érvus *D*àma), were presented to the Society's museum. The Meeting then adjourned for a month.

April 7. Read. A paper by the Rev. Patrick Keith; the object of which was to prove that the sap of plants has the power of producing buds; or, at least, that this is the case in a great number of trees. We should say, it is the case in all trees which will stole when cut over by the surface, or which will produce suckers or shoots from the root, as *P*ỳrus, *P*rùnus, *C*ratæ̀gus, *U'*lmus, *T*'ilia, &c. Mr. Keith illustrated his paper by a drawing of a fragment of lime tree, in which two young shoots were protruded from the lip of a wound. We have now before us a piece of a shoot of the common elm of about 18 in. in length, and half an inch in diameter, in which four such shoots are growing from the lip of the cut or section, on the upper end. This elm stick, as it may be called, was put into a crystal jar, as a perch for our *R*àna arbòrea (p. 79.) on the 16th of January last; there is a little water at the bottom of the jar, which keeps it moist. It has not thrown out a single fibre, nor formed much of a callosity at the lower cut or section; but at the upper section the callous is large with four small shoots, and the different buds in the natural bark have pushed from 2 to 4 in. in length. The stick and the frog were examined by several physiologists at the London Institution, March 31st. Mr. Keith alluded to the opinion of the writer of the article Vegetable Physiology, in the Library of Useful Knowledge (No. xiv.), on this subject, as being inconsistent with the facts stated. The circumstance of the common thorn and of the elm and many trees producing shoots from cuttings of the roots is, in our opinion, quite decisive of the power of the sap or blood of plants to form buds generally; but some trees require a more powerful excitement to do this than others, and some, as the pine and fir tribe, are exceptions.

Geological Society.—Jan. 16. Read. An Appendix to Mr. De la Beche's paper on the Geology of Nice, by the Rev. W. Buckland, D.D., &c. After bearing testimony to the correctness of the description given by Mr. De la Beche of the immediate neighbourhood of Nice, the author communicates his own observations made along the high road from that city to the Col de Tende, for the distance of about fifty miles.

Dr. Buckland infers that the lower part of the calcareous deposit near Nice is the older Alpine limestone; as is the opinion of M. Risso. On the authority of that gentleman, Professor Buckland remarks that near the source of the Var the older Alpine limestone contains gypsum, with sulphur and salt springs; and he thinks it probable that the gypsum found near Vinaigre and Requiez, and at Cimiez, belongs to this formation, rather than to the younger Alpine limestone, to which Mr. De la Beche refers it. A similar developement of the new red sandstone is seen between Toulon and Frejus, accompanied with gypsum, saccharine dolomite, rauchwacke, and conglomerate.

Read, also. Observations on the mountain Ben Nevis, and on some other places in Scotland.

Art. III. *Natural History in the English Counties.*

Kent.

A Male Spermaceti Whale, P*hysèter catòdon* (*katō*, below, *odous*, a tooth; teeth in lower jaw only) *Lin.* — Sir, Most of your readers are acquainted with the character of the whale, his voracity, strength, and enormous size; but few of them can have had, or probably ever will have, an opportunity of seeing this truly gigantic and stupendous fish. Such an opportunity, however, has lately occurred. A male spermaceti whale had, for some weeks, been observed moving around the coasts of Essex and Kent, when, on Monday last (Feb. 16.), it was perceived near Whitstable (a small fishing-town, about six miles from Canterbury), in an apparently exhausted and debilitated state. Some fishermen, therefore, went boldly in quest of him; and, after a short but perilous hunt, drove him within half a mile of the shore, where the wearied animal, having in vain attempted to escape, rolled himself on his back, and almost instantly expired. He measured 62 ft. in length, and 16 ft. in height; a size, I believe, by no means large, some having been caught in the northern seas upwards of 100 ft. Two harpoons were found sticking in his back, which seemed to be very much bruised, owing, probably, to the shallowness of the water in which he had been so long confined. The stench arising from the dead body was almost intolerable, and was smelt at three miles' distance from the sea. I might here enlarge on the curious method of cutting the flesh, extracting the oil, &c.,

but I have already trespassed too long on your valuable pages, and shall, therefore, merely observe in conclusion, that the plates and descriptions, by Bewick and others, are, as far as I could judge from a short but minute inspection, perfectly correct. I am, Sir, &c. — *Perceval Hunter. Kingstone Rectory, near Canterbury, Feb.* 19. 1829.

Capture of a Cachalot on the south Coast. — On the 15th of February a fine spermaceti whale was captured at Whitstable; and such an occurrence being very rare on our coasts, at your request I proceed to state the information respecting it which I have been able to collect; truly regretting, from the imperfect knowledge of these giants of the waters possessed by our naturalists, that none appear to have been able to avail themselves of so excellent an opportunity of removing the many doubts and difficulties respecting the external figure and anatomy of the animal.

The only detailed account of its capture which has been presented to the public has been given in the *Essex Herald*, and that is in some particulars at variance with others, derived from persons who profess to have been eye-witnesses.

According to the first authority, the whale was seen approaching some dredging boats in comparatively shallow water, and the fishermen instantly went in pursuit. Being unprovided with weapons, they threw their anchors on him; and the crew of one boat, of 11 tons' burthen, had the temerity to sail over him; upon which he rose and lifted it above the surface. In this strange warfare fortunately no injury was sustained, except by the whale, whose back retained the traces of the vessel's passage. The fishermen for a long time persevered, and at length harassed him so much that he was driven into shallow water, on the Grass Bank, upon which he threw himself on his back; in which position he continued to bellow loudly until he expired. With the night tide he was floated by a warp upon the rock.

A Whitstable boatman at Billingsgate has communicated to me the following additional and rather varying particulars: — The whale was first observed in shallow water (on the 11th) off the Essex coast. He was immediately attacked by two boats, the men in which trying to kill or disable him, commenced by destroying his sight, and also thrust a sharp bar of wood into the abdomen, which, by the agonised efforts of the animal, was instantly and forcibly ejected, followed by a large quantity of blood. They then attempted to secure him by two very strong cables, and with another fastened a small anchor to his tail. The cables were speedily snapped, and the leviathan broke from his pursuers, but only to meet a more certain fate on the opposite shore. The Whitstable men were more fortunate, the whale becoming stranded upon their coast, and assisting to destroy himself by his tremendous efforts to escape into his native element from the incessant persecutions of his new enemies, who endeavoured to kill him by wounds in every accessible part of his body. The noise of his floundering upon the shingles was compared by our informant to that of all his bones being broken, which, added to his bellowing, was as terrible to the ear as the sight of so vast an animal, exerting his utmost power in a struggle for existence, was to the eye. It was the opinion of this person that he ultimately died from the exhaustion occasioned by his unavailing efforts. The first intention of the captors was merely to disable him, and tow him up alive to London, where they would doubtless have reaped from his exhibition a rich reward for their perilous exertions.

Mr. Gould, who went to Whitstable some days after the death to secure and prepare the skeleton for the Zoological Society, has kindly favoured me with all the information he was able to procure on the spot. He was informed that the whale was left by the tide in only 8 ft. of water on the Essex coast, in which situation he was seen by the master of a French ship, who immediately put off to attack him. He was then so much exhausted by beating about in shallow water, as quietly to suffer a small cable to be attached to his tail, and thus promised to become an easily conquered prize. He was forthwith fastened to the vessel and taken in tow. In about half an hour, however, the tables were turned, the deep water having by that time so much renovated his power, that it was soon apparent he was the stronger swimmer of the two, as he actually towed the ship stern foremost a considerable distance. This trial of strength between two such large floating bodies, so slightly connected, could not last long; the cable broke, and he regained his liberty. Respecting his ultimate capture and death, Mr. Gould's account differs but little. The whale lay upon his side, and not upon his back; which position Mr. Gould thinks it impossible for him to assume, from the sharp ridge of the dorsal line. His death was promptly effected by a seaman in the preventive service, who had served on board a whaler, thrusting a spear in a proper direction, and putting an instantaneous stop to his sufferings.

This whale, which was a male, belongs to that subdivision of the cetaceous animals which are distinguished by their heads being, in appearance, enormously disproportioned to their bodies, occupying about one third of the entire length. Of these there are only two genera, the *P*hysèter, or cachalot, and the *B*alæ̀na, or whalebone whale; and it is to the former that the individual in question belongs. Although these huge monsters of the deep are found occasionally in almost all seas, and migrate, in a limited manner, at particular seasons, they very rarely approach the temperate coasts of Europe, their principal locality being the Frozen Ocean. The following instances of their so doing are, however, on record: — A cachalot was seen off the Kentish coast in 1769; during the life of Sir Thomas Brown (who died in 1774), a very large one was stranded on the coast of Norfolk; in March, 1784, thirty-two young ones were cast on shore, during a violent gale, near Audierne, in France; and, about twelve years ago, a small one was captured in the river Thames, just above Gravesend.

The present subject of consideration may be considered as nearly full grown, being 63 ft. in length, and 36 ft. in circumference. In Griffith's translation of Cuvier's *Règne Animal*, upwards of 70 ft. is mentioned as their usual length, and 52 ft. 3 in. as their circumference; yet, I believe, they are seldom captured exceeding in size the subject of the present article; and it is rather singular, unless a different species had been measured, that Mr. Griffith assigns 15 ft. as the length of the lower jaw, which was precisely that of our smaller specimen. The whale in question yielded 9 tons of oil and a considerable quantity of spermaceti: much of both was, however, unfortunately lost, by oozing out of the wounds, in the interval between its death and *flencing*, as the cutting up is termed by the whale fishermen. The value of the oil is stated to be 80*l.* per ton, making the animal worth 720*l.*, exclusive of the spermaceti. As soon as the prize was secured, the fortunate men despatched one of their comrades to town, to offer it for sale for 200*l.* It is said that he succeeded in his mission, but, by some accident, not returning at the time expected, it was sold to Messrs. Enderby and Sturge, of Thames Street, for 60 guineas, the first purchaser relinquishing his claim; and coppers being erected on the beach by Mr. Sturge's men, the operation of cutting up and boiling the blubber commenced five days after its death: but, even in that short interval, the internal parts had become so insufferably putrid, that the intestines, which were three cart-loads, were carried away and spread on the fields as manure. Mr. Gould afterwards examined these exuviæ, in the hope of discovering ambergris, but was disappointed. This recalls to mind the quaint observation of Sir Thomas Brown upon a similar occasion, as quoted by Dr. Shaw in his *General Zoology* (vol. ii. part ii. p. 500.): "In vain it was to rake for ambergriese in the paunch of this leviathan, as Greenland discoverers and attests of experience dictate that they sometimes swallow great lumps thereof in the sea, insufferable fœtor forbidding that enquiry; and yet, if, as

Paracelsus encourageth, ordure makes the best musk, and from the most fetid substances may be drawn the most odoriferous essences, all, that had not Vespasian's nose, might boldly swear here was a fit subject for such extractions."

Messrs. Enderby and Sturge liberally gave the men 40 guineas in addition to the original bargain, and they also realised 40*l.* by exhibiting the whale on the beach; so that the crews of the boats (which, according to a second account in the *Essex Herald*, were seven in number) were eventually well recompensed for their trouble and risk. The skeleton was presented by those gentlemen to the museum of the Zoological Society; but government having put in a claim to the "royal fish," the whole proceeds of it are under arrest, and the bones now lie whitening on the shore.

Although resembling a fish in their form and in being entirely confined to an aquatic life, the whales, in common with the dolphins and narwhal, are similar in formation and consequent habits, reproduction, &c., to terrestrial quadrupeds, except that they are deficient in hinder extremities, having only rudiments of the pelvic bones, not attached to the spine, and having some of the muscles proper to the thighs, &c. united to form the tail, which is of amazing power, and so deadly a weapon of offence, that a large boat has been upset by a single blow with it. Their ribs (which are fourteen in number in the spermaceti whale) are of course large, but not remarkably thick. One of them is exhibited in St. Mary's church, Redcliffe, near Bristol, as that of the *dun cow* slain by Guy, Earl of Warwick! The anterior extremities, although appearing externally like fins, the office of which they serve, are composed of the same bones as those of other Mammàlia, but those of the arm and fore-arm are short and flattened, and the latter possess no power of rotation. The bones of the wrist are also flattened, and joined together by cartilage; there is no opposable thumb, and the phalanges of the fingers are unequal in number.

The heads of these animals offer the most remarkable departures, in form and structure, from the usual type. Both in the whales and cachalots they are of enormous and uncouth size: hence the specific appellation of the latter is Macrocéphalus. In them they are abruptly truncated in front, from which character is derived the common name, *blunt-headed.* From the head the body tapers gradually to the tail (which is broad, and placed horizontally), having, like fish, no proper neck, the seven cervical vertebræ being very thin, and crowded together so as to form virtually but one bone. From this description of the outline of the animal, it is evident that it is a complete wedge; but, in contradiction to the usual laws of mechanics, this wedge, or cone, moves with its *base* foremost, and, which is most astonishing, proving how seldom analogical theories should be implicitly relied on when applied to vital action, moves with the most astonishing rapidity, literally glancing through the yielding water like lightning through the air. This shows the utility and application of the powerful tail.

This particular formation of the head affords room for that remarkable deposit of spermaceti which is contained between two large rising plates, composed of expansions of the frontal, temporal, and occipital bones. The space between these plates is divided longitudinally into two parts, which, from their vast size, have been aptly compared to caverns. This peculiar secretion has been ignorantly mistaken for the brain, the place of which it apparently occupies, that organ being very small, and situated far back in the head.

Viewing the cranium, when divested of its integuments, &c., as seen in the beautiful preparation of the skeleton in the Jardin des Plantes at Paris, and in one of a head only in the British Museum, this space is not unlike the body of a large gig, or cabriolet. In this the greater portion of the spermaceti is contained in a fluid state during the animal's vitality, and mixed with a small portion of oil; upon standing some time it concretes into nearly a solid mass. The head of the Whitstable whale was, as it were, tapped by driving a bar of wood into it, and the spermaceti flowed out in a full stream. This substance is likewise diffused through various parts of the body in a chain of membranous sacs, which communicate with each other like the air cells of birds; and is also, in small proportion, mingled with the general oil of the blubber.

The spiracles, nostrils, or breathing holes, form another remarkable character of the *C*etàcea; but their structure, which enables the animals to *blow*, or eject water in a fountain, when they rise to the surface to breathe, is too well known to need description. In the present species they unite into one canal, which opens near the muzzle. After being wounded, much blood was mixed with the water spouted by our unfortunate animal.

The mouth, also, affords several marked peculiarities. In the *B*alæ'næ the place of teeth is supplied by an apparatus which can by no means answer a purpose at all similar. This consists of a number of fringe-like plates on each side of the upper jaw. These plates constitute the *whalebone* of commerce: their number sometimes amounts to 500. The cachalot, on the contrary, is furnished on each side with from nineteen to thirty, according to its age, of strong but short and comparatively blunt teeth; but even here an anomaly exists, they being found in the lower jaw only. The upper is covered with a callous gum, as hard as cartilage, and its edge is indented in sockets for the reception of the teeth of the lower. Arguing theoretically, it has been supposed that this structure is only fit for crushing the shells of crustaceous animals; but the cachalots are, unfortunately for this hypothesis, well known to be truly and tyrannically carnivorous, seizing every thing in their way, and, in the words of an author * before quoted, " covering the seas with blood, and pursuing their prey with a bitterness and pertinacity that has scarcely any parallel in animated nature;" in fact, being the insatiate tigers of the ocean. If this predacious habit were, indeed, a disputed question, the present specimen would not tend to decide it, as in his stomach was found only a little fucus, which he had probably snatched in haste from the surface of the waves, with the vain hope of satisfying his hunger and exhaustion, during his painful and protracted chase.

We have had the opportunity of inspecting an eye of this animal at the Zoological Society, and find it precisely according with the descriptions given of it by Cuvier and other comparative anatomists. Its structure is extremely curious. The longest diameter of the whole globe, which is flattened anteriorly, does not exceed 3 in., and that of the iris little more than one. The cavity containing the crystalline and vitreous humours is small and completely spherical, the great bulk of the eye being composed of the sclerotic coat, which is as dense and hard as cartilage. The lens is not larger than that of a haddock, and is spherical like those of fish. The optic nerve is the size of a goose quill, and is singularly surrounded by a very peculiar, soft, spongy substance, like finely reticulated cellular membrane. This substance is rather more than an inch in diameter, and is enclosed in a sheath as dense as the coat of an artery. The muscles of the eye are not distinct as in quadrupeds, but surround the whole ball like a purse, radiating from behind the edge of the cornea. The whole anterior part of the eye was destroyed.

We have few additional particulars to add, and those are from the observations of Mr. Gould. The eyes were sunk into, or rather surrounded by, blubber of nearly a foot in thickness (they were probably driven into that situation by the efforts of the fishermen to blind the animal); the

* Griffith.

mouth was long and narrow; the palate smooth; the roof of the mouth high and arched; the tongue according with the shape of the cavity it had to fill; the stomach simple; the heart about 3 ft. across; and the aorta, of which a section is preserved at the Zoological Society, 15 in. in diameter.

From these dimensions of the parts composing the fountain of life, we can feel no difficulty in giving credence to the apparently extraordinary calculations that have been made respecting the circulation of the whale. Dr. Hunter tells us (in the *Phil. Trans.*) that "ten or fifteen gallons of blood are thrown out of the heart at a stroke with an immense velocity:" upon which Paley observes, "the aorta of a whale is larger in the bore than the main pipe of the water-works at London Bridge; and the water roaring in its passage through that pipe is inferior in impetus and velocity to the blood gushing from the whale's heart."

We must now take leave of the subject, trusting that, should such another visitor approach our coasts, care will be taken to obtain at least a good figure, which, from the insuperable difficulties that surround those who seek them in their native haunts, perhaps does not exist of any of the larger cetaceous animals. — *Henry Woods, A.L.S. &c.* *April* 9. 1829.

Art. IV. *Natural History in Ireland.*

Natural History in Belfast.—The town of Belfast, though containing little more than 40,000 inhabitants, possesses two literary establishments of public foundation: the "Academy," founded in 1786, and the "Academical Institution," founded in 1810. From the similarity of the names, the constitutions, and the original objects of these two seminaries, they are frequently confounded by persons living at a distance. Mr. James Bryce, who is at the head of the mathematical department of the Academy, has lately introduced into his course of geography a series of lectures on mineralogy and geology. His pupils, lads from eighteen to twelve years of age, became exceedingly interested in the subject; some of them attended, as visitors, the meetings of the Belfast Natural History Society, an institution mentioned in a former Number of your work (Vol. I. p. 85.), and at length, one morning at the close of a lecture, they astonished their teacher by a proposal that they should form a Natural History Society for the Academy. The idea was cordially taken up by Mr. Bryce, and the consent of the Principal of the Seminary being joyfully given, the Society was instituted. Its objects are, to give mutual instruction in the various branches of natural history, and to form a museum for the Academy. Its constitution is almost a copy of that of the Belfast Natural History Society. Its meetings are held on alternate Wednesdays in the Academy library, where the specimens are kept; a separate apartment not having been as yet provided for the museum. Mr. Bryce, himself a very young man, is president of the Society, and an ordinary member; and reads his paper in his turn. The writer of this article was present at one meeting of this juvenile association, when, Mr. Bryce being to read, the chair was occupied by one of the vice-presidents, a very manly, gentleman-like, yet modest lad of about fifteen, and the whole business was carried on with as much decorum and propriety as could have been observed by the gravest assembly in the land. Mr. Bryce intends soon to enlarge his lectures, and instead of confining them to his own geographical pupils, to give the inhabitants of Belfast generally an opportunity of attending them. — *I. M'A.* *Belfast, April* 9. 1829.

Art. V. *Calendar of Nature.*

Scotland.

Diagram, showing the Motion of the Mercury in the Barometer, Thermometer, and Differential Thermometer, or the mean, for each ten days of January, February, and March, 1829; as extracted from the Register kept at Annat Gardens, Perthshire, N. lat. 56° 23½′, above the level of the sea 172 ft., by the mean of daily observation at 10 o'clock morning and 10 o'clock evening. (It may be proper here to correct an error in the notice of the meteorological table kept here, in last Number, p. 94., where the latitude is stated to be "56° 33½′," in place of 56° 23½′.)

An unaccountable difference appears between the mean temperature of last year, by the register kept at this place, and that kept at Wycombe Bucks by Mr. Tatem, where the difference in favour of a higher temperature is more than 4½° of S. lat. in favour of Wycombe, and which, according to Mayer's formula, supposing the height above the level of the sea of both places to be the same, should give about 5° of higher temperature at Wycombe than at Annat Gardens, but, in place of this, the annual average is reported to be nearly 2° lower.

As I conceive it to be of much importance to the science of meteorology, as well as the credit of your publication, that such discrepancies should be noticed, and, if possible, avoided in future, Mr. Tatem will excuse me for submitting the method by which I keep my register, and my reasons for adopting this mode. The mean temperature at 10, morning and evening, has been found to coincide nearly with the mean of the daily extremes (see Brewster's *Encyclopædia*, art. Meteorology, p. 159.): from 1822, I have kept a register on this principle, and I have always found the mean annual result to be within a small fraction of a degree with registers kept with the utmost correctness at Kinfauns Castle. Last season, the annual mean at Kinfauns Castle was nearly $\frac{3}{4}°$ above that at Annat Gardens; but this may be accounted for, partly from Kinfauns being 32 ft. lower, and every way better sheltered than this place, though in the same parallel of latitude. The annual mean, by Mayer's formula, of Wycombe should be about 52°, and his formula I have found, in many instances, to approximate very near to the true mean. If Mr. Tatem takes the mean of any *one hour*, without referring to the mean of the daily extremes, it may account for the difference; at any rate, the propriety of avoiding such difference by your meteorological contributors, and of their acting on the same principles in furnishing their observations, will apologise to Mr. Tatem for the liberty I have thus taken, and may induce him to favour us with his remarks on the subject. The calendar which that gentleman has furnished is such as to render it impossible to doubt the accuracy of his observations; the difference must be in the modes in which we take them. After this long digression, I must proceed to explain the diagram: *b* shows the mean height of the mercury in the barometer, by inches, as expressed on the right-hand side; *t* shows the mean temperature, as marked on the index at the left-hand side. The month is divided into three parts, and the lines cross at the mean height of each. The dotted line across each month shows the mean temperature for that month; and the dotted line across the table shows the mean temperature for the three months. The marks show the exact height of rain in the rain-gauge, for the division of time to which it is opposite; the whole will be given in figures at the end of the season. The range of the index will suit the whole season. *h* shows the dew-point, of which the observations commenced at the beginning of what is called the vegetating season, the 20th of March.

The mean temperature this season was, in January $3\frac{5}{10}°$, in February $0\frac{2}{10}°$, and in March $4\frac{2}{10}°$ lower than in the corresponding months of last year. The fall of rain is for the same period $5\frac{1}{2}$ in., or $2\frac{3}{10}$ in. less than last season. The coldest day was on the 21st of January; mean temperature of that, $24\frac{1}{2}°$; extreme cold, 20°; wind, N. The warmest day for the three past months was on the 15th of February; mean temperature of that day, $48\frac{1}{2}°$; extreme heat, 56°; wind, N.W. The mercury in the barometer was highest on the 31st of January; height, $29\frac{7}{10}$ in.; wind, N.E.: lowest on the 17th of March; height, $28\frac{7}{10}$ in. The only loud gales of wind occurred on the 14th and 20th of March.

Calendar of Nature for the Carse of Gowrie, Perthshire.

January. — In this month, which was announced by a storm of thunder on the last hours of the old year, there was not a single fresh day. Snow fell on 10 days; 19 days were cloudy; and 12 clear sunshine. The wind blew from the north and west, 7 days; from the west, 3 days; and from the east and south-east, 21 days. The vocal songsters of the grove ceased their notes, except, occasionally, the robin redbreast, when sheltered near the haunts of men. The high temperature in December had brought the winter aconite (Eránthis hyemàlis) above ground, but its petals did not open till the last day of January.

February. — The temperature of this month being 40°, we have little to record of the progress of vegetation. The wind blew from the north and north-west, 18 days; from the east and south-east, 10 days; 13 days were cloudy, and 15 clear sunshine. Larks began to sing on the 10th; partridges were seen in pairs on the 19th; and wood-pigeons were heard cooing on the 22d.

March. — The wind blew from the east and north-east, 20 days; and from the west and north-west, 11 days. The frost was severe from the 13th till the 18th; on the 15th the mercury in the thermometer fell to 23°. There were only 4 days on which snow or rain fell; 12 days were clear, and 19 cloudy. Peas that were sown on the 14th of February gave a braird on the 31st of March, a period of 45 days; mean temperature of that period, 40°. Rooks began to build on the 6th, regardless of the cold, the same day on which they were noticed to begin last year. The *S*axífraga oppositifòlia opened its beautiful flowers here on the 20th, 16 days later than last season. Apricots on walls are not quite so full in blossom on the 31st, as they were last season on the 12th. Daffodils and marsh-marigold remain to be noticed next month. Wild geese have been rising in flocks within the last three days, attempting to wing their way northward to their summer quarters; but, on observing the snow-clad hills, they wheeled about, and have again settled in the Low Carse.—*A. G. Annat Gardens, March* 31.

Art. VI. *Queries and Answers.*

Lists of Engravings. — If, in your future Numbers, you would, when reviewing zoological works, exhibit a list of the engravings which they respectively contain, you would, by so doing, render your Magazine additionally useful, and would confer, at the same time, a particular favour on, I am persuaded, a numerous class of your country readers, who must have often felt the same inconvenience, in this respect, with myself. The works to which I more particularly allude are such as the *Zoological Journal, Selby's Ornithology, Selby and Jardin's General Ornithology, Griffith's Edition of Cuvier, Swainson's Zoological Illustrations,* &c. &c. — *A. C. R. March* 31, 1829.

The Guinea-pig (Càvia Cobàya). — What are the colour and habits of this animal, in its wild state? It was known to the Romans, and, I believe, it is also a native of South America, but this is all I know. — *C. Lamb. March* 3.

Donovan's Eggs of British Birds. — Have any more than four numbers of this work come out, and is it to be continued? I have heard nothing of it since Feb. 1827. — *A. C. R.* [See the answer to J. D. Salmon below.]

British Birds' Eggs. — Which is the best work, with *coloured* plates, on British birds' eggs, and, at the same time, the cheapest? Are the plates of the *Ovàrium Británnicum*, by George Graves, Esq. F. L. S., well executed? — *J. D. Salmon.*

I am sorry to be obliged to say there is no English work on birds' eggs that I can venture to recommend. Mr. Lewin's is expensive, somewhat incorrect, and, unless one of his very early and best copies can be procured, but very badly coloured. The *Ovàrium Británnicum* of Mr. Graves, only part i. of which has appeared that I am aware of, and that so long ago as 1816, contains but a small portion only of our British birds' eggs, and but imperfectly executed. Mr. Donovan has published four numbers, at 3*s.* 6*d.* each, of a work on British birds' eggs, containing about seventeen in the whole, and not on that account only somewhat objectionable. The best work on eggs, that I am acquainted with, is Naumann and Buhle's

Eggs of the Birds of Germany (with Latin names), five numbers of which are already published. I obtain my copy from Mr. Wood, 428. Strand, at about 14*s*. each number. The five numbers contain together about 200 eggs. I possess parts only of two other German works on eggs. — *W. Y. March* 10. 1829.

Habits of the Kingfisher.—Sir, In the remarks of S. T. P. of Leeds, on the habits of the kingfisher, in your first Number (p. 23.), is not a circumstance upon which, I believe, all naturalists do not agree, entirely passed over, namely, the nest of the bird being made of fish bones? This, as far as one instance may go, I can confirm, having taken a nest whilst at school. It was situated in the bank of a pool well stocked with fish, in Shropshire, in a burrow about four feet in length, the end of which was considerably enlarged, and contained about as many small fish bones as would fill a quart pot. They were disposed so as to form a nest, in which were seven beautiful eggs just such as described by S. T. P. with respect to figure and colour, and of, I think, a large size for the bird. Whether the burrow was formed by the kingfisher itself, I do no not know, but am inclined to think it was not, as there were several sand martens' burrows in the same bank. Yours, &c. — *F. July* 30. 1828.

Feet and Legs of the common Heron. — Sir, Many years ago an opinion was held among the fishermen of this neighbourhood, that the feet and legs of the common heron (*A'*rdea màjor) had something in them very attractive to fishes, and particularly to eels, which enabled that bird, when standing in water, to congregate his prey about him, and to take it with greater facility; it was, therefore, a desirable object, among the fishing amateurs, to procure such feet and legs and to extract the little oily matter they contained, wherewith to anoint the worms forming the bait of, what is here called, a "Reball," with which eels are generally taken. I have heard but little said of this of late years; probably, it has been discovered to be an erroneous opinion, and may have been only a conjecture, arising from the observation of the wonderful provision which Nature generally affords to supply the wants of its creatures, a most striking instance of which is recorded in the last Number of your excellent Journal (p. 64.) under the head of "Great American Bittern," where it is said, that "Wilson has omitted to state a most interesting and remarkable circumstance attending that bird, which is, that it has the power of emitting a light from its breast, equal to that of a common torch, which illuminates the water so as to enable it to discover its prey." This has brought to my recollection, that most, if not all, birds of the *A'*rdea genus, but especially the common heron, have on their breasts a considerable space void of feathers, the place of which is supplied by a well-defined dense tuft of down, to which is adherent a peculiar farinaceous substance, clammy, and unctuous to the touch.

It has always appeared to me very strange, that no ornithological writer which I have consulted has conjectured the use of this appendage, nor do I recollect having seen its existence very particularly mentioned. May it not be given to the bird for a purpose analogous to that of the organ by which its congener, the American Bittern (possibly by some electrical operation), produces the light, which must be so useful to him in taking his prey, and perhaps of enticing it within his reach, agreeably to a method found so successful by the fishermen of the Antilles, and of other parts of the globe; or is it a conveniently placed repository of oily matter, to be used for the purpose of smoothing the waters, when ruffled, to enable him to see how to strike his prey with greater certainty, similar to the well-known practice of the fishermen of the Mediterranean? I hope some of your correspondents will make their observations, and give their opinions on this subject, if you think it worthy of enquiry. I am, Sir, &c. — *R. A. Bridgewater, March* 20. 1829.

A Species of Plover was shot by my brother last winter, which nearly agrees in colour with one described by Dr. Turton, as a variety of the golden plover inhabiting the island of St. Domingo; but I think, from its superior size and some other distinctive marks, ornithologists might be disposed to make it a separate species. I made a memorandum, at the time, of its colours, &c., as well as I was capable, which is as follows: — Bill near an inch long, dark brown; head, hind part of the neck, back, and covers of the wings, dark brown tipped with ochraceous, which gives it a spotted appearance; legs dark, with three toes, which have a membrane extending to the first joint, no spur; cheeks, chin, and upper part of the breast, like the missel thrush; the remaining part of the breast and belly white, with large black spots. Length 10 inches; breadth 21 inches from the tips of the wings. It is here a scarce bird, and solitary. The golden plover generally comes here in small flocks. I should be glad to be informed by any of your numerous correspondents (if they can make it out from this description), whether it frequents any other part of the island of Great Britain; and if so, whether single or in small flocks. — *Thomas Hawkins. The Haw, near Gloucester, June* 18. 1828.

European singing Birds in India. — Perhaps some of your correspondents may be able to inform you whether European singing birds are as highly valued in the East Indies now, as it appears by the following note of the prices given for some that they were in January 1782. It is extracted from an account book of the late James Graham, Esq. of Rickenby, near Carlisle, who resided in India above twenty years: 11 goldfinches, 66 Racary rupees (rather more than 2*s.* each); 1 blackbird, 40 *rup.;* 1 thrush, 30. *rup.;* 1 nightingale, 26 *rup.;* 1 lark, 25 *rup.;* 3 goolsarahs, 24 *rup.* Can any of your readers inform me what kind of birds the last named are, and how the others thrive in the climate of India? I am, Sir, &c. — *W. C. T. March*, 1829.

Scólopax Sabìni.—Where could I obtain a coloured representation or any details regarding the *Scólopax* Sabìni? — *A. C. R. March* 31. 1829.

The Bird with a Sound like the Bleating of a Goat. — Sir, For the satisfaction of your correspondents, J. N. and J. M. (Vol. I. p. 297.), I need only refer them to Montagu's *Ornithological Dictionary*, title " Snipe, common," where a description of its habits in the spring will be found recorded almost in the words of J. N. Lest that useful but now rare book should not be in the possession of either, I will copy Montagu's description. " In the breeding season, the snipe changes its note entirely from that in the winter. The male will keep on wing for an hour together, mounting like a lark, uttering a shrill piping noise; then descend with great velocity, making a bleating sound, not unlike an old goat, which is repeated alternately round the spot possessed by the female, especially while she is sitting on her nest.' Only a few of the snipes remain with us the whole year. The provincial name, heather-bleater, will be found in Montagu's *Appendix*. Neither the sanderling nor whimbrel, as supposed by J. M., have, I think, any claim to the above habits. — *J. F. London, Sept.* 23. 1828.

The Bird with the Sound like the Bleating of a Goat. — Sir, In your Magazine (Vol. I. p. 297.) I find that an erroneous answer has been given to your querist, J. N., respecting the bird called the heather-blite. The bird in question was, without a doubt, the common snipe (*Scólopax* Gallinàgo *Lin.*). As snipes do not leave this country in the breeding season, I have had frequent opportunities of observing them whilst in the act of making the peculiar sound alluded to by your correspondent, and which they never make at any other season. If you will look into Bewick, you will find that heather-bleater is put down as a provincial name of the common snipe. — *J. G. C. Ballitore, County Kildare, Dec.* 6. 1828.

The Sound of a Bird resembling the Bleating of a Goat (Vol. I. p. 297.) — The bird that your correspondent, J. N., is desirous of obtaining the name of is the common snipe (*S*cólopax Gallínula). Had he applied to any of his sporting friends, they would have informed him that heather-bleat (Scotice, blite) is a common provincial name for that bird, and that they very commonly make the noise which he describes J. M., in answering J. N.'s query, could scarcely have fixed on two birds more unlike to each other in their call than *C*haràdrius Cálidris and *S*cólopax phæ`opus, and in whose call, when I have heard them, I could never perceive the least resemblance to the bleating of a goat. I presume he has never had the following familiar ornithological puzzle propounded or expounded to him: —

> "The cuckoo and the gowk,
> The lavrock and the lark,
> The heather-bleat, the muire snipe,
> How many birds is that?" — *J. V. S.*

*P*ìcus *minor and máximus.* — Perceiving that some of your correspondents have mentioned *P*ìcus mìnor as a bird of extremely rare appearance, I beg leave to inform them that it may frequently be met with in all the woods near Leith Hill, a place fully deserving the attention of, and every way adapted as a residence for, the naturalist. The salubrity of the air, the soothing music of the neighbouring groves, and the many scarce and beautiful plants flourishing in the copses, have justly rendered Leith Hill an object of admiration and delight to all those who have hitherto visited this romantic and picturesque spot. The nuthatch, so beautifully described by your correspondent, S. H. (Vol. I. p. 328.), is there often heard hammering in the woods, and *P*ìcus máximus (the last a name of my own), another bird that I may probably send you some notice of. I am, Sir, &c. — *Perceval Hunter. Dec.* 23. 1828.

Derivation of the Name John Dory. — Is it not plain *jaune dorée* as the French fishermen call it? — *M.*

Winter Quarters of Frogs. (p. 103.) — On the approach of winter, frogs retire from their drier and shady haunts, to ponds, wet ditches, or rivers; under the grassy margins of which they sink and lodge themselves among the mud, out of the reach of frost, and of their natural enemies. In such situations they may be found congregated in great numbers, remaining inactive till the return of spring calls them to the important business of procreation. Their colour becomes much darker during their submersion, and they are then often mistaken for toads. — *M.*

The Tick which moved on a deceased Part of itself. (p. 103.) — This appearance, in all probability, was only a consequence of the pedicle, which attaches the thorax and abdomen, being elongated by the force applied in extracting it from its hold on the dog, and which enabled the body and legs to turn and surmount the floating abdomen. — *M.*

Frogs dormant during Winter. — Sir, In answer to your querist J. B. (p. 103.), whether frogs lie dormant during the winter or die, I can satisfactorily assure him that they do *lie dormant;* for I observed, on the 18th of March ult. in a ditch of stagnant water, about a furlong from the river Ouse, a number of frogs in the act of spawning, they were full grown and of a dark mould colour. On the 21st, the ditch was frozen over and not a frog was to be seen, but on the sun thawing the ice, I could observe them emerging from holes at the bottom of the ditch, which appeared to penetrate into the bank a considerable distance, so that there is no doubt but that they lie dormant at the bottom of deep stagnant ditches; or they penetrate into banks, under water, sufficiently deep to be out of the reach of frost. As a proof that they do *not die* during the winter

I believe, according to naturalists, they do not propagate till they are three or four years old. Again, were they to die during the winter, how could they be found in companies of several hundreds in the spring, and full grown? — *W. H. White. Bedford, April* 3. 1829.

Distinction of Sex in Frogs, and whether it is the Male or Female that croaks. — As I have never been able to perceive any *external distinction* between the sexes of frogs, I shall be glad if any of your correspondents can inform me, whether the male impregnates the eggs before or after emission. Also whether it is the male or female that croaks, and whether they croak, according to the old adage, on the approach of wet weather, or only at the time of spawning. I am, Sir, &c. — *W. H. White, H. M. C. S. Bedford, April* 3. 1829.

A Jelly-like Substance supposed to be the Remains of Frogs (in answer to *J. B.* p. 103.). — Sir, I found a mass of this jelly last winter, together with the bones of the animal whose flesh had been thus decomposed: I have been informed that at night it is luminous, which is I think very probable. This substance has, I believe, been sometimes taken for a plant of the genus Tremélla. In *Withering's Botany*, under the head of T. *Nóstoc*, is the following notice of it: — "After very severe frost, I have frequently found a gelatinous substance, which from a careless observation might pass for a Tremélla, but it is the remains of frozen frogs. This substance does not shrivel up in dry weather as the Tremélla does, nor is it plaited and waved; and generally some of the bones of the frog may be found in it. After the severe winter of 1789, I found great quantities of these on the edges and in the water of ponds." — *W. C. T. March*, 1829.

The Jelly-like Substance in which your correspondent B. (p. 103.) noticed the remains of the head and feet of frogs, might probably be the dung of the heron, as I have witnessed something similar by the sides of ponds visited by those birds. — *H. D. Richmond, March* 25. 1829.

Psalm-singing to Bees. — Sir, I have made every possible enquiry relative to the custom of psalm-singing to bees (Vol. I. p. 303.), but have been hitherto unsuccessful as to the particular circumstance stated, but I have learnt from apiarians, that such custom does not prevail in this country, and that the circumstance to which you alluded was an *individual superstition.*

The apiarians of Bedfordshire have a custom of *ringing their swarms with the house-door key, and the frying-pan*, and if a swarm settles on another person's premises, it is not recoverable by the owner, unless he can prove the ringing, but it becomes the property of that person upon whose premises it settles. — *W. H. White. Bedford.*

Ants and Aphides. (p. 104.) — Sir, I have made some further observations on the aphides found adhering to the root of the endive; and I have been much amused by watching them, and the ants attending them. I observed that the ants first proceeded towards the head, or fore part of the aphis, and with its head or forceps gently moved the body of the aphis, which immediately commenced a rapid vibratory motion with the long legs proceeding from the centre of its body; it also emitted, from the extreme point of the abdomen, a pellucid drop of liquid which the ant greedily collected, and again proceeded to agitate the body of the aphis; taking it gently up with its forceps, and inducing it to emit another discharge of liquid. The aphis did not seem to dislike their operations, nor did it attempt to avoid the ant, but continued to feed quietly. Other ants were similarly employed, whilst others, I observed, disengaged the aphides from the root of the plants to which they adhered, and carried them to their subterraneous abode. Though the aphides made considerable resistance, and in point of size were equal, and often superior, to the ant, yet by perseverance and greater strength, they were conveyed struggling at every step to the strong hold of the ant. I removed an aphis some distance from the endive root, and immediately an ant was despatched to fetch it back: I then observed that the ant was very cautious as to the manner in which it seized the aphis, evidently carrying it so that it might give the least possible uneasiness to the insect. I several times disengaged it from the grasp of the ant, which would not be deprived of its prey, but invariably seized the aphis by the same part of the body (exactly behind the long legs), nor could I prevent the ant from searching for it. At length the ant entirely removed its prey; and on my disturbing the earth surrounding the endive, I observed many ants conveying aphides to their cells. I removed one of the roots to a considerable distance, into fresh mould; carefully destroying every aphis upon it, amounting to some hundreds. Another root I also removed, leaving a few aphides attached to it; after a lapse of some days, I looked at both the roots, and found the first, which I had freed from insects, still without them. They had not increased on the second root, but those that remained were attended by ants, though at some distance from their former quarters, and there were proceeding as I have before described. I had the curiosity to taste the liquid which seemed to attract the ants, and which they invariably yielded on being touched, and found it sweet, though slightly bitter, arising, I have no doubt, from feeding on the endive. I cannot discover this species of aphis on any other plant. Query, is this the puceron of Hubert, of which he gives so interesting a history in his work on the ant? Yours obediently. — *Walter Henry Hill. Newland, Sept.* 22. 1822.

Aphides on Endive and Lettuce. (p. 104.) — If the insects described by your correspondent Mr. Hill were environed by a white cotton-like substance, they are the same species which usually infest the roots of dandelion. Although it cannot be affirmed that "all the aphis tribe produce honey dew," it is very probable that the excrement of all is of a saccharine quality. Wherever ants are busy, they are in quest of something edible either for themselves or young: and where it is not spontaneously supplied, they will destroy an insect, or nectariferous flower, to obtain it. — *M.*

Wood Leopard. — Sir, In answer to your correspondent A. Mathews (p. 67.), I beg leave to state that the larva of the wood leopard does change into a pupa, in the *tree just beneath the bark* in a thin web. When ready to change, it forces its way out by means of *bristles or prickles on each ring* pointing backwards, so that as it alternately contracts and lengthens itself, they catch against the sides of its hole, and enable it to push hard enough to break away the bark into a hole *larger* than necessary for the escape of the moth. I observed this in one which had penetrated a garden service tree; there were two more larvæ in the same tree, which I did not obtain, but I have now four from a quince tree, two apparently full grown, and two half grown. Hence I conclude they are two years in a larva state. In this as well as other respects (size and colour excepted), the larvæ of the wood leopard resemble the larvæ of the willow goat, the pupæ of which have bristles on the rings likewise, and for the same purpose. — *G. H. Clapton, March* 5. 1829.

A very minute Insect alighted on my coat sleeve; I think it belongs to Ephémera, and to the first division of Turton, having three hairs or bristles. Wings two, hyaline, immaculate; abdomen white except on the back, the segments of which are spotted with dark brown; under part of the abdomen and legs snow-white; bristles of the tail white; head and thorax dark. It approaches nearest to the E. halteràta than any that I see in Dr. Turton, who refers to *Degeer's Ins.* 2. tab. 17. fig. 17 and 18.; but his description does not exactly agree, neither does he mark it as a British insect. Length, about a line from head to tail, without the bristles, each wing about a line in length, and as much in breadth. When living, the wings being rounded and erect, they are nearly fan-shaped. — *Thomas Hawkins. The Haw, near Gloucester, June* 18. 1828.

Larvæ of Lepidóptera. — Late in the autumn (October), after two or three severe frosty nights, I observed hundreds of the larvæ of a species of *P*apílio or *P*halæ̀na affixed to the stalks of grass, frozen to death (although in some of them life was not quite extinct). They were smooth and of a dark brown, nearly black, something the colour of Cologne earth; the head was of a shining black colour. Can any of your numerous correspondents, from this incomplete description, tell me what species of caterpillar it is? Does the larva of the meadow butterfly put on this colour before it changes into the pupa state? — *Id.*

A Sea Spider.— Sir, One day last month, as a fisherman on this coast was dragging up his net, he found an *intruder* had entangled itself in the meshes of it; which said intruder has since been exhibited under the denomination of a "Tarantula Sea Spider." It certainly, in many respects, resembles the spider, but in others materially differs from it. It has eight legs, which are not jointed; and appear to be similar, both in form and situation, to the *rays* of the *S*èpia officinàlis. (Vol. I. p. 278. fig. 147.) It has but two eyes, which, when alive, were green, and are placed on the back of the thorax. It has no head, and is destitute of palpi. The mouth is beneath the abdomen, and inside of it is a spiral tongue nearly half a yard long, the extremity of which is armed with a pair of forceps. The *spinner* is very large, out of which the exhibiter took a web, but unluckily had thrown it away. The abdomen is oval, in form a little resembling the *A*rànea marginàta. The colour of the insect is that of a pickled tongue, which, probably, may be accounted for by the pickle that had been used to preserve it; namely, of bark, alum, and salt. You may form some idea of its size when I add, it weighed 5¼ lbs. Many wonderful stories are told of it when alive; such as that it run with the velocity of a race horse, and changed colour every instant. The form of it is oval, and the abdomen terminates with a horny spike, nearly 3 in. in length; which, when alive, was invisible. Mr. Murray, the owner of it, intends to exhibit it in London, in about a month, and he may he heard of at the Bazaar in Portman Street North. Pray what is it? I am, Sir, &c. — *M. C. G. Margate, Oct.* 22.

The Worm found among Herbage by W. W. (p. 103.) — Sir, I have frequently found worms of the same description in puddles after autumnal showers, and once saw a smaller one twisting round some plants. My opinion has been, that they fall down with the rain; and their appearance may be accounted for precisely as that of the small frogs mentioned in the same page of your Magazine, said to have occurred at Rouen. The largest I have seen measured less than 4 in. when unrolled, and much resembled a piece of dull-coloured copper wire; one end of the worm had a small bristle-like appendage, with a small knob at the end, projecting from a convex abrupt end, about the twelfth part of an inch long. When cutting they feel hard under the knife; the inside appears like a white pithy substance. During motion it was frequently, for half the length, rolled into small circular rings: while the other half of the length was thrust out into a very obtuse angle, at about one fourth of its length. Some of the country people assert them to be animated horse-hairs, which fall from the tails of horses when drinking, and afterwards become eels; and it is not an easy matter to persuade them otherwise. Perhaps some of your correspondents could better describe them, and their species and habits. I have observed the smaller ones much whiter in colour than the larger. I do not recollect to have seen them in ponds, and can scarce think them intestinal worms. — *H. D. Richmond, March* 25. 1829.

A curious Worm. (p. 103.) — The Górdius aquáticus is as often met with on the surface of garden or other ground, in wet weather, as it is in water or clay, its common habitat. — *J. M.*

The Górdius aquáticus is not unfrequently found to inhabit the intestines of insects. De Geer mentions these worms being found in grasshoppers.

Dr. Matthey, likewise, mentions one of these worms being found in the body of a certain grasshopper (*A'*cnida viridíssima) which was no less than 2½ ft. in length. Wherefore I think it probable that the afore-mentioned worm was voided by some insect. — *C. Lamb. March* 3.

Art. VII. *Retrospective Criticism.*

Lists of Plants. — Sir, Excuse me for hinting that your botanical readers would be more highly gratified if the botanical notes (Nótulæ Botánicæ), in your Magazine of Natural History, were more extensive, and the lists of rarer plants, sent you from time to time were more select. Of what are called *rarer plants* noticed in the vicinity of Bath, not more than about a dozen are anywhere uncommon; while, properly speaking, there is hardly one rare plant enumerated. They are, with the above exceptions, common in all places where flowers grow, except on the sea-shore or the rocks of Cairngorum. Few of them would be deemed rare at Johnny Groat's House, or the dismal regions of *ultima Thule.* But the contribution of such lists as contain the more uncommon and rare species with their localities, would be of immense advantage to the botanist, as he might either visit the places where his favourites are found, or put in requisition the services of his friends and connections for procuring specimens of them. Your botanical correspondents might also send queries to be answered by other correspondents. Thus, "A. B. wishes to be informed, &c., where the following plants are to be found growing naturally: Pinguícula lusitánica, Fragària vésca, &c. &c." The reply might be as concise as the query: thus, "Pinguícula lusitánica, Potton Marshes; Fragària vésca, Box Hill, Surrey."

It would also be desirable to have a description of the soil and habitation in which such plants are chiefly found. This would assist the botanist in finding them, and enable the florist to cultivate them successfully in his flower-beds and open borders. Some plants generally grow on a clay soil, some on chalk or limestone beds, some on sand, others on loam; some thrive best in the shade, others in exposed situations. Instead of the uninteresting notices of white harebells, violets, &c., which are well known even to children, the physiological botanist would both amuse and edify us by describing the characteristics, habitats, and conformation of those plants which have any thing peculiar in these respects. Facts such as the following might, perhaps, be explained and illustrated: — Why the common primrose (Prímula vulgàris) when cultivated becomes double and assumes a lilac colour, while the oxlip and cowslip (P. elàtior and P. vèris) retain their original form and colour under the same circumstances, though individuals of the same family as the primrose. Why some flowers, such as the night stock, and some plants of the natural order *Orchídeæ*, are odoriferous only towards evening or at night. Whether different species of herbaceous plants can be budded or grafted on the same stem, as different species of roses can be produced on the same tree. These and many other things of a like nature would be invaluable to your readers, and put in exercise the talents and ingenuity of your correspondents. — *S. Palmer. Chigwell, Essex, Sept.* 1828.

The Dog not the only brute Animal that Dreams. — "Dormit auditu acutiore, *somniat*."* (*Lin.*) In your Magazine, Vol. I. p. 377. there is an extract from the *Medical Gazette,* in which it is stated that "the dog is the

* "He sleeps with sharper hearing, *he dreams*."

only animal that dreams." I do not know how this position can be satisfactorily maintained, involving, as it does, the necessity of proving a negative, and being also contrary to what we should *a priori* expect. The fact that dogs do dream, I conclude the writer thinks sufficiently established by the circumstance, so commonly to be observed, of the convulsive motion of the feet, tail, and jaws, accompanied too, sometimes, with a short bark or yelping, to which these animals are subject during sleep; from which it is reasonably inferred that they are dreaming of pursuing their prey, &c.; and I feel no disposition to deny the conclusion drawn from such premises. But surely the same may be predicated of cats also, who are subject, in a high degree, to the very same convulsive motions during sleep, as I have myself repeatedly witnessed. — *W. T. Bree. Allesley Rectory, Nov.* 13. 1828.

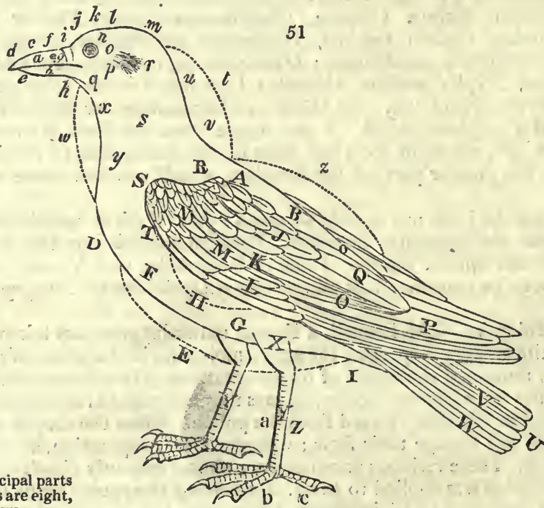
Mr. Babington's List of rare Plants in the Neighbourhood of Bath.—A correspondent at Bath has sent you lists of what he calls the *rarer* plants and insects found in that neighbourhood: among the plants, I was surprised to find Campánula rotundifòlia, *V*ìola trícolor, *S*olànum Dulcamàra, *A*lísma *P*lantàgo, Epilòbium hirsùtum and parviflòrum, Adóxa Moschatellìna, Bùtomus umbellàtus, *O*'xalis Acetosélla, *L*ýchnis dioíca, *L*ýthrum Salicària, *R*esèda Lutèola, *S*piræ'a Ulmària, *C*helidònium màjus, *N*ùphar lùtea, *M*éntha hirsùta, Linària vulgàris, *H*ypéricum perfoliàtum, *T*ragopògon praténsis, *E*upatòr*ium c*annábinum; *O*'rchis mòrio, maculàta, and máscula; Listèr*a* ovàta, *T*ýpha latifòlia, Hùmulus Lùpulus, Tórtula subulàta and muràlis, *B*rýum argénteum. All these I reckon among our more frequent plants in this neighbourhood. I am aware that the local Floras vary according to soil, situation, &c.; but most of the above plants I considered common in the greater part of the kingdom, which was the cause of my surprise.

Of the *insects*, I am not so able to speak: but Dýticus marginàlis and Nèpa cinèrea are frequently met with; Panórpa commùnis in the greatest abundance, and *S*phínx *l*igústri, Pygæ'ra Bucéphala, and A'rctia càja so often as not to be considered at all scarce. — *Daniel Stock. Bungay, Nov.* 17. 1828.

Active Molecules. — M. Raspail, a French naturalist, who has taken much interest in the enquiry respecting the active molecules in the grains of pollen, has recently published the result of his observations. He will not admit that these granules are organised bodies, he says they are minute resinous concretions, formed in the fluid ejected from the pollen. When the drop is evaporated they do not change their form; whereas, after evaporation, all animalcules collapse. These resinous granules were almost instantly dissolved when a drop of alcohol was applied to them. Respecting the spontaneous motion supposed to be found in all inorganic substances, he says: "I have never discovered the smallest trace of it." M. Raspail mentions some of the causes of external agitation, which I enumerated in my paper on the subject in your last Number; but the most important one, the existence of animalcules in river and cistern water, he has omitted. There is a species of Monas, which Muller says is so small and transparent, that it is exceedingly difficult to throw the light in such a manner as to make them perceptible with the microscope, but at times the whole mass of water seems full of them; minute opaque particles, placed in such water, will appear to be driven about by inherent spontaneous motion.

Dr. Brewster, perhaps the most competent microscopic observer in Europe, has also published a paper on the subject in the *Edinburgh Journal of Science* for April. He says, in examining the grains of pollen, "I have never perceived a single motion in the least degree characteristic of animal life." It would have been more satisfactory if Dr. Brewster had also stated the result of his own observations. On the motions of inorganic molecules, he considers the question decided by the antecedent improbability of their existence. I concur in opinion with Dr. Brewster, from having attentively examined various mineral substances, but I think a naturalist so eminent as Mr. Brown should be answered by facts, and not by conjectures; and the more so, as Dr. Brewster's opinion, in the same paper, respecting a planetary motion of the molecules, will by many be deemed as improbable as Mr. Brown's opinion of their possessing spontaneous motion. Yours, &c. — *Robert Bakewell. Hampstead, April* 4. 1828.

Terminology of Birds. — Sir, Your having in your Magazine (Vol. I. p. 121, and p. 276.) furnished us with the technical names of the various parts of birds, shows your anxiety that your readers should be well grounded in the study of ornithology, yet I think your list of names of the various parts of birds are deficient in arrangement, which renders them more difficult to commit to memory than they would otherwise be. I have from these lists arranged one for my own convenience, of which I send you a copy; in it I have omitted the terms "tridáctylos," &c., which are not names of a part of the animal, but only descriptive of the formation of the foot. — *Thos. Thompson. Hull, Sept.* 9. 1828. [For more convenient reference, two cuts which appeared in Vol. I. are repeated.]



The principal parts of birds are eight, as follows: —

1. Róstrum, the bill, which is divided into 3 parts.
   1. Maxílla the upper part of the bill, which is subdivided into 5 parts (*fig.* 51. *a*)
      1. Nàres, the nostrils (*g*)
      2. Dértrum, the hook (*d*)
      3. Cúlmen the ridge (*c*)
      4. Mesorhínium, the upper ridge (*f*)
      5. Cèra, wax on the bill (*fig.* 52. *a*)
   2. Mandíbula, the lower part of the bill (*fig.* 51. *b*)
   3. Gònys, the point of the Mandíbula (*e*)
2. Càput, the head, which is divided into 17 parts.
   1. Lòrum, the naked line at the base of the bill (*fig.* 51. *i*, and 52. *b*)
   2. Língua, the tongue.
   3. Fróns, the forehead (*fig.* 51. *j*)
   4. Capístrum, the face (*k*)
   5. Sínciput, the hinder part of the head (*m*)
   6. Règio opthálmica, region of the eyes (*o*)
   7. O'culus, the eye.
   8. O'rbitæ, the orbits or centre of the eyes (*fig.* 52. *o*)
   9. Supercílium, the eyebrow (*fig.* 51. *n*)
   10. Témpora, the temples (*p*)
   11. Gèna, the cheek (*q*)
   12. Crísta, the crest (*fig.* 52. *n*)
   13. Córnua, the horns.
   14. Bárba, the beard (*d*)
   15. Méntum, the chin (*e*)
   16. Aúres, the ears (*fig.* 51. *p*)
   17. Règio parótica, protuberance behind the ear (*r*)

3. Cóllum, the neck, which is divided into 2 parts (*fig.* 51. *s*).
   1. Cérvix, the hinder part of the neck, which includes 2 parts (*fig.* 51. *t*).
      1. Nùcha, nape of the neck (*fig.* 51. *u*)
      2. Auchènium, part below the nape (*v*)
   2. Gúttur, the throat, which is subdivided into 4 parts.
      1. Carúnculæ, wattles (Vol. I. p. 124. fig. 56. *d*)
      2. Gùla, the gullet (*x*)
      3. Júgulum, the lower throat
      4. Sáccus juguláris, or Inglùvies, the crop.

4. Dórsum, the back, which is divided into 5 parts.
   1. Interscápulum, between the shoulders (*fig.* 51. A)
   2. Hùmeri, the shoulders (R)
   3. Térgum, the middle of the back (B)
   4. Scapulàres, the scapulars (*fig.* 52. *i*)
   5. Uropýgium, the rump (*fig.* 51. G, and 52. *v*)

5. Córpus, the body, which is divided into 7 parts.
   1. Péctus, the breast, (B)
   2. Axíllæ, the armpits (T)
   3. Abdòmen, the abdomen (E)
   4. Hypochóndria, the sides of the abdomen (H)
   5. Epigástrium, the stomach (N)
   6. Vénter, the belly (G)
   7. Críssum, the vent (I)

6. A'la, the wing, which is divided into 7 parts.
   1. Flexùra, the bend of the wing (S)
   2. Téctrices majòres, largest wing-coverts (L)
   3. Téctrices mèdiæ, middle wing-coverts (M)
   4. Téctrices minòres, smallest wing-coverts (N)
   5. Primàriæ, quills (P)
   6. Rémiges, rowers (Q)
   7. A'lula spùria, bastard wing (*fig.* 52. *v*)

7. Caúda, the tail, containing 2 pts.
   1. Réctrices intermèdiæ, or Téctrices caúdæ intermèdiæ, the middle tail feathers.
   2. Réctrices lateràles, or Téctrices caúdæ lateràles, the side tail feathers.

8. Crús, the leg, which is divided in 3 parts.
   1. Fémora, the thighs (*fig.* 52. *x*.)
   2. Tíbia, the part from the thigh to the foot, which contains 2 parts.
      1. Acrostársium, the front of the leg (*fig.* 51. *a*)
      2. Calcària, the spurs (Vol. I. p.124. fig. 56. *c*)
   3. Pès, Plánta, or Társus. the foot, contains 3 parts.
      1. Dígiti, the toes (*fig.* 51. *b*)
      2. Hállux, the great toe (*c*)
      3. U'ngues, claws (Vol. I. p. 124. fig. 56. *f*)

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A Cloud of Witnesses in favour of the Motion of Ultimate Molecules (p.46.). — Erasmus mentions, I think in his "Spectrum," that a man stood in the streets of London, looking at the clear sky with astonishment, and uttering fearful exclamations. The passengers paused to enquire the cause: "Do you see that monstrous dragon?" At first, they were incapable to discover any thing, but, after intense gazing, one saw the tail move, another then saw the head, a third described its colour, and so on, till, by the force of sympathy, the whole crowd saw the dragon very plainly. Your reviewer's "*cloud of witnesses*" proves that the present people of London can see as strange things, as those who lived in the days when it was visited by Erasmus. — *Y. T. H.* *March* 2.

Gray's Natural Arrangement of British Plants.—You have not inserted the query I sent you on this book. [We sent it to an eminent botanist, whose answer we did not think it advisable to insert; but we now regret not having done so.] The expression in *Smith's Flora* is, "I have also, for the first time in a general British Flora, introduced the natural orders of our plants;" which is, supposing he knew of Gray's work, a palpable falsehood. I have heard the increased number of terms, and the multiplication of genera, in Gray, objected to; but is not this the consequence of the progress of science towards perfection? If organs are really different in form, although intended for similar purposes, such as seed-vessels, surely it is better to designate such organs by a particular term, which at once conveys to the student the idea of the form and construction of the part in question. But some of your readers will favour me with an opinion on the subject; because the work, if it has any merit, ought not to be cast into oblivion, merely because this or that author, however high he may stand, chooses to pass it over in silence. It has one advantage over all other works of the kind, in the English names being generally a translation of the Latin names; and if the derivations of the generic names had been given, it would have been, in this respect, complete. — *D. S. July* 28. 1828.

Geological Arrangement of British Fossil Shells. — Sir, In the Table of the Geological Arrangement of British Fossil Shells, which you did me the favour to insert (p. 26.), an accidental transposition of a line, in the press, has occasioned an error it may be useful to correct. At p. 34., the genus Sòlen should commence with the upper green sand, which formation, by the inadvertent transposition alluded to, is placed two lines above, under the genus Saxícava. It becomes the more desirable to point out this circumstance, because it is the first time, I believe, that the occurrence of Sòlen in any but the tertiary beds has been noticed.

At present only one species of Sòlen, S. affìnis of the London clay, seems to have been noticed in our treatises on mineral conchology. It is probable that there are several other species, and I believe I am correct in mentioning their occurrence in the following beds: —

In the Green sand below the chalk	1 species.
" London Clay - -	2
Crag - -	3

Whether there be a repetition of species in any of these formations is undetermined.

It need scarcely be remarked here, that the Table of Shells is susceptible of considerable extension, as almost every collector possesses a few undescribed specimens. It is sufficient, for the present, that *all* the characteristic fossils are included therein; and, however extensive the subsequent additions, it is not very probable that the relative proportions of their numbers, in the different geological eras, will eventually be found to vary much from the estimates which the present state of science enables us to form. At some future period, perhaps, I may trouble you with an amended Table; and I mention this with the hope that the pages of your Magazine may be one medium of adding to our knowledge of these interesting remains of a former world. I shall consider myself honoured by the notice, either by this means, or privately, of any authentic species and localities of undescribed fossil Testàcea. — *R. C. Taylor.* 7. *Wilmington Square, London, April* 8. 1829.

THE MAGAZINE

OF

NATURAL HISTORY.

JULY, 1829.

Art. I. *Farther Observations on the Influence of Fresh Water on Marine Animals.* By Lieutenant J. H. Davies, R. M. Communicated by James L. Drummond, M.D., President of the Belfast Natural History Society.

Sir,

The following statement, which I have received through the kindness of your able correspondent, Lieut. J. H. Davies, R. M., being very illustrative of the fatal power often exerted by fresh water on animal life, and of the observations in my communication on that subject in your last Number, and being also highly curious in itself, I request, with Lieutenant Davies's permission, that you will give it a place in your next.

I am, Sir, yours, &c.

Jas. L. Drummond.

Belfast, May 9. 1829.

In the summer of 1817, being at that time a resident in St. John's, the capital of Newfoundland, I frequently amused myself, in company with my brother-in-law, the comptroller of the customs, in hauling a small seine in that harbour. We were accustomed to shoot the net across where the water was perfectly salt, and drawing it up the harbour, haul it on shore at the upper end, where a small river discharges itself, so that the fish were drawn out of the salt water into the fresh. The species included were, eels, flat fish, codling, and a common fish, known as the sculpen, bull-head, &c. (Cóttus Scórpio?), which in Newfoundland grows to a considerable size, and is finely marked with blotches of brown, red, and white. On those occasions all the other species of fish were lively, but the whole of these were dead and stiff. My attention was, of course, attracted by this singular circumstance, which was attributed to their being drawn into the fresh water. I witnessed the same effect being produced several times at the same place; and that this particular species is always killed by being suddenly brought in contact with fresh water, is corroborated by my having seen the same effect produced in another place. In the upper part of the harbour of Portsmouth, Hants, at a place called Fleethouse, is a fine spring of pure water, situated below the high-water mark; it is consequently covered by the sea every tide, at the receding of which, as the spring discharges copiously it is speedily fit for use, and is resorted to by all the neighbourhood. I have frequently seen this species of Cóttus lying dead in numbers round the spring; they had evidently advanced with the tide, and been killed by coming in contact with the fresh water flowing from the spring, the falling of the tide leaving them beside it.

JOHN HENRY DAVIES.

Portsmouth, May, 1829.

ART. II. *Notice of an Imposture entitled a Pygmy Bison, or American Ox.* By V.

Sir,

As it is the duty of every naturalist to guard the public against impositions such as those exposed in your Magazine under the heads Mermaid (Vol. I. p. 106.), and Zoological Imposture (Vol. I. p. 189.), I have to bring under your notice another of a somewhat different description, which, from the uncommon ingenuity with which it is made up, is well calculated to deceive those little conversant with Nature. I allude to the specimen of a Pygmy Bison (*fig.* 53. *a*), said to have belonged to Count Bournon, and at the time I saw it in possession of a Mr. Murray, a dealer in curiosities, &c., from Hastings, who valued it at forty guineas, as it was supposed to be unique of its kind, being but about 7 or 8 in. high, and every way proportionate and symmetrical, and at the same time quite perfect in horns, coat, and every other part which distinguishes the fully developed *male* Bison. Now, as the animal of which it is the representative is, when full grown and equally perfect, of the stature of an ox, and even acquires such a size as to weigh from 1600 to 2900 lbs.; and, as it may be presumed from analogy that the calf, or embryo, of the bison has not any horns, mane, &c., there can be no doubt of the imposture, which may, nevertheless, be fully worth the sum demanded for it, as a most perfect *model* of the bison, and as the summit of the art of deception. As I took some pains to examine this curiosity, and to consider how so difficult a task had been accomplished, it appeared to me to have been grounded on a well-formed model of wood, very tightly covered, in the first instance, by the skin of a pug-dog of corresponding

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a

size, the long hair about the head, hunch, and belly being added with consummate skill from the skin of a young bear, while the horns and hoofs were formed out of the black horn of the buffalo, all, however, so admirably put together, and the *tout ensemble* so elegant, as to stamp the artist as the first of his calling.

I am Sir, &c.

August, 1828. V.

Art. III. *Some Account of the Water-Shrew: a Mouse supposed to have been lost for about a Century.* By John F. M. Dovaston, Esq. A.M. Oxon., of West-Felton, near Shrewsbury.

> "Thou need'st na startle
> At me, thy poor earth-born companion,
> And fellow-mortal." Burns.

Sir,

On a delicious evening, far in April, 1825, a little before sunset, strolling in my orchard, beside a pool, and looking into the clear water for insects I expected about that time to come out, I was surprised by seeing what I momentarily imagined to be a Dýticus marginàlis, or some very large beetle, dart with rapid motion, and suddenly disappear. Laying myself down cautiously and motionless on the grass, I soon, to my delight and wonder, observed it was a mouse. I repeatedly marked it glide from the bank, under water, and bury itself in the mass of leaves at the bottom: I mean the leaves that had fallen off the trees in autumn, and which lay very thick over the mud. It very shortly returned, and entered the bank, occasionally putting its long sharp nose out of the water, and paddling close to the edge. This it repeated at very frequent intervals, from place to place, seldom going more than two yards from the side, and always returning in about half a minute. I presume it sought and obtained some insect or food among the rubbish and leaves, and retired to consume it. Sometimes it would run a little on the surface, and sometimes timidly and hastily come ashore, but with the greatest caution, and instantly plunge in again. During the whole sweet spring of that fine year, I constantly visited my new acquaintance. When under water he looks grey, on account of the pearly cluster of minute air-bubbles that adhere to his fur, and bespangle him all over. His colour, however, is very dark brown, not quite so black as that of the mole, over the head and upper part of the body: the belly and throat are of the purest silvery white, with a dark spot under the tail: the ears are white at the edges, and very conspicuous; not from their prominence, being almost buried in the fur, but from contrast of colour. The nose is long and sharp, but broader at the end than that of the *land*-shrew (*S*òrex *a*ràneus); and the pretty little creature is broader and longer, of the utmost cleanliness and beauty, when afloat appearing almost flat. Length about 3 in.; tail not quite 2 in.; eyes very small; the claws fringed with very fine bristles. This minute description I am enabled to give, having, at the suggestion of my friend, John Clavering Wood, Esq., a most able and ardent naturalist, caught it in an angler's landing-net, and carefully inspected it in a white chamber-basin of water. The poor creature was extremely uneasy under inspection; and we soon, with great pleasure, restored it to liberty and love: for he had a companion, whom, from her paler colour and more slender form, we doubted not was his mate; and were fearful, by our intrusion, of giving offence to either.

He swims very rapidly; and, though he appears to *dart*, his very nimble wriggle is clearly discernible. He is never seen till near sunset, but I saw him, every evening I watched, with the most perfect facility. They are easily discovered about the going down of the sun, on still evenings, by the undulating semicircles quickly receding from the bank of the pool, when they are dabbling at the side, and readily distinguishable from those of the *Gyrìnus natàtor.* I believe this to be the animal said to be so long lost in England, the water-shrew, *Sòrex fòdiens* of Pennant, and the *Sòrex bícolor* of Turton's *English Linnæus;* for my Latin edition (Holmiæ, 1766) has him not at all. Gm. Lin. 113., describes him, "caudâ mediocri subnudâ, corpore nigricante subtus cinereo, digitis ciliatis;" * though, to me, the under parts seemed purely white. By reference to various books, I find the female has ten teats, and brings forth nine young; fore-teeth, lower two; tusks, upper three, under two; grinders, upper four, under three. I have said he only appears at evening, and such are his general habits. Once, however, at broad and bright noon, while leaning on a tree, gazing on the sun-sparkles passing (like fairy lights) in numberless and eternal succession under the gentlest breath of air, I was aware of my little friend running nimbly on the surface among them. My rapture caused me to start with delight, on which he vanished to security within his rush-fringed bank; while I, reasoning at every step, exclaimed with good old Belarius,

> ——— "To apprehend thus,
> Draws us a profit from all things we see:
> And often, to our comfort, shall we find
> The sharded beetle in a safer hold
> Than is the full-wing'd eagle." *Cymbeline.*

I should have mentioned that, on very still evenings, when my ear was close to the ground, I fancied I heard him utter a very short, shrill, feeble sibilation, not unlike that of the grasshopper-lark, in mild light summer nights, but nothing near so loud or long-continued. Though I have watched for him warily in that and other places, after having, to the end of May, contributed to the myriads of my amusements, I never saw him more.

I have written this account, Sir, principally to gratify the urgent entreaties of some students of nature in these parts; particularly those of my amiable friend Mr. Richard Tudor, surgeon, who, I may almost say, can neither eat, drink, nor even sleep without your Magazine; and in whose ardent mind every, the minutest, gem of nature stirs some kindred germ: also those of my able, indefatigable, and scientific friend John E. Bowman, Esq., already a contributor, and likely to be a strong future support, to your pages. Should you sanction this with your *imprimatur,* I may, with such stimulants as the conversa-

* "Tail, middle-sized, nakedish; body, blackish, cinereous beneath; toes, ciliated."

tion of these gentlemen, make some *head* against my habitual indolence, rummage my notes, and brush up my brains, being most cordially a well-wisher to the cause.

Yours, &c.

JOHN F. M. DOVASTON.

Westfelton, near Shrewsbury, May 6.

ART. IV. *Remarks on the Nature and Habits of the Bearded Titmouse* (*Pàrus biármicus.*) By a LOVER OF NATURE.

Sir,

IN the Introduction to your valuable Magazine of Natural History, you invite your readers "to communicate every circumstance, even the most trivial, respecting the nature, habits, and economy of animals;" and thus encouraged, I am induced to offer a few remarks, drawn from my own observation, on the nature and habits of the Bearded Titmouse (Pàrus biármicus) (*fig.* 54.), which, as I have not found mentioned in any work on ornithology, may, perhaps, be acceptable, and be considered to throw some light on the history of a bird so very little known.

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Bearded Titmice inhabit the marshes bordering on the Thames, both in Kent and Essex. I was told, in December last, that some had been lately seen in a large piece of reeds below Barking Creek; and being desirous and determined, if possible, to see and observe them in their haunts, I went, accompanied by one person and a dog, to the above-named place on a cold windy dull morning, weather by no means favourable for my purpose; but the reed-cutters having even then commenced their operations, I was fearful of deferring it, lest my game should be driven away.* Arrived on our ground, we traversed it for some time without success; and were about to leave it, when our attention was roused by the alarm cry of this species, and looking up, we saw eight or ten of these beautiful little creatures on the wing, just topping the reeds over our heads, uttering in full chorus their sweetly musical note, which resembles (if it may be likened to a word) the monosyllable *ping, ping;* pronounced at first slow and single, then two or three times in a more hurried manner: it may be compared to the music of very small cymbals; is clear and ringing, though soft, and corresponds well with the delicacy and beauty of the form and colour of the bird. We saw several flocks during the morning, or, what is more probable, the same flock several times. Their flights are short and low, only sufficient to clear the reeds; on the seedy tops of which they alight to feed, hanging, like most of their tribe, with the head or back downwards. If disturbed, they immediately descend by running, or rather by dropping. The movement is rapid along the stalk to the bottom, where they creep and flit, perfectly concealed from view by the closeness of the covert and the resembling tints of their plumage.

We could hear, but not see, our dog hunting; and we thought he was of service in pointing out to us whereabouts the birds were. His being near them, however, did not make them easily take wing; they seemed to follow him, hovering and crying about him. I question if we should have seen, or even heard, a single bird without his assistance. We were fortunate enough to shoot one (a male) in fine plumage. I held it in my hand when scarcely dead. Nothing could exceed the beauty of the eye; the bright orange of the iris, nearly surrounded as it is by the deep glossy black of the mustachios and streak above, receives additional brilliancy from the contrast, and struck me as a masterpiece of arrangement in colour and neatness. The bill also was of a fine clear delicate orange; but this, too, soon became dull and opaque. I would here ask if you, Sir, or any of your correspondents can guess of what use the long feathers, called the mustachios of this bird, are. We may fairly suppose that Nature does not give her creatures useless appendages, for mere ornament; but I own I am at a loss to imagine their purpose, unless it be to aid the wearer in its passage through so thick a covert.

* The Bearded Titmouse is known in these parts by the name of the Reed Pheasant; and is not unaptly called so. Their relative length of tail is not very unequal; and when placed in certain lights, the tints of the tail feathers are by no means dissimilar. The accompanying sketch [from which *fig.* 54. is an engraving] represents the bird as I saw it.

I am told that the males and females keep distinct during the winter. This is not improbable; Mr. White says the same of the chaffinches, in his *Natural History of Selborne*. I had no opportunity of deciding on the day in question. I have heard also that the families of old and young birds are sometimes seen together in the months of August and September. This I hope to witness; at present I am rather sceptical.

As my name would give no weight to these remarks, I withhold it; but should they be thought worthy of a place in any of your forthcoming Numbers, I may at some future time trouble you under my own signature. At present I subscribe myself, A LOVER OF NATURE.

Woolwich, March 20. 1829.

ART. V. *On the White Butterflies of Britain.* By J. RENNIE, Esq. A. M. A. L. S.

THE power of discriminating among things which differ in many minute points, but whose general similarity of appearance usually deceives the common observer into a belief of their identity, is one of the most necessary qualifications of a naturalist. This power, indeed, constitutes almost the whole difference between the accurate naturalist and those persons who look on the wonders of creation with careless indifference, who call every wild flower a weed, and every insect a fly or a beetle. According to my experience, it is exceedingly difficult for persons arrived at manhood to acquire this power of discrimination; but in early life, a little care on the part of a parent or a teacher will render it comparatively easy. The training up young people to this mode of observation is of infinitely more importance to them than exercising their memory exclusively upon books; which is the usual routine of procedure at schools. By the latter method, the memory may, no doubt, be highly improved; but it is, almost without exception, at the expense of the judgment, which, by the former method, is the chief faculty exercised. It would not, indeed, be a very hard matter to demonstrate that the practice of distinguishing among the genera, species, and varieties in natural history is a more efficient exercise of judgment than even mathematics, though I cannot at present spare time for this. It will answer my purpose better to illustrate the principles of discrimination which I have advocated, by some of the most conspicuous of our native insects.

The most common British butterflies must have been remarked by most persons to be those which are white; and all these, it may be inferred, are usually looked upon as of the same species, differing in nothing, except perhaps in the size; the latter being erroneously ascribed to difference of age, according to the analogy of birds, quadrupeds, and fishes. But the fact is, that there are a considerable number of species of our white butterflies, as well as several genera; and probably more varieties even of these than have yet been ascertained or described. To these I shall now endeavour to direct the reader's attention. It may be of use, however to make the previous remark, that butterflies do not, like the larger animals, increase in size as they grow older: for every individual, from the moment it becomes a butterfly, continues invariably of the same size from its birth till its death. Butterflies, indeed, seldom live longer than a few days, or, at most, a few weeks, and during this time they eat little except a sip of honey: and since this is so, it would be absurd to expect that they could increase in size. It must not, however, be understood from this that the same species will always measure or weigh precisely the same; for, though this will hold as a general rule, there are many exceptions, arising from the accidents the caterpillar may have suffered from which an individual butterfly originated. It is only during the caterpillar state that the insect eats voraciously and grows in proportion; and if it is, during this stage of its existence, thrown upon short allowance, it cannot acquire the standard magnitude, and the butterfly will be dwarfed from the first, and may even be sometimes deficient in one or more of its wings; a circumstance which I have witnessed more than once in butterflies reared by entomologists, who sometimes forget to furnish their caterpillars with food. The same remarks with respect to growth apply to insects of every kind; and the fact cannot be better exemplified than in the uniformity of size in the house-fly (*Músca doméstica*), among which scarcely one individual in a thousand will be found to differ a hair's breadth in dimensions from its fellows.

It is not, however, by size only that our British white butterflies may be distinguished; for they differ very considerably both in the shape of their wings and the markings with which they are embellished. The ground-colour, indeed, is white, but this is, in many instances, dotted, clouded, or shaded with black, and sometimes with other colours, which furnish good characteristic distinctions. I shall now give a short outline of these distinctions, such as may enable young entomologists to determine the species of those which fall in their way in their summer rambles.

The most common and conspicuous of our white butterflies belong to the genus Pόnti*a,* with which I shall begin. Mr. Stephens forms two divisions of it; the first having an obtuse angle at the tip of the fore wings, while the hinder wings are uniform in colour or not variegated on their under surface; the second having the tip of the fore wings rounded, and the hinder wings variegated beneath.

I. — *Fore wings with an obtuse angle at the tip; hinder wings of one colour on the under surface.*

1. The common large cabbage butterfly (Pόnti*a b*rássicæ) (*fig.* 55.) measures 2½ in. across the wings, whose upper surface is milk-white; the tips marked with a black band, irregularly jagged on the inner edge (*a a*), and having a black spot (*b b*) on the upper edge of the hinder wings. The under surface of the fore wings is white, with a yellow band at the tips, and two black spots on the disc of each; the upper surface in the male having two corresponding spots which are wanting in the female. The under surface of the hinder wings is yellow, thickly studded with minute black points.

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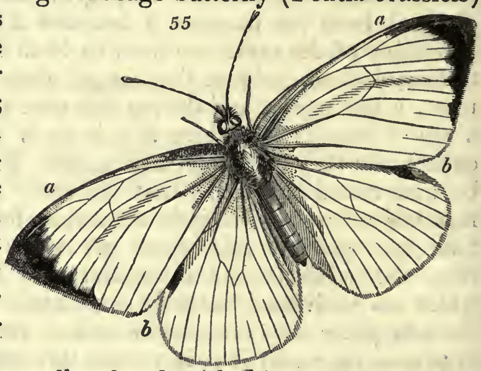

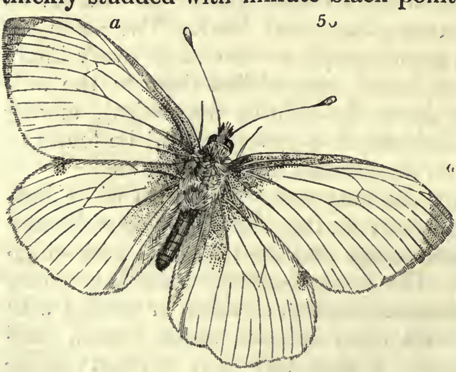

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2. The early cabbage butterfly (Pόnti*a* Charicl*èa* Steph.) (*fig.* 56.) is exceedingly like the preceding, though there are a few points of distinction. It usually appears much earlier than P. *b*rássicæ, and is considerably less in size; the wings expanding only 2¼ in., while the black band at the tip of the wings is paler, and not jagged on the inner margin (*a a*), and the outer margin is fringed with yellowish white. In the

female, the inner margin of this band is deeply shaded with black. The inferior size alone appears to be sufficient to distinguish this insect as a peculiar species.

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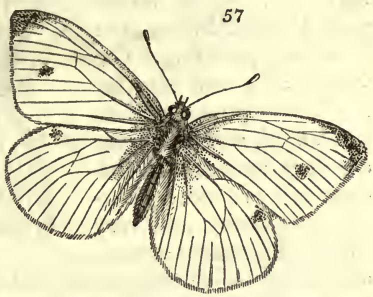

3. The small cabbage butterfly (Póntia ràpæ) (*fig.* 57.) is very similar to the preceding, but much smaller, the wings only expanding about 2 in. or less; sometimes there is one, sometimes two, black spots on the upper disk of each fore wing; and in some varieties the spot is nearly wanting. There are always, however, two black spots on the under surface of each fore-wing, as in P. *b*rássicæ and P. Chariclè*a*.

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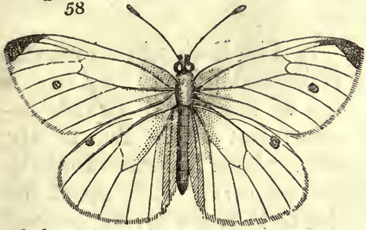
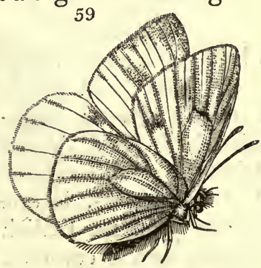


4. The spotless small cabbage butterfly (Ponti*a* mètra *Steph.*) (*fig.* 58.) is very like that variety of the preceding in which the wing spots are nearly wanting. It is of the same size as the preceding, but appears earlier. The tip of the wings is acutely angled, where there is a slightly shaded dusky band. The base of the wings is deep black; and the black spots on the disk, which characterise the three preceding species, are on this very faint, if not altogether wanting

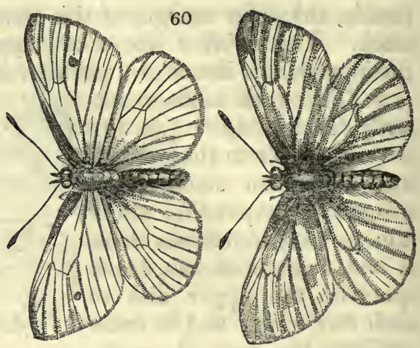
59



5. The green-veined white butterfly (Pónti*a* *n*àpi) (*fig.* 59.) is somewhat less than the two preceding species, but is easily distinguished from them by dilated greenish veins branching over the under disk of the wings; as may be seen in the figure. The upper surface of the tips of the fore wings is shaded with black, and the disk, in the female, marked with two large black spots placed transversely. Considerable variety occurs in the markings.

6. The larger green-veined white butterfly (Pónti*a* Napæ`æ *Esper.*) is considerably broader in the expansion of the wings than the preceding. The ground colour is milk-white, with the upper tips of the fore wings black, and also a black spot on their disk, with two or three triangular dashes on their hinder margin; the veins below are dilated and greenish.

60



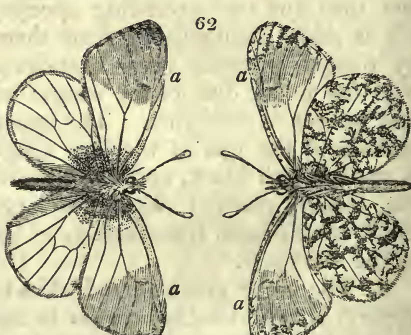
7. The middle green-veined white butterfly (Pónti*a* sabéllicæ *Petiver*) (*fig.* 60.) is larger than P. *n*àpi, but smaller than the preceding. The wings also are shorter and more rounded than in P. *n*àpi, and the veins are dark above, and underneath are not greenish, but dusky and very broad. This insect agrees, according to Mr. Stephens, with P. *b*ryònìæ of Wallner. It is not easy to distinguish it from the preceding.

II. — *Fore wings with the tip rounded; under wings variegated beneath.*

61

8. The Bath white butterfly (Pónti*a* daplidice) (*fig.* 61.) is one of our rarest British insects; not above five or six having been hitherto caught in this country. It is about the size of P. Napæ`æ; the ground colour of the wings white, with the tips of the fore wings black spotted with white, and the under surface of the hinder wings yellowish green, with white spots and an angular transverse line.

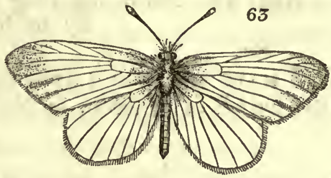
62



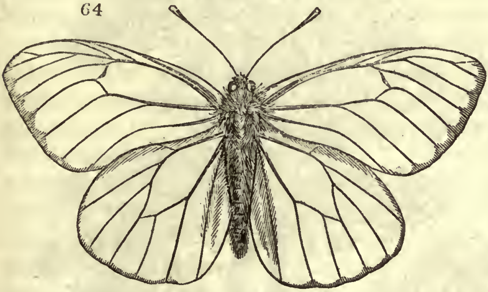
9. The orange-tip butterfly (Pónti*a c*ardámines) (*fig.* 62.), or *Wood-lady* of the London fly-fanciers, is one of our prettiest British insects, and is common all over the country. The beautiful shade of orange on the angle of the fore wing (*a a a a*) will readily distinguish the male from every other butterfly; but as the female has no orange mark, it may be necessary to look at the under side of the hinder wings, the fine marbling of which cannot be mistaken.

10. The wood white butterfly (Leucophàsia sinàpis *Steph.*) (*fig.* 63.) measures $1\frac{1}{3}$ in. in the expansion of the wings, which are milk-white, with the tip of the fore wings rounded and dusky. In the female the wings are more rounded. It is by no means so common as those which frequent the cruciform plants; its caterpillar feeding, not on Sinàpis, but on the bird's-foot trefoil (*L*òtus corniculàtus), and pea everlasting (*L*áthyrus praténsis).

63



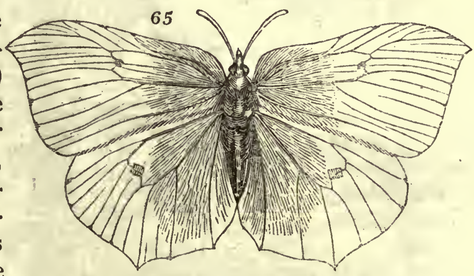
64



11. The black-veined white butterfly (Pièris *c*ratæ̀gi) (*fig.* 64.) is a beautiful indigenous insect, which seems to have disappeared from the vicinity of London for several years. The expanded wings measure $2\frac{1}{3}$ in., being consequently about the same size as the P. Chariclè*a*. The wings are of a uniform white colour, distinctly veined with black. It frequents woods and hedges; the caterpillars, which are black with yellow and white hairs, feeding in society beneath a silken web, on the hawthorn.

12. The brimstone butterfly (Gonépteryx *r*hámni) (*fig.*65.) cannot properly be ranked amongst our white butterflies, since the ground colour is bright primrose yellow; but this applies only to the male: the female is greenish white, with a dusky spot at the base of the wings, and an orange spot in the centre. The angular shape of the wings, however, will at once distinguish it beyond all mistake.

65



From these brief sketches, aided by the figures, which are given from the accurate pencil of Sowerby, I think it will be in the power of the youngest and least experienced collectors to distinguish and name any of the white butterflies which they may chance to capture.

Lee, Kent, June 25. 1829.

Art. VI. *Notice respecting an Oak Tree struck by Lightning.* By the Rev. T. W. S.

Sir,

I have sent you a drawing (*fig.* 66.) of an oak growing in the parish of Weston, in Norfolk, which was struck by light-

66

ning on the 26th of last September. The drawing was taken immediately after, and represents the damage sustained at the time correctly; but, since that, the standing bough has fallen, and the tree is otherwise fast going to decay. Not the slightest portion of bark was left upon the trunk, although not a bough was affected in that way, nor the leaves thrown off. The fissures reached from the top to the ground, but not in connection; gradually decreasing downwards, except the lowest, which decreased upwards. Pieces of bark were thrown the distance of ninety yards. This was one of six trees standing in a line, and not the tallest. In the summer of 1822, a fine oak was struck by lightning, which was growing on Scottow Common, in the same county; but which, so far from being killed, had continued to grow and flourish till 1828, when it was felled, and proved to be a sound and good tree in most parts. The tree was large and wide-spreading, affording shade in the summer, and shelter in the winter, to the stock turned out to pasture; and, at times, attracted attention from the number which it could cover. From the time of its being struck, not a head of cattle has been near it, not only not seeking its shade, but obviously avoiding the tree as being disagreeable. This (to me curious) fact is attested by many witnesses of the highest respectability; and, if any of your correspondents will favour you, and you the public, with the reason for the aversion which the cattle have from this tree, they will much oblige many, and

Yours, &c.

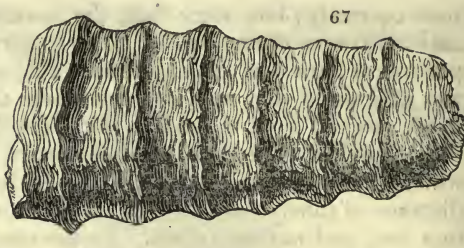
Weston Rectory, Nov. 28. 1828. T. W. S.

Art. VII. *Notice of some Fragments of Orthóceras annulàris and striàta, found in the Barr Limestone in Warwickshire.* By Frederick Jukes, Esq.; with a Note by J. D. C. Sowerby, Esq. F.L.S.

Sir,

The discovery of the Barr Trilobite, which you did me the favour to insert in a former Number of your Magazine (p. 41.), being new to the English lime formations, I am induced to offer to your notice some fragments of Orthoceratites from the same stratum referred to in my former paper, in the hopes that they may also present some variety in fossils of that nature not already discovered. The enclosed drawing (*fig.* 67.) may, probably, be worthy of insertion, as it yet bears the marks of a very beautiful external configuration; the section exhibits

67



its chambers and siphúnculus nearly perfect.

Its general appearance somewhat resembles a transversely fluted column, with an elevated ring corresponding to each septum. It is surrounded, also, by a number of beautifully waved lines, which, on the rings, form angular projections. The specimens I have yet seen, from this place, are quite straight, and present, perhaps, three or four varieties.

Some specimens (*fig.* 67.) have elevated rings, with waved lines around them; others (*fig.* 68.) have slight depressions with longitudinal straight lines. The larger kind are frequently from 2 in. to 3 in. in diameter, and upwards of 1 ft. in length; but the smaller specimens are generally most perfect and beautiful.

68

The shaft from which the new trilobite was obtained, and from which the most perfect orthoceratites may also be procured, is at this time filled with water; and the open-work or out-crop of this stratum being subject to decomposition, from atmospheric influence, very few specimens of value can at this time be obtained.

The upper, or Dudley, stratum, which also extends superficially to this place, carries with it all the train of fossils which are found at Dudley and Walsall; but, in the lower stratum, I have not yet heard of any others than the large trilobite and orthoceratites having been found.

Since I wrote the above, I have been informed, by Mr. Miller of Bristol, that he has in his possession two specimens of trilobites, discovered in the transition limestone at Ledbury, corresponding precisely, in size and outline, to the large species found in this neighbourhood.

Mr. Miller also states, that, at Ledbury, the upper and lower portions of the A'saphus caudàtus are abundant, though seldom in a perfect state. The Calymène Tristàn*i* is occasionally found there; but the Calymène Blumenbàch*ii*, so plentiful at Dudley, has not yet been discovered.

The Orthóceras also occurs there, though not sufficiently perfect to exhibit the external shell. It would be a satisfactory circumstance to persons interested in geology, to know if the orthoceratites, and large trilobite discovered at Ledbury, are found in lower beds to those which contain fossils of the Dudley character.

I remain, Sir, &c.

General Hospital, Birmingham, FREDERICK JUKES.
March 3. 1829.

THE specimens with elevated rings (*fig.* 67.) are of one species, Orthóceras annulàris *Min. Con.* t. 133.; the others (*fig.* 68.), found in Colebrook Dale also, are the Orthóceras striàta of *Mineral Conchology*, tab. 58., a species that is found in the Black Rock near Cork, and in the low beds of limestone near Preston, Kendal, and other parts of the transition series; in none of which, however, as far as I know, has the Barr trilobite been discovered. Many fossil sheils are found with it in all these places, but, according to Mr. Jukes, not at Barr; a distinction which appears extraordinary, and requires to be verified by a diligent search.

The figure in *Min. Conch.* of O. annulàris is taken from a specimen by no means so strongly marked as one sent by Mr. Jukes; but another approaches very near to it, and proves them to be only varieties.

March 10. 1829. J. D. C. S.

PART II.

REVIEWS.

Art. I. *A Flora of Berwick upon Tweed.* By George Johnston, M.D. &c. Vol. I. — Phænogamous Plants. Berwick. 8vo. 1829.

In the course of time many wise saws have been held current in physic, and many vain promises made by the empirical, yet we are acquainted with no apothegm half so wise as that which is condensed by Dr. Cullen, into two lines of small pica, and read as follows: " I have cured weak stomachs by engaging the persons in the study of botany, and particularly in the investigation of native plants." This being our sovereign panacea for the cure of the ills which flesh is heir to in this great city, we shall be excused for calling our readers' attention, more at large than usual, to one of the best local Floras that has passed through our hands.

The northern counties have been more than ordinarily fortunate in the number of active botanists who have resided within their borders. Mr. Winch of Newcastle, so well known among naturalists for his skill and accuracy, has published various works as Guides to the Botanists through this interesting corner of the island. Then, Mr. Thompson, a surgeon in the army, set an excellent example to his migratory brethren, and showed them how they might reap laurels in other fields than those of death, and published "*A Catalogue of Plants growing in the vicinity of Berwick*," adding thereto many which had not been observed before.

The author of the present work, not content with describing species for the hundredth time, and giving a mere catalogue within a limited district, has thrown in many pertinent remarks respecting their geological distribution, their uses in the arts, their physiological phenomena; and in the Flora of a river so celebrated in pastoral as the Tweed, "where flowers of fairy blow," he has noticed the superstitions connected with them in former times, and the illustrations they have furnished to the poet. Not a field nor a flower but suggests to our author some beauty which is veiled from the ordinary passenger. The pleasures of science are thus greatly enhanced, and a higher relish given to the pursuits of life.

The district, whose vegetable productions he professes to examine, contains every variety of soil, whether inland or on the sea shore; and is remarkably distinguished also for the variety of its stratification. The catalogue is very properly prefaced with an account of the geology of the neighbourhood, drawn up by a friend of the author, who has justly impressed upon his readers, both by precept and example, the importance of remarking the geological relations of plants. Up to a late period, the compilers of Floras have thought it of more consequence to add a species, than to ascertain its relation to the locality in which it was found; yet every addition to the Flora of a country throws some light on the laws of vegetable distribution. It suggests the questions whether it be indigenous and coeval with the soil; or if introduced, by what means that has been effected. Whether arts or commerce, agriculture or manufactures, superstition or medicine, has brought it; or, which is frequently the case, whether the altered state of the earth's surface has not afforded to Nature, by her ordinary laws, increased means of diffusion. In the days of Gesner, *F*umària officinàlis was a very rare plant in the fields of southern Europe, and supposed to have come from the East; now it is the commonest weed in corn fields and gardens, from Greece to Lapland. Again, as plants approach the limits of their range, it is often curious to enquire what soils or rocks they prefer. Many south country species, without showing any particular attachment in places where they abound, become choice as they approach their northern boundary. Some terminate their range on chalk; others on mountain limestone, or red sandstone, or the sea shore. Some, which with us affect the driest soil, occur, in southern latitudes, in moist ones, as *L*ìnum cathárticum. On the contrary, plants coming to us (so to speak) from the north, what strata and soils do they prefer or reject? how are the moisture, the temperature, the isothermal range, compensated for, when plants reach more southern parallels? *D*áphne *M*ezèreum may safely be pronounced not to be indigenous; because its head quarters being in the subalpine regions of the north, and its locality in England being in the chalk woods of Hampshire, according to Miller, it is contrary to all our experience of compensation. What is there, again, in the nature of some plants that should dispose them to be vagabonds all over the earth, while others are limited to a single spot? It is very important, also, that botanists should observe the negative list of particular places, as well as the positive. For instance, it is remarkable that *A*nthemis Cótula (stinking May-weed) should not be found within the district of this author, whereas it is a most abundant weed in the south of England, and naturalises itself easily in America. It is delightful to observe how the boundaries of knowledge enlarge as we make progress, and there is nothing which marks poverty of intellect so much as that complacency which supposes it has gathered in all that a subject will afford.

The Flora of Dr. Johnston comprehends a copious list of species, which is not so remarkable for containing any that are peculiar to the district (which is the case with the eastern counties and Cornwall), as it is for the singular stations where some of them are found. Thus to find Rhodìola *r*òsea, which is generally alpine, on the sea coast, is quite unexpected; as are *E*'mpetrum nìgrum and *S*cílla vérna, on sea banks. Erióphorum pubéscens, which is of modern creation, seems to be frequent, while the old E. polystàchion is not common. The difference of these species is not very obvious; and, like a thousand others of the present day, are only known by the "ear mark." Dr. Johnston's keen eye has rediscovered, in Ray's locality on Cheviot, the long lost *C*órnus suécica.

Of the origin of the name "Forget me not" (*M*yosòtis) the author gives the following account, extracted from Mill's *History of Chivalry*, and communicated to that work by Dr. A. T. Thomson:—"Two lovers were loitering on the margin of a lake on a fine summer's evening, when the maiden espied some of the flowers of *M*yosòtis growing on the water, close to the bank of an island, at some distance from the shore. She expressed a desire to possess them, when the knight, in the true spirit of chivalry, plunged into the water, and swimming to the spot, cropped the wished for plant, but his strength was unable to fulfil the object of his achievement, and feeling that he could not regain the shore, although very near it, he threw the flowers upon the bank, and casting a last affectionate look upon his lady-love, he cried, 'Forget me not!' and was buried in the waters." As the world insists upon a reason, this story is as good as another; but the worthy knight must have been sadly out of his element not to have been able to return from a bank on which his mistress could discern so minute a blossom, unless, indeed, we suppose him to have been clad in armour, which was a habiliment ill adapted for a lover by land or water.

Is the author correct in assigning the name of "Blue-bells" to Campánula rotundifòlia? We had always imagined that the "Blue-bells of Scotland" were the *S*cílla nùtans, and that the Campánula rotundifòlia was the "Hare-bell," from its slender and grassy appearance. Thus Walter Scott, in describing the grace of the "Lady of the Lake," says,

> " E'en the slight hare-bell raised its head,
> Elastic, from her airy tread.

When doubtful natives are found, it is extremely desirable that authors should be particular in examining all the causes, as far as they can, which may have brought them into their situations. In a highly improved country like ours, there are, no doubt, hundreds of species adopted as natives, which art and cultivation have introduced. *A*'llium Schœnopràsum, for instance, which is found at "Fastcastle," can hardly be established as wild. This, we know, was an oleraceous plant used by our forefathers, perhaps before the "Onion" was introduced. There are many plants peculiar to the neighbourhood of castles, which probably were the products of the gardens attached, and which have no claim to be regarded as indigenous. *M*elampy̆rum montànum is a new species which the author has attempted to establish, though not without hesitation, since the differences, he remarks, may be attributable to situation. Why not, then, have placed it as a variety, or variation, under its nearest congener, until he had satisfied himself of its permanent character by cultivation? This hasty splitting of species is involving the science in inextricable difficulty.

The author states *V*ícia *l*athyrŏìdes to belong to the Berwick Flora; but he assigns its station in so general a way as to lead us to suspect some mistake. This species, as far as we know, has hitherto been found only on the sands of the eastern counties. Probably, *V*ícia angustifòlia or some variety of *V.* satìva has been taken for it. It appears that *A*'rctium Bardàna more frequently occurs in waste grounds about Berwick than the *A. L*áppa. The author finds the *Verónica* filifórmis of Decandolle, of which a figure is added, in cultivated grounds. Mr. Borrer had found it before in Sussex.

Having now given our readers some slight taste of the contents of Dr. Johnston's work, we cannot dismiss it without recommending it to their rumination. It is composed more in the spirit of the *Flòra Lappónica*, that model for all similar undertakings, than any other which occurs to our recollection. Its technical dulness is relieved by little excursions into the by-paths of literature and the useful applications of science. Instead of being as dry and uninteresting as a spelling-book, it is as engaging as that entertaining book, Dr. Johnson's folio dictionary. Without sacrificing good taste, he touches upon familiar topics, or cites a poet; yet maintains the dignity of science, and manages to mingle instruction with pleasure by means of the hitherto impracticable vehicle of specific descriptions. ☞

Art. II. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

Britain.

Anon. Attributed to Miss Lætitia Jermyn of Ipswich: The Butterfly Collector's Vade Mecum; with a Synoptical Table of British Butterflies. Ipswich and London. 12mo, 5 plates. 7*s.* 6*d.*

This "Account of British Butterflies" is dedicated to the Rev. W. Kirby (p. 20.), and stated there and in the advertisement to be "enriched by his accurate and valuable remarks," which, to all who have perused Kirby and Spence's *Entomology*, will be a sufficient guarantee and recommendation of Miss Jermyn's work.

After stating the improvements which the edition of 1827 has received, some of the attractions of this pleasing branch of natural history are noticed. "Although the study of every class of animals is most indisputably attended with peculiar advantages, yet it may safely be affirmed, that it is from the knowledge of the characters, metamorphoses, and various modes of life which insects are destined to pursue, that a more intimate acquaintance may be obtained with the laws of Nature, and veneration for the great Creator of all, than can be derived from the contemplation of any other class in the animated world. Whilst most animals retain, during life, the form which they receive at their birth, insects are distinguished by the wonderful changes they undergo. Their existence partakes of two, three, and four distinct states, and, in each of these, differs most essentially in appearance, organisation, and manner of living. It is in this class of animals, also, above all others, that we are struck with what Cicero has called 'the *insatiable* variety of nature.'" (p. 7.)

The whole of the preface is so much to our mind, that we cannot deny ourselves the pleasure of extracting largely from it.

In answer to the charge of inhumanity sometimes brought against the collectors of living animals, it is argued that the objection applies less in the case of insects than in that of the higher classes; because "it is an admitted hypothesis that, in proportion as we descend in the scale of being, the sensibility of the objects that constitute it diminishes;" and that the poet's conclusion that a beetle, trod on, feels "a pang as great as when a giant dies," is incorrect. Why, Ray asks, were insects arrayed in beauty, and surrounded with wonders, but that we might be led to glorify the hand that made them? "If,' says Gedner, 'we do not think it worth our while, for any other reason, to turn our attention to the works of nature, yet surely, for the glory of the great Creator, we ought to do it; since, in every insect, we may observe some singular artifice which is not to be found in any other bodies, and which fully demonstrates the omniscience of the Supreme Being who has created nothing but for a certain end, and for some valuable purpose.' (p. 9.)

"Can it be necessary," asks Miss Jermyn, "to declaim on the superiority of a people amongst whom intellectual pleasures are preferred to animal gratification? Is it to be regretted that many of the Spitalfields weavers spend their Saint Monday holidays in search of some of the more splendid Lepidóptera, instead of smoking in an alehouse? or, is it not rather to be wished that they should recreate their leisure-hours by breathing the pure air, while in pursuit of this 'untaxed and undisputed game?' Insects (and more particularly butterflies) appear to have been Nature's favourite productions; in which, to recompense them for their weakness, and to manifest her power and skill, she has combined and concentrated almost all that is either beautiful and graceful, interesting and alluring, or curious and singular in every other class and order of her children. To these her valued miniatures she has given the most delicate touch, and highest finish of her pencil. (p. 10.)

"The splendid appearance of the plumage of tropical birds is not superior to what the curious observer may discover in a variety of Lepidóptera; and those many-coloured eyes, which deck so gorgeously the peacock's tail, are imitated with success in Vanéss*a* I'*o*, one of our most common butterflies. 'See,' exclaims the illustrious Linnæus, 'the large, elegant, painted wings of the butterfly, four in number, covered with small imbricated scales; with these it sustains itself in the air the whole day, rivalling the flight of birds, and the brilliancy of the peacock. Consider this insect through the wonderful progress of its life, how different is the first period of its being from the second, and both from the parent insect. Its changes are an inexplicable enigma to us: we see a green caterpillar, furnished with sixteen feet, creeping, hairy, and feeding upon the leaves of a plant; this is changed into a chrysalis, smooth, of a golden lustre, hanging suspended to a fixed point, without feet, and subsisting without food; this insect again undergoes another transformation, acquires wings and six feet, and becomes a variegated white butterfly, living by suction upon the honey of plants. What has Nature produced more worthy of our admiration? Such an animal coming upon the stage of the world, and playing its part there under so many different masks! In the egg of the *P*apílio, the epidermis or external integument falling off, a caterpillar is disclosed; the second epidermis drying, and being detached, it is a chrysalis; and the third, a butterfly. It should seem that the ancients were so struck with the transformations of the butterfly, and its revival from a seeming temporary death, as to have considered it as an emblem of the soul, the Greek word *psyche* signifying both the soul and a butterfly. This is also confirmed by their allegorical sculptures, in which the butterfly occurs as an emblem of immortality.' Swammerdam, speaking of the metamorphosis of insects, uses these strong words: 'This process is formed in so remarkable a manner in butterflies, that we see therein the resurrection painted before our eyes, and exemplified so as to be examined by our hands.' 'There is no one,' says Paley, 'who does not possess some particular train of thought, to which the mind naturally directs itself, when left entirely to its own operations. It is certain, too, that the choice of this train of thinking may be directed to different ends, and may appear to be more or less judiciously fixed, but in a *moral view*, if one train of thinking be more desirable than another, it is that which regards the phenomena of nature with a constant reference to a supreme intelligent Author. The works of nature want only to be contemplated. In every portion of them which we can descry, we find attention bestowed upon the minutest objects. Every organised natural body, in the provisions which it contains for its sustentation and propagation, testifies a care, on the part of the Creator, expressly directed to these purposes. We are on all sides surrounded by bodies wonderfully curious, and no less wonderfully diversified.' Trifling, therefore, and, perhaps, contemptible, as to the unthinking may seem the study of a butterfly, yet, when we consider the art and mechanism displayed in so minute a structure, the fluids circulating in vessels so small as almost to escape the sight, the beauty of their wings and covering, and the manner in which each part is adapted for its peculiar functions, we cannot but be struck with wonder and admiration, and must feel convinced that the Maker of all has bestowed equal skill in every class of animated beings; and also allow with Paley, that 'the production of beauty was as much in the Creator's mind in painting a butterfly, as in giving symmetry to the human form.'

"'To see all things in God,' say the authors of the *Introduction to Entomology*, 'has been accounted one of the peculiar privileges of a future state;' and in this present life, 'to see God in all things, in the mirror of the creation to behold and adore the reflected glory of the Creator, is no mean attainment; and it possesses this advantage, that thus we sanctify our pursuits, and, instead of loving the creatures for themselves, are led, by the survey of them, and their instincts, to the love of him who made and endowed them.' The more, then, we study the works of creation, the more will the wisdom and the goodness of the Creator be manifested; and while we admire the order and harmony of the whole, or the beauty and variety of its parts, it will be impossible not to adore 'Him who is wise in heart, and wonderful in working;' and at the same time confess, with humility of soul, that 'The hand that made them is divine.'" (p. 19.)

After the preface follows an introduction, in which is discussed the general character of the order Lepidóptera, and the natural as well as practical history of diurnal Lepidóptera, or butterflies. These form the Linnean genus *P*apílio, which is subdivided into numerous genera by modern entomologists. These modern genera are here described, and a number of them figured, so that there cannot be a better book for a beginner in this study; and we are therefore desirous most strongly to recommend it, regretting that a press of matter prevented us from rendering the authoress this justice last butterfly-season. — *T.*

Loudon, J. C., Editor, with the assistance of Professor Lindley, Mr. Sowerby, and others: The Encyclopædia of Plants; comprising all those in Britain, either indigenous or cultivated, flowering or without Flowers; with Figures illustrating one Species or more of every Genus, all the Classes and Orders, and many of the Botanical Terms. London. 1 vol. 8vo, pp. 1159. 4*l.* 14*s.* 6*d.*

This work, the labour of nearly ten years, is intended to be in botany, what a Johnson's Dictionary and English Grammar are in the English language; and, if it is properly executed, it ought to hold the same place amongst English botanists, as a grammar and dictionary hold amongst English readers. In a short time the character of its execution will become known; meanwhile, its editor can recommend the book for the objects stated with the more confidence, since by far the greater part of the volume is the labour of Professor Lindley and Mr. Sowerby.

Smith, Gerard Edwards, Esq., of St. John's College, Oxford: A Catalogue of rare and remarkable Plants collected in South Kent, with descriptive Notices and Observations. London, 1829. 8vo, 6 col. pls.

Here is an author whose names usher him into the presence of naturalists under the most favourable auspices, and who furnishes a whimsical speculation how far his baptism and his botany are cause and effect. However this may be, he does credit to his patronymics, and discovers great sagacity in distinguishing plants. The district he has examined comprehends Weald clay, green sand, chalk, and plastic clay; and he has not been unobserving of the limitations which these strata present to the diffusion of particular plants.

Mr. Gerard Smith was already known to English botanists as having made the discovery of O'phrys arachnìtes, which stands recorded in the *English Flora* upon his authority. In this "catalogue" he has elaborately worked out the character of that species, and those of *O.* aranífera and fuscífera, while he has added coloured delineations of them, as well as other plants: still, the intermediate varieties which he finds, throw some doubts on the permanency of his distinctions. Sir James Smith regards the *O.* arachnìtes of Kent, and fuscífera, as furnishing good specific characters, and as being identical with the foreign specimens bearing those names. Whether it really be so may still be doubtful; but, in so interesting a tribe as the insectiferous *O*rchídeæ, even the ordinary observer will be grateful to him for his laboured observations.

Another discovery of this "fine-nosed herbalist," as Wordsworth would call him, is *O*robánche caryophyllàcea of Sir James Smith, which was supposed to be confined to the Apennines and Siberia. It is allied to *O.* màjor, but is, no doubt, a better species than some others of this intricate genus.

The trefoils and medicks have attracted the author's particular attention; and he adds the Medicàgo denticulàta *Willd.* to our native list. His woodcut of the spines of the legume of several species, though an after-thought, deserves attention.

Ray's plant, *L*imònium mìnus, the author elevates to the rank of a species under the name of *S*tàtice cordàta, in which he seems to be fully warranted by the practice of modern botanists. He also directs attention to a remarkable variety of Lathræ'a squamària, which, he thinks, may prove distinct.

The observations on the mode of impregnation in Rúppi*a* marítima deserve to be repeated by one so favourably situated for the purpose as Mr. Gerard Smith is. He does not agree with Dr. Hooker's theory that the impregnation takes place beneath the water, and within the sheath of the leaves, before the flower-stalks are elongated, but thinks that Sir J. Smith abandoned his own opinion, and adopted that of Dr. Hooker, too hastily.

If we were disposed to find fault with an author who really has shown great acuteness and quickness of observation, we might, perhaps, remark that he appears to be too ready to adopt species, which, unless they be well established, are the bane of science. He might also be censured for being occasionally too sentimental and pictorial in his composition, when treating of trivial matters; a fault, alas! which time will correct soon enough, and which we willingly screen, and think abundantly redeemed by the ardour of which it is characteristic. — ☞

Art. III. *Literary Notices.*

The Gardens and Menagerie of the Zoological Society delineated; being Descriptions and Figures in Illustration of the Natural History of living Animals in the Society's Collections. Published, with the Sanction of the Council, under the Superintendence of the Secretary and Vice-Secretary of the Society. This work will appear in 8vo parts, monthly. "At the request of the Council, the Secretary of the Society, N. A. Vigors, Esq., has in the kindest manner consented to charge himself with the task of superintending the execution of every department of the work. The descriptions and anecdotes in illustration of the natural history of the animals represented will be furnished by E. T. Bennett, Esq., the Vice-Secretary. The whole of the drawings will be made by Mr. William Harvey, who has already given so many proofs of his talent in this department of his art; and the engravers, Messrs. Branston and Wright, will exert their utmost skill to do justice to the efforts of his pencil."

We have seen a specimen of the first part, than which, in the way of engravings on wood, we have seen nothing superior.

Agenda Geognostica. — The veteran mineralogist, Leonhard, is about to publish *Agenda Geognostica,* or a Manual for Travellers in Mountainous Districts.

PART III.

COLLECTANEA.

Art. I. *General Subject.*

Active Molecules. — Fifteen years ago, Dr. Drummond, now Professor of Anatomy and Physiology in the Belfast Academical Institution, detected these bodies in the choroid coat of a haddock's eye, and published an account of the discovery, at that time, in his thesis *De Oculi Anatomia Comparativa.* He described them as long and spicular, various in size, and with the glitter of polished silver, so intense, that, when viewed in sunshine, the eye could scarcely bear its brightness. Multitudes revolved continually round their axis, while other and larger particles, after lying motionless for a little time, described three or four semicircles, and then sank into their former quiescence. These they repeated at short intervals, when they vanished to reappear in the same spot after the lapse of two or three minutes. This singular movement was only observable in the larger corpuscles, the smaller glittering in perpetual revolution around their axis. The motion could not have proceeded from evaporation, for whether the fluid were compressed between plates of glass, or covered with oil, it continued; nor from electricity, for neither attraction nor repulsion was exhibited; nor from the agitation of the water, for then the other molecules should have shown a similar motion. "To suppose these particles," says the Doctor, "possessed of vitality may appear repugnant to reason, but I can conjecture no other way in which the phenomenon can be explained." The above-mentioned thesis was published in 1814, and a more detailed account was given in the *Transactions of the Edinburgh Royal Society* for the same year, in a paper "On certain Appearances observed in the Eyes of Fishes;" a title by no means inviting, which may perhaps account for the little attention which the communication received.

To these spicula, as he afterwards ascertained, the metallic colour of fishes is owing; and to observe them in a very simple manner nothing more is necessary than to scrape some of the scales off a salmon or herring, where the metallic or silvery tint is brightest; put them into a wine-glass with a tea-spoonful or two of water, and stir them so that the silvery film which is attached to the under surface of the scales may separate. That film is composed of the moving spicula; and when it has whitened the water in the slightest degree, put a drop of the latter on any black or very dark surface in the sunshine, the stronger the light the better, and, with the naked eye, thousands of brilliant particles may be observed as busy as motes in the sunbeam. In the microscope also the light must fall on them; for they seem to be very opaque, and it is only by reflected light that they can be observed. — ¶

Art. II. *Zoology.*

The Cuckoo. — Sir, Reading what you say relative to the cuckoo in your Magazine of Natural History, I beg to inform you that about fifteen years ago I obtained a cuckoo from the nest of (I think) a hedge sparrow, at Old Brompton, where I then resided. It was rather curious, as being within ten yards of my house, Cromwell Cottage, and in a narrow and much frequented lane, leading from near Gloucester Lodge to Kensington. This bird I reared and kept alive till late in January; when it fell suddenly from its perch, while feeding on a rather large dew worm. It was buried: but I had, long afterwards, strange misgivings, that my poor feathered favourite was only choked by his food, or in a fit of some kind — his apparent death was so extremely unexpected from his health and liveliness at the time. I assure you that I regretted my loss much, my bird being in full plumage and a very handsome creature. He was quite tame, for in autumn I used to set him on a branch of a tree in the garden, while I dug worms for him to dine upon, and he never attempted more than a short friendly flight. During the coldest weather, and it was rather a sharp winter, my only precaution was, nearly to cover the cage with flannel; and when I used to take it off, more or less, on coming into my breakfast room in the morning, I was recognised by him with certainly not all the cry "unpleasant to a married ear," but with its full half "*Cuck! Cuck!*" — the only sounds or notes I ever heard from my bird. Though trifling, these facts may be so far curious as illustrating the natural history of a remarkable genus, and I have great pleasure in offering them for your excellent Journal. — *W. Jerdan.** *Brompton.*

Nuthatch. — Sir, In confirmation of the account by your correspondent H. S. (Vol. I. p. 328.) of the persevering exertions of the nuthatch to escape from confinement, I beg to offer you a corroborating instance, which fell under my own observation. When a boy I occasionally amused myself, like other youths, with setting traps for birds, constructed, according to the ordinary method employed for that purpose, of four bricks, one of which was propped up in an oblique position, ready to fall down and secure the bird on its entering the trap. In one of these traps I ensnared a nuthatch. How long it might have remained in confinement, I cannot at this distance of time exactly state, but most probably not more than a few hours. On taking the bird from the trap, I was struck with the singular formation of the beak, so unlike that of any other bird I had ever seen. It was blunt at the end, and presented the appearance of having been truncated in an oblique direction i. e. as if the natural beak (*fig.* 69. *b*), had been cut off in the direction of the line (*a*). Having never before examined a specimen so closely, I at first thought this apparent truncation constituted the natural conformation of the beak; but I soon perceived that it had been fairly ground down to about two thirds of its original length, by the bird's pecking at the bricks in its efforts to escape from the trap.

As your correspondent does not enter much upon the habits of this amusing bird in its natural wild state, it may not be uninteresting to notice the expertness it occasionally exhibits while engaged in the operation of piercing the shells of nuts, &c. The bird fixes the nut in a chink or crevice of the bark of a tree, or the like, and commences a vigorous attack upon the shell by forcibly and repeatedly striking it with its beak. This knocking (as your correspondent observes from White) may be heard to a considerable distance. During the operation, it sometimes happens that the nut swerves from its fixture, and falls towards the ground; it has not descended, however, for the space of more that a few yards, when the nuthatch, with admirable adroitness, recovers it in its fall, and replacing it in its former position, commences the attack afresh. The fall of the nut in the air, and its recovery by the bird on the wing, I have seen repeated several times in the space of a few minutes. Whether the nuthatch seizes the falling nut with its beak, or, as is more probable, with its grasping feet, I am not able positively to determine. — *W. T. Bree. Nov.* 15. 1828.

* The learned and witty editor of the *Literary Gazette*.

Developement of the Eggs of Spiders. — In spiders' eggs, M. Harold has observed a membrane corresponding to the shell of those of birds, also the white or albumen and the yolk and scar. But the yolk has no proper membrane, though it passes into the intestinal canal. The scar is also observable, and disperses itself in granules; and the white, instead of being absorbed by the young animal, as in birds, is the matter out of which is formed all its members, a circumstance that constitutes the principal difference between the eggs of birds and spiders.

The eggs of spiders, which are laid in the autumn, remain throughout the winter enclosed in a silken web; on the approach of summer they gradually change into their active perfect form. The progress of this transformation has been M. Harold's study, and his observations are detailed with great perspicuity in his *Unters. über die Bildungsg. der Wiebellosen Thiere im Eie.*

The eggs, in their dormant state, every body knows, are very small (*fig.* 70. *a*); magnified (*b*), the scar or germ is discernible (*c*). The first change is this germ dispersing its granules into the albumen, which attach themselves to the vitellus, or yolk; and, after being expanded in this manner, it assumes the figure of a comet in the interior of the mass. When the albumen becomes as it were saturated with these grains from the germ, or vital principle, it is theu called *colliquamentum;* and, when sufficiently coagulated, is for the present called *cambium.* This cambium becomes divided into two unequal parts: the smaller portion (*fig.* 71. *a*) being uppermost, is called the *cephalic cambium,* it being that from which the head of the animal is afterwards formed; and the greater portion (*b*), situated below, is called the *thoracic cambium,* from which the body is composed. Soon after this division of the cambium, it is seen marked with the rudiments of the limbs and other parts, eyes, breast, &c.; next, the lower extremities become moulded from that portion of the cambium called the abdominal. In process of time all the parts of the frame have gained form and consistence, the animal secretions commence, and the actions of the legs and palpi begin by throwing off the thin skin which enveloped the whole mass. (*fig.* 72.) Some time passes before the young spider is very active; he feels a kind of torpor until his frame is sufficiently fitted for his wandering predatory life. It was on the eggs of the *A*rànea diadèma that M. Harold made the observations, from which the foregoing is a brief extract. — *J. M.*

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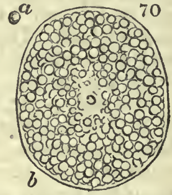

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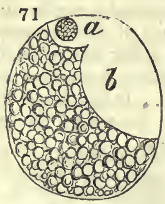

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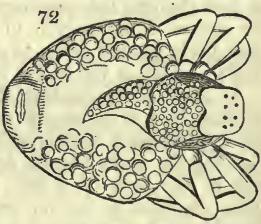

Musical Snails. — As I was sitting in my room, on the first floor, about nine P.M. (4th of October last), I was surprised with what I supposed to be the notes of a bird, under or upon the sill of the window. My impression was, that they somewhat resembled the notes of the wild duck in its nocturnal flight, and, at times, the twitter of a red-breast, in quick succession. To be satisfied on the subject, I carefully removed the shutter, and, to my surprise, found it was a garden snail, which, in drawing itself along the glass, had produced sounds similar to those elicited from the musical glasses. — *Sam. Woodward. Diana Square, Norwich, April* 3. 1829.

Developement of the Eggs of the Common Crab (Cáncer Pagùrus, L.) — In a late number of his *Zoological Researches,* Mr. J. V. Thompson of Cork has given some additional particulars relative to the animal of the supposed genus Zoëa, which he considers as the larva of the common crab, having hatched it from the eggs of the latter. His notes are accompanied by a magnified representation of the minute creature (*fig.* 73. *a*, antennæ; *f*, feet; *s*, one of the lateral spines) together with a second figure, of the natural size, for comparison (between *s* and *f*). He states that, after numerous fruitless attempts, he at length procured, in 1827, examples of the crab with spawn apparently ready to hatch, and succeeded in protecting one individual until young burst from their envelopes, and swam about in myriads, under the exact form given in the plate. In this stage, he adds, they are colourless, and transparent as glass, except the dark central part of each eye, and a blackish dot on each side every abdominal segment, the dorsal spine exhibiting a pale pink tint, for nearly half its length, from the point downwards.

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We cannot but recommend the example of Mr. Thompson to our other friends on the sea-coast, some of whom will, we doubt not, be stimulated by his success, as well as assisted by the clue which he has afforded, in the investigation of this highly interesting subject. As several forms of Zoëa have now been described and figured, it is perhaps but fair to presume that they are the young of as many forms of Decapodous Crustàcea; and it may not be too much to imagine that the whole order will be found, on examination, to be subject to the same laws of metamorphosis which regulate at least one of its species. At all events, here is an ample field of study opened for the careful observer. — *E.*

Art. III. *Botany.*

Drying Plants. — As one main object of your Magazine is to assist the tyro in natural history, I do not hesitate to send you some details of the process of drying plants, which I have, from time to time, adopted, and can, from pretty long experience of their efficacy, safely recommend. I entirely approve, and have long practised, the principle stated in Mr. Bree's letter (Vol. I. p. 298.), of frequently changing the papers as they become moist, but have satisfied myself with replacing them by others thoroughly dry without heating them. Heated papers will, no doubt, shorten the process and more effectually preserve the colours. I would, therefore, advise their being always employed; and what follows is little more than a detail of the principle laid down in the letter above alluded to. Always gather the root with herbaceous plants, and, if possible, select a specimen with part of the head in seed as well as in flower. Clear away the soil, &c., and when quite dry place the plant between the papers, holding down the parts adjusted with the left hand while regulating the remainder, and taking care to display any particular part which marks the generic or specific character. Instead of employing only two sheets of paper, lay three or four both above and below the plant to absorb a greater portion of the moisture, and place detached pieces of soft paper, folded into the required shape, size, and thickness, on each side the stem and more prominent parts, and, if necessary, over the petals and leaves. This will equalise the pressure, and add much to the beauty of the specimen. Different plants require different degrees of pressure, accordingly as their texture is more or less firm; and a less degree of pressure should always be used the first two or three days of the process, than as they approach desiccation, to prevent extravasation of the juices. Succulent plants may be left exposed 12 or 24 hours (sometimes several days) before pressing, to render them flaccid and more conformable; and the interior parts of their stems, if bulky, and also all but the outer coats of tunicated bulbs, may be removed by making a longitudinal incision on the side that is to lie next the paper. On the first removal of the moist paper, any irregularities in the disposition and folding of the leaves, &c., may be easily rectified, as they will then be partially flattened and more pliant; and, on every subsequent removal, the plants may remain exposed for half an hour or an hour on a table, and submitted to a gentle current of air. This will carry off much moisture, and hasten the process; but they should be again placed under pressure when the petals begin to curl up or contract. The operation of changing the papers should be repeated morning and evening for the first few days, and afterwards once a day; as a general rule the oftener the better, particularly plants with purple or blue flowers, from which confined moisture very soon discharges the colour. After the drying is completed, it will be well to place the specimens in an oven with a gentle heat and under a very slight pressure, which, in the course of a night, will effectually drive off any remaining moisture that may have lurked in the central parts of thick stems, flower-buds, &c. If the oven be resorted to in the earlier stages of drying, the necessary pressure will confine the moist heated juices, and destroy the colours. I have found great advantage in dry weather in placing my press close to a window, opening the latter only just enough to throw a current of air round the sides of the press to carry off the moisture as it is given out. My presses are of the simplest kind: flat boards, or covers of books, on which I place weights, bricks, or books, to obtain the requisite pressure. Many layers of plants may be put under the same press, weighting it accordingly. These details may appear trifling; but when I recollect how slowly I surmounted one difficulty after another, I feel a pleasure in thinking they may be of service to some of your young readers, who, like myself, at the commencement of their botanical pursuits, may have no experienced friend at hand to direct them. — *J. E. Bowman.*

ART. IV. *Geology and Mineralogy.*

FOSSIL Shells unpublished. — Sir, Extensive as is the catalogue of fossil shells (p. 26.), it might be considerably augmented by unpublished species; and I subjoin a list which you may perhaps think worthy a place in your Miscellany. My cabinet contains entire specimens of all therein enumerated, with the exception of those against which an asterisk is affixed, and of which I as yet possess only imperfect specimens. I have also some other fragments, but they are not perfect enough to determine the genera.

Simple Univalves.

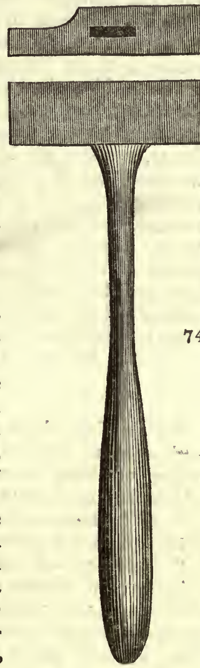
Gen.	No. of Species.	Gen.	No. of Species.
*B*álanus	1	Pileópsis	2
Bùlimus?	1	Paludìna? (small)	2
Búlla (lignària)	1	Pleurótoma	2
Cancellària	1	Pyramidélla	1
Ceríthium	1	Rostellària	1*
Cypr*æ*`a	1	Sérpula	2
Infundíbulum	1	Solàrium	1
Melània	1	*T*ròchus	2
*M*ùrex	2	Térebra	1
O'vula	1	Vermiculària	1
Patélla	1		

Simple Bivalves.

Gen.	No. of Species.	Gen.	No. of Species.
Anòmia - -	1	Máctra - -	1
Càrdium (echinàtum) -	2	Modìola - -	1
*C*hàma - -	1	Nùcula (rostràta) -	2
A reversed var. of *C*hàma squamòsa, i. e. the lower or adherent valve turns the contrary way.		*O*'strea - -	2
		Panopæ'*a* - -	2
		*P*ínna - -	1*
		Psammòtea ? - -	1
*D*ònax - -	1	Phòlas (cuspàtus) -	1
Lìma - -	1	*T*ellìna - -	4
Lucìn*a* (divaricàta) -	2	Vènu*s* - -	3
Lutrària - -	1*	Pullástra - -	1

The above shells are from the Crag formation, and are in addition to those published in Mr. Taylor's article (p. 26.); I am not aware they have hitherto been any where published.— *S.V. W. Woodbridge, March,* 1829.

Geological Hammer. — Sir, Having had occasion for the use of a geological hammer, which should unite the qualities of power and compactness, it occurred to me, that an elastic handle, applied to one of Knight's Trimming Hammers, would effectually answer my purpose. I therefore selected one of that kind which is marked No. 5. in Knight's plate and description of Geological and Mineralogical Instruments and Apparatus (*fig.* 74.), and, removing the handle of wood, attached it to an elastic handle of leather, and it has answered extremely well, during a long campaign amongst the rocks of Germany, serving every purpose which I wished it to serve.



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The construction of the handle is as follows: — Three narrow slips of *soling leather* having been selected of the length most convenient, I caused them to be firmly glued together, so as that the grain of the exterior pieces should be in a different direction from that of the enclosed piece. The whole was then rounded, and reduced from the extremity upwards, till it fitted the aperture in the metal, and then by two small wedges of wood driven in between the slips of leather the whole was firmly secured. The handle was then strongly bound with twine, round and round, from the one end to the other. I would certainly recommend this plan in preference to a vine-wood handle, or any other, as it is not liable to break, possesses a nearly perfect elasticity, and preserves its shape. — *W. B. Clarke. East Bergholt, Suffolk, Nov.* 24. 1828.

Schorl, dark-coloured mica, slate (except it is very light-coloured), and many other minerals, attract the magnetic needle, after being exposed to the reducing flame. In some cases it is sufficient to attach a fragment of the mineral to be examined to the end of the platina wire, by means of a part of the moistened powder of the same substance; in others, the whole must be reduced to powder, and a little borax added before it is exposed to the flame, to enable it to act upon the needle. This character, which is useful in leading us to a knowledge of one of the component parts of a mineral, as well as enabling us to distinguish it from others, appears for the most part to have escaped the observation of mineralogists, at least it is seldom noticed in their works. — *W. H. M.*

Art. V. *Meteorology.*

Almanacks.—In the essay on almanacks, in the *Companion to the Almanack* for 1829, published by the Society for the Diffusion of Useful Knowledge, it is stated (p. 7.) that at the present day none of the almanacks of the Continental states contain any misleading matters similar to the astrological predictions of that of Moore. This is a mistake. I have now lying before me an almanack for 1829, professing to be compiled "par Maître Mathieu Laensbergh, Mathématicien," and printed at Liége for nearly a century past; which is in as much repute in the Netherlands as *Moore's Almanack* is in England, being universally read by the Flemish peasantry and lower classes; and in which not less than twenty-five pages are filled with predictions of the weather, and of political events*, besides an "Extrait des prophéties perpétuelles de Thomas Joseph Moult, natif de Naples; pour l'année 1829;" in which this great astrologer, whose name, I fear, is unknown in England, departing from the wary obscurity of his brother Moore, boldly proclaims that the spring will be fine, the summer wet, and the autumn cold and late. This little volume, of about 150 pages (which include some useful matter on agriculture, gardening, &c.), and of the price of about threepence, concludes with an "Almanach des Bergers pour l'année 1829," wholly composed of hieroglyphics (previously explained), as a glove for frost, an awl for strong frost, a fan for heat, &c. &c., and in this the actual weather is predicted for every day of the year: as that on the 1st of January it would freeze, on the 6th it would snow, on the 9th it would rain, and so on. Another line of hieroglyphics indicates what days are suitable for sowing, grafting, &c., and also for cutting the hair, and cutting the nails. It is evident, therefore, that we are not single in absurdity, but in fact outdone by our Flemish neighbours; and, I believe, one astrological almanack is published in France, or more. How the case may be in Germany I am ignorant; but I am inclined to think that the labours of societies, like that in England for the diffusion of useful knowledge, directed to the reformation of the almanacks, are as much wanted throughout Europe as with us. — *W. S. Brussels, March* 20. 1829.

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* One of the shortest of the "Prédictions pour l'année 1829," will serve both as a specimen of the riddles, over which the Flemings have to ponder during the long winter evenings, and of the tone of political feeling to which they are adapted. The whole series is introduced by this address:—

"*Au Lecteur.* — Doutez ou croyez, peu importe; les événemens que je prédis ne s'accompliront pas moins.

"Janvier. — Vœux intéresses mais superflus. — Puissant qui tombe, médiocre qui s'élève. — Il fallait un calculateur: ce fut un danseur qu'on choisit. — Lutte sanglante et obstinée. — La croix brille à l'orient. — Nazarin faisait chanter ses contribuables: certain ministre fera pleurer les siens.— Belle alliance qui se prépare. — Défaite inattendue, résultat inespéré. — Quelle leçon pour les rois! Hommes libres, reprenez courage."

["*To the Reader.* Doubt or believe, it matters little; my predictions will not the less be accomplished. — January. Wishes selfish but vain. — The powerful falls, the weak rises. — An arithmetician was wanted: they chose a dancer. — Strife bloody and obstinate. — The cross shines in the East. — Nazarin made his tax-payers sing: a certain minister will make his weep.— A fair alliance is in preparation. — Unexpected defeat, unhoped for result. — What a lesson for kings! Freemen, take courage."]

PART IV.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Natural History in Foreign Countries.*

FRANCE.

Collection of Natural History from Pondicherry. — Messrs. Cuvier, Desfontaines, and Dumeril read a report, at a recent sitting of the Academy of Sciences, on the collections of natural history made by the officers of the Chevrette, during her voyage to Pondicherry. The specimens brought home include 16 species of the mammalia, 236 of birds, 57 of reptiles, 238 of fishes, 271 of mollusca, 16 of the annelides, 132 of crustacea, 590 of insects and spiders, and 161 of zoophytes. Many of these are altogether new to science; and we are indebted for them solely to the enlightened zeal of the officers, as it formed no part of their duty to attend to natural history. (*Le Globe.*)

Ingenuity of a Beaver at Paris. — A beaver from the Rhine is now, or was lately, in the royal collection in the Jardin des Plantes at Paris, which exhibited as much ingenuity as has ever been ascribed to the species in a wild state, and more than enough to silence the incredulity of sceptics respecting the beavers' dams, and their magazines of winter provisions. This beaver, for instance, we are informed by M. Geoffroi St. Hilaire, was, during the severe weather in winter, furnished with fresh twigs of trees, to give exercise to his propensity to gnawing, and with apples, &c., as a more nutritive food. One night there came on a snow storm, and the snow beat into his domicile in considerable quantity, till he found out a plan of shielding himself from the inconvenience. For this purpose, he cut his supply of twigs into proper lengths, to be wove in the basket fashion, between the bars of his cage; chopped his apples in pieces, to fill up the intervals between the twigs; and, when even this did not appear sufficiently air-tight, or (if you will) storm-tight, he kneaded the snow into the intervals. By the morning it appeared that he had laboured hard all night, and had completed a very neat and ingenious barricado against the intrusion of the snow. (*Athenæum*, Nov. 19.)

The Cuckoo. — The Continental naturalists have raised a controversy respecting the species of the common cuckoo, which is found to vary considerably in the colour of its plumage, one being thence called the red and another the grey cuckoo; the former supposed to be the *Cùculus* hepáticus of Latham, and the latter the *C.* canòrus of Linnæus. M. Payrandeau, however, states distinctly, on the authority of a series of specimens, as well as of repeated dissection, that both the male and female young of the *Cùculus* canòrus, before the first moult, have the same colour: that, after the first moult, the males have a deep olive ash colour, and the red spots have already begun to disappear; in the females, on the contrary, the red spots become brighter and larger: that, at the third moult, the red spots on the male disappear altogether, while in the female they continue to the most advanced age, when it puts on the plumage of an old male, of which change M. Payrandeau possesses a specimen. M. Temminck, again, whose authority is very high, regards the red cuckoo as the young of the grey cuckoo of one year old; but Vieillot, the father of the French ornithologists, as well as Meyer, Jules, Delamothe, and Baillon of Abbeville, agree with M. Payrandeau. (*Bulletin des Sciences.*)

Submergence of the Continents.—M. Constant Prevost has just published an interesting memoir on the geological question, whether our continents have been submerged oftener than once. He attempts to prove that there do not exist, under alluvial formations, any beds or strata which can be regarded as having formed the surface of an ancient continent, covered for a considerable time with land vegetables, and inhabited by land animals, before it was enveloped in marine deposits. The *débris* of vegetables and of land animals, sometimes found in vertical positions in sandstone, in diluvial strata, or in caverns, he supposes to be wholly accidental, and originating in the sea invading a country previously inhabited. He thence proceeds to explain the formation of the basins of London, Paris, and the Isle of Wight, according to the following series of epochs: —

1. A deep tranquil sea deposited the two varieties of chalk which compose the bottom and the sides of the great tertiary basins.

2. Then, by the ocean becoming shallower, the great basin would be formed into a gulf, in which chalk-breccias and plastic clay would be deposited, and covered by the marine remains of the first coarse limestone.

3. The deposition was next interrupted by some commotion, which sensibly broke and displaced the strata. The basin then became a salt-water lake, traversed by copious streams of water, flowing alternately from the sea and from the continents, and producing a mixture, presenting the second coarse limestone, siliceous limestone, and gypsum.

4. A large volume of fresh water, charged with clay and marl, burst into the basin, still forming in the middle a deposit of marine bivalve shells, the basin becoming a lake of brackish water.

5. The lake now ceased to communicate with the ocean, the level of the waters going on to decrease, and the muddy deposits from the continental waters continuing.

6. The ocean burst in accidentally, whence beds of sand and the upper marine sandstone were deposited; and, soon after, the basin being drained, continued only fresh water, of little depth. There was now much less influx of water; animals and vegetables made their appearance, and millstone grit and fresh-water limestone were deposited.

7. The succession of these different epochs was terminated by the diluvian cataclysm.

GERMANY.

Natural History in Wurtemberg. — The Society denominated the *Naturhistorische Reiseverein* (Natural History Travelling Society), "under the direction of the Landwirthschaftliche Verein, last year sent out two travellers, whose researches were highly successful: Fleischer, who made collections of specimens of natural history in the environs of Smyrna; and Müller, who was employed to examine the productions of Sardinia. The latter passed the winter at Cagliari, and will continue there this summer. Both travellers have paid particular attention to botany, and have also collected a considerable number of insects, conchylia, &c. This year the Society have provided for making mineralogical researches, and have sent out to Norway two other travellers: one for botany, especially algology, muscology, and lichnology; the other for oryctognosy and geology. The former is Huber of Hamburg; the latter, Kurr of Wurtemberg, an excellent mineralogist. It is intended that they should extend their researches as far as Lapland. Several friends of the Society at the Cape have undertaken to form an African Flora, and have already sent to Europe between 6,000 and 7,000 specimens." (*For. Rev. and Cont. Misc.* Jan. 1829.)

Goats of Thibet. — The project of introducing the breed of goats of Cashmere into Germany, has not been very favourably entertained. One writer has pretended to show that the European goat, by a single cross, might be brought to yield the precious article for which so much money is sent into Asia. Another argues against the Asiatic animal, on the ground that a single sheep of a good breed will bring four times the profits of a goat of Thibet; and a third, M. Schmidt, rejects their introduction into Germany, because France has anticipated that country in the manufacture of the merchandise in which their down is used. M. Schmidt makes the following observations on the fleece of these animals. Judging by their fleece, there are, he says, two sorts of goats; one which may be called the race of Angora, with hair long and pendent; the other, the goat of Thibet, with hair short and stiff. The former has no down; the latter, on the contrary, is covered, during winter, with a down which is more abundant and finer in those kept on the mountains. These two races, originally from Asia, have produced by their mixture, aided by the influence of climate, many varieties. On examining with attention the European goat, it will be found also that the long-haired ones have no down; or, if they have any, it is in very small quantities along the vertebral column; while of those which have short hair, there are to be found some which have a down spread over the entire carcass. This down grows almost to the length of hair in the spring; then comes off, and appears on the surface, to which it gives a grey tint. By the mixture of these breeds a bastard race is formed, which have more or less down; but it is observed that the offspring partook more of the nature of the dam than of the sire. The two principal importations of the goats of Asia into Germany are those of M. Wallner of Geneva, who procured them directly from Thibet; and of M. Lowenherz, who received them from M. Terneaux; so that the former are goats of Thibet, the latter Kirguises. The Emperor of Austria, the Kings of Bavaria and Wurtemberg, all the Archdukes, and some private individuals, have procured goats of the former importation. They have been introduced into Saxony by M. de Buest, on his domain of Tossfell. (*Bulletin des Sciences Naturelles.*)

Breeding of Leeches. — M. Mehrer of Maulbronn, by turning his attention to the care of leeches, has succeeded in introducing the breed of those Mollúsca into Wurtemberg, and in producing them in such quantities as to dispense with all importation from abroad. He received a premium of twenty ducats and a silver medal as a reward for his efforts. (*Allgemeine Literatur Zeitung.*)

SWITZERLAND.

A Society of Naturalists is formed here, for the purpose of exploring the more elevated regions of the Alps, which hitherto have been considered as inaccessible. M. Hugi, a leading member of the association, after surmounting last year some almost insuperable difficulties, succeeded in obtaining much valuable geological information in the same districts. (*London Weekly Rev.*, April 4. 1829.)

Natural History Societies. — There are no less than ten societies for natural history in Switzerland, as we learn from the speech of the president of the Society at Lausanne.

HOLLAND AND THE NETHERLANDS.

Fossil Bones in Brabant. — Mr. Charles Morrens has just published a pamphlet, entitled *Revue Systématique des Nouvelles Découvertes d'Ossemens*

Fossiles faites dans le Brabant Méridional, with lithographic plates. This pamphlet contains facts and observations highly interesting to the history of geology. The researches and discoveries made by the author, prove that there formerly existed in this country not only animals like those of the equinoctial regions, but also other species, such as still exist near the pole. The fossil bones discovered in several places belong to animals of the following species: the badger, the elephant, hippopotamus, the whale, sparrows, water-fowl, reptiles of various kinds, tortoises, lizards, toads, and various fishes. The quarries of St. Gilles, Milsbroek, Suventhem, Woluwe, and in the environs of Brussels, have furnished the greater part of those bones, which appear to be antediluvian. (*Bull. Univ.*)

RUSSIA.

The Museum Alexandrinum, at Petersburg, is now completed, and open to the public. It contains a rich collection of natural curiosities and anatomical preparations, together with a valuable library of modern books. (*For. Rev., and Cont. Misc.*, July, 1828.)

The Museum of Natural History at Abo, an extensive philosophical apparatus, and a library of more than 30,000 volumes, were burnt in the late dreadful conflagration. Mr. John Bowring has appealed to the literary and scientific world to contribute towards the reparation of this loss. He says, "the inhabitants of Finland are almost universally poor, but as universally deserving of instruction; and of late many men have appeared among them who have done no inconsiderable service to sciences, philosophy, and the belles-lettres. So much have even the Finnish peasants been touched by the destruction of the Abo library, that in some places, where money is little known, they have subscribed the produce of their farms towards its restoration; and among them the villagers of Wichtis sent fifty barrels of rye; the university of Dorpal has contributed 394 scientific works, besides many philosophical instruments, and collections in natural history. One liberal Russian bookseller (M. Hartmann of Riga) has presented books to the value of 5357 silver rubles, or nearly 800*l.* sterling; his townsman, M. German, sent 193 volumes; Dr. Hasser, of Petersburgh, 995; and Professor Storch (whose works on political economy are so well known), 269. Many other useful and generous donations have been received; and it is confidently trusted that examples so honourable will find many imitators in Britain. The publishers of the *Foreign Review* will most cheerfully assist in receiving and forwarding any works, instruments, &c., which may be liberally given to the Abo University Library." We have sent Vol. I. of this Magazine, and a few other volumes which were presented to us for the purpose of being reviewed. — *Cond.*

Composition of Hailstones. — On analysing small stones enclosed in hail, which fell in the circle of Sterlitamak, in the government of Oneaburg, they were found to contain, in 100 parts of red oxide of iron, 70·00 of oxide of manganese, 7·50 alum, 3·75 silica, 7·50 sulphur, and waste 5·00. (*Bulletin des Sciences Nat.*)

ASIA.

Cochineal transplanted to Java. — The success with which the cultivation of the nopal and the breeding of the insect which produces cochineal have been practised at Cadiz, and thence at Malta, is well known. A French apothecary is said to have made the experiment in Corsica, but on a very confined scale; and the King of the Netherlands, on information that the Isle of Java was well adapted for the cultivation of this important article of merchandise, determined on attempting the transplantation into that colony. As the exportation of the trees and of the insect is prohibited by the laws of Spain, some management was requisite to acquire the means of forming this new establishment. The following were those resorted to: — His Majesty sent to Cadiz, and there maintained, for nearly two years, one of his subjects, a very intelligent person, who introduced himself, and by degrees got initiated into the *Garden of Acclimation* of the Economic Society, where the breeding of this important insect is carried on. He so well fulfilled his commission (for which the instructions, it is said, were drawn up by his royal master himself), that he succeeded in procuring about one thousand nopals, all young and vigorous, besides a considerable number of insects; and, moreover, carried on his plans so ably, as to persuade the principal gardener of the garden of acclimation to enter for six years into the service of the King of the Netherlands, and to go to Batavia. Between eight and ten thousand Spanish dollars are said to have been the lure held out to him to desert his post. In the service of the Society he gained three shillings a day, paid in Spanish fashion, that is, half, at least, in arrear. A vessel of war was sent to bring away the precious cargo, which, being furtively and safely shipped, the gardener and the insects were on their voyage to Batavia before the least suspicion of what was going on was entertained by the Society. (*Bulletin des Sciences Naturelles.*)

NORTH AMERICA.

Diluvian Deposits. — Mr. Eaton has just published an interesting notice of the diluvian deposits in the state of New York, the canal of Lake Erie, &c. In the latter, the alluvial strata occupy two parallelograms; one of 480 miles in length by 20 in breadth, commencing 20 miles to the east of Connecticut, and extending along the southern bank of Lake Erie; and the other, 280 miles in length by 70 in breadth, commencing at Crown Point, on Lake Champlain, and running along the Hudson. It is also found in the western valleys at the foot of Catskill. There are also many beds of plastic clay in a deposit of clay marl, which is compared to the London clay; but in no part does this plastic clay constitute a formation. Along the Erie canal, from Little Fall, a diluvian basin extends for 160 miles, having, it should appear, been filled with three preceding deposits; the last having been dismantled by torrents coming from Little Fall, and running towards the west, and the valleys thence formed have been filled with gravel, sand, clay, trees, fresh-water shells, &c. This diluvium is about 108 ft. in thickness. The wood, which is Canadian pine, is buried at a great depth. The chief shells are Hélices, Uniònes, and Limnèæ. All the plains, elevated and crowned with virgin forests, exhibit, under the vegetable stratum, a bed of fine earth. The antediluvian animal remains are scanty, and consist of Pachydérmata. (*Silliman's Journal*, vol. xii. p. 117.)

Anthracite. — In Rhode Island has been found a quantity of anthracite, with which Silliman has made comparative experiments, in reference to the anthracite of Pennsylvania. He found that it gives out an equal volume of inflammable gas, and burns without difficulty in furnaces built with fire-proof bricks. It burns with a considerable red flame, and with a very intense heat. Its colour is steel-grey, and much resembles plumbagine. The surface is sometimes covered with a thin pellicle of this substance; and small particles of genuine plumbagine are accidentally among the schists which company it. It sounds semi-metallic, and is somewhat of a slaty structure. (*Silliman's Journal.*)

Ancient Fish-banks near Lake Ontario. — All along the western rivers, and little lakes near the Lake Ontario, are small mounds and heaps of gravel of a conical form, erected by fish for the protection of their spawn: these fish-banks are found at the foot of the ridge, on the side towards the lake; on the opposite side none have been discovered. The ridge between Genessee and Niagara runs in a direction from east to west, with a general altitude of 30 ft. above the neighbouring land, and more than forty yards wide. Its elevation above the lake is about 160 ft., and its distance from the water, to which it descends by a gentle slope, is between six and ten miles, but at one place is not more than one. There is every reason to believe that this remarkable ridge was the ancient boundary of the lake. (*Rigby, in Phil. Mag.*, *N. S.* v. 6.)

SOUTH AMERICA.

Changes in Animals. — All domestic mammiferous animals introduced into America have become more numerous than the indigenous animals. The hog multiplies very rapidly, and assumes much of the character of the wild boar. Cows did not at first thrive, but, in St. Domingo, only twenty-seven years after its discovery, 4000 in a herd was not uncommon, and some herds of 8000 are mentioned. In 1587, this island exported 35,444 hides, and New Grenada 64,350. Cows never thrive nor multiply where salt is wanting either in the plants or the water. They give less milk in America, and do not give milk at all if the calves be taken from them. Among horses the colts have all the amble, as those in Europe have the trot: this is probably a hereditary effect. Bright chestnut is the prevailing colour among the wild horses. The lambs which are not from *merinos*, but the *tana basta* and *burda* of the Spaniards, at first are covered with wool, and when this is timely shorn, it grows again; if the proper time is allowed to elapse, the wool falls off, and is succeeded by short, shining, close hair, like that of the goat in the same climate. Every animal, it would appear, like man, requires time to accustom itself to climate. (*M. Roulin*, in *Le Globe.*)

Bees' Nests. — In the woods of Brazil is frequently found hanging from the branches the nest of a species of bee, formed of clay, and about 2 ft. in diameter. (*Bulletin des Sciences.*) It is more probable that these nests belong to some species of wasp, many of which construct hanging nests. One sort of these is very common in the northern parts of Britain, though it is not often found south of Yorkshire. — *J. R.*

Art. II. *Natural History in London.*

The Zoological Society. — The Report of Council read at the Anniversary Meeting, April 29. has just been published. By this it appears that the Society "is incorporated, and has become a chartered body under the name of the '*The Zoological Society of London.*'" The date of the charter is March 7. 1829. The Council had held one meeting since, and a code of by-laws are in preparation. The Society are to hold meetings on the first Thursday of every month, in their house in Bruton Street. By the statement of accounts printed in this report, the finances seem to be flourishing.

In the Museum in Bruton Street various improvements have taken place. "Additional cases have been erected, wherever space could be obtained, for the exhibition of the different collections; and two persons have been in constant employment in preparing and setting up the more interesting specimens. An assistant has also lately been added, for the arrangement of the shells, insects, and the other smaller subjects of the collection; and much care has been bestowed upon the various departments of comparative anatomy. An instructive as well as an attractive series in every branch of zoology, but more particularly in the groups of mammalia, birds, and insects, has thus been arranged for inspection. A catalogue of the more important objects in the Museum has been published;

and a more detailed list, accompanied with scientific notices of all the species, is in preparation.

"The increase in the number of subjects in the collection during the last year has been considerable, and many of the additions have been of the utmost importance to science. The whole of these, with a few exceptions, have been presented by the friends of the Society. A detailed list of these donations, which are too numerous for insertion in this report, is laid upon the table; a reference to the contents of which will evince that the spirit of liberality, which laid the foundations of this already valuable collection, has not decreased.

"A very extensive correspondence has been established with naturalists of foreign countries, and persons resident in distant parts, who are anxious to promote the objects of the Society. Through these channels many valuable acquisitions have been already received; and it is expected that much of novelty and interest will continually pour in to increase the attractions of the Museum and Menagery.

"The Garden in the Regent's park is the principal source of attraction and of expense. The nature of the soil, which consists of a thick ungrateful clay, increases the cost of every work. The health of the animals requires that oak floors be raised above the surface of the ground; and it is necessary to lay a thick substratum of dry material under every enclosure and every walk. These disadvantages are however amply counterbalanced by its immediate vicinity to the town. The Council have, notwithstanding the nature of the soil, endeavoured to give to the garden all the attractions which good cultivation and an abundance of flowers can afford: and they have to return their thanks for the very liberal supplies for this purpose which they have occasionally received from the Horticultural Society. The resort to the garden has far surpassed the most sanguine expectations of the Council; 112,226 persons have visited it during the last year."

Nothing can be more striking, and at the same time more gratifying, than the circumstance of the gardens being visited by such an immense number of persons. We hope this circumstance will, in time, lead to the whole of the Regent's Park being arranged as a Zoological and Botanical Garden, and thrown open to all the public, rich and poor. A very small tax on each of the parishes composing the metropolis, regulated according to distance, population, &c., would suffice for this, and we are sure, would be most readily paid. We refer to what we have said on the subject of public gardens, in former Numbers of this publication and of the *Gardener's Magazine*.

In naming both the animals and plants in the gardens, we would suggest the use of small cast-iron frames, in which a card containing the name, natural order, native country, and any characteristic fact respecting the uses or history of each animal or plant should be placed with a glass over it, as in the botanic garden at Glasgow. (See *Gard. Mag.*, vol. v. p. 344.) We consider the proper naming of the animals and plants as a matter of very great importance to the public. Something besides the mere name ought to be added to the card of every animal and of every plant, in order to excite interest and lead to farther research. It is not enough that a catalogue may be referred to, great numbers will look at the animal and the card, who will not have it in their power, or who will not take the trouble, to look at the catalogue; and one historical or descriptive fact, presented to the mind along with the view of the animal itself, is worth the reading of many others to a beginner, because it makes an impression never to be forgotten. We earnestly hope the Council will take this matter fully into consideration, in all its various bearings.

The time may perhaps come when it will be found necessary to render Greenwich Park a similar Zoological and Botanical Garden, for the use of that part of the metropolis. The thing, like similar things on the Continent, will then be done by the public, to supply the wants of the public. In the mean time, the founders of the Zoological Society are entitled to the honour of having commenced this highly rational and humanising species of gratification in England.

"The number of species and varieties now living of animals belonging to the Society is 194; of which 69 are quadrupeds, and 125 are birds. The whole amounting to 627 individuals, of which 152 are quadrupeds, and 475 are birds. They are at present generally in good health, order, and condition. Measures have been taken to add to them, especially by the acquisition of some of the larger and stronger quadrupeds; and these will be brought forward and exhibited as speedily as dens and enclosures can be prepared for them.

"The Council very reluctantly postponed to a late period the attempt to render the Society more directly and practically useful by experiments in breeding, and in the domestication of foreign animals. The establishment in the Regent's Park is obviously unfit for this purpose. Its limited space and great publicity operate strongly against the success of such attempts; and the results have only been satisfactory with some species of aquatic fowls which were last year bred upon the lake. For these objects the Council have long seen the necessity of forming an establishment at such a distance from London as should insure sufficient quiet, and at the same time should be easily accessible: and they have with this view concluded a negotiation with Mr. Pallmer and the corporation of Kingston for the occupation of a farm, consisting of a house with some convenient buildings, and about thirty-three acres of land, nine miles from Hyde Park Corner, in a beautiful situation under the wall of Richmond Park, with a very light soil peculiarly favourable for rearing birds, full of very abundant springs, and with some excellent ponds.

"The application of the farm to the purposes and objects of the Society will be under the following heads: — First, in affording a convenient relief and assistance to the menagery in the park, by removing from it such quadrupeds and birds as may require a quiet place to bring forth and rear their young: also in receiving the duplicates of the collection which it may be expedient to keep in hand to replace those which are exhibited in the park, when necessary; and likewise to maintain such as want a more extended range than the garden at present admits of, or which it is necessary to allow to remain at liberty. Second, the rearing various domesticated quadrupeds and birds, both of ornamental as well as useful varieties, with a view of having their kinds true and free from mixture; or in effecting improvements in the quality or properties of those which are used for the table; and likewise in domesticating subjects from our own or foreign countries, which have not hitherto been inmates of our poultry or farm yards. Third, the conducting experiments in all matters relating to breeding and points of animal physiology connected therewith, the range of which is very various and extensive. Many of these will require much time to be completed; some may be brought to a conclusion within a year or two. It is remarkable that there have never been published any correctly recorded facts, on which the opinions at present entertained by physiologists on many of such matters can be supported. It is to be hoped that the Zoological Society may be the instrument of settling many questions of this description in a satisfactory manner.

"In the objects of attention at the farm, the breeding and trying experiments with fish are of course included."

The Linnean Society. — The library of Linnæus and of the late President (mentioned p. 83.) has been brought from Norwich, and is now systematically arranged in the Society's house in Soho Square. The library of the Linnean Society may now be considered one of the first botanical libraries in the world; and its central situation in London, and the facilities afforded to the members and their friends in referring to the works it contains, will prove of real value to scientific and literary men, and must greatly increase the desire of belonging to this Society.

May 25. At the anniversary dinner some very interesting speeches were delivered, especially by Mr. Duncan of St. John's College, Oxford, on the influence of the study of botany and natural history in general on human character and happiness. No study was so likely to guard young minds from falling into that train of thinking which led to superstition and fanaticism, and by dividing those who ought to be as one brotherhood into sects and parties, produced enmity instead of love and friendship. We had the evidence of the present state of France and Germany, as contrasted with the present state of Spain*, to prove that science could break down a religious despotism; and of all sciences the fittest for this purpose, because the fittest for universal application, is the study of the objects of nature. Professor Henslow, we understand, took a similar view of the same subject at the commemoration dinner of Ray; and it is highly gratifying to us to add that we have heard the same sentiments from various clergymen. It seems generally agreed on, in all countries, that the surest way of neutralising the exclusive spirit, generated by artificial religion or sectarian principles, is to study the religion of nature. Since these lines were in type, Mr. Duncan favoured us with the substance of what he delivered, and his excellent letter shall appear in next Number.

June 2. Read.—A very interesting paper, by Mr. Yarrel, on the throats of birds.

Geological Society. Feb. 6.—A paper was read, "On the discovery of a new species of Pterodactyle; and also of the Fæces of the Ichthyosaúrus; and of a black substance resembling Sepia, or Indian Ink, in the Lias at Lyme Regis;" by the Rev. W. Buckland, D.D. F.R.S. Professor of Mineralogy and Geology in the University of Oxford.

1. This specimen of Pterodactyle was discovered, in December last, by Miss Mary Anning, and was found to belong to a new species of that extinct genus, hitherto recognised only in the lithographic Jura limestone of Sollenhofen,—which the author considers as nearly coeval with the English chalk.

The head of this new species is wanting, but the rest of the skeleton, though dislocated, is nearly entire; and the length of the claws so much exceeds that of the claws of the Pterodáctylus longiróstris and breviróstris, of which the only two known specimens are minutely described by Cuvier, as to show that it belongs to another species, for which the name of Pterodáctylus mácronyx is proposed. A drawing of this fossil by Mr. Clift accompanies the paper. The author had for some time past conjectured, that certain small bones found in the lias at Lyme Regis, and referred to birds, belong rather to the genus Pterodactyle. This conjecture is now verified. It was also suggested to him, in 1825, by Mr. J. S. Miller of Bristol, that the bones in the Stonesfield slate, which have

* It is a remarkable fact, that there are more universities, colleges, and schools in Spain, in proportion to the population than in any country in Europe. There is a school in every parish, and in every hamlet, as in Germany, Scotland, and Sweden, and yet all the lower class are in complete ignorance, and no farther advanced in the useful arts than they were five centuries ago. To what can this be owing? To the total exclusion of useful science from the schools, and to a law by which no person is allowed to study at a college, who is not destined for the church, the law, or medicine. All that is gained at school in Spain is reading, writing, a little arithmetic, and the love of church and king. (See the *Manual of Science and Literature*, vol. i.) — *Cond.*

been usually considered as derived from birds, ought to be attributed to this extraordinary family of flying reptiles: Dr. Buckland is now inclined to adopt this opinion, and is disposed to think still further, that the coleopterous insects, whose elytra occur in the Stonesfield slate, may have formed the food of those insectivorous Pterodactyles. He conceives also, that many of the bones from Tilgate Forest, hitherto referred to birds, may belong to this extinct family of anomalous reptiles: and, from its presence in these various localities, he infers that the genus Pterodactyle was in existence throughout the entire period of the deposition of the great Jura-limestone formation, from the lias to the chalk; expressing doubts as to the occurrence of any remains of birds before the commencement of the tertiary strata.

2. *Fossil Fæces of the Ichthyosaurus.* The author concludes, from an extensive series of specimens, that the fossils, locally called bezoar stones, that abound at Lyme, in the same beds of lias with the bones of Ichthyosaúrus, are the fæces of that animal. In variety of size and form they resemble elongated pebbles or kidney potatoes, varying generally from 2 to 4 in. in length, and from 1 to 2 in. in diameter; some few being larger, others much smaller: — their colour is dark grey; their substance, like indurated clay, of a compact earthy texture, and their chemical analysis approaches to that of album græcum. Undigested bones and scales of fishes occur abundantly in these fæcal masses. The scales are referable to the Dapèdium polìtum, and other fish that occur in the lias; the bones are those of fish and also of small Ichthyosaúri. The interior of these bezoars is arranged in spiral folds; their exterior also bears impressions received from the convolutions of the intestines of the living animals. In many of the entire skeletons of young Ichthyosaúri, the bezoars are seen within the ribs and near the pelvis: these must probably have been included within the animal's body at the moment of his death. The author found, three years ago, a similar ball of fæcal matter, in the collection of Mr. Mantell, from the strata of Tilgate Forest, which abound in bones of Ichthyosaúri and other large reptiles; and he conjectures that these bezoars exist wherever the remains of Plesiosaúri are abundant.

3. *Fossil Sepia.* An indurated, black, animal substance, like that in the ink-bag of the cuttle-fish, occurs in the lias at Lyme Regis; and a drawing made with this fossil pigment, three years ago, was pronounced by an eminent artist to have been tinted with sepia. It is nearly of the colour and consistence of jet, and very fragile, with a bright splintery fracture; its powder is brown, like that of the painter's sepia. It occurs in single masses, nearly of the shape and size of a small gall-bladder, broadest at the base and gradually contracted towards the neck; these are always surrounded by a thin nacreous case, brilliant as the most vivid lumachella. The nacre seems to have formed the lining of a fibrous, thin, shelly substance, which, together with this nacreous lining, was prolonged into a hollow cone, like that of a belemnite, beyond the neck of the ink-bag. Close to the neck of the ink-bag there is a series of circular transverse plates and narrow chambers, resembling the chambered alvèolus within the cone of a belemnite; but beyond the apex of this alvèolus, no spathose body has been found.

The author infers that the animal from which these fossil ink-bags are derived, was some unknown cephalopode, nearly allied in its internal structure to the inhabitant of the belemnite, the circular form of the septa showing that they cannot be referred to the molluscous inhabitant of any nautilus or cornu-ammonis.

Feb. 6th.—A paper was read "On the Oolitic District of Bath," by William Lonsdale, Esq., of Bath-Easton.

The tract described in this paper comprehends a space included between the lines passing, on the north, from Wycke, north west of Bath, through

Marshfield, Kingston St. Michael, and Lynham, to the Chalk-downs north of Calne and Cherhill; and on the south and south-east, from the south of Radstock, through Frome and Westbury, to Devizes. The author refers to the works of Mr. Smith, and of Messrs. Conybeare, De la Beche, and Phillips, as the principal published authorities on the district; and states his obligations for much valuable information to the Rev. B. Richardson of Farleigh, near Bath.

Feb. 20. At the *Annual General Meeting* the Report of the Council on the finances, presents, and other matters, was read, and an address delivered by the President. The government have granted this Society apartments in Somerset House, which have been fitted up under the direction of Mr. Decimus Burton, well known for his skill and taste as an architect, and who has declined receiving any pecuniary compensation. Mr. William Phillips, one of the authors of *Geological Outlines of England and Wales,* and Dr. Wollaston, author of an *Elementary Introduction to Mineralogy* and of various other works, and who has left 1000*l.* to the Society, have died during the past year; and a considerable part of the speech is devoted to an account of their geological labours and merits, and of the regret of the Society at their loss.

In adverting to the progress which geological research has made during the past year in this country, the President follows the descending order of the strata in our series; and refers to the Tabular View of our Stratification, of which Mr. De la Beche has recently published a second edition, for one of the most convenient and succinct views of the present state of our knowledge respecting them.

" A complete account of the deposits which appear on the coast of Suffolk, and other parts of the eastern shore of England, especially of that which has been denominated Crag, is still a desideratum of importance in the history of our strata. The publications of Mr. Robberds and Mr. R. C. Taylor have given some information of considerable value upon this tract: but a general account of it, combining the local phenomena with those of analogous deposits in other quarters, is still to be wished for; and from the connection of the facts which our eastern shores exhibit, with some of the great questions touching the true theory of the diluvial accumulations, an acquaintance with them is almost necessary to the removal of some of the numerous difficulties which still attend that subject.

" Mr. Webster has announced a new work upon the Isle of Wight: in which, under the simple form of a guide to that most interesting island, he proposes to illustrate fully its topography and geology; particularly the relations of the strata immediately above the chalk.

" The true order of the beds between the chalk and the oolitic series, which has been the subject of much recent enquiry and discussion, appears now to be generally recognised; and considerable light has been thrown upon that remarkable group, united principally by zoological relations (for, mineralogically, its members are sufficiently distinct), which occurs between the lowest of the beds denominated green sand, and the oolite of Portland. The succession, though the beds are not continuous, has been shown to be uniform throughout England, from Norfolk southwards, and to be the same, in fact, with that long since enounced, though with much variation of nomenclature, by Mr. William Smith, in his Geological Maps of the English Counties.

" A full and elaborate Catalogue of the Fossils of Sussex has been contributed by Mr. Mantell; whose labours as a geologist, amidst the duties of an arduous profession, have long been so useful to the public, and so creditable to himself. This valuable paper will be published in the next portion of our *Transactions.* Mr. Martin of Pulborough in Sussex, another member of the same profession, has published a detached Memoir, the developement of a Paper read here during the last session; which, besides an account of the stratification in his own neighbourhood, contains much ingenious speculation on the phenomena which seem to have attended the elevation of the tract beneath the chalk, within the denudation of Sussex, Hampshire, Surrey, and Kent."

The researches of Mr. Lonsdale on that important tract between Calne and Bath; the work upon the coast of Yorkshire, by Mr. Phillips of the York Institution; the various important memoirs by Professor Sedgwick, and by Mr. Murchison; a variety of foreign publications; the labours of Dr. Macculloch, Professor Henslow, Professor Jameson, John Taylor, F.R.S., and various other authors are next adverted to.

"The labours of the Geological Society of Cornwall are continued: and a work, of which the first volume has been published by Mr. John Taylor, one of the principal miners in this country, promises considerable additions to a department of knowledge comparatively new to our scientific literature, but intimately connected with our pursuits. This work is entitled *Records of Mining;* and it proposes to embrace 'reports and statements upon particular mines, and the produce of metals, in various districts; notices on geological facts relating to mining; discoveries of ores and minerals, and descriptions of existing processes connected with the treatment of ores, and the operations of smelting, or other modes of reduction; with investigations of the methods of working now usually employed in different countries, and of projected improvements; and descriptions of machinery or implements destined to the service of the mines.' The editor justly adds, that many facts relating to these subjects continually present themselves to observation, all record of which is lost, for want of a proper depository; and that not only is a quantity of valuable matter constantly occurring in the reports and statements upon our British mines, but that much more may be expected to reach us from those foreign countries in which English capital is now employed.

"In the foreign geology of Europe, we have the gratification of knowing that the examination of France, with a view to a general map of the strata, is steadily proceeding.

"The proofs of the identity of the prevailing rocks, in the more distant parts of the world, are continually multiplied by the reception of authentic specimens; for which we have been of late indebted to the Admiralty, and to British officers in the Navy, and in the service of the East India Company: and the donors of every such contribution, — even of the smallest specimen, the locality of which in a distant quarter is correctly ascertained, — will have the satisfaction of feeling that they bring us nearer to the ultimate solution of the interesting problems which are before us.

"The Memoir of Dr. Richardson, read at one of our Meetings, and published in the Appendix to the account of Capt. Franklin's second journey, contains a most valuable series of observations, made under great disadvantages, during the advance and return of that memorable expedition to the shores of the Polar Sea; in the course of which a space of about 5000 miles was for the first time surveyed and laid down, — the total distance travelled over by the party in America being not less than 14000 miles. The great similarity of the rocks, and of their structure and external features, to those of Europe; the uniformity in composition of vast tracts of the country; and the very large proportion of the surface occupied by water, especially within a broad calcareous band, that intervenes between the Rocky Mountains and another primary tract which has nearly the same direction, are some of the more obvious general results that may be collected from the perusal of this important Memoir, a full abstract of which will be found in our *Proceedings*. And the whole is rendered still more interesting to us, by the liberality of the collectors, who have placed in the Museum of the Society a complete series of the specimens described and referred to by Dr. Richardson.

"From Africa we are still without any communication from any of the settlements on its extensive coasts.

"I am happy to say there is every day new reason to hope for the extension of geological enquiry in India; where the liberality of the Company in carrying on the magnificent trigonometrical survey has already laid the best foundation for such researches. A copy of the portion of the great map, which has been already published, has been presented to us by the Directors; and there is every reason to suppose, that they are as much disposed to favour geology, as they have shown themselves to be to advance the progress of astronomy and scientific topography. We owe, under this head, considerable obligation to the exertions of our own distinguished member Mr. Colebrooke, whose activity and varied information have enabled him to contribute so much to several departments of literature and science in connection with the East.

"The Asiatic Society, also, has recently taken up the extension of geological enquiry with much interest and zeal; and has opened an intercourse with India upon this subject, though Sir Alexander Johnstone, the chairman of their committee of foreign correspondence, from which the best results may be expected. The attention of the Asiatic Society of Calcutta has of late been particularly devoted to this department of natural science; and we have, in the different settlements, several friends and fellows of this Society, who have shown their desire to promote our views.

"The Society has received from the Admiralty, in the course of the present session, a small collection of specimens, from the site of the intended settlement in the vicinity of Swan River, on the west coast of Australia; and Captain Stirling, before his departure from England, in the capacity of its governor, was good enough to place in my hands some brief notes relating to them, which I shall take an early opportunity of laying before the Society. From the zeal expressed by that distinguished officer, we may regard this contribution as an earnest of what may be expected hereafter from the colony under his superintendence: and having already received from the eastern shores of Australia enough to prove the resemblance of the rocks to ours, and even to point out the relative position and structure of the formations on some points of the coast, we may with reason expect the solution of some of the great questions respecting that region, which still are undetermined. It is remarkable, for example, that no traces have yet been descried of any active volcano along the whole circuit of those shores; although the latitudes nearer to the equator, and under nearly the same meridians, are the scenes of some of the most tremendous volcanic phenomena on record. The mode in which the waters condensed upon the vast continent of Australia are disposed of, — whether by evaporation from inland seas or lakes, or conducted to the ocean by rivers, whose existence has hitherto escaped detection, is another great question connected in all probability with its geological structure. But there is no subject of greater interest to us, at present, than the fossil organised remains of that country; a knowledge of which, especially the remains of animals, will be an addition of capital importance to our subject, and probably not less valuable to the zoologist. The diluvium, therefore, respecting which we have at present no information whatever, is deserving of the greatest attention: and since the existing races of Australian animals are so widely different from those of every other portion of the earth, the identity, on the one hand, of these animals with those occurring in a fossil state, would lead to some of the most important inferences; while, on the other, the agreement of the fossil remains of Australia with the existing races of other regions, now disjoined from that country, would give new support to some of the most popular speculations of our day. With a view to these enquiries, scarcely any thing that can be collected by our fellow-labourers in that quarter, will be without interest to their friends in Europe.

"Mr. R. C. Taylor, one of our Fellows, has prepared a valuable list of the fossils hitherto discovered in the British strata [published in a former Number of this Magazine, p. 26.], drawn principally from the works and authority of Mr. Sowerby, to whose indefatigable exertions, in extending our acquaintance with the fossils of England, geology is under most essential obligation.

"The Council has mentioned to you the late addition to the Museum, of a splendid series of casts of fossil remains, presented by the Baron Cuvier, and doubly valuable from their connection with his own publications. These, in fact, are but continued proofs of the interest which that illustrious naturalist has always taken in the progress of this Society; and few of us have ever visited the French capital, without partaking, in person, of his hospitality, and deriving advantage from his aid in our enquiries. When the state of knowledge which many of us can remember, is contrasted with what we know at present respecting fossil organised remains, — now that we have acquired the power of determining from a single bone, or even a fragment, almost the entire structure and relations of animals, whose races are no longer in existence; and when we recollect that we owe to the same person the most complete history of fossil remains that has ever yet appeared, in richness of matter, in arrangement, and in style; and that all this is but a part of what one man has already performed; we cannot be surprised at the eminence which he occupies in public opinion. The name of Cuvier is in fact identified with our subject; for, unquestionably, to no one now living is geology so much indebted as to him: and he enjoys the enviable good fortune, not only of receiving from every side the tribute of admiration and gratitude arising from his works, but of witnessing himself the influence which they have shed, and are every day producing, on all the kindred departments of science, and in almost every quarter of the globe.

"On the subject of fossil plants, we have heard, during the last session, a valuable paper; and there are, at present, before the Society, several new specimens, which it is intended to figure and describe without delay. The number of such specimens, in detached private collections throughout this country, we know to be so great, that when the wish of the Council to assist in describing and publishing them is generally known, we shall probably never want such a supply, as will enable us to connect with every future part of our *Transactions* some contribution to fossil botany. Great benefit will thus be produced, by circulating information at present locked up and unavailing; and the specimens lent to the Society for illustration will be rendered doubly valuable to the proprietors themselves.

"The botanical paper, in the last part of our *Transactions*, is that of Dr. Buckland on the *C*ycadeöídeæ; a new family of fossil plants, discovered in the Isle of Portland, and obtained most probably from a stratum immediately above the oolitic beds, which contains also lignite with the silicified trunks of dicotyledonous trees.

"On the suggestion of Mr. Brown, these fossils have been considered as belonging to a family very nearly related to, but perhaps sufficiently distinct from, the recent *C*ycàdeæ: and the observations of this distinguished botanist, with respect to the stem or caudex of this family, are illustrated by sections represented in the plates which accompany Dr. Buckland's paper.

"The family of *C*ycàdeæ consists at present of two genera, Zàmia and *C*ȳcas. In certain Zàmiæ, Mr. Brown states, there is one narrow vascular circle, divisible into radiating plates, and situated in the midst of the cellular substance of which the stem is in a great part composed. In *C*ȳcas revolùta, a second circle is added externally, at a small distance from the first; and in *C*ȳcas circinàlis (according to the only section of this plant yet published) the circles are more numerous,—the outermost being still considerably removed from the circumference.

"The fossil stems, which are the immediate subject of Dr. Buckland's paper, like the recent *Cycàdeæ*, are not covered with true bark, but have a thick case, made up of the basis of decayed leaves, which externally form rhomboidal compartments, similar to those of the recent plants. The internal structure in the fossils, so far as hitherto examined, resembles that of the *Cycàdeæ*, except in the more external position and greater breadth of the circle or circles visible in the section of the stem, a character whereby, Mr. Brown is of opinion, this fossil family approaches more nearly than the *Cycàdeæ*, to the ordinary structure of dicotyledonous woods; and consequently may be considered as supplying, from the fossil world, a link which helps, in some degree, to connect the still distant structure of the *Cycàdeæ* with that of the nearest existing family, the Coníferæ.

"M. Adolphe Brongniart's publications on the history of fossil vegetables, though produced in another country, are too important to our enquiries not to be mentioned here. Some fear, perhaps, may be entertained, that his data are not yet sufficiently extensive to form an adequate base for his deductions; but there can be no question as to many of his inferences, nor respecting the impulse which the subject will receive from such an accumulation of facts as he has brought together. His views contrasting the climate of the globe at former periods and at the present time, and his division of the epochs of geological deposition, as deduced from the study of fossil plants, in comparison with those which mere geological enquiry points out, are most ingenious. Even if regarded as no more than the conjectures of so acute and indefatigable an enquirer, these speculations would be well deserving of attention; and, altogether, his works on fossil plants must be considered as constituting one of the most valuable contributions to this department of geology that has ever appeared."

We are obliged to pass over various subjects of the greatest interest, in order to find room for an extract from the President's very interesting conclusion: —

"Such, Gentlemen, is a brief statement of the product of our labours during the past year, and of some of the objects which you may perhaps regard as still deserving your attention. If, on comparing our subject with some other departments of physical research, we lament that we cannot avail ourselves of such aid as mathematical science furnishes to the astronomer; if the phenomena we are occupied in observing be inferior in sublimity to those presented by the heavenly bodies, and the laws we investigate less strict than those which govern their motions, — still do our enquiries claim a very high place as an exercise of intellectual power. The geologist, like the astronomer, is called upon to trace the effects of forces, not only vast beyond conception in themselves, but acquiring almost infinite augmentation of effect, from the numberless ages during which they have been unremittingly exerted: and the problem, to explain the condition of the earth's surface at any moment of this career, is complicated as much, perhaps, as any other in physics, from the nature of the agents, of which change and irregularity appear to be essential characteristics. The degradation of the surface by the atmosphere, the erosion of streams and torrents, the encroachments of the sea, the growth and decay of the organised beings that successively inhabit the globe, with all the chemical and mechanical changes going on around us, though constantly in operation, are for ever varying in their energies and effects. The great phenomena of volcanic agency, which seems as it were to constitute one of the vital powers of the earth, are from their very nature transitory and erratic. Viewed, nevertheless, in relation to the vast periods of time during which phenomena of the same kind have been continually recurring, these very accidents and apparent irregularities acquire a sort of uniformity. They intimate the repetition of results in future, resembling those which seem already to have occurred repeatedly in the history of the globe; and that part of the Huttonian theory, where the progress of geological revolution has been compared to the cycles, in the movements of the heavenly bodies, — in which, after a long series of periodical deviations, the same order is certain to recur, — seems to acquire new probability from every step of our progress, and to be really no less just, in a philosophic view, than it is captivating to the imagination."

The part of the Huttonian theory alluded to is as follows: —

"The geological system of Dr. Hutton resembles, in many respects, that which appears to preside over the heavenly motions. In both, we perceive continual vicissitude and change; but confined within certain limits, and never departing far from a certain mean condition, which is such, that in the lapse of time the deviations from it on the one side must become just equal to the deviations from it on the other. In both, a provision is made for duration of unlimited extent; and the lapse of time has no effect to wear out or destroy a machine constructed with so much wisdom." (*Playfair's Illustrations*, § 387. note xx.)

Ornithology of the Metropolis. — Sir, How little, at the present time, is known of the natural history of many birds, of the cuckoo, for example; nay, how little of our own perennial warbler, the *redbreast!* It does not appear to be yet satisfactorily determined whether the male and female both sing, or whether the male only of this species sings. Till I brought the subject before the public, I am not aware that any one had controverted the opinion long since made public by the Hon. Daines Barrington, *that female birds do not sing;* whereas, we now find that female birds do many of them sing, and that some, perhaps, even sing while sitting upon their eggs. The advantage, therefore, of a periodical work like the Magazine of Natural History, is now manifest; for, if any misstatements be made, the means of their being publicly corrected is at hand.

I have, in my *Ornithològia*, mentioned some of the birds to be found at large in London, a singular situation, it must be admitted, for them; but in addition to those mentioned in my work, I wish now to give the following particulars concerning the ornithology of the metropolis.

I heard the thrush (*T*úrdus mùsicus) singing delightfully on a tree, in Berkeley Square, March 22. 1828. I am quite sure of this fact, as I took care to see the bird.

Jackdaws (*C*órvus *M*onédula) frequent some of the church towers of London, particularly St. Michael's, Cornhill; and it is said (for of the fact I am not myself cognisant) that the hawk (Fálco *T*innúnculus) builds in some of the more elevated parts of St. Paul's Cathedral.

Mr. Britton informs me that, in the winter, tomtits (Pàrus cærùleus) frequent his garden in Burton Street, Burton Crescent, to the number of four and six at a time. The redbreast (Sýlvia Rubécula) is also frequently seen in the same garden; the chaffinch (*F*ringílla cœ̀lebs) has also been observed there; and, last summer, the whitethroat (*M*otacílla Sýlvia) poured its pleasing song in the same place. It is scarcely necessary to add, that pheasants and partridges are seen in the Regent's Park; because these were, I presume, brought there by those having command in that region, and which, therefore, can scarcely be considered as the *natural* and voluntary domicile of those birds.

Another fact, not indeed relative to the birds of London, but to the redwing (*T*úrdus ilìacus) may, in concluding these notices, be mentioned; namely, that a friend of mine at Trowbridge, Wilts, on whose accuracy of observation I can rely, assures me this bird occasionally sings in this country before its departure in the spring. — *James Jennings. London, April* 7. 1829.

Arrival of the Swallow. — I saw yesterday (Sunday), for the first time this year, two swallows flying from the east towards the west, about the height of the houses, over the water in the enclosed part of the Regent's

Park: they seemed travelling, as I looked for some time, and did not see them return as they usually do when in search of their food. [We observed a flight of swallows the same day at Bayswater, as did Mr. Sweet at Fulham.]

The Nightingale I have not yet heard, this season, in the Park; though I heard it last year before the 20th of April. I am, Sir. &c. — *R. G. Sussex Place, Regent's Park, April* 27. 1829.

Art. III. *Natural History in the English Counties.*

Indigenous Floras of London and Plymouth compared. — Sir, The following tables, illustrating the difference of climate between this neighbourhood and that of London, were furnished, at my request, by my friend, Mr. Banks of Devonport, who unites to a profound acquaintance with our indigenous botany the greatest accuracy of observation. Hence, the greatest dependence may be placed upon the materials which he has furnished, and which I place at your disposal, as a hint which will, I hope, be followed up, in other places, by equally attentive observers. In this the means will be furnished of comparing the climate of different parts of our island even more accurately than by the most correct registers of meteorological observations. I am, Sir, &c. — *William Hamilton.* 15. *Oxford Place, Plymouth, March* 1. 1829.

A List of early-flowering Plants growing in the Vicinity of Plymouth, with their usual Period of beginning to flower there, compared with the Periods assigned for their flowering in the Vicinity of London in the last edition of the *Hortus Kewensis*: from the Observations of Mr. George Banks, Lecturer on Botany, &c., Devonport.

Names.	Vicinity of Plymouth.		Vicinity of London.	
	Flower.	Fruit.	Flower.	
*D*áphne Lauréola	January	- -	January	March
Galánthus nivàlis	January	February	February	March
*H*ellèborus viridis	January	February	March	April
Fragària vésca	January	- -	April	May
*L*àmium purpùreum	January	-	May	June
Stellària mèdia	January	- -	May	June
*R*ibes Grossulària	February	-	March	April
*N*arcíssus Pseùdo-*N*arcíssus	February	- -	March	April
*T*ussilàgo *F*árfara	February	-	March	April
*D*ràba vérna	February	February	March	April
*B*úxus sempervìrens	February	- -	April	
Ficària vérna	February	-	April	
A'rabis Thal*iàna*	February	- -	April	May
Cochleària officinàlis	February	February	April	May
Prímula vulgàris	February	-	April	May
O'xàlis Acetosélla	Feb. March	- -	April	May
*V*iola hírta	February	-	April	May
canìna	February	March	April	June
palústris	February		May	June
Potentílla fragarioìdes	February	- -	May	June
*R*anúnculus *h*ederàceus	February	-	May	August
*P*rùnus spinòsa	Mar. [leaf Ap.]	- -	March	April
*A*nemòne nemoròsa	March	-	April	
insititia	March	- -	April	May
Cérasus	March	-	April	May
Prímula elàtior	March	April	April	May
vèris	March	- -	April	May
U'lex europæ'us	March	-	April	May
*F*ráxinus excélsior	March	- -	April	May
Barbar*èa* præ'cox	March	-	April	October
vulgàris	March	- -	May	August
Pulmonària officinàlis	March	-	May	
*T*rifòlium subterràneum	March	- -	May	
Sherárd*ia* arvénsis	March	- -	Summer	
*F*è*dia* olitòria	March	- -		
Stellària *H*olóstea	April	-	April	June
*V*accínium Myrtíllus	April	- -	April	June

A List of Plants flowering late in the Season in the Vicinity of Plymouth, compared with the Periods assigned for their flowering near London in the last edition of the *Hortus Kewensis:* from the Observations of Mr. George Banks, Lecturer on Botany, &c., Devonport.

Names.	Vicinity of Plymouth.	Vicinity of London.	
	Flower.	Flower.	
Verónica serpyllifòlia	August	May	July
*P*lantàgo màjor	September	May	July
*G*erànium lùcidum	September	May	August
*R*esèda Lutèola	September	June	July
*P*apàver Rhœ'as	September	June	July
*C*orónopus Ruéll*ii*	September	June	August
Agrimònia *E*upatòr*ia*	October	June	July
Verónica agréstis	October	May	June
Lonicèr*a P*ericlýmenum	October	May	July
*S*tátice Armèria	October	May	July
*V*iola trícolor	October	May	September
*T*rifòlium rèpens	October	May	September
*V*erbèna officinàlis	October	June	September
*C*órnus sanguínea	October	June	July
*C*onvólvulus arvénsis	October	June	September
*S*tàchys arvénsis	October	July	August
*E*rýsimum cheiranthöides	October	July	August
*A*nagállis arvénsis	October	July	September
Euphràsia officinàlis	October	July	September
*Verónica h*ederæf òlia	November	April	June
*S*álvia *v*erbenàcea	November	April	June
Geràn*i*um Robert*iànum*	November, December	April	October
*P*olýgonum, species omnes	November	April	October
*E*rìca cinèrea	November	June	September
Spérgula arvénsis	November	July	September
*C*henopòdium muràle	November	August	September
*T*hláspi B*ú*rsa pastòris	December	March	September
Fragària vésca	December	April	May
*L*àmium purpùreum	December	May	June
*L*ýchnis dioíca	December	May	September

Middlesex.

Plants collected by the Rev. S. Palmer of Chigwell, Essex. The rather uncommon marked with a star (*). — Parietària officinàlis, *A*ntirrhìnum Cymbalària, walls, Highgate. *M*elampýrum praténse, copses, Highgate. Scutellària galericulàta and *mìnor, Turnham Green, marshes. — *S. P. Sept.* 1828.

Surrey.

Plants collected by the Rev. S. Palmer of Chigwell, Essex. The rather uncommon marked with a star (*), the more rare with a cross (†). — † Impatiens Nolitángere§, River Wey, near Guildford, flowers in August. * *V*erbáscum *L*ychnìtis, * pulveruléntum, * nìgrum, and * virgàtum, road-sides, between Guildford and Shalford, and on Shalford Common. * Galánthus nivàlis, Stoke Park, Stoke, near Guildford. † *O*rnithógalum pyrenàicum, Send, near Ripley, flowers in April and May. † *A*lísma Damasònium, flooded hollows on Shalford Common. * Chrysoplènium oppositifòlium, between Shalford and St. Martha's Chapel, in moist copses. *S*axífraga granulàta, * *C*linopòdium vulgàre, St. Catherine's Hill, near Guildford. * *L*athræ'a squamària, in a field between Chantry Downs and Shalford Turnpike. *A*ntirrhìnum spùrium, corn fields near the Telegraph, Guildford. † *I*sàtis tinctòria. This rare plant (the woad of the ancient Britons, from which they extracted a dye to stain their skins) grows on the chalk rubbish at the pits between Guildford and Shalford. * *G*erànium columbìnum, at Losely, near Guildford. * Convallària majàlis, copse near Worplesdon. * *B*ùtomus umbellàtus, Thames, between Kew and Richmond. *E*rígeron àcre, Kingston. — *S. P. Sept.* 1828.

§ Our favourite balsams are of this family.

The Literary and Philosophical Institution of Chatham. — This institution was formed, a very short time since, by the spirited and commendable exertions of a few gentlemen, who possessing varied knowledge themselves felt a proportionate zeal for its diffusion. The establishment is yet in its infancy; but if we may judge of its ultimate success by that which has attended its commencement, we may calculate that it will speedily rise into eminence, and excite an interest in the promotion of natural science, which cannot but be attended with the most happy results, as the beautiful county of Kent furnishes the first-rate advantages for the prosecution of this interesting branch of knowledge. The Committee have shown a most laudable zeal in the formation of a good library and in the establishment of a museum, which, under the present liberal management, bid fair to become extremely useful. A considerable collection of birds is already made. The illustration of mineralogy has not been less sedulously attended to; and the very fine Herbarium of Staff-Surgeon Gulliver has been purchased by the Society. This latter collection is entirely indigenous, and is prepared and arranged in a very excellent manner, and I understand is particularly rich in the minuter plants of the order Cryptogàmia, especially the *F*úngi and *L*ichènes: its value is, moreover, materially enhanced by the immense labour which has been bestowed by that gentleman in *determining* and noting the synonyme of every author who has written on the subject. This is an important feature of the collection, for every one knows, who has studied this branch of botany, how much difficulty and error have arisen in this enchanting science, by the custom of merely *quoting* synonymes from books, without an attentive examination of their accuracy, and how useful and pleasant it is to have an opportunity of access to the practical labours of those who have spent time and research in the record of their observations. I hope shortly to furnish you with some information on some points touching natural history. I am, Sir, &c. — *Zeta.*

A White Lark was lately shot in this neighbourhood. — *P. H. Kingston Rectory, near Canterbury, Nov.* 22. 1828.

A'mpelis gárrula and Upùpa E'pops. — Sir, That lovely-plumaged bird, *A*'mpelis gárrula (the Waxen Chatterer), and *U*pùpa *E*'pops (the Upoe), were frequently seen during the brumal months in various parts of Kent. The former generally appears in small flocks of from five to eight in number, and is an occasional visitant even in the most northern parts of our island; this being probably the first instance on record of its being found so far south as the above-mentioned county. The latter is a timid, shy, and solitary bird, but by no means uncommon in severe winters. Little, however, as a correspondent has before remarked, seems to be known of the natural history of these, or indeed of any of the northern feathered tribes which occasionally visit our coasts; and an ornithologist who has enthusiasm, leisure, and ability for the undertaking, might reap many a rich harvest by a few years' residence on those inhospitable and barren shores, which "seem," says the animated Bewick, whose recent death all men of science must so deeply deplore, "as if they were set apart for the nations of the feathered race as their peculiar heritage, a possession which they have held coeval with creation." I am, Sir, &c. — *Perceval Hunter. Kingstone Rectory, near Canterbury, April,* 18. 1829.

Suffolk.

Insects collected near Ipswich. — E'ndromis versícolor, Notodónta *I'rcto-pha*, *S*ílpha quadrimaculàta. Larvæ of Pàphi*a*, A'tropo*s*, Zeuzèra *æ*'sculi, Ægèri*a* *c*rabronifórmis et *a*pifórmis. — *K. Ipswich, Feb.* 17. 1829.

Moss Agate. — A very beautiful moss agate has recently been found at Aldborough, on the coast of Suffolk. Since it has been polished, its size is 5 in. long by 3 in., the greatest width, and about 1¾ in. thick; weight, 14 oz. Many good specimens of agate have been found on this coast, but this, of which the above is a brief description, is said to be by far the most valuable —*R. C. T.*

Worcestershire.

Flocks of Crossbills near Worcester. — Sir, Observing in the Magazine of Natural History an account, by a Worcester correspondent, of flocks of crossbills visiting Cothoridge, near Worcester, each spring and autumn, I am induced to send you the following account of the case from my own observation. In the autumn of 1821, being at Cothoridge, I was aroused early one morning by the information that a large flock of crossbills was feeding in a grove of firs near the house. After watching them for some time, with a gun I procured fifteen specimens, out of which only two were in full feather, the breasts and backs of the others being nearly bare. After this they used to visit the same spot pretty regularly twice a day. The males varied very much in colour, some being of a deeper red, and others inclining rather more to yellow, particularly on the tail coverts, and being a little mottled with yellow upon the breast and back. The Weymouth pine was their particular favourite; indeed I scarcely ever observed them on any other tree, except the sentinel, who regularly took his station on the top of a spruce fir, which happened to be the highest in the immediate neighbourhood of their haunt. Their note or call very much resembled the chirping of a chicken. They continued their visits (though the flock certainly gradually diminished) during great part of the winter; and one pair remained long after the rest had left, being continually seen in February and the beginning of March, 1822. Crossbills, though occasional visitants there, had not been seen at Cothoridge for several years previous to the autumn of 1821, nor have they ever been seen there since that time.

The lesser spotted woodpecker, which has been once or twice referred to in the Magazine of Natural History as very rare, is by no means an uncommon bird at Cothoridge; I have procured two or three specimens there and seen several others. I have also observed it in Whaddon Chase, Bucks, and in Bradgate Park, Leicestershire; from the woods in which neighbour, hood, I last year procured a specimen of the middle-spotted woodpecker-I believe, a much scarcer bird, and also a pair of pied blackbirds (if they may be so called). Of the largest spotted woodpecker I procured two specimens at Cothoridge; I have also seen it in Warwickshire and in Whaddon Chase. A few days ago I preserved a fine specimen of the chatterer, which was killed in a garden near Knighton, Radnorshire. I am, Sir, yours, &c.—*J. W. Ludlow, March* 15. 1829.

Warwickshire.

The present Season strikes me as remarkably backward; but yet we have with us the redstart, blackcap, whitethroat, swallows, and martens. The first (the redstart) appeared April 7., which is rather early. *P*apílio *r*àpæ (or mètra, as they now call it), i. e. the pale variety, appeared April 17.; on which day, also, my eyes and ears were gratified by the first sight and song of a swallow. This is to me a highly interesting period of the year: some fresh and pleasing appearance of nature is every day presenting itself. — *W. T. B. April* 25. 1829.

Varieties of Plants found in Warwickshire. — To the list of plants varying with white flowers, by the Rev. W. T. Bree (Vol. I. p. 392, 393.) may be added the following, which have been observed by myself: —*Verónica* agréstis, in a garden at Warwick. Fritillària *m*eleàgris, in a meadow by the road-side, opposite to Wroxall Abbey. *L*àmium purpùreum, in a garden at Warwick. *C*árduus *a*canthöìdes, on the top of the hill above the bank-croft, Hampton Lucy.

The following are additional stations of varieties included in Mr. Bree's list: — Campánula rotundifòlia, with a white flower, on the road-side between Leek Wootton and Wootton Grange. *V*ìola odoràta, with a white flower, in several places near Warwick. *V*ìola odoràta, with a flesh-coloured flower, on an old wall facing Levenhull Lane, Warwick. *S*cílla nùtans, with white flowers, in a grove, on the road-side between Norton Lindsey and Wolverton. *Prunélla* vulgàris, with white flowers, in a lane leading from the turnpike-road at Guy's Cliff to the Woodloes. *P*olýgala vulgàris, with white flowers, on the side of the road from Hampton on the Hill towards Norton Lindsey, a short distance beyond the cross. *P*olýgala vulgàris, with flesh-coloured flowers, on a high bank 2¼ miles from Warwick, on the Birmingham road, &c. *A*chillè*a* *M*illefòlium, with purplish red flowers, near Warwick.

I have also observed a few varieties of plants, depending on other circumstances than colour. Cynosùrus cristàtus, with a viviparous spike, by the side of the canal at Leamington Priors. Scabiòsa arvénsis, with all the leaves undivided, near Warwick. *N*arcíssus Pseùdo-*N*arcíssus, with full flowers, in a field near Wedgnock Park, towards Warwick. *S*axífraga tridactýlites with a branched stem, and opposite lanceolate stem leaves, on a tiled building, Warwick. *L*ýthrum Salicària, with ternate leaves and hexagonal stem, at Emscote Bridge. *R*anúnculus bulbòsus, with full flowers, near Warwick. *C*ardámine hirsùta, with a zigzag stem, in several places near Warwick. *T*rifòlium rèpens, with heads of leaves growing out of the flowers, at Warwick. *C*rèpis tectòrum, with a flat stem, and crowded panicle, with a broad, flat, terminal flower, near Warwick. *C*nìcus lanceolàtus, with a broad flat stem and a crested flower, 10 in. in circumference at Hampton on the Hill. *S*colopéndrium vulgàre, with the frond lobed at the apex, and also with a deeply bipartite frond and incurved segments, in a ditch by the side of the footpath from Warwick to Hampton on the Hill. — *W.G. Perry. Warwick, Nov.* 7. 1828.

Yorkshire.

Flora of Rotherham. — Sir, I have been highly gratified by the notices, in your excellent Magazine, of new habitats of rare and beautiful plants; and, as I have the happiness to reside in a district, than which few are more favourable for the study of indigenous botany, I venture to think that a similar list of our local Flora may not be unacceptable to the lovers of natural history. In this catalogue I shall only insert the rarer plants which have been actually gathered or observed, in a circuit of eight miles, by myself and my friend, the Rev. E. Wilson, jun., of Swanton; otherwise, I might much extend it, by the addition of the numerous and interesting discoveries of our indefatigable and intelligent neighbour, Mr. Cooper, curator of Lord Milton's splendid collection at Wentworth.

*H*ippùris vulgàris.
Circæ'*a* lutetiàna.
*Verónica A*nagállis.
  montàna.
Pinguícula vulgàris.
Valeriàna dioíca.
  officinàlis.
Fèdia olitòria.
  dentàta.
*I*ris Pseudácorus.
Mélica nùtans.
Glycèria rígida.
Móntia fontàna.
*D*ípsacus fullònum.
Scabiòsa *c*olumbària.
Sherárd*ia* arvénsis.
Gàlium religiòsum.
  *M*ollùgo.
*P*lantàgo mèdia.
*C*órnus sanguinea.
Parietària officinàlis.
Alchemílla vulgàris.
*P*otamogèton gramíneum.
  críspum.
Moénch*ia* eréćta.
*M*yosòtis palústris.
  intermèdia.
*L*ithospérmum arvénse.
*S*ýmphytum officinàle.
E'chium vulgàre.
Prímula elàtior.
Hottòn*ia* palústris.
*L*ysimàchia nemòrum.
*A*nagállis cærùlea.
  arvénsis white var.
*C*onvólvulus sèpium.
Campánula pátula.
  latifòlia.
  glomeràta.
Campánula hýbrida.
*V*erbáscum *T*hápsus.
  pulveruléntum.
*H*yoscýamus nìger.
Erythræ'a *C*entaúrium.
Lonicèr*a* *C*aprifòlium.
*R*hámnus cathárticus.
  Frángula.
*E*uónymus europæ'us.
*V*inca mìnor.
  màjor.
*G*entiàna Amarélla.
Sanícula europæ'a.
*C*aúcalis *d*aucoìdes.
*B*upleùrum rotundifòlium.
*P*arnássia palústris.
*N*arcíssus biflòrus.
*O*rnithógalum umbellàtum.
Convallària majàlis.
Triglòchin palústre.
*C*ólchicum autumnàle.

Chlòra perfoliàta.
*V*accínium Myrtillus.
*V*itis Idæ'a.
Oxycóccus.
Callùna vulgàris.
White var. of ditto
*E*rìca *T*étralix.
cinèrea.
*D*áphne Laurèola.
*Pol*ý*gonum* amphíbium.
Hydropìper.
Bistórta.
Pàris quadrifòlia.
Adóxa Moschatéllina.
Pýrola mìnor.
Sclerânthus ánnuus.
Saponària officinàlis.
Arenària trinérvis.
*s*erpyllifòlia.
Cerástium aquáticum.
*L*ýthrum Salicària.
*R*esèda lùtea.
*P*rùnus *P*àdus.
*T*ormentílla réptans.
*N*ùphar lùtea.
*C*áctus Heliánthemum.
Aquilègia vulgàris.
*A*nemòne *Pulsatilla*.
*T*halíctrum flàvum.
*R*anúnculus Flámmula.
*h*ederàceus.
*H*elléborus víridis.
*N*épeta Catària.
*V*erbèna officinàlis.
*L*àmium amplexicaúle.
*G*aléopsis versícolor.
*M*arrùbium vulgàre.
Leonùrus Cardìaca.
*C*linopòdium vulgàre.
*O*ríganum vulgàre.
*Th*ýmus *A'*cynos.
Calamíntha.
*A*ntirrhìnum *E*latìne.
mìnus.
Camelìna satìva.
*C*ardámine amàra.
Turrìtis glàbra.
Eròdium cicutàrium.
*G*erànium lùcidum.
*c*olumbìnum.
*F*umària capreolàta.
*G*enísta ánglica.
claviculàta.
*A*nthýllis vulnerària.
Orníthopus perpusíllus.
*A*stràgalus hypoglóttis.
*H*ypéricum montànum.
*C*árduus nùtans.
Mariànus.
Bìdens tripartìta.
*E*upatòr*ium* cannábinum.
*E*rígeron àcris.
*T*ussilàgo *P*etasìtes.
Solidàgo Virgaúrea.
*I'*nula dysentérica.
*C*entaurèa Scabiòsa.
*O'*rchis bifòlia.
pyramidàlis.
mòrio (white var.)
ustulàta.
víridis.
conópsea.
*O'*phrys *m*uscífera.
*a*pífera.
Neóttia spiràlis.
Listèr*a* ovàta.
*E*pipáctis latifòlia.
*U*rtìca ùrens.
Sagittària sagittifòlia.
*P*otèrium Sanguisórba.
Hydrócharis morsus *r*ànæ.
Ophioglóssum vulgàtum.
*A*splènium *R*ùta murària.

I am, Sir, &c. — *Larret Langley. Brompton Academy, near Rotherham, Dec.* 6. 1828.

Northumberland.

Museum of Natural History in Newcastle upon Tyne.—When the Literary and Philosophical Society of Newcastle upon Tyne was established, thirty-six years ago, the first article in the original scheme of its founders had for its object to investigate the two great natural products of this part of the country — coal and lead. This may, therefore, be considered as having laid the foundation of the museum of which we purpose giving here a brief description. For while many of the papers read at the monthly meetings of the Society had immediate reference to these important subjects, a collection of geological and mineralogical specimens was very early begun. Books, likewise, connected with natural history, were among the first purchases, when a library was afterwards made an appendage to the Society.

The specimens in mineralogy, conchology, &c., with some coins, and a hortus siccus, which had formed the collection in the possession of the Society, had become, in the course of time, greatly injured and dilapidated for want of suitable accommodations. Of these, two zoological specimens, which had found their way to the museum, may here be mentioned: one was the wombat, the other the duck-billed platypus of New South Wales, sent home, in 1800, by Governor Hunter himself. It is worthy of remark, likewise, that this was the first public notice given in Great Britain of these, at that time, nondescript animals.

A project for erecting a new building, for the reception of the Society's rapidly increasing library and other property, had long been entertained; and in 1814, the preparatory measures were set on foot. In this project a museum had all along been included. It was not, however, till the year 1822 that the necessary arrangements were completed, and apartments in the new building planned. By a fortunate coincidence, it happened about this very time that the collection which originally belonged to Marmaduke Tunstall, Esq., of Rycliffe, in the county of York, and which had subsequently come into the possession of George Allan, Esq., of Blacknell Grange, in the county of Durham, was advertised for public sale. This cabinet, even as a nucleus for a more extended collection, but still more, for reasons to be presently noticed, it was most desirable to have deposited in Newcastle. But though no time was to be lost in the acquisition, the state of the Society's funds, which had been calculated to meet the expenses of a building only, presented a formidable difficulty. This, however, was soon got over, through the liberality of George Townshend Fox, Esq., of Westoe, near South Shields, who, with a degree of public spirit which deserves to be recorded, agreed to advance the purchase-money (400*l*.), allowing it also to remain in the Society's hands for two years, without interest, and the principal sum to be repaid at the convenience of the Society. The entire collection was accordingly transferred from the Grange to Newcastle, and carefully preserved in rooms prepared for it, during the three years occupied in erecting the new edifice. The same interval was employed in examining the condition of all the specimens, and in repairing the injuries which damp and neglect, for twenty-two years, had unavoidably committed. The apartment in the new building allotted to the museum is an octagon, 40 ft. long by 20 broad, and 16 ft. high, placed directly over the vestibule. The entrance to it is by two narrow winding staircases within the library hall, which also conduct to the gallery of the library. This part of the general arrangement is rather awkward; but that is not its only nor its worst fault, for the situation has unluckily curtailed the dimensions of the room, and led to an apprehension that, if the additions which the museum is rapidly receiving continue progressive, as there is every reason to suppose they will, the space will be found too small. The room is lighted from above by large squares of ground glass, which throw a somewhat sombre air over it; but, upon the whole, the appearance is handsome enough.

The collection, as originally formed by Mr. Tunstall, though it embraced all the other departments of nature, and some miscellaneous curiosities, was essentially an ornithological one, in the proportion of about eight parts British to three of foreign birds. In the present collection the birds are mounted in separate glass cases, arranged round the room into the great Linnean divisions; but in consequence of the repairing and renewing of specimens, the final placing of the cases is not yet completed, and cannot be for some time to come. The imperfect mode of mounting known fifty years ago, and the dishevelment which carelessness and repeated removals from place to place have occasioned, render it necessary, whenever it can be done, to replace the older by more recent specimens. This work is in constant progress, and a considerable number of specimens, of birds especially, as well as of other objects, in the highest preservation, are daily finding their way into the museum. One object which is steadily kept in view is, that the collection of the birds, at any rate, of the British islands, should be as complete as is to be met with any where throughout the empire. This we approve of, for many reasons; but chiefly because it would seem to be highly appropriate that, in the native town of Bewick *, the votaries of this delightful branch of natural history shall have it in their power to see specimens of all the British birds, in as perfect a state as they are to be seen any where else. The members of the Society feel that what gives a peculiar value to the birds in this museum is the interesting fact, that they include many of the identical specimens from which their own illustrious townsman drew his figures for the wood-cuts which embellish his unique and celebrated work. It was his master-hand that originally traced out for them a celebrity only to perish when all that is perfect in design, and exquisitely

* This truly amiable man, and, beyond all comparison, greatest genius Newcastle has ever produced, died on the 8th of November last, in the 76th year of his age. He continued to the last in the enjoyment of all his faculties; his single-heartedness and enthusiasm not a jot abated, and his wonder-working pencil still engaged in tracing, with his wonted felicity and fidelity, those objects which had all his life afforded him such delight, and which have charmed, and must continue to charm, all those who have any relish for the pure and simple beauties of nature.

faithful and minute in execution, in the art of wood-cutting, shall have passed away and been forgotten. The Wycliffe museum most probably never would have emerged from that obscurity which attaches to all provincial private cabinets, but for its singularly good fortune in furnishing prototypes for the graver of this "wondrous artist," as Pennant, in one of his letters, emphatically and most felicitously styles him. We have reason to know that it was the circumstance of its being thus intimately associated with the name and labours of this distinguished person, that mainly interested many of the members of the Society in the purchase of the museum. The museum possesses several specimens of rare British birds. Of these we may notice the Red-breasted Goose (*A*nas ruficóllis *Linn.*) in very fine preservation; the Spur-winged Goose (*A*nas gambénsis *Linn. Gmel.*), by no means in such high condition, having been rescued from the dunghill by the exertions of H. Mewburn, Esq., St. Germains, Cornwall, who has contributed several valuable articles to the collection; the Cock of the Wood (*T*étrao urogállus *Linn.*), a specimen ascertained to have been shot in this country, and now, consequently, almost unique, if not entirely so. Among the more recent acquisitions it can boast of some water-birds, particularly of the gull, tern, and diver tribes, into any description of which, or of the foreign birds, we shall not enter at present.

But in what was the Wycliffe, and is now the Newcastle, museum, the class of birds did not wholly supersede every other. A few specimens of the mammàlia are preserved in it, but none of first-rate importance, with the exception of the two animals from New South Wales, already pointed out. A somewhat similar account may be given of the amphibia, fishes, insects, vegetables, and minerals. A few antiquities, seals, and miscellaneous curiosities are also to be found in it; but these do not fall within our province.

The recent acquisitions in all the departments of zoology have been very considerable; and we may observe, in general, that the *desiderata* in all, as far as concerns the British productions, are rapidly filling up. The British shells are already nearly complete. Great additions have been made to the list of insects, both indigenous and foreign, chiefly the latter. The collection is already rich, and the most active means are using for rendering it perfect in the two great natural products of the district, coal and lead; so that future geologists will not have to search about the land for the most perfect series of exemplifications of these two important substances, but will find them, where they should be found, in Newcastle itself.

Indeed, in Newcastle and its neighbourhood, natural history would appear to have always been a favourite pursuit. It is daily becoming more so; for besides its own Bewick, that part of the country can boast of one of the most accomplished ornithologists of the day, in the person of J. P. Selby, of Twizell House, in the county of Northumberland, whose *Illustrations of British Ornithology* are already recognised as an original standard work. W. C. Trevelyan, Esq., of Wallington, in the same county, devotes to science that fortune and leisure which too many of his compeers waste in idleness and dissipation. He is favourably known by his contributions to natural history, and by his ardour in its pursuit. He possesses a valuable collection, rich in conchology and mineralogy. The Hon. H. T. Liddell, of Eslington, M.P. for the county of Northumberland, has a small but select cabinet of rare birds, all in the best state of preservation. There are a great many other private collections, which, though of minor consequence, are very creditable to the individual owners, and manifest a very commendable zeal in the prosecution of an amusing and most instructive study.

From the foregoing sketch, short though it be, it will appear that, in the north of England, a taste for the science of nature is cultivated with ardour and success, and promises to be as rapidly and generally diffused there as it is now becoming in many other parts of the kingdom.

Lancashire.

Land and Fresh-water Shells in the Neighbourhood of Preston. — Sir, As you think a list of the species of land and fresh-water shells found in this neighbourhood may be interesting to some of your readers, I will endeavour to furnish it. I have thought it better to make as complete a list of the British land and fresh-water species as I am able *, distinguishing such as occur in this vicinity by an asterisk.

Any of your readers following the same pursuits, and desirous of becoming possessed of species found here, will, at the same time, be thus furnished with a list of those wanting, any one of which would be acceptable to the Preston collectors, and several of which are, doubtless, common in many places within the range of your useful Magazine.

MOLLUSCA.

Tracheli'poda.

Neritàcea.
Neritìna fluviátilis.

Peristómata.
Paludìna vivípara.
* impùra.
* símilis *Zool. Journ.*
* acùta *Zool. Journ.*
* Valvàta piscinàlis.
cristàta *Fleming.*

Lymnæàna.
Lymnæ'a stagnàlis.
* frágilis *Fleming.*
detrìta *Fleming.*
* palústris.
* auriculària.
* ovàta.
glutinòsa *Drap.*
* péregra.
* lùtea *Fleming.*
* leucóstoma.
* minùta.
scaturíginum *Zool. J.*
* Phŷsa fontinàlis.
álba *Zool. Journ.*
fluviátilis (Búlla fluv. *Turt.*)
* *h*ypnòrum.
subopàca.
Planórbis córneus.
* marginàtus *Drap.*
carinàtus.
* spirórbis.
* vórtex.
* contórtus.
* híspidus.
* Planítidus (*N*aútilus lacústris *Turt.* &c.)
* complanàtus *Drap.*
* imbricàtus.

Colimàcea.
Cyclóstoma élegans.
truncátulum.
* Aurícula mínima.
* Succínea amphíbia.
* Achatìna acícula.
Bùlimus acùtus.
montànus.
tuberculàtus *Zool. Jour.*
* *h*ordeàceus.
* lùbricus.
lineàtus *Zool. Journ.*
* Clausília bìdens *Drap.*
ventricòsa *Drap.*
plicátula.
sólida ? *Drap.*
* rugòsa.
párvula *Zool. Journ.*
Pùpa *A*vèna.
* frágilis.
* británnica (Túrbo trìdens of authors).
* umbilicàta.
* *m*uscòrum.
ánglica *Wood's sup.*
* antivertìgo *Drap.*
* pygmæ'a *Drap.*
* vertìgo *Drap.*
* edéntula *Drap.*
obtùsa *Fleming.*
Carocólla lapicìda.
albélla.
élegans.
Hèlix pomàtia.
* aspérsa.
* arbustòrum.
* nemoràlis.
* horténsis.
sylvática ?
* fúsca *Pennant.*
pisàna.
variábilis.
ericetòrum.
Carthusianélla ?
obvolùta ?
* cellària.
* nítida.
* rufèscens *Donovan,* &c.
* híspida.
* serícea *Drap.*
* rotundàta.
striàta.
* *T*róchilus *Fleming.*
* crystállina *Drap.*
rupéstris *Drap.*
scarburgénsis *Beau.*
* aculeàta *Drap.*
* pulchélla.
pygmæ'a *Drap.*

Gastero'poda.

Limaciàna.
* Vitrìna pellùcida.
Testacella haliotídea.
Mángii Bowdich.
* *L*ìmax cinèreus.
* agréstis.

Calyptraciàna.
* A'ncylus lacústris.
* fluviátilis.

Conchi'fera Bimusculo'sa.

Nàida.
* A'nodon *c*ýgneus.
* *a*natìnus.
U'nio elongàtus.
rostràtus
pictòrum.
batàvus.

Conchàcea fluviatìlia.
Cýclas rivícola.
* córnea.
* lacústris.
* oblìqua.
* fontinàlis.

I remain, &c. — *Joseph Kenyon. Preston, Oct.* 4. 1828.

Manchester Museum. — The following is a notice of some rare British birds in the Museum of the Society for the Promotion of Natural History established in Manchester : —

Honey Buzzard (Fálco *a*pívorus). — This rare species of falcon was killed in Staffordshire. The sex was not ascertained, but is probably either a female, or a young male in immature plumage.

Rough-legged Buzzard (Fálco *L*agòpus). — It is well known that some species of the falcon tribe, particularly the buzzards and harriers, are rea-

* The following obscure species of Turton are not included, viz. Túrbo bìdens, Hèlix rhómbea, H. variegàta, H. disjúncta, H. térebra, *M*ýtilus stagnàlis, *M.* dentàtus, *M.* avonénsis.

dily taken in baited steel-traps placed near their haunts, and in this manner the bird here introduced to notice was captured in the North Riding of Yorkshire.

Cinereous Shrike (Lànius excùbitor). — J. Moore, Esq. of Sale Hall, Cheshire, shot this bird in the neighbourhood in which he resides.

Golden Oriole (Orìolus Gálbula). — This bird, which is a female, was shot by Mr. James Hall, of Manchester, in the month of July, 1811, in Gorton Fields, near Manchester.

Rose-coloured Pastor (Pástor ròseus). — The sex of this specimen, which was shot many years ago, near the Crescent, in Salford, Lancashire, was not ascertained by dissection, and the plumage, perhaps, scarcely affords a sufficient criterion for determining it with certainty.

Bohemian Wax-wing (Bombycívora gárrula). — This beautiful specimen, which, on dissection, proved to be a female, was shot at Hulland Ward, in Derbyshire, on the 15th of January, 1829. Its food was found to have consisted chiefly of the fruit of the wild rose, which it had swallowed entire. Bohemian Wax-wings have been unusually abundant this winter four having been killed near Derby, and several in the vicinity of Middleton in Lancashire, and Leeds in Yorkshire, in the month of January last. About the same period, some of the northern and midland counties of England were visited by large flocks of Siskins and Snow Buntings.

Pied Flycatcher (Muscícapa luctuòsa). — The Pied Flycatcher has been regarded by several distinguished ornithologists as indigenous to England, while others have considered it as an occasional visitor merely: this latter opinion, however, must be abandoned, as I know that it breeds annually in the woods in the vicinity of Ullswater. The prevalence of the idea, that this species does not migrate, may be attributed principally to the assertion of Montagu, that it "rarely, if ever, makes its appearance in the southern parts of the island" (see the Supplement to the *Ornithological Dictionary*); but Messrs. Sheppard and Whitear, in their *Catalogue of the Norfolk and Suffolk Birds*, published in the *Transactions of the Linnean Society*, vol. xv. part 1., state that they have "seen a specimen of this bird, which was killed near Cromer;" that "two others were caught by Mr. Downes, in his garden at Gunton, in Suffolk; and a fourth was shot at Keswick, near Norwich." Mr. Selby also, in his *Illustrations of British Ornithology*, informs us that he has seen specimens from Dorsetshire. Montagu's observation, therefore, loses much of its force; indeed, from the general habits of the bird, and the nature of its food, there can scarcely be a doubt that it withdraws from this country in autumn. The specimen in the Manchester collection is a male, and was procured on the 3d of June, 1828, in the woods on the western bank of Windermere.

Mr. Sweet (Vol. I. p. 100.) expresses a desire to possess a living male Pied Flycatcher, and entertains the hope, that persons who have opportunities of supplying this desideratum in his aviary, will lend their assistance towards accomplishing his object. If I resided in a district where this species breeds, I should be happy to use my best endeavours to meet his wishes in this matter; and, as it is, should I be able to obtain a bird or nest, it shall certainly be forwarded to him. The eggs and young of the Pied Flycatcher might be procured, without difficulty, in the neighbourhood of Ullswater, if Mr. Sweet has any acquaintance in that part of Cumberland, who has a knowledge of the bird. Fresh-laid eggs, carefully packed in wool, as Mr. Sweet suggests, might be sent to him, without the least inconvenience, from almost any part of the kingdom, and if placed under the Spotted Flycatcher, or indeed any of the sylvan warblers, I doubt not, would be incubated, and there is every reason to believe that the young, when extricated from the shell, would be nourished by the foster parents.

Crossbill (Lóxia curviróstra). — There are several specimens of this species in the museum, both males and females, adults and young. They were shot at Park Hall, near Heyfield, Derbyshire. Crossbills, on their arrival in this country, sometimes seem to apprehend little danger from man, and will suffer themselves to be approached very near without manifesting the least alarm. In the month of August, 1810, a small flock of these birds frequented the plantations in Crumpsall, and on one occasion I fired three shots in quick succession, and killed an individual each time in a small spruce fir, without appearing to disturb their companions which were feeding in the same tree, nor did they ultimately take flight till I shook the fir violently for the purpose of dislodging the birds I had shot, from the branches on which they had fallen. The high condition of these birds proved that their disregard of man and fire-arms was not occasioned by hunger.

Tree Sparrow (*F*ringílla montàna). — This bird was captured at Chat Moss, in Lancashire, and was kept alive for some time in an aviary at Ardwick, near Manchester, the proprietor of which presented it to the Society.

Olivaceous Gallinule (Gallínula pusílla). — Mr. James Hall took this rare bird alive, in a drain in Ardwick meadows, near Manchester, in the autumn of 1807.

Great Snipe (*S*cólopax màjor). — This is a male bird, and was shot at Bradford, near Manchester.

Leach's Petrel (Procellària Leách*ii*). — This specimen was found dead in a ploughed field near Wilmslow, in Cheshire, about four or five years since, the morning after a heavy gale of wind from the north-west. A short time afterwards, another individual of the same species was discovered in a putrid state, at little Green, near Middleton, in Lancashire. Several instances are on record of Leach's Petrel and the Stormy Petrel having been found far inland, after violent storms, in a state of complete exhaustion.

Little Auk (A'lca *A'*lce). — Like the smaller species, the Little Auk is occasionally met with in the interior of the country, at a considerable distance from the sea. Our specimen was taken alive at Sale, in Cheshire, on the 10th of December, 1824.

Crested Cormorant (Cárbo cristàtus). — The fact that the Crested Cormorant does not retain the long feathers on the crown of the head throughout the year, has occasioned much perplexity among ornithologists. This specimen is in the plumage of the pairing season, and was shot near Flamborough Head, in Yorkshire.

Besides the birds already enumerated, there are, in the Manchester collection, the *Osprey* (Fálco *H*aliæ'etus); the *Cirl Bunting* (Emberìza *círlus*); the *Hawfinch* (Fringílla *C*occothraústes); the *Bearded Titmouse* (Pàrus biármicus); and the *Little Bustard* (*O'*tis Tètrax), which have also been killed in Great Britain; but as their history is less perfectly known to me than that of the preceding species, I must rest satisfied with having particularised them. — *John Blackwall. Crumpsall Hall, March* 30. 1829.

Cumberland.

Birds in the Neighbourhood of Whitehaven, Cumberland.—Sir, Observing that the Fauna of the different British counties constitutes a part of the plan of your interesting Journal, I have taken the liberty of sending you a list of the birds met with in this part of Cumberland; they are named after the Linnean system, except where expressly stated otherwise.

Accípitres. Fálco *B*ùteo, the common Buzzard; F. *M*ílvus, the Kite; F. *N*ìsus, the Sparrow-hawk; F. *T*innúnculus, the Cestril, the males tolerably frequent; F. *Æ'*salon, the Merlin; *S*tríx *O'*tis, the Long-horned Owl; *S*. brachyòtos, the Short-eared Owl; *S*. flámmea, the Barn Owl; *S*. strídula, the Tawny, or Wood, Owl.

Pìcæ. Córvus *C*òrax, the Raven; a specimen, with a white ring round its neck was seen and fired at, some time since, in the woods about Calder Bridge; *C. C*órnix, the Hooded, or Royston, Crow, not very common; *C.*

frugílegus, the Rook; *C. C*oròne, the Carrion Crow; *C. M*onédula, the Jackdaw; *C. P*ìca, the Magpie; *C. G*ráculus, the Red-legged Crow, or Chough, rare; *C.* glandàrius, the Jay; Cùculus canòrus, the Cuckoo; *P*ìcus mèdius, the Middle-spotted Woodpecker, rare; *A*lcèdo I′spida, the King-fisher.

A′nseres. A'nas *Cý*gnus, the Wild Swan, in hard winters small flocks are seen, several were shot near Ennerdale Lake two or three years ago; *A*'nas *Tadórna*, the Sheldrake; *A.* nìgra, the Black Diver; *A. Marílla*, the Scaup Duck, not common; *A. A′*nser, the Grey Lag Goose; *A.* erythrópterus, the Barnacle Goose, rare; *A.* mollíssima, the Eider Duck, very rare, I have only seen one specimen, and that a young bird; *A.* Clángula, the Golden Eye, rare; *A. P*enélope, the Widgeon; *A*'nas *c*icùta, the Pentail Duck, rare; *A.* ferìna, the Pochard, not common; *A.* Crécca, the Teal; *A. Bós*chas, the Mallard; *A* fulígula, the Tufted Duck. *M*érgus Mergánser, the Goosander; *M. C*ástor, the Dundiver; *A′*lca *Tórda* the Razor Bill; *A. A*'lce, the Little Auk; *P*elicànus Cárbo, the Corvorant; *P. G*ráculus, the Shag, or Scarp. *C*olýmbus *Troíll*e, the Foolish Guillemot; *C. I′mmer*, the Imber Diver, rare; C. rubricóllis, the Red-necked Grebe. *L*àrus *Ríssa*, the Kittywake; *L.* cànus, the Common Gull, or Mew; *L.* fúscus, the Herring Gull; *L.* crepidàtus, the Black-toed Gull of Bewick, rare, a chance one being seen among a number of the common Mews. It is singular that no notice is taken of this bird by Fleming, it being strictly British, and a remarkable bird of its kind. *L.* ridibúndus, the Black-headed Gull, or Blackcap. *L.* marìnus, the Black-backed Gull; a colony of these birds breed on the margin of a lake in this neighbourhood, called Devouck Water, and are known here by the name of the Devouck Water Mews. A pair of these Gulls, a few seasons ago, passing over the mountains to Ennerdale Lake, forcibly dispossessed a colony of Blackcaps, who for years had bred on a rocky island in the centre of the lake, and compelled them to resort to the rocks on the margin, in consequence of which, the whole of the succeeding young brood, from a sudden torrent of rain sweeping down the mountains, were washed into the lake and destroyed; the larger Gulls have retained possession of their conquest ever since. Stérna *H*irúndo, the common tern; S. minùta, the lesser tern.

Excellent specimens of most of the above, together with many others yet to be enumerated (having duplicates of most), I should be willing to dispose of to any gentleman, or infant society forming a museum, on moderate terms: also a beautiful collection of shells, upwards of 200 species, all perfect live shells, and mostly with duplicates if required. If the present communication suits your purpose and is agreeable, I shall be happy to furnish you, in detail, with a list of the specimens in the other branches of natural history found here and on the coast. I remain, Sir, yours, &c. — *J. Stanley, M.D. Whitehaven, Nov.* 26. 1828.

Hampshire.

Rare Plants collected by the Rev. S. Palmer of Chigwell. The rather uncommon marked with a star (*). — *G*laúx marítima, beach, Fareham. *V*ibúrnum *O′*pulus, Fareham. * Myosùrus mínimus, Stubbington. * *A′*llium oleràceum, Old Fareham. Adóxa moschatellìna, Boarhunt. *S*èdum *T*elèph*ium*, Titchfield. *P*rùnus *P*àdus, *P*ýrus *M*àlus, Fareham. *R*anúnculus auricomus, hirsùtus, bulbòsus, arvénsis, Fareham. *R. h*ederàceus and aquátilis, Peel Common near Brockhurst. Galeóbdolon lùteum, *D*ràba hírta and incàna, fields and hedges near Brockhurst. Teesdàl*ia* nudicaúlis, Ornithopus perpusíllus; *T*rifòlium subterràneum, ochroleùcum, marítimum, suffocàtum, common near Gosport. * *L*òtus diffùsus, Alverstoke. *O′*rchis álbida and conópsea, Portsdown Hill. *R*úscus aculeàtus, hedges, *passim*. *E*quisètum palústre. Ophioglóssum vulgàtum, copses near Fareham. *P*lantàgo marítima, Porchester. Pulmonària marítima, Ilchen Ferry, Southampton.— *S. Palmer. Chigwell, Essex, Sept.* 1828.

Somersetshire.

Bristol Institution. — The fifth Annual Meeting of the Members of this Institution was held on Feb. 14. 1828, Thomas Daniel, Esq., in the chair, when the Annual Report was read. The Committee, in adverting to the principal objects to which their attention had been directed during the past year, stated that the aggregate income had been so liberal, as not only to enable them to make several improvements in the lecture room and in other parts of the building, but to discharge every obligation for which the Institution was liable.

Courses of lectures had been delivered on phrenology; on ancient history; on elocution; on the structure and functions of the human frame, the entire proceeds of which course were given to the Institution, in a spirit of liberality on which the Committee are prevented from enlarging, by the consideration that the lecturer, Mr. Estlin, is one of their own body; and on natural and experimental philosophy.

To procure an improved lucernal microscope, the profits of some lectures upon the structure of the eye, delivered by Mr. Estlin in 1824, were, at his request, set apart. The completion of the purchase was an object of the lectures on the structure and functions of the human frame, recently delivered by Mr. Estlin. The receipts from these latter lectures have not only been adequate to procure the improved lucernal microscope, but have yielded a surplus of 20*l.* 5*s*., which, at that gentleman's request, is to be appropriated towards the future purchase of a chronometer clock, to be placed in the Institution; an instrument which is not to be met with in any of the public establishments of this city.

During the past year, several specimens have been added to the museum. The greater part of the collection of shells has been arranged in the glazed drawers under the mineral cases, in such a manner as to illustrate the genera as established by Lamarck. The geological collection and the extraneous fossils have been arranged in the upright glass cases over the minerals, in conformity with the views of Professor Buckland and the Rev. Mr. Conybeare on that subject; and the publication of Messrs. Conybeare and Phillips has been used as a text-book. Among the donations received in this department, a very fine specimen of the Ichthyosaúrus tenuiróstris, from Lyme-Regis, deserves to be particularly noticed, which is believed to be the most complete, if not the only one, ever yet discovered. In the zoological and ornithological departments, a great number of specimens have been received and prepared.

With a view to the promotion of a taste for the fine arts, as well as to the appropriate embellishment of the interior of the building, casts of several of the finest statues which grace the halls of the Vatican and other celebrated galleries have been purchased, and arrangements are in progress for placing them permanently in the principal room of the Institution. In the same apartment it is also intended to arrange the noble and unique collection of casts from the Ægina marbles, so liberally presented to the Institution by C. R. Cockerell, Esq., whose active research discovered, and whose learning and taste have illustrated, the beautiful originals.

A valuable addition has been made to the library of the reading room by his Grace the Duke of Bedford, who has presented to the Institution *Engravings and Descriptions of the Woburn Abbey Marbles*, and also *Engravings of the Woburn Abbey Heaths*. The value of the present is enhanced by the circumstance, that these works were printed for the private use of the noble donor, and have never been published.

The Committee suggest to the friends of the Institution, that should any works of a scientific character be in their possession which have ceased to be useful to them, from a change of studies, or from any other cause, they would confer a great benefit on this department by the loan or donation of them, for the purposes of reference.

In adverting to the periodical evening meetings of the Philosophical and Literary Society, annexed to the Institution, the Committee feel peculiar pleasure in being able to state that the zeal, the talent, the research, and the ingenuity which have successively furnished on those occasions a most valuable series of original essays on interesting subjects of literature or science, have met with their appropriate reward, in the assiduous attendance, and the grateful applause, of numerous and intelligent audiences.

The Report concludes with an expression of confident hope that the interest taken by the public in the welfare of the Institution, far from diminishing, may each successive year augment in active energy, and thus perpetuate and extend its various resources for gratification and instruction. (*Feb.* 14. 1828.)

Devonshire.

The Dartmouth Warbler and other Birds.—As a lover of natural history, and willing to assist any one in the pursuit of it, I beg you will inform your ornithological friends that the Dartford Warbler, the Serle Bunting, and the Grasshopper Lark are every summer to be seen in this immediate neighbourhood. The first I have never seen except in the spring and summer; the second does not migrate, but remains all the year; the third arrives in the spring, and departs in the autumn. The Dartford Warbler haunts furze and hedge-rows, or the borders of heaths. A friend of mine shot a pair last spring. They are extremely nimble and active, and remain in the thickest bushes; and although they will permit one to approach close to the bush in which they are, from their constant motion it is difficult to shoot them in a fit state for preservation. Still it is very possible to procure dead specimens any week, if diligently sought after. Should I ever procure a living specimen of either, I shall have much pleasure in presenting it to your correspondent, R. Sweet. I have further to observe, that a friend of mine, last October, shot on Dawlich Warren a fine specimen of the Osprey, or Sea Eagle; and in January last, at Newton Abbot, six miles hence, two or three of the Waxen, or Bohemian, Chatterers. Of the Little Horned Owl (*S*trix *S*cóps of Linnæus) several pairs breed in the plantations of the Rev. Thomas Martin, near Haverfordwest, Pembrokeshire. I am, Sir, &c.—*Charles Blomer, Capt. H. P. 36th Regiment. Teignmouth, Devonshire, April.* 1829.

Art. IV. *Natural History in North Wales.*

Localities of rare Plants, by N. Winch, Esq.—To any of your readers who may be about to make a botanical tour in North Wales, the following account of the localities of rare plants, ascertained during the course of last summer, may prove useful in facilitating their researches. For the accuracy of the catalogue I feel no hesitation in standing pledged, specimens of the whole being in my herbarium. When no person's initials follow a habitat, it implies that I have seen the plant growing in the place mentioned; but I by no means would have it understood that these species were first noticed there by myself, for, at least, four fifths of them were pointed out to me by Mr. Wilson of Warrington, an indefatigable and correct botanist, the fortunate discoverer of Cotoneáster vulgàris and Chàra áspera in Wales, and Kobrès*ia c*arícina in Scotland.

Callítriche autumnàlis. In Anglesea. W. Wilson, Esq. Specimen. Notwithstanding the authorities of Wahlenberg and Smith, I cannot help considering this plant as a submersed variety of the common C. aquática. In deep ditches connected with Derwentwater in Cumberland, it may be seen growing luxuriantly.

Verónica hýbrida, *Eng. Bot.* t. 673. *V.* spicàta var. β. of Hudson. Near Gloddaeth, W.W.; on the ledges of the encrinal limestone rocks above the village of Llandudno. These are Davies and Griffith's localities for *Verónica* spicàta; but, from authenticated specimens, I am convinced that this Welsh *Verónica* is the same as that found on St. Vincent's rocks near Bristol, and on Umpher-head in the vicinity of Cartmel, Lancashire. The apparent difference between it and the Cambridgeshire plant will be evident on consulting the well-executed figures in *Eng. Bot* Still whether they be specifically distinct, I will not pretend to determine.

Fèdia dentàta. On the rocks above Llandudno.

*S*chœ`nus nígricans. On the shores of the Menai, near the bridge, Anglesea.

*S*círpus rùfus. In the same place.

Erióphorum polystàchyon. On boggy ground near Beaumaris, Anglesea. — E. pubéscens. In the same locality. — E. grácile. On Cwm Idwal, Carnarvonshire. W.W. Specimens; a doubtful species.

Knáppi*a* *a*grostídea. Abberffraw, Anglesea. W.W. Sps.

*P*òa rígida. On the coast near Beaumaris. — *P.* glaúca. Near Twll Du on Cwm Idwal.

Festùca uniglùmis. On the S.W. coast of Anglesea. W.W. Sp.

*A*rúndo epigèjos. On the banks near the sea, N. of Beaumaris.

*T*ríticum *l*oliàceum. On the beach near Beaumaris.

*G*àlium Witheríng*ii.* Near the Menai Bridge, Anglesea. May not this be a variety of *G.* palústre, growing in rather dry situations.

*R*ùbia peregrìna. On rocks by the road-side between the ferry and Beaumaris, also between Bangor and the Menai Bridge, and at Gloddaeth, Carnarvonshire.

*P*otamogèton lanceolàtum. In the rivulet near Longwy, Anglesea. W.W. Sps.

Sagìna apétala. Near Beaumaris, Bangor, and Llandudno. — S. marítima. On Beaumaris Green, and the coast in Llandudno Bay.

*M*yosòtis sylvática. In woody situations near Beaumaris.

*L*ithospérmum officinàle. On the rocks at Llandudno. — *L.* marítimum. On the beach in Llandudno Bay.

*C*onvólvulus Soldanélla. In the same situation.

Lobèl*ia* Dortmánn*a.* In the river between the lakes at Llanberis, in Lake Ogwan, and other lakes in North Wales. Not rare.

*V*ìola hírta. On the rocks above Llandudno. — *V.* canìna var. arenària. Near Swansea. Bicheno, Sps.

Erythræ`a pulchélla. Aberffraw, Anglesea. W.W. Sps. — E. littoràlis. On the coast below the Great Orms Head.

Torìlis *A*nthríscus. Near Llandudno.

*S*ìson *A*mòmum. Near Llan Ros. W.W.

*A*nèthum *F*œnículum. By the road-side near Llandudno.

*S*tátice reticulàta. On the sea-beach S. of Llandudno.

A'llium vineàle. On the rocks above Llandudno.

*S*cílla vérna. On the coast of Anglesea close to the Menai Bridge; on rocks near Bangor; also, above Llandudno, and near the Little Orms Head.

Anthéricum serótinum. Just coming into flower, May 30.; on rocks close to the chasm called Twll Du on Cwm Idwal.

*A*spáragus officinàlis. Coast near Llanfadog. Henslow. Sps.

*J*úncus triglùmis. On Cwm Idwal.

Oxýria renifórmis. On the same mountain.

*A*lísma nàtans. In the river between the Llanberis Lakes. — *A. r*anunculöìdes var. rèpens. By the sides of lakes in Anglesea and near Bangor. W.W. Sps.

*Œ*nothèra biénnis. Near Swansea. Bicheno. Sps.

*S*axífraga stellàris. On rocks by the road-side near Lake Ogwan, and on the mountains. Not rare. — *S.* nivàlis. On the Peak of Snowden. W.W. — *S.* oppositifòlia. On Cwm Idwal near Twll Du. — *S.* cæspitòsa. Three varieties, at least, of this very changeable plant occur in North Wales. Near Twll Du its common appearance is that of the Lady's Cushion of the gardens; but in this state it has not been figured in the *Eng. Bot.*, though *S.* hírta, t. 2291. of that work, comes nearest to it. The segments of the leaves are narrow, and it is but slightly hairy. Under this appearance it is *S.* cæspitòsa of the Swedish botanists. On Cwm Idwal near Twll Du it is plentiful. *S.* cæspitòsa var. greenlándica, *Eng. Bot.* t. 794., the dwarf broad-leaved variety is met with occasionally on the same mountain; and *S.* palmàta, *Eng. Bot.* t. 455., *S.* decípiens, *Sternberg*, t. 23., the large broad-leaved variety grows on the Peak of Snowden. The two latter are described in Smith's *English Flora* as *S.* cæspitòsa α. and β. — *S.* tridactýlites. On walls near Beaumaris and the Little Orms Head.

Diánthus deltöìdes. On rocks near Diganwy.

Silène nùtans. On rocks above Llandudno and on the Little Orms Head. — *S.* acaúlis var. flòre rùbro et flòre álbo. On Cwm Idwal.

Arenària vérna. On Cwm Idwal, the Little Orms Head, and at Llandudno.

*C*otylèdon umbilìcus. On rocks and stone walls near Bangor, Llandudno, Carnarvon, and Beaumaris.

*S*èdum dasyphýllum. At present indigenous on stone walls near Conway church, though probably the outcast of a garden. — *S.* ánglicum. On rocks about Bangor, Llandudno, &c. — *S.* Forsteri*ànum.* On Cwm Idwal, but more abundant on the limestone rocks of the Little Orms Head.

Cerástium semidecándrum. On the coast near Beaumaris and Llandudno. — C. tetrándrum. In the same localities. — C. latifòlium. On Clogwyn Du; also on the Peak of Snowden. W.W. Sps.

*S*pérgula subulàta. On hedge banks near the Menai Bridge, Carnarvonshire.

Cotoneáster vulgàris, *Hooker* in *Flora Londinensis*. On three ledges of the limestone rocks above the village of Llandudno. First added to the *British Flora* by W. Wilson, Esq.

*P*ýrus *A*'ria. On the same rocks.

*S*piræ'a Filipéndula. Same place.

*R*òsa rubélla. On the banks of the Menai, near Bangor. W.W. — *R.* spinosíssima β. Ciphiàna. In Llandudno Bay. — *R.* villòsa. Near Llanberis. — *R.* Forstèr*i*. In the grounds at Penrhyn Castle, near Bangor; also near Llandudno. — *R.* Sherárd*i*. At Park Pool, Anglesea. W.W. An elegant rose, and very unlike any other species which ever came under my observation.

*R*ùbus nítidus. Near Beaumaris.

Potentílla vérna. In fields near the Little Orms Head, and on rocks at Llandudno.

*G*laúcium lùteum. On the coast near Conway, and below the Orms Heads.

*P*apàver hýbridum. Near Llandudno. — *P.* cámbricum. By the river near Llanberis, and by the Ogwan near Dolawar slate quarries. The favourite situation of this rare plant is on sand banks left by the winter torrents in the beds of alpine rivers.

*C*ístus *m*arifòlius. On the rocks above Llandudno; abundant. — *C.* Heliánthemum. On the same rocks, &c. &c. — *C.* gùttàtus. On Holyhead Mountain, Anglesea. W.W. Sps.

Aquilègia vulgàris. In the woods of Plas Newydd, Anglesea, on rocks by the Menai, and in the grounds at Penrhyn Castle, near Bangor.

*T*halíctrum mìnus. On Cwm Idwal, and near Llandudno.

*R*anúnculus parviflòrus. On stone fences near Bangor Ferry.

Tróllius europæ`us. In meadows by the river Ogwan, and near the Llanberis Lakes; abundant.

*L*àmium amplexicaúle. Near Beaumaris.

*T*hỳmus *A*'cinos. On the rocks above Llandudno. — *T.* Calamíntha. In the same place.

Scrophulària vernàlis. In the lane near Gloddaeth.

*O*robánche màjor. Among furze near Bangor. — *O.* mìnor. On the ruins of Diganwy Castle. W.W.

Hutchíns*ia* petræ`a. On rocks and stone fences above Llàndudno. Not rare.

*L*epídium hírtum. Near Bangor.

Teesdàl*ia* nudicaúlis. By the road side on Penmanmaur. Mr. Roberts of Bangor. Sps.

*C*rámbe marítima. On rocks and the sea-beach at the Orms Heads and in Llandudno Bay.

*S*inàpis tenuifòlia. On the walls of Chester.

Cheiránthus *Cheìri.* On the ruined castles of Conway, Beaumaris, and Carnarvon.

A'rabis híspida. On Clogwyn Ddu'r Arddu, Snowden. W.W. Sps. — *A.* hirsùta. On stone walls near Beaumaris, and on rocks at Llandudno.

*B*rássica oleràcea. On rocks at the Little Orms Head.

*G*erànium lùcidum. On walls near the Little Orms Head. — *G.* pusíllum. On the coast at Beaumaris. — *G.* sanguíneum. About Llandudno, and on the coast between it and Conway.

*F*umària capreolàta var. flòre álbo. In hedges near the Little Orms Head. This variety I never observed in the North of England, where the plant is to be met with in every hedge; but I have specimens of it gathered at Naples.

*V*ícia sylvática. In woods near Beaumaris.

Hippocrèpis comòsa. On the rocks above Llandudno.

*T*rifòlium ornithopodioìdes. On Beaumaris Green, and on the sea-coast a little to the north of the town. — *T.* suffocàtum. On Beaumaris Green; abundant. — *T.* striàtum. On the coast near Beaumaris and near Diganwy.

Medicàgo maculàta. Near the ruins of Gogarth on the Great Orms Head.

*H*ieràcium alpìnum. On Glydyr Vor. W.W. — *H.* sylváticum. On Chester walls.

*H*ypochæ`ris maculàta. On rocks above Llàndudno.

*E*pipáctis latifòlia, *β. Sm. Eng. Fl.* Near Llandudno and Gloddaeth. W.W. — *E.* ensifòlia. In the wooded bank opposite the inn at Dolbadarn near Llanberis.

*C*àrex limòsa. Near Llanfechell, Anglesea. W.W. Sps. — *C.* dístans. Near the Menai Bridge, Anglesea. — *C.* binérvis. In the same place.

*S*àlix Russell*iàna.* About Bangor. — *S.* argéntea. On the coast towards the north of Anglesea. W.W. — *S.* Smith*iàna.* Near Beaumaris.

Rhodìola *r*òsea. On rocks on Cwm Idwal, near Twll Du.

*J*uníperus alpìna. On Glydyr Vor. Probably only a variety of *J.* commùnis.

Chàra grácilis. In Llyn Idwal. — C. áspera, *Greville's Cryptogamic Flora.* Near Holyhead, Anglesea. W.W. Sps.

Woódsia ilvénsis. Upon Glydyr Vor near Lyn-y-Cwm.

Cyathèa règia. On Snowden, in a cave where copper is selected, also near Twll Du on Cwm Idwal. W.W. Sps.

*P*tèris críspa. In the Pass of Llanberis, and near the Lake Ogwan.

Isoëtes lacústris. In Llyn-y-Cwm, Lake Ogwan, and the Llanberis Lakes.

Diphýscium foliòsum; Gymnóstomum æstìvum; Anictangìum ciliàtum; Andræ'*a* alpìna; Encalýpta ciliàta; Weís*sia* acùta; Trichóstomum ellípticum; T. aciculàre; Dicrànum flexuòsum *a* and γ. — D. *a*diantöìdes. On Cwm Idwal. — D. polyphýllum. Near Nant Frangon.

Orthótrichum diaphànum. On walls near Bangor Cathedral. — O. Hutchíns*ia*. Near Nant Frangon. W.W.

Tórtula tortuòsa. Near Lake Ogwan and Nant Frangon.

*B*artràm*ia* Hallèr*i*. In the Pass of Llanberis.

Pterogònium filifórme, Neckèr*a* críspa, N. curtipéndula, *Hý*pnum rufés-cens, *H.* dimórphum. On Cwm Idwal. — *H.* pilíferum. In the Pass of Llanberis. — *H.* commutàtum. In Anglesea.

*B*rỳum Zièr*ii*. On Cwm Idwal.

Jungermánn*ia* trichophýlla, J. *j*unipérina, J. emarginàta, J. nemoròsa, alpine var. On Cwm Idwal. — J. pùmila. Near Bangor. W.W. — J. concinnàta. On Carnedd, Llewelyn, and Snowden, W.W.; on Cwm Idwal, and in the Pass of Llanberis. — J. inflàta. Anglesea. W.W. — J. Taylòr*i*. Cwm Idwal. — J. polyánthos. Near Bangor, Abber, and Llanberis. W.W. J. *T*richómanes, J. stipulàcea. Near Llanberis. W.W. — J. barbàta. In Anglesea, near Bangor and Llanberis. W.W. J. platyphýlla? lævigàta. Near Abber. W.W. — J. ciliàris. In Anglesea. W.W. — J. Hutchíns*iæ*. In Llanberis Pass. W.W.

Lecídea Œdèr*i*. L. silàcea. On rocks near Llanberis. — L. vesiculàris. On rocks above Llandudno.

Lecanòra gélida. On rocks in Llanberis Pass. — L. crássa. On rocks above Llandudno.

Parmèlia áquila. On rocks on the coast of Anglesea.

Gyróphora proboscídea. In Llanberis Pass.

Urceolària Achàr*ii*, Stereocaúlon frágile, S. *c*orallöìdes, Cornicularia pubéscens. On rocks and stones in Llanberis Pass.

Endocárpon Webèr*i*. On stones in Lake Ogwan.

Collèma nìgrum. On slate rocks at Nant Frangon. — Collèma lácerum. Among moss on the ruins of an old tower near Beaumaris.

Your most obedient servant,

NAT. JOHN WINCH.

Newcastle upon Tyne, Feb. 18.

ART. V. *Natural History in Scotland.*

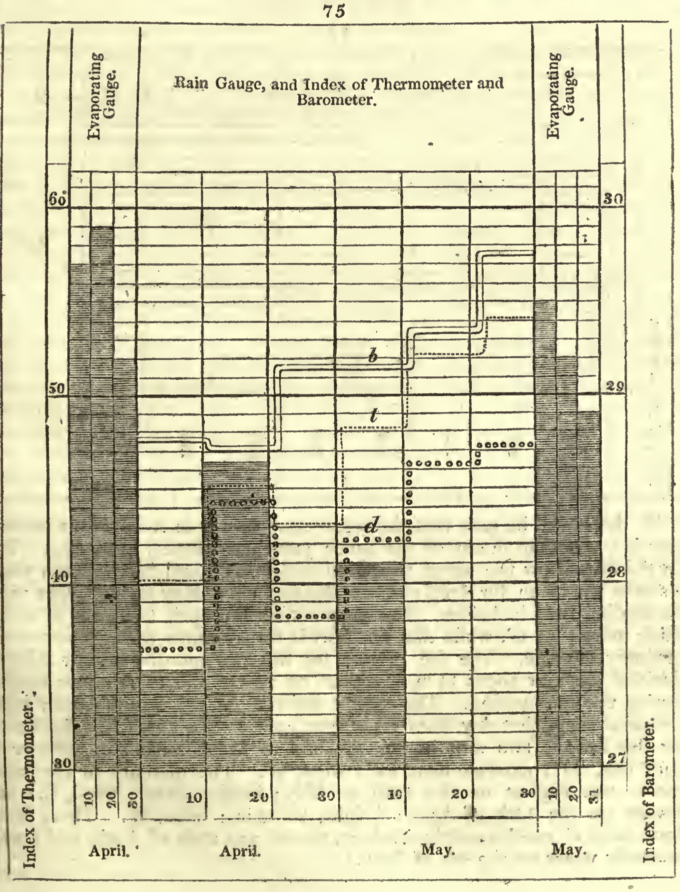
RARE Birds shot in Dumfries-shire. — The following rare birds, of the natural family *S*colopacìdæ, have been killed in Dumfries-shire during the last winter. The first, Phalàropus platyrhínchus, is of rare occurrence in Great Britain, and the distribution even very limited in every part of the world. The others are more frequently found, particularly in fenny countries, and upon the English shores. In the present district they are met with once or twice in a season, either in very stormy winters, or occasionally in spring and autumn, when passing to or from their breeding quarters. Phalàropus platyrhínchus (Grey Phalarope) was shot on the shore of the Solway Firth at Preistside, parish of Ruthwell. The specimen had nearly attained its perfect winter plumage, retaining only a few black and reddish markings. *Tótanus* óchropus (Green Sandpiper) was shot at the foot of Skein Water, a small stream running into the Annan, where a pair have frequented for some years, and, with the last, is in the possession of John D. Murray, Esq., Murraythwaite, Dumfries-shire. It is the first time that authenticated specimens of these birds have been killed in this district. —

Tótanus Glóttis (Green Shank). A pair of these birds were shot on the Annan, about two miles below Jardine Hall: they frequented also the adjoining lochs of Lochmaben; and, when disturbed, immediately passed over, always nearly by the same route, to the quieter haunt, flying very high, and incessantly uttering the shrill piping whistle. They are now in the collection of Sir W. Jardine, Bart. — *W. J.* *May* 21. 1829.

Art. VI. *Calendar of Nature.*

Scotland.

Diagram, showing the Motion of the Mercury in the Barometer and Thermometer, and the Dew Point obtained by the Differential Thermometer, or the mean of each, for each ten days in April and May; also the Depth of Rain in the Pluviometer, and the Quantity of Moisture evaporated from the Evaporating Gauge, for the same periods; as extracted from the



Register kept at Annat Gardens, Perthshire, N. lat. 56° 23½′, above the level of the sea 172 ft., and 15 miles distant from the coast, by the mean of daily observations, at 10 o'clock morning and 10 o'clock evening.

The shaded part of the columns, representing the evaporating gauge, shows the water remaining unevaporated at the end of every ten days, when the gauge was again filled to the brim; the open space from the top consequently shows the depth evaporated each period. The rain-gauge was emptied at the end of every ten days, and the shaded part of the column shows the depth of the fall of rain. The dotted line *t* shows the mean temperature; the line marked *d* shows the mean point of deposition, or the temperature at which part of the moisture held in solution in the atmosphere throughout the day began to fall in the shape of rain or dew; the double line *b* shows the mean height of the mercurial column in the barometer in inches and tenths. As lines representing the monthly means produce confusion, they are not inserted, and will appear in figures in the Calendar of Nature.

Diagram, showing at one view the Mean Temperature for April and May, from A.D. 1822.

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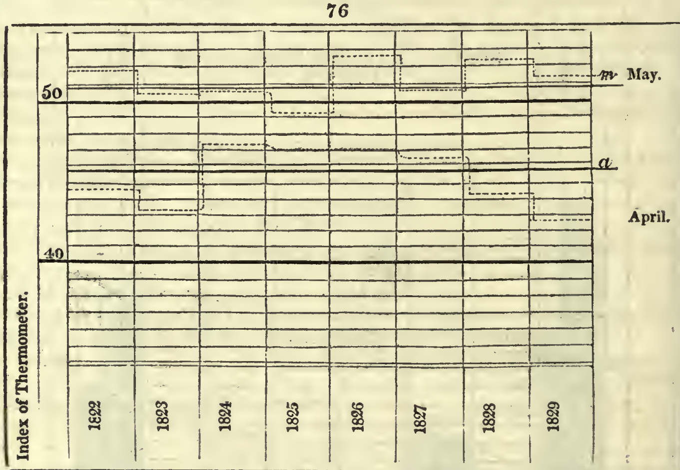

By this it will be seen that the mean temperature in April of the present year is lower than in any of the seven years immediately preceding. The dotted lines show the mean temperature for April and May in each year; *a* shows the mean for April; and *m* the mean for May for the eight years succeeding 1822 inclusive. The temperature for April this year is something more than 3°, while that for May is rather more than ½° above the ordinary average. The fall of rain for the two months is only 3 in. 45 decimal parts, or about 1½ in. less than on any of the two former seasons during the same period. The coldest day was on the 2d of April: mean temperature of that day, 36·5°; extreme cold, 31·5°; wind, N. The warmest day for the two months was the 23d of May: mean temperature of that day, 56°; extreme heat, 62°; wind, W. The mercury in the barometer was highest on the 26th of May; height, 30 in.; wind, E.: and lowest on the 15th of April; height, 28·25 in.; wind, W. There were loud gales of north-easterly winds on the 2d and 29th of April, and north-westerly winds on the 4th of May.

Calendar of Nature for the Carse of Gowrie, Perthshire.

April. — The mean temperature for this month was only 42·8°, or about 3° below the ordinary average temperature for that month. From the low temperature of the three months immediately preceding (see p. 204.), it may easily be inferred that at the end of April vegetation was unusually late. Cold north and north-easterly winds prevailed for the most part of the month, with the exception of only 6 days, from the 14th to the 20th, on which days the wind was westerly. The Erythrònium déns cànis (Dog's-tooth Violet) opened its flowers on the 1st, the Pulmonària paniculàta on the 3d. The sea-mew appeared on ploughed fields in the Low Carse on the 8th. Gooseberries were in leaf on the 8th, 27 days later than last season. The Soldanélla alpìna and *D*ràba *a*ïzöìdes, two alpine plants, were in flower in Annat garden on the 12th. Wildgeese had taken their departure by the 14th: it is remarked that they never leave the Carse till they have tasted the young braird of beans. Daffodils were in flower on the 14th, 26 days later than last season. The larch tree, which usually shows its foliage between the 1st and 5th of April, did not appear green before the 23d. Green-gage plums were in flower on walls on the 29th, 23 days later than last season. Oats that were sown in Annat park on the 8th, gave a braird on the 28th, or 20 days later. Mean temperature of that period, 44°. The atmosphere was cloudy 20 days, and clear 10 days.

May. — At the beginning of this month vegetation was about 23 days in arrear. The mean temperature for the month was 51·5°, which is more than half a degree *above* the ordinary average. The wind was north and westerly 14 days, and north and easterly 17 days. There were 9 days in which the atmosphere was clouded, and 22 of clear sunshine; which, together with the limited fall of rain, will account for the rapid progress vegetation made towards the latter end of the month. The sloethorn was in flower on the 3d. Barley sown at Annat park on the 17th of April brairded on the 2d of May, a period of 14 days: mean temperature of that period, 43·3°. Swallows appeared on the 3d; but, as insects were scarce, some were found dead near the coast. The cuckoo was heard on the 6th: we never hear that bird nowadays in April in this quarter. The horse-chestnut came in leaf with the appearance of the swallows, and the wood anemone came in flower at the approach of the cuckoo. Crows were fledged on the 9th, 5 days later than last season. Barley sown on the 1st brairded on the 10th inclusive, a period of 10 days: mean temperature of that period, 47·7°. The maple was in leaf on the 11th; the summer snowdrop and *I*ris pùmila in flower on the 11th; the beech and lime were in leaf on the 13th; and figs, on walls, in leaf on the 14th. At this period, vegetation was only 6 days behind what it was at the same period last season. An exception appeared in the lilac, which did not unfold its blossoms till the 24th, about 12 days later than last season. The Virginian and Rose strawberries, too, seem to have been retarded longer than other plants in unfolding their blossoms, which did not appear before the 17th. Barley brairded on the 18th which had been sown on the 9th, a period of 9 days: mean temperature of that period, 51·1°. Turnips brairded on the 18th which had been sown on the 13th, a period of 5 days: mean temperature of that period, 53·1°. The walnut came in leaf on the 24th. Red-streak apples were in flower on the 26th, and the *N*arcíssus on the 36th. So that vegetation is at this time within two days' march of last season at the end of May; a proof that a late spring is no sure indication of a late harvest.— *A. G. Annat Gardens, June* 1. 1829.

Art. VII. *Microscopic Amusement, as a Means of educating the Feelings.*

Mr. Carpenter, in *Gill's Repository*, vol. iv. p. 336., speaking of the fine displays of anatomy and wonderful construction of insects, creatures so much "despised, and which are, indeed, but too often made the subject of wanton sport by many persons, who amuse their children by passing a pin through the bottom of their abdomen, in order to excite pain and long suffering in the insect, and thus making them spin, as they ignorantly term it," has the following most humane and benevolent observations: — "Many of these cruel sports might undoubtedly be effectually checked, if the teachers of schools were occasionally to exhibit to their pupils, under the microscope, the various parts of an insect with which they are familiar; and, by interesting lectures of instruction, to point out the uses to which those parts are applied by the insect, for its preservation and comfort; and that, when they are deprived of them, or they are even injured, a degree of suffering takes place in the creature, which the children at present seem to be wholly uninformed of. I certainly think that, if the above-mentioned useful lessons were inculcated, they would afford a check to those cruel propensities in many children, which they at present indulge in, for want of being better instructed."

We think this a most excellent idea, and have little doubt that its adoption in schools and families would have the intended effect. We earnestly beseech such of our readers as are patronesses or patrons of girls' or boys' schools to purchase, and give or lend to the mistress or master, a common microscope of any power that can be afforded, from *5s.* to *1l.* Directions for its use will be sent along with it; and the mistress or master may first instruct two or three monitors in its use, and then grant permission to examine objects with the aid of a monitor, as a reward for merit, and as a gratification during a part of the hours of recreation, and on holidays. Vestries might do worse than purchase a microscope for parochial schools; and, in rich parishes, a seven-guinea microscope might be purchased, which would show the active molecules of Mr. Brown, Dr. Drummond, and others, which we have seen, or think we have seen, through such a microscope. If a microscope would be a good thing in a school, it would evidently be most valuable in a private family; and we should say at once, that whoever can afford to keep a governess or tutor, ought to afford also to have a seven-guinea microscope. In our next Number, we shall commence a series of papers, exemplifying the use of different kinds of microscopes, with a view to the prosecution of this excellent idea of Mr. Carpenter.

Art. VIII. *Hints for Improvements.*

A Natural History Society.—Sir, In looking at the prosperity and high attainments made in this country, in perfecting all kinds of machinery, we are led to consider what is the cause, and what has placed knowledge on this head in so much more an advanced state than on many others, and in this I allude to the study of natural history. It may be answered, because it has not the means for remunerating the toil and labour used in acquiring it. This may be true and yet not be all. In zoology and entomology, the correct information of the commonest, as well as the rarest, of their parts will be best obtained by those who make it their endeavour to collect specimens. Now, the persons who do so are generally those of no great abilities, yet having a taste for the pursuit, which the profit arising from it enhances. This profit is derived by supplying those who desire to possess, without the trouble of collecting, as well as those whose study is directed to the theoretical and physiological part. Hence we see the majority of books, published for the extension of these studies, are in error in many parts, for the want of that information which only the practical pursuit of them can give. Thus, those who publish apply for guidance to those who collect; but the pecuniary advantage they derive from secrecy on this point, leads them to give wrong dates and circumstances. Many instances occur of the public being wrongly informed, from these causes, by publishers of works on natural history.

I would, therefore, propose something that would obviate this, and make a more public acquaintance with what may be the desiderata, to those who pursue it, of natural history, viz. the habits and places of their specimens.

My ideas are, that a fund should be established by those who are desirous to join in a theory of this sort, by subscription; a society formed, who should be at liberty, in the same way as the Royal Society, to offer money or medals as a reward for the best information respecting any subject that might be proposed by the society, due care being taken that such was truly authenticated. Such a course would operate materially on those who only look to pecuniary advantage; as in addition to the reward would be a self-satisfaction, that what they had discovered would be duly attributed to them, and made known as such, which their present want of ability to communicate properly their ideas precludes. A simple medal would induce these people to give information, when the offer of four or five times its value has been unable to accomplish it, because it would enable them to show they had done something for the pursuit they had embraced. Persons publishing would give more satisfaction, and would get rid of an idea that has some hold now, viz. that book-making, and not science, is the inducement. In furtherance of the plan I have proposed, I am quite ready to contribute to the promotion of it by my subscription. I remain, Sir, yours, &c. — *K. Ipswich, Feb.* 17. 1829.

Songs of Birds.—A very pleasant letter in the Magazine of Natural History (Vol. I. p. 414), on the subject of American song-birds, suggested to me an idea, that letters on English birds, written in the same lively strain, would be interesting. Many persons, who are highly interested in all the operations of nature, are at a loss to distinguish the songs, cries, flights, &c., of birds; the more, as many vary at different seasons of the year. I think, if a familiar account of the haunts, habits, sounds, &c., of such birds as are more commonly seen in any particular season, were given in the Magazine preceding it, it would be both interesting and useful. I have not a sufficient practical acquaintance with the feathered tribe, to do justice to such a thing myself, or I would send you a specimen of what I mean; it should be done by a person familiar with their notes and flights, not by one who must put "salt upon the tails of the birds" to examine their colours and forms, before he could tell you how they ought to fly and sing. I find that comparatively few persons are aware of the vocal powers of that very familiar bird, the robin: I have frequently heard this bird sing in a manner to do honour to its connection with the nightingale; when it has been disputed, whether or not it could be the robin. I would at any time silence the finished song of the chaffinch, in three distinct parts, to listen to the mellow notes of my warm-hearted friend, robin. I doubt, even, if there be any bird I would prefer but the nightingale itself: I hesitate as to the black-cap. I wish, however, some one would introduce them to us more familiarly, and make us acquainted with their several claims and merits. — *E. K. Feb.* 7. 1829.

Baron de Humboldt. — I have frequently heard it regretted that no English translation has yet been announced of many of the works of this illustrious traveller and natural philosopher, such as his *Tableaux de la Nature*, *Recueil d'Observations de Zoologie*, *On the Geographical Distribution of Plants*, *On Isothermal Lines*, and other detached essays and memoirs of a popular character. Considering the lofty situation this incomparable author occupies on the hill of science, it is surprising this has not been already done; and should the respectable publishers of the *Personal Narrative*, &c., not be engaged in accomplishing it, I hope some *competent* person will take the hint, and immediately set about conferring so signal a benefit upon the English reader, from which he may safely calculate upon an ample remuneration for his labours. — *J. E. B. The Court near Wrexham, Feb.* 4. 1829.

Art. IX. *Queries and Answers.*

Skulls of Brutes. — Your correspondent C. (p. 209.) asks if the skulls of brutes are in two tables in the manner of those of the human race. It is not clear, whether by brutes he means all animals except man, or the Linnean order of *Béllux*; however, in either case he will find the information he wants in Cuvier's eighth lecture on Comparative Anatomy, where he will also find what he does not seem aware of, viz. that the skulls of men are formed of eight instead of two plates. Yours, &c. — *Thos. Thompson. Hull, Sept.* 9. 1828.

The Owl feeding on Fish. — The Rev. W. T. Bree has narrated the circumstance of the common brown owl's feeding on fish (Vol. I. p. 179), confessing his ignorance of the methods by which the bird is enabled to take its prey. I am as ignorant of the subject as the reverend gentleman, but I humbly suggest the probability of there being a luminous appearance in the eyes of the owl, by which the fish are enticed within the reach of its beak or claws. Fishing by torch-light is practised in some countries: it is likely that it could have derived its origin from a consideration of this kind. — *J. S. Thurgarton, Norfolk, April* 17. 1829.

Rearing of Pheasants. — The following observations are for the use of your correspondent from the Isle of Wight (Vol. I. p. 300.). Pheasants may be easily reared, if they are fed on boiled eggs till they are able to eat small wheat, when a heap of gravel should be deposited in their coops. It is usual to give them the larvæ of ants, but they should never have more of them at one time than they would be likely to find in the fields. I should recommend the larvæ of the black ant, because I think that the larvæ of the red ant sometimes prove fatal. I once supplied a very healthy brood of pheasants with a hearty meal of them, and in less than an hour some of the birds were dead. If I am right in classing cause and effect, this is a singular fact. I accounted for it by supposing that the peculiar acid which is so predominant in the perfect insect, may be equally potent in the larvæ and as fatal. — *Id.*

The Crow, noticed by P. H. (p. 101.), was evidently the Royston, or Hooded, Crow (*Córvus Córnix Linn.*), which is a peculiar species that comes over to us from the north of Europe at the approach of winter, about the same time with the woodcock and other birds of passage, is seen generally in pairs, and near to the sea coast, and leaves us again in the spring. — *J. C.*

The Crow alluded to in p. 101. is the Hooded, or Royston, Crow, common in the Isle of Thanet and parts of East Kent, *Córvus Córnix* of Linnæus. — *Anon. Bishopsbourne, Kent, March* 26. 1829.

Scólopax Sabini (in answer to A. C. R., p. 207.) — There is a very good representation and description of the *Scólopax Sabini* in the second volume of Bewick's *British Birds*, p. 416., last edition. I am, Sir, &c. — *Perceval Hunter. May* 6. 1829.

The Black-headed Bunting. — Do you call the Black-headed Bunting a Blackcap? as we have no migratory bird in this neighbourhood but it which deserves the name. What is called the blackcap here is the largest titmouse, which stays the winter with us, and in summer is so injurious to the crops of peas, that I have known them sometimes eat them all, not leaving a single pod for any one else. — *T. G. Clithero. April* 17. 1829.

Stourchat and Wheatear. — What is the difference between the stourchat and the wheatear? The same bird is called by both names here. I am, Sir, &c. — *Id.*

Superfœtation of a Pheasant's Egg.—I had a pheasant's nest last year, on one of my fences, containing eleven eggs. In due time ten birds escaped from the shell and one egg proved barren. In one of the shells, out of which a bird had evidently gone, was a thick film, extending entirely across the middle, in the direction of the conjugate diameter, and dividing the egg into two cavities. Beyond the film, when broken, was discovered another egg, of a globular form, having a very hard shell, and containing, as usual, white and yolk. My brother still retains it in his collection. Is this an instance of what medical men call superfœtation? — *J. S. Thurgarton, Norfolk, April* 17. 1828.

Winter Quarters of Frogs.—In reply to the query on the winter quarters of frogs (p. 103.), it must be recollected, that on the breaking up of the ice at the end of winter, or in the early part of spring, in these climates, vast numbers of full-grown frogs make their way to the surface of the water in the ponds and ditches which they inhabit, and there congregate, with their heads out of the water, making such a gurgling noise as often to attract the attention of idle boys, whom I have often seen contending with each other in the numbers they could knock on the head with their missiles; a circumstance which probably suggested the fable of the Frogs and the Boys, and which our young friends will, we hope, bear in mind, when they contemplate this annual display of joy in these harmless creatures on the return of genial spring; and recollect what the old frog said, viz. "Although this may appear fine sport to you, remember it is *death* to us." As, then, the frogs reappear in spring, it is evident that they do not die at the beginning of winter; and the general belief is, apparently not without foundation, that they lie dormant amongst the weeds at the bottom of the water, or buried under the soft mud; the reason for which may probably be found in the abstraction of food during the winter season: as they can neither obtain food nor get to the surface to respire, these functions, as in all hybernating animals, become suspended, and the animal, as in a profound sleep, remains quite unconscious of its existence. — *J. C.*

Gelatinous Mass like the Remains of a Frog.—In reference to the remarks about frogs in p. 103., permit me to say, that the gelatinous mass your correspondent refers to, is not unlikely that commonly called "Shot-star," and occasionally met with in fenny countries and meadows. I have no doubt but it proceeds from frogs having been swallowed by sea-fowl, and ejected again from the stomach; the gelatinous substance is, in all probability, the *oviduct* of the frog, which expands by the temperature of the stomach, and is the principal cause of its being voided shortly after having been swallowed. Thus the oviduct of the frog, if placed in a tumbler of water, about blood heat, expands to very many times its original volume.

As to showers of frogs, an officer of high rank in India informs me that he has not unfrequently seen, after a shower, the roof of his tent covered with minute frogs, and sufficiently lively too; may not powerful evaporation be *also* a source of their transport into the air, or the tube of the water-spout inhale them which the nimbus diffuses and scatters? — *J. Murray.*

Mole Cricket (*Grýllus gryllotálpa*) (*fig.* 77.), (in answer to Mr. Robert Jones).—These curious hemipterous insects are oftener heard than seen; as they only come abroad in the night, and then, as may be seen by their paths, but a little way from their dwelling place. They live, breed, and constantly inhabit

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the sides of ditches and drains, in boggy grounds. Here they form numerous tunnels about 6 or 8 in. under the surface, for which their two foremost feet are well adapted, being remarkably strong, and shaped like the large claws of a lobster. They are an ugly and hostile-looking insect, though perfectly harmless; $1\frac{1}{2}$ in. in length, of a dirty brown colour, and entirely covered with close short down, which serves to form an envelope of hair, and defend them from the contact of water while immersed. Their chirp or call, which appears to be produced by the vibration of their shells, is a deep-toned jar, performed in their recesses, and has caused them to be called the *Churr*-worm; a name very significant of their call. — *J. M. Chelsea.*

Harvest Bug (*A'carus autumnàlis* Shaw). — Passing some days in Gloucestershire, with my family, in the early part of September last, we were daily annoyed by the appearance of small vesicles, chiefly on the neck, arms, and legs. These vesicles seemed to be filled with a semi-transparent fluid, were surrounded with more or less of redness, and attended by very troublesome itching, especially if irritated by rubbing. Our friend (a medical man) assured us it was caused by the harvest bug, which he described as an insect of very minute size, and of a bright red colour. It may be remarked, that we invariably found fresh vesicles making their appearance after walking in a neighbouring plantation. If you or any of your readers could throw any light upon the natural history of this troublesome little insect, it would oblige yours, &c. — *G. B. K. Birmingham, Nov.* 14. 1828.

The Sea Spider alluded to in p. 211., and which, by being exhibited under the title of a tarantula sea spider, has no doubt extracted some money from the pockets of John Bull, cannot be regarded in any other light than as one of those gross impositions upon the public, which are occasionally offered to the credulous and ignorant in all countries, but more particularly our own. Your Magazine, and the increasing taste for natural history, will gradually diminish the number of such experiments, by causing them to be detected and exposed in the first instance. Enough of the description of this new cheat is given by M. C. G., to enable a zoologist to determine it to be no other than a species of cuttle fish, probably *S*èpia officinàlis, disguised by the removal of its suckers, by the addition of a "spiral tongue half a yard in length, armed with a pair of forceps at the end! and that of a very large spinner out of which the exhibiter had taken a web!" The bone in the species above indicated terminates posteriorly, but within the exterior tunic, in a short spinous point, so that it would appear that this also had been exaggerated by some addition. It will readily occur to those acquainted with these animals, that the possessor of this treasure has either wilfully or ignorantly mistaken the position of the mouth, which, as described by M. C. G., is the opening of the sub-abdominal pouch, the place of the real mouth being within the centre of the arms which crown the head of the animal. — *T. J. May* 21. 1829.

Remarkable Spider. — Sir, I beg leave to send you the following account of a remarkable spider, which I took some time ago, I believe about the end of summer, on a furze bush. His abdomen exceeded in size a wren's egg, was of an extremely bright yellow, and marked with brown something in the shape of the marks on a diadem spider (*Arànea diadèma*). (*fig.* 78.)

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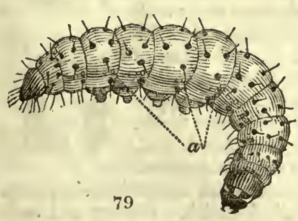
After I had returned home, delighted with my prize, I put him into a work-box made of fine wire gauze, together with large specimens of the before-mentioned species, many of whom he devoured. He was of great strength, and had very long sharp jaws, but I had not the curiosity to find out whether they were venomous; his legs were long, and after his committing these murders I was obliged to remove him into a mouse cage, and subsequently into a box. I fed him daily on flies, and allowed him to walk about after being fed. Notwithstanding all my care, however, he gradually lost colour, grew thinner, and in about a month he died. I, being ignorant at that time how to preserve spiders, ran him through with a pin after the manner of other insects, and placed him in my cabinet, where he now remains, but shrivelled to half size, and retaining hardly any thing of his former beauty. Position of the eyes thus, : :: :

If any of your correspondents can tell me, through the medium of your Magazine, to what species it belongs, and likewise a simple and easy method of preserving spiders that have much colour, I should feel myself much obliged. — *C. Lambe. May* 6. 1829.

Spiders on Chestnut Timber. — In Wood's *Letters of an Architect* (vol. i. p. 60.), it is stated that all the timbers in the cathedral of Rheims " are said to be of chestnut, and the proof is, that no spiders are found upon it." What is meant by this? Will spiders not live on chestnut timber? — *John Brown. Westcroft, near Huntingdon, April,* 1829.

The Zeuzèra æ'sculi (Vol. I. p. 66.) has been supposed to feed only on elms; the specimen I have was taken from an ash. The moth lays its eggs on the body of the tree during July or August; the larvæ, on exclusion from the egg, feed at first on the bark of the tree, penetrating the solid wood shortly after. I am not certain as to the length of time they feed, but I have reason to believe it is not until the second summer the perfect insect is excluded. My ideas for this I give: the egg is not hatched before August, and the larva from it becomes torpid by November, and as it cannot in this short time be full grown, it commences feeding the following spring, and perfects itself during the summer. Before winter it spins a web across the orifice in the tree, and remains in this state until a month and a few days previous to its appearance as a perfect insect, when it assumes the chrysalis form. Its extrication from the tree is perfectly easy. In the chrysalis state every segment of the body has a row of sharp short spines, which enables it to shift itself along the passage it has made by the motion of its body, the spines acting as levers against the sides of the hole. By these means it soon reaches the entrance from the exterior of the tree, which takes place a few hours before the developement of the perfect insect. The drawing (*fig.* 79.) is of the natural size; my specimen, being a female, is large. It is furnished with powerful jaws, and has a hard brown shield on the top of the first segment of the body, within which it can entirely withdraw its head. The last segment of the body is furnished with a similar hard shield. The drawing of the wood is the full size. Another larva, found at the same time, had been the cause of its own destruction, the tree on



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which it was feeding being so nearly divided, that the upper part had fallen and crushed the caterpillar. *a*, the respiratory organs.

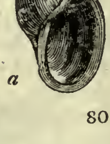
I shall be happy to furnish you with a drawing of the chrysalis, when it enters that form, should this be sufficiently interesting. I am, Sir, &c. — *D. G. Kerridge. Ipswich, March* 3. 1829.

The Hessian Fly. — Sir, At Vol. I. p. 227., I observe some notice taken of the Hessian fly, and I send this in hopes that you will insert it in an early Number, where it may meet the eye of the reverend author, who will, I trust, favour us with his remarks on the nature and mode of propagation of a fly which has this year destroyed about one third of late sown wheat all over this country.

As soon as the ear of wheat was fully developed, and before the flower was expanded, a small yellow or sulphur-coloured caterpillar, about one eighth of an inch in length, and thick in proportion, had taken its abode in numbers where the young milky grain was forming, which they completely devoured; and the infested grains never showed the stamina, nor did the anthers expand. In about twelve days they became torpid, and in six days more they were transformed into small black flies, not half the size of those figured by Mr. Kirby. On calm evenings these flies appeared in myriads on the outside of the ear, but always sheltered themselves from the sun's rays amongst the husks; they existed about two weeks in the fly state and then disappeared, but have, in all likelihood, left the rudiments of a future generation. This is the second year that the same destructive insect has proved hurtful to the wheat crops in this country. It will be obliging if Mr. Kirby, or any of your scientific correspondents, will, through the medium of your Magazine, inform us where they think the eggs are likely to be deposited. Can it be in the downy end of the grain of wheat? Is it likely that these eggs will continue in the future plant, till the ear is again protruded, and then come into life, or how are we to account for their existence at that late period of the season, without appearing earlier? When once its history is properly known (which in the present instance can only be discovered by analogy), means may be judiciously employed for its extermination. I am, Sir, yours, &c. — *A. G. Perthshire, Sept.* 1828.

The Turnip Fly. — In Cunningham's work on New South Wales, it is stated that the turnip fly has been introduced into that country by means of turnip seed. Was it introduced in the egg or larva state? If either egg or larva be found among the seed, can they be destroyed by immersion in prepared fluid? As this is a question of the greatest importance to the agriculturist, it is to be hoped that some of your correspondents will give it a careful consideration. — *J. S. Thurgarton, Norfolk, April* 17. 1829.

Lymnæ̀a ovàta. (*fig.* 80. *a.*) — From the specimen in my collection, I should consider this shell distinct from the H. pùtris, or péregra of authors, and certainly not the Hèlix pùtris of Dr. Turton. This variety (of H. pùtris) may be that which I have found in tolerable abundance in the neighbourhood of Doncaster, and which very much resembles the Lymnæ̀a ovàta of some authors; but this last (L. ovàta) is not described in his *Conchological Dictionary*. The terminal volutions are much more covered by the body than those in the shell figured in the *Magazine of Natural History* (Vol. I. p. 425. *g*). The line of separation is not quite so oblique; the outer lip is somewhat compressed at the margin, and it is attached nearer to the upper part of the body, where it is rather flattened; it is more tumid than the péregra, and slightly striate longitudinally; and, like the H. stagnàlis, has a few flattened spaces, as if pieces had been chipped off. My largest specimen is somewhat more that six tenths of an inch in length, and about four tenths in breadth. Having met only with two specimens in this spot, I consider it more rare than L. pùtris,



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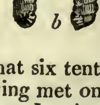

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which is very common here. Lymnæ'a frágilis *Mag. Nat. Hist.* (vol. i. p. 425. *a*) corresponds with mine; but, as I found them at Malmaison, near Paris, could Lamarck have been ignorant of its habitat, and refer his specimen to Dr. Leach's? Túrbo *m*uscòrum (Pùpa *m*uscòrum) is much confused, as justly remarked by Mr. Kenyon. I have several specimens marked by different conchologists, and not two alike; it would be desirable to represent all the varieties for the sake of comparison. P. *m*uscòrum, P. chrýsalis, and P. sexdentàtus of Turton, are however found in the same locality in this island, if I understand them as described in his *Conchological Dictionary.* Is not Volùtaríngens of Turton the young of Volùta refléxa? These are both found here together in inlets of the sea. Túrbo *j*uníperi (*fig.* 80. *b*), mentioned by authors as rare, is found in great abundance on the oolitic hills of Gloucestershire, under dry tufts of grass; and, like most toothed shells, have the back of the outer lip visibly marked by white opaque lines. — *F. C. L. Guernsey, April* 20. 1829.

The curious Worm. — In answer to your correspondent W. W. (p. 103.), I beg to say that his curious worm is a species of *F*ilària, which inhabits the intestines of the larger beetles, but is occasionally to be found in ditches, or in moist earth. See Kirby and Spence's *Entomology*, vol. iv. p. 229. I have taken this worm, from 3 to 4 in. in length, from the bowels of the *C*árabus horténsis and *C.* mádidus of Marsham; and I have found the same in wells, and once, like your correspondent, on the ground. — *G. I.*

Dr. Martius's Discoveries. — I am anxious for a detail of the discoveries of Dr. Martius. I have no doubt but there are discoveries yet to be made on the structure of plants, that will some day make the *knowledge* of the present day appear like child's play. — *E. K. Feb.* 7. 1829.

A Cedar and a Species of Wild Basil. — In Ashantee (*Bowdich's Mission*, p. 175.) there is a cedar, the leaves of which exude a considerable quantity of liquid salt, which crystallises during the day. There is, also, in Chile, a species of wild basil, which is every morning covered with saline globules, resembling dew, which the natives use as salt. (*Bucke's Beauties of Nature.*) Can any of your readers inform me of the systematic names of these trees? — *P. S. March* 1829.

Starwort. — The plant described by Graham, in his *British Georgics*, under the name of Starwort, which your Berwick correspondent (Vol. I. p. 299.) cannot identify, is manifestly the Pinguícula vulgàris (*fig.* 81.), very common in upland marshes and in peat soil. — *J. R.*

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The ancient Mallow. — Sir, in answer to the courteous objections of your correspondent G. M. (p. 118.), permit me to observe that one is already refuted by himself, since he admits that we cannot positively identify the ancient mallow, which was expressly my own assertion; observing, at the time, that many other plants were in the same predicament. He says, " there is at least as much reason to believe that the Malva, of Horace, is the same as the mallow with us, as there is that it should be any other plant." I will allow that there is much more reason to believe it our mallow; but supposing that no doubt remained, not only of the mallow of Horace being a malvaceous plant, but of its actual inclusion in the genus *M*álva, still the plant would not be identified, the species being so numerous.

It would be more difficult, perhaps, to determine whether the mallow of Horace be the same with that of the *Old Testament*, than whether it be ours. If mallow be derived from the Latin, it expresses those emollient qualities for which the Roman mallow was noted; if we trace it to the Hebrew, the name expresses saltness, for which neither the Roman nor the modern mallow is remarkable, but which is very observable in many of the *A*tríplices, to which, according to Bochart, some suppose the scriptural mallow to belong.

It might, perhaps, have been more judicious to speak of the ancient mallow as an esculent in frequent use, than as an important one; yet I can scarcely admit that it is incorrect. I would willingly abide by the decision of those wandering tribes who were reduced to the necessity of plucking mallows from the bushes; or of the Romans, who appear to have rated the mallow much as we do the lettuce, as a cool and agreeable vegetable. Evelyn says it was taken by the poets for all salads in general. "Pythagoras," continues he, "held *malvæ folium sanctissimum,* and we find Epimenides in Plato, at his mallow and asphodel; *and, indeed, it was of old the first dish at table.* The Romans had it also in deliciis, *malvæ salubres corpori,*—approved by Galen and Dioscorides;—namely, the garden mallow, by others the wild, but I think both proper for the pot rather than sallet."

Your correspondent observes that Sir J. E. Smith expressly states that the malvaceous plants are not esculent; but a moment's reflection will show him that if he takes this in its strictest sense, as including *all* the plants of that order, it argues rather against than in favour of Horace's mallow being the same as our own, since, whether important or otherwise, the Roman mallow was undoubtedly an esculent. Some of this order, however, *are* eaten; the *H*ibíscus esculéntus for instance, which, according to Martyn, affords a rich dish (the pods being boiled with butter), eaten only in private families. Evelyn says that the "arborescent holy hocks" are "by some recommended and eaten with oil and vinegar, and by others with butter." He includes the curled mallow in his Acetària.

It is understood that the Chinese use some kind of mallow in their food; and "Prosper Alpinus informs us that a *tree* of the mallow kind is eaten by the Egyptians." * — *E. K.*

Lathræ'a squamària. — This curious plant is not uncommon near Richmond, and is found in the thickest parts of the woods, generally at the roots of the hazel. I never saw it growing truly parasitically but once, and that was on the roots of an ash tree by the side of the river Swale, from which I have seen fine specimens gathered: it even flowered once after the tree had been cut down, and the root torn up; but died in the winter. It was not in any way different from other specimens gathered in this neighbourhood, and was, in my opinion, truly parasitical. — *L. E. O. Richmond, Yorkshire, March* 4. 1829.

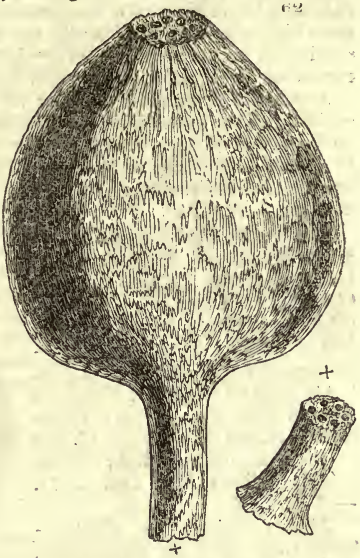
Blackdown Fossils sent to us by J. R. — The following names of genera and species of fossil shells, from Blackdown, Devonshire, figured in *Mineral Conchology* or elsewhere, have been supplied by Mr. Sowerby: —

Vènu*s* plàna, *Mineral Conchology,* tab. 20; Túrbo rotundàtus, 433; Vènu*s* *f*àba, 567; Ammon*ìtes* varicòsus, 451; Turritélla granulàta, 565; Túrbo concínnus, 433; Cárdium Hill*ànum,* 14; Cardium proboscídeum, 156; Cucullæ'a oblónga, 286; Cucullæ'a glàbra, 67; Cucullæ'a costellàta, 447; Cucullæ'a carinàta, 207; Cucullæ'a punctàta, n. s.; Vènu*s* caperàta, 518; Pectúnculus umbonàtus, 472; Trigònia alifórmis, 215; *M*ýtilus edéntulus, 439; Inocéramus concéntricus, 305; Nùcula impréssa, 475; Gryphæ'a cónica; Córbula élegans, 572; Córbula gigantèa, 209; Nática canrèna, *Parkinson,* t. 6. f. 2.; Isocárdia cuneàta; Isocárdia sp.?; *S*òlen Sanguinolària; *B*úccinum sp.?

On the Blackdown Fossils, by R. C. Taylor, Esq. — The quarries of Blackdown have long been known to furnish the best whetstones, and the most beautiful fossils, perhaps in all England. Whatever may be the merits of the former, the latter come more especially and properly under our notice. From this locality have been furnished more than 150 species of fossil Tes-

* Martyn's Miller's Gardener's Dictionary.

tàcea, and it is distinguished no less by the profusion of these remains, than by the variety of their species, and the beauty of their preservation. Its site is upon the western extremity of the green sand formation, where it is prolonged or protruded considerably beyond its general line of escarpment, and forms extensive out-lying masses; amongst which the elevated table-land of Blackdown is conspicuous.



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The fine state of preservation of the fossils of this district is owing to the subtitution of chalcedony for the calcareous matter of the shells; by which singular process all the delicacy and characters of the original are preserved, in a much less destructible material; nothing being requisite to complete the copy but colour. Those with which we have been favoured by our correspondent belong to the following genera: Turritélla, A′rca, Cucullæ`a, Trigònia, Cárdium, Pectúnculus, Vènus, Córbula, Chàma, Inocéramus, and Ammonites, with an Echinite. They are the most prevailing of the green sand fossils.

As it forms part of our plan to illustrate the geology of our island by catalogues and sketches of the most characteristic forms in the respective formations, it will perhaps be advisable to postpone the drawings of the Blackdown fossils, until they can be more appropriately introduced in the course of our geological articles. Meanwhile, we figure one of those bodies (*fig.* 82.) which are conjectured by our correspondent to be fruit, but which, in fact, are zoophytes, originally bearing the name of Tulip Alcyònia, and now placed under the genus Siphònia. Some interesting illustrative figures of this zoophyte may be seen in *Geol. Trans.*, vol. ii.

Mr. Parkinson describes it as a fossil animal, with a polymorphous body supported by a stem proceeding from a fusiform or ramose root-like pedicle; the original substance spongious, and pierced by a bundle of tubes derived from the pedicle, passing through the stem, then ramifying and terminating on the surface of the body.

With the other fossils from Blackdown are obscure spongiform spherical bodies, which must have existed in great abundance at the same time with the Testàcea.

There are some other varieties of zoophytes, and numerous shells, besides those now furnished, which occur in this rich depository of organic remains.

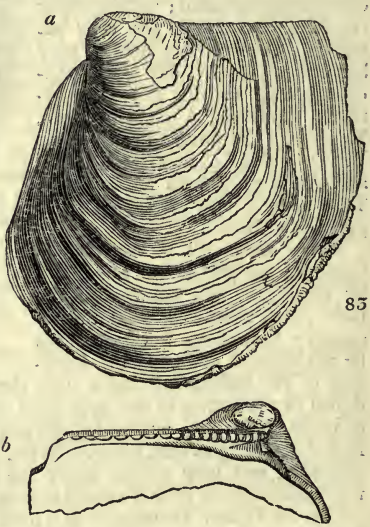
Contributions like these are highly estimated; they enlarge our acquaintance with the products of different districts, and will, moreover, much facilitate the object we have in view of furnishing an outline of English geology, derived, as much as possible, from original sources.

We cannot expect collectors to contribute specimens of rarity or of value, but there are districts where they are so readily attainable, that the geological student would often find it preferable to furnish originals, as in the present instance, than the drawings with which we have been favoured. — *R. C. T.*

The Packet of Fossils sent by Samuel Tyssen, Esq., of Narborough Hall, Norfolk, are, with one or two exceptions, casts of chalk fossils in flint, and have apparently been collected from the surface of the soil, or from the loose assemblage of disturbed and shattered flints which covers, in a great measure, the entire superficial area of the chalk formation of this country.

The shells consist chiefly of Inocérami, of the species before figured and described at page 69. in Volume I. of this work (fig. 39 and 40.). They often occur in groups, and a single flint may be seen marked with the distorted casts and impressions of a numerous assemblage of these Testàcea, without any visible traces of their shells remaining. Thus, in one of Mr. Tyssen's specimens, we perceive sixteen or eighteen Inocérami. These surround the cast of an *Echìnus, Spatángus* (cór marìnum), also distorted.

Another flint exhibits the cast of a single tubercle of a mammillated echinite, of the genus Cídaris. Similar detached impressions are common on fragments of flint, but entire siliceous specimens of the Cídaris are less abundant, particularly in Norfolk. There is also a small plicated Terrebrâtula of a species rather abundant in chalk. — *R. C. T.*



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The species from the chalk itself are as follows: — *Radiàta:* Cónulus albogalèrus *Mantel,* t. 17.; Galerìtes? *Lamarck;* Cónulus (Galerìtes) Rótula *Brong. Acephalous Mollúsca:* Inocéramus intermédius, n. s. (*fig.* 83. *a*) *Min. Con.* t. 440., and its hinge (*b*); Gryphæ'a globòsa *Min. Con.* t. 392.; Terrebrátula cárnea *Min. Con.* t. 15. one of the same cast in flint; Terrebrâtula oblìqua *Min. Con.* t. 277. — *J. D. C. S.*

Minute Objects on Flints. — Some time about last midsummer, walking on the Precinct Meadows, I was struck with the appearance of the flints and other hard substances being partially covered with a white powder, particularly in the crevices. I found this powder fixed, and, on further examination with a lens, that they must be either minute plants of the order Cryptogàmia, or the nidi of insects. I also found them on the high ground on the opposite side of the river. The annexed sketch (*fig.* 84.) is from

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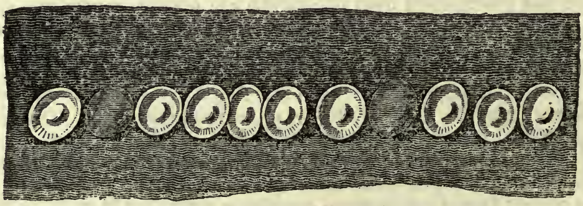

a flint in my possession, which shall be forwarded if requested. The objects appear to be in the same state as when I first brought them home. The portion of the flint is one tenth of an inch in length, and the sketch is magnified thirty times. The disks of the objects are finely radiated, and two of them (*a b*) are globular. An explanation will much oblige, Sir, yours, &c. — *Samuel Woodward. Diana Square, Norwich, April* 3. 1829.

I have ever considered these to be the eggs of a red *A'*carus, which always accompanies them, as far as I have observed. *J. D. C. S.*

Limestone from Coral Rocks. — It is well known that the Bermudas, or Somers Isles, are surrounded by innumerable coral rocks. On examining the limestone of which these islands are principally composed, I am inclined to think it has been formed by the coral being raised above the surface of the sea (for the coral insect works no higher) by some convulsion. In support of this, I have observed many appearances of decomposing coral in the limestone, although it generally resembles the oolite or roestone of Portland, &c., but with larger grains. Besides this, I have now by me some shells of the *Mùrex* and *Tròchus* genera taken from this rock, the former with the colour as perfect as if recently brought from the sea shore. In this same stratum I also noticed the bones of a whale, on the east side of Ireland's Island (one of the Bermudas). The limestone of Barbadoes bears similar marks of coral, and seems, in common with that of Bermuda and other parts, to be nothing more than the coral rock and coral sand raised from the sea. — *W. H., R.N.* *Yeovil, April* 22. 1829.

A Fossil like a broken Nut. — Some time since, in making a collection of fossils from the inferior oolite in this neighbourhood, I found a specimen having all the appearance of a broken nut (*fig.* 85.) with the kernel quite perfect. From its habitat (being amidst a great variety of shells), I conclude it must be a marine production, but what it is I should much wish to know. It is true, the same quarry whence it was taken contains a great deal of petrified wood, but its presence is almost as great an enigma to me as the nut itself. — *Id.*

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The blue Colour of the Sea. — Sir, I remember once to have noticed the last ray of the setting sun, on a fine calm evening at sea, which was of a bright emerald green. I believe the fact is noticed by Lord Byron, in some of his works. Does not this prove the blue colour of the sea, in the same way that the green appearance sometimes observable on each side of the setting sun may be accounted for by knowing that his golden rays intervene between us and the colour of the blue sky beyond? — *Id.*

A Corn Spring. — Sir, My attention has lately been called to a corn spring in this parish. I mean a spring which is supposed to indicate, by its flowing, a rise in the price of corn. Such, I believe, have been noticed in many other places; in particular, one other of a similar kind I have heard of in the neighbourhood of Atherstone in this county. The *Dudley's* spring (for such is the name by which the one here is known) has long been held in estimation among the lower orders for foretelling, as they believe, the dearness of corn; and many old people, I am told, have been in the habit of watching its operations, and placing much faith in them. The spring, I should state, is a land spring, which occasionally oozing out of a low boggy corner of a field, flows with a considerable rill down the ditch which separates this parish from the adjoining parish of Corley. It is often quite dry, flowing periodically only, and at long and uncertain intervals. My personal knowledge of this phenomenon is only of very recent date, as I have never visited the actual spot till this summer, when the spring was flowing; I can, therefore, only speak from report of the people in its more immediate vicinity. From them I learn that the spring commenced flowing about the middle of May last, after having been dry for about two years. On the last occasion of its flowing, more than two years since, they acknowledge that the spring did not maintain its prophetic character, as no rise in the price of corn ensued. The most remarkable circumstance relating to this spring (if true, as I am informed) is, that its operations do not appear to depend on the seasons, but that it is often known to flow in a very dry season, and again to be dry in a very wet one. This account, however, is hardly credible, as there can be little doubt, I think, that the flowing of the spring must depend, if not directly, remotely at least, on the quantity of rain that falls;

an opinion which derives much confirmation from the circumstance of the spring having ceased to flow during the last two years of unusual drought, and breaking out again in May of the present year, after the copious and heavy rains which fell in the spring. White, in his *History of Selborne*, speaking of the wet autumn and winter of 1773, says that "the land springs, which we call *lavants*, break out much on the downs of Sussex, Hampshire, and Wiltshire. The country people say, when the lavants rise corn will always be dear; meaning that when the earth is so glutted with water as to send forth springs on the downs and uplands, that the corn vales must be drowned: and so it has proved for these ten or eleven years past. For land springs have never obtained more since the memory of man than during that period; nor has there been known a greater scarcity of all sorts of grain, considering the great improvements of modern husbandry." (See Let. 19. to Hon. D. Barrington.) It is an acknowledged fact, that a dry season is most favourable to the produce of corn in this country, to say nothing of the getting in of the harvest. There are several old proverbs to this effect, such as, "Drought never bred dearth in England:" and,

"When the sand doth feed the clay (which is in a wet summer),
England, woe and well-a-day!
But when the clay doth feed the sand (which is in a dry summer),
Then it is well with England." (*Ray's Proverbs.*)

Now, this being the case, and the flowing of the land springs depending, as it should seem it certainly must do, on the quantity of rain that falls, it is easy to perceive how these corn springs, as they are called, came to have attributed to them a character for foretelling a dearness of corn. It would be worth while, however, to watch their operations more minutely; and it is in the hope that some intelligent persons, who have the opportunity, may be induced to do so, that I have now called your attention to the subject.

The Dudley's spring is still flowing (Sept. 13.) as copiously as when I visited the spot two months ago. Yours, &c. — *W. T. Bree. Allesley Rectory, Sept.* 20. 1828.

Laudanum, a species of dew. — Laudanum is procured in a curious manner, in some parts of the Isle of Cyprus. It is a species of dew, which falls during the evening and night upon plants resembling sage, the flowers of which are like those of the eglantine. Before the sun rises, flocks of goats are driven into the field, and the laudanum fastens on their beards, whence it is taken. It is of a viscous nature, and, collected in this manner, is purer than that which adheres to the plants; because these plants are subject to being covered with dust during the day. (*Bucke's Beauties of Nature.*) Can any of your readers explain this? — *R. S. March*, 1829.

Art. X. *Retrospective Criticism.*

Accentuation of Names.—Sir, I never take up your Magazine of Natural History, but its multifarious contents bring before my mind the imaginary picture of Horace, "undique collatis membris." * I say this with reference only to the sources of your information: the consummation of the poet's supposition, "ut nec pes nec caput uni reddatur formæ," † will by no means attach to your work; for I am persuaded that it will hereafter

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* "Members collected from all parts."

† "That neither foot nor head can be referred to the same form."

exhibit a picture of truth in due symmetry and proper proportion. There are a few great artists already employed about the head, more about the body, and a still greater number about the limbs. I, too, would have a share in so goodly a work, but I am an artist of the humblest class. I can offer only the "great toe of the assembly," and if that be not in proportion, I beseech you to reject it and suffer it not to deform your picture.

You have made the penultimate syllables of the words Chrysomela and Cicindela long: and Ainsworth, quoting from Pliny, has done the same. The poet, Gray, has adopted a different accentuation, as you will perceive by the subjoined lines, which are a portion of his verses commemorative of the Linnean Orders and Genera:—

> "Chrysomela inflexa loricæ stringitur ora.
> Maxilla exserta est oculoque Cicindela grandi."

Gray was a classical scholar, and would not, I conceive, accentuate a word without sufficient authority. But where is his authority in the present instance? In the whole nomenclature of entomology, no words are more variously pronounced than these two now before us: and I must confess that, if Chrysomèla be the correct accentuation, I am utterly unable to discover any thing in its derivation applicable to the insect to which it is assigned.

In page 160. you have written elȳtra, and in page 423. élytra. I presume that, prosodically, it may be either ĕlȳtra or ĕlȳtra; but in no case can it be ēlȳtră. Gray has written ĕlȳtra. I prefer your former pronunciation, because it is, to my ear, more euphonic.

In one case I find prodrŏmus; in another, through inadvertence I suppose, prodrōmus. I do not make these remarks, Sir, from any fastidious feeling, but for the purpose of information; and, more particularly, to show the necessity of annexing to the end of each volume of your work a correct accentuation of the terms therein employed. I am, Sir, &c. — *J. S. Thurgarton, Norfolk, April* 17. 1829. [Our correspondent's other communications are inserted in their proper places.]

Errata. — Page 107. line 16. from the top, *for* "the fossils (*figs.* 25. and 26.)," *read* "the fossils (*figs.* 24. and 25.)." Page 162. line 9. *for* "fifty," *read* "forty." Page 169. line 22. *for* "annona," *read* "ananna."

Ascent of the Aerial Spider. — Sir, Mr. Blackwall's letter in your Magazine (p. 116.) leaves this question exactly as it was. It is true he is pleased to deal in invective and complaint; but this has nothing to do with the case. Your correspondent need not be told that the *council* of no scientific society hold themselves responsible for the papers that may appear in their published *Transactions*; the entire *onus* rests on the individual authors of the respective papers; nay, more, as in the case of the Royal and Horticultural Societies and others, an express printed notice to that effect is prefixed to each volume. An author may gain sufficient credit with the council of any society, to warrant the publication of his sentiments or opinions, however erroneous they may be ultimately found to be. On such promulgation, these published opinions become public property, and they may be sifted and tried before that tribunal. If Mr. Blackwall finds himself unable to contest the question single-handed, I cannot concede to him the right of calling into his aid the *coup de main* of the council of the Linnean Society, the individual members of which I highly respect, and feel assured they will not be so unwise as to wage an indiscreet war against any one contending for the principles of truth. The opinions sustained in that paper are the opinions, surely, of Mr. Blackwall, and not of the council of the Linnean Society, or, if otherwise, how could Mr. Blackwall lend his name to a paper which did not belong to him. I shall not yield in my respect for the Linnean Society to him or any one, and am only surprised, he should wish to shield his paper behind a screen, when he alone is responsible for the acts of his own offspring.

Mr. Blackwall assures us, he was unacquainted with Gay Lussac's account of the ascent of the soap bubble, and we have a right to believe his statement; the principle, though he confesses it, has not *novelty* to recommend it; he applies it to the ascent of the spider, exactly as that eminent philosopher applied it to the soap bubble, and I must really leave Mr. Blackwall to manage the tackling of his composition of forces, as best he may. To *me at least*, it seems sadly complicated and confused.

Mr. Blackwall seems really to consider my observations as almost personal against himself; but I can assure him that this is not even possible, since I never even met with his name previously to seeing it in the *Transactions of the Linnean Society*, in a paper on the ascent of the spider which purports to bear his name.

Because I did not *mention* the temperature within and without, *ergo* I had not taken it, and had not ascertained the direction of the current. Now, Mr. Blackwall may have, if he presses for it, all the benefit that may arise from his illogical conclusion.

It seems that Mr. Blackwall did not mean to canvass the electrical aptitude of the air as to its *positive* or *negative* relations; but only that the aeronautic spider is not particularly select in the quantity or intensity that may abound.

As Mr. Blackwall is very sensitive about his name being introduced into a question which has, or ought to have, *truth* for its aim and object, he should have been a little more cautious in rejecting the opinions of those who have investigated the subject with as much care as himself; and I must confess that, in that very memoir, I can perceive but little courtesy exhibited toward his fellow-labourers in the delightful field of natural history, and in the case of those who have canvassed the subject.

I have "committed" my opinions to the same test which must be applied in the case of his asserted facts; by that standard of appeal we must both submit to be judged, and receive our acquittal or condemnation accordingly, and it is needless for either him or me to endeavour to fly off at a tangent. I merely repeat that my experiments have been numerous and diversified, and all those who know me will concede to me the merit of an indefatigable, laborious, and careful experimenter; and when that volume is reprinted I shall be able to adduce a multitude of facts more.

Last autumn I let go an aeronautic spider, together with some *thistle-down*, simultaneously from the same spot in the open air. They *moved in exactly contrary directions!* I must leave the phenomenon with Mr. Blackwall, to be adjusted by the "laws of compound forces." I, however, did not *ascertain the temperature*. I remain, Sir, yours, &c. — *J. Murray*.

The Lump attached to the Throat of the Hare. (Vol. I. p. 216.) — Sir, In confirmation of the opinion which I was led to form in my communication to you respecting the hare, *that the lump attached to its throat was most probably caused by a diseased state of some of the glands*, and was not an original deformity from its birth, I had the good fortune to meet with the following parallel case in one of the feathered tribe, *a common hen* (*P*hasiànus *G*állus), and as it appears to be a novel circumstance, and may assist the mind in forming a just conclusion as to the cause of that singular appearance, I hope I may secure for the following description of it, a place in the next Number of your Magazine: — Happening to find the hen just as she was dying, and perceiving that she was expiring from suffocation, I felt curious to ascertain the immediate cause by which her breathing was affected; and my curiosity was not a little increased by the person who had the charge of her informing me, in answer to my queries, that she had a large lump in her craw. This lump I at first supposed to have been occasioned by swallowing something which she could not digest, and that it had probably brought on swelling and inflammation; but on dissecting her, and cutting through the outer skin of the throat, I was much surprised to find that though the lump occupied the usual situation of the craw, it was in no way connected with it or the œsóphagus, but was entirely confined to the *tràchea* which it quite encompassed, and which it had, by the portion of it intervening between it and the neck, forced out of its natural situation. The lump, which was composed of cellular substance, like the one on the hare, was quite round, about six inches in circumference, and presented no appearance of inflammation; it encircled the tràchea immediately above its entrance under the breast bone. From its great size, and from its being retained in a fixed position by the windpipe, it had forced the craw quite to one side of the neck, and so entirely occupied the space allotted by nature to that necessary organ, that it could hold but a *very small* portion of food. The lump was, in every respect, similar to the one on the hare; except that from the upright position of the neck, and from its entirely surrounding the tràchea, it was retained by it in a fixed position, and by that means prevented from becoming pendulous by its own weight as with the hare. The pressure, occasioned by the lump and its confined position, caused her death by producing strangulation of the tràchea. It is, however, I think, probable, that it would soon have ulcerated, as I found an effusion of viscid brown matter nearly in the centre of it. As the hen presented no unusual appearance until lately, and as she was an old one, I think it cannot have arisen from an original malformation; it must, therefore, have been caused by some disease, and as there was not the slightest appearance of inflammation, or that callosity which is, I believe, always attendant upon cancer, and as the lump on her and the hare so exactly correspond with the description and position of what is termed goître in the human species, I am very much disposed to consider them similar. As I am not aware of this disease having ever been ascertained in the brute species, I feel some distrust in coming to this conclusion; but should it be correct, it might throw some light on that disease, and would, I think, satifactorily disprove the vulgar idea that it is caused by drinking snow water. Trusting, therefore, that the consideration of this subject, though it may appear trivial to many of your readers, will not be found unworthy of the attention of some who are more competent than myself to give an opinion on the subject, I remain, &c. — *John V. Stewart. Ards House, Dunfanaghy, Sept.* 29. 1828.

The Pygmy Bison. — Had you inserted my article on the Pygmy Bison four months ago, you might have saved many individuals the mortification of being humbugged by another attempt of the same individual to appropriate some of their cash to his own use, by such unfair means as the exhibition of his Tarantula, or Sea Spider. — *V. May* 23. 1829.

Birds presented to the Hull Literary and Philosophical Society. — Your informant (Vol. I. p. 289.) has committed an error in describing the birds I lately presented to the Society. They were not a male and female Rállus aquàticus, but *S*túrnus *C*ínclus (or, as I conceive it should be, "*cinctus*," though all the authors I have consulted write *C*ínclus, which is a word of which I can make nothing). The Rállus aquáticus, of which you have given us an excellent engraving, was two or three years ago presented to the Institution by my nephew, Mr. B. B. Thompson, who shot it in this neighbourhood. I wish you would give us a good likeness of Stúrnus *C*ínclus, for I do not know of one; Bewick's specimen, though incorrect, is the best I have seen. I do not believe the story of its walking on the bottom of the beds of rivers, though doubtless it dives with ease. The authors who mention this seem to have followed each other; and the whole appears to rest upon the testimony of Mr. Herbert, who wrote the letter on the subject which M. Buffon has inserted in his work on birds. *S*túrnus

Cínclus, though a shy bird, is to be found by streams on the moors of the north of England; and if you could induce any who have an opportunity to favour you with observations on its habits, so as either to confirm or contradict this supposed habit of walking on the bottom of streams, I think it would be useful. — *Thomas Thompson. Hull, Sept.* 9. 1828.

The Solitary Snipe. — The beak of the solitary snipe (fig. 34. p. 147.) is made as long as that of the woodcock and common snipe, if not longer, whereas it is invariably shorter. Having seen many hundreds of those birds abroad, I have almost always found their beaks to be about [the dimensions destroyed by the wafer] of an inch shorter than those of the woodcock or common snipe. — *Your constant Reader. June* 5. 1829.

Mountain Cock. — Has not J. M. made some confusion (Vol. I. p. 296.) in speaking of the birds which, at a particular season, form the immediate objects of the sportsman's attention. He mentions moorcock, ptarmigan, heathcock, and mountain-cock. If we except the Capucaila, or wood-grouse (*T*étrao Urogállus), which, I believe, has long been extinct in this island, I am not aware that there are more than three other indigenous species of grouse, viz. the blackgame, or heathcock (*T.* Tétrix); the red-game, or moorcock (*T.* scóticus), and the ptarmigan (*T. L*agòpus). It is not apparent, therefore, to what species the name of mountain-cock applies. Should it not be entirely omitted? — *B. Coventry, Sept.* 5. 1828.

Rállus aquáticus. — One complaint more, and I have done. In your figure of Rállus aquáticus (Vol. I. p. 289.), the bill is made straight at the apex, whereas it should have been slightly curved downwards. The bird also is in too erect a posture, and the figure entirely fails of expressing the character of the bird so admirably represented by Bewick. — *Id.*

Certain little Moths. — In the Magazine of Natural History (Vol. I. p. 295.), speaking of the appearance of certain little moths, the larvæ of which had been so destructive to the leaves of plants, J. M. says, "they prove to be the *P*halæ̀na *P*ýralis of Linnæus." I am at a loss to know what insect is meant by this. *P*ýralis is not the specific name of any Linnean species, but is employed by that naturalist to distinguish a family or subdivision of his genus *P*halæ̀na, under which he placed about eighteen species in his *Systèma Natùræ:* it is now adopted as a regular generic name for that particular family of moths. From J. M.'s account of the insects in question, I should suppose that they could not even belong to the genus *P*ýralis at all, but rather to that of Tórtrix or *T*ínea. — *Id.*

Tarsus of Chlànius vestìtus. — Sir, Having met with a curious formation in the tarsus of a specimen of Chlànius vestìtus, I send you the following account of it: — By the accompanying figure (*fig.* 86.) you will see that the fourth joint of the tarsus, instead of being straight, is bent, and has a projection from one side of the base, upon which is fixed what appears to be a supernumerary joint of a very different shape from the other joint, and having a depression in the middle, as if for the articulation of a terminal joint. This supernumerary joint was perfectly visible when the insect was in a fresh state. All the other legs of this insect were formed in the usual manner. The tarsus thus affected is the intermediate one on the left side. To some the noticing of so minute a fact as the above may appear ridiculous; but it must be considered that insects having a horny covering to their bodies, and casting their skin many times before coming to perfection, are less likely to be deformed than most other animals. I therefore consider a variation so great as the above worthy of observation. I remain, Sir, &c. — *Cacale. Cambridge, April* 10. 1829.

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Zoological Researches. — In noticing the first number of my *Zoological Researches and Illustrations*, p. 51., of your Second Volume, the manner in which your critique is worded seems likely to deprive me of the merit of the discovery I was fortunate enough to make of the metamorphosis in the Crustàcea: thus you state that I "had the satisfaction of witnessing the metamorphosis *first* described by the Dutch naturalist Slabber;" now if you will take the trouble of reperusing my first Memoir, p. 8, and of inspecting Slabber's two figures copied into my first plate (fig. 1. a and 1. b,) you will readily perceive that, allowing Slabber to have seen what he describes, it is, at most, a change from one form of a natatory crustaceous animal *into another natatory form* wholly unknown, except to Slabber himself, and is hence a change which could never authorise an idea of the Decápoda undergoing metamorphosis. As you may observe, I doubt altogether that Slabber witnessed my change, and shall shortly show what his fig. 1. b really is, this constituting one of the many discoveries I have more lately made. I should probably have published this in my next Number, but that I have a still more interesting memoir on the Cirrípedes prepared for it, which will develope mysteries still more unexpected and important than the discovery of the metamorphosis in the Decapodous Macroúra. — *J. V. Thomson. May* 21. 1829.

A singular Nidus. — I possess one of the same singular species of nidus as that mentioned by your correspondent (p. 104.). I, however, doubt its belonging to an aquatic insect, as mine was found by a friend (a botanist) in a hedge in a lane, and is attached to a small twig of the blackthorn. I have never met with it myself, although I am in the constant habit of exploring the country, at every season of the year, for insects and shells. — *Charles Blomen. Teignmouth, Devonshire, April,* 1829.

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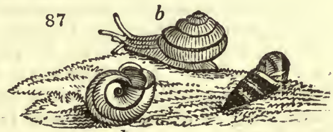

Bùlimus acùtus and Hèlix virgàta (fig. 40. p. 150.) were not distinguished in a part of our impression; the cut is therefore repeated (*fig.*87.); the snail (Hèlix virgàta) being marked *b*, and the Bùlimus *a*.

British Land and Fresh-water Shells.— Sir, I will thank you to make the following alterations in my paper on British Shells (Vol. I. p. 424.): —

After the observations on Lymnæ'a frágilis add, "Is this shell the immature L. stagnàlis, or a variety of it? I have specimens of a Lymnæ'a sent to me as the L. stagnàlis, agreeing with Montagu's figure 7. plate 16., which is referred to as a representation of L. frágilis. I find little difference in the descriptions and figures, except in size."

After those on Hèlix fúsca add, "The Hèlix subrufèscens of Fleming is only the young of this species, according to the observations of W. Bean, Esq., of Scarborough."

After those on H. carthusianélla add, "The specimens labelled H. carthusianélla in the Manchester Museum, however, are much less than either Draparnaud's figure or our English shell."

After those on H. rufèscens add, "Since writing the above, I have observed in the Manchester Museum this shell designated as the Hèlix córnea. I believe the label is in the handwriting of W. Swainson, Esq., but may have possibly been subsequently misplaced; for certainly our English shell differs very materially from the H. córnea of Draparnaud, to whose figure Lamarck refers." Yours, &c. — *Joseph Kenyon.*

Spinning Slugs (p. 69.). — It is long since this supposed species of slug has been described. On very many occasions have I observed the descent of the common grey and common green-bellied slug from trees and bushes, but without ever having reason to suspect that there was a distinct species, having the property of spinning a web. The fact is, that any small snail, in good health, can let itself down from almost any height to the ground, by the tenacity of the slime exuded retromissively from the pores of the belly. The same muscular motion of the belly, exerted on giving motion to this footless animal on the ground (and by which their slow and uniform progress is made), is also exercised in the air; adding thereby to the length of the suspending line till they reach the ground. Their descent in this manner is an accident, not a purpose, and the doubts of your valuable correspondent respecting them are, therefore, perfectly just and rational. — *M.*

The Fruit of the Artocárpus integrifòlia. — In the Magazine of Natural History (Vol. I. p. 274.), quoting from the *Botanical Magazine* for July, it is stated that the fruit of the entire-leaved bread-fruit (Artocárpus integrifòlia) is a pod or pericarp. Having seen and eaten the fruit in its native country, I rather suspect there is some error here. If the pine-apple (Bromèl*ia*), or the cones of the Scotch pine, can be called a pod, then the *Botanical Magazine* is correct. I very well remember having, in partaking of it, begun at the base, and pulling off, one after another, the subdivisions of the fruit. Each of these divisions contains a seed the size and shape of an almond, enclosed in a thin shell or membrane. The membrane is covered with a soft yellowish pulp, which is the eatable part. The centre of this aggregated fruit is occupied by a prolonged receptacle, to which all the subdivisions are fixed in the manner of a strobile, and the interstices are filled up by the eatable pulp. I never saw the seeds eaten in India; but I have no doubt they may be used like chestnuts. — *J. M.*

Fritillària tessellàta. — Your correspondent D. S. announces (Vol. I. p. 289.) that he saw "Fritillària tessellàta very abundant in some meadows near Harleston, Norfolk." I do not find any species of Fritillària in botanical works under that name, a name certainly not inapplicable to F. *m*eleàgris, which, I believe, is the only species indigenous to this country, and which is well represented by the plate annexed to p. 289., under the name of F. tessellàta. F. *m*eleàgris is a rare, or at least a very local, plant, but it occurs plentifully near Oxford both with purple and with white flowers, particularly in the meadows near Ifley, in Christ-Church Meadow, and most abundantly in Magdalen Meadow. — *W. T. Bree. Allesley Rectory.*

Our correspondent D. S. has adopted the name of R. A. Salisbury, in Gray's *Natural Arrangement of British Plants.* — *Cond.*

The Weather, the Winds, and falling Stars. — I am happy to find occasional remarks on meteorology in your Magazine. It is a study yet in its infancy, but, I doubt not, will, in common with the many branches of natural history your publication embraces, be greatly perfected by a collection of facts and observations. I know very little of the theory of this science, but I believe the direction of the wind, and, consequently, the weather, both with us as well as in the southern hemisphere, depend on the degree of heat between the tropics. With respect to judging of the weather, I know no better criterion than that which our Saviour has given us: "When it is evening ye say it will be fair weather, for the sky is red; and, in the morning, it will be foul weather to-day, for the sky is red and louring." Doubtless, this has been noticed by almost every one, as well as the two other observations, that the livid appearance of the sun's rays bears witness to the moist state of the atmosphere, and that if it sets in dense clouds which reach below the horizon, these clouds will assuredly come up with a westerly wind on the morrow, accompanied by rain. As to any indication of the direction the wind may assume, from the appearance of the higher clouds, I think many mistakes have arisen from not making sufficient allowance for the different currents of air in the atmosphere. I have no doubt but the direction of the current might be ascertained by these clouds; but this same current may never reach us at all below. I am apt, however, to draw an inference quite the contrary to Mr. J. Rennie (see his Observations on the Modification of Clouds called Wind Reels, Vol. I. p. 454.), for I have noticed the direction of the wind to lie commonly at right angles with the greatest diameter of the cloud; and this is borne out by the fact, that the clouds which arise successively in gales of wind, bringing with them heavy squalls and slight rain, assume a line which is at right angles with the wind. Neither do I allow the correctness of his remark, p. 456. (although it does not affect his argument in attempting to prove the influence of terrestrial magnetism), that " if the wind were the sole agent in determining their forms and positions, they ought always to stream in the direction of its current, as we see is uniformly the case in the analogous instance of smoke." This is doubtless the case when any vapour issues from an aperture, like smoke from a chimney; but it soon begins to assume the contrary form, and, when finally detached from its source, it takes a position with respect to the wind like the clouds before mentioned, as may be observed in the distance, after a steamer has passed, leaving a dark volume behind her.

There are two other observations I have made, which I would mention, although not immediately connected with the preceding remarks. The first is, that the meteors commonly called falling stars are so much lower between the tropics than with us, that I have frequently known them to pass close to the masts of a vessel, and, bursting with a noise like the firing of a pistol, emit a number of brilliant blue sparks. The second is, that in long calms at sea, which sometimes, in certain latitudes, are of several weeks' duration, the clouds appear heaped one on the other, like mountains of snow, all round the horizon; whilst, in the zenith, the clear blue sky is as unsullied by a cloud as the watery mirror below is by a wave. I remember once a bucket was thrown into the sea, and so perfect was the calm that, during three days, we were not separated from it a stone's cast; and actually, the third day, it struck against the very part of the ship whence it was thrown. — *W. H., R. N. Yeovil, April* 22, 1829.

Art. XI. *Biography.*

Memoir of the late John Templeton, Esq., forming part of the Anniversary Address delivered on the 24th of May, 1827, to the Belfast Natural History Society, by the Rev. Thomas D. Hincks, M.R.I.A. &c., President of that Society. Communicated by Dr. Drummond.

(*Concluded from* Vol. I. p. 406.)

In the year 1802, Mr. Templeton sent a new rose, which he had discovered in 1795 or 1796, in the neighbourhood of Belfast, and afterwards found in other parts of the north, to the Dublin Society, which he named *R*òsa hibérnica, but which was by many called the Templeton rose. This Society had offered a reward of 5 guineas for the discovery of new native plants, limiting the whole sum to 20 guineas. Mr. Templeton was of course adjudged this small sum, which has from some mistake been called 50*l.*, and spoken of as a liberal premium, by Sir J. E. Smith, in different publications where he had occasion to mention it. A similar prize was obtained by Dr. Scott, Professor of Botany to Trinity College, Dublin, and by Dr. Wade, Professor of Botany to the Dublin Society, for some new mosses; but, either from the fluctuation attendant on the proceedings of a body constituted like the Dublin Society, or from a supposition that the end of offering the reward was sufficiently attained by directing the attention of botanists to discovery, the premium was dropped after 1803. Had it been continued, Mr. Templeton would have had an opportunity of again claiming it, not only for the *O*robánche rùbra which he first discovered on Cave Hill in 1805, and which has since been found on basaltic rocks in other parts of the country and in Scotland, but also for a number of cryptogamic plants, which he communicated to such friends as were engaged in botanical pursuits. His application for the premium for his rose, opened a correspondence with General Vallancey, one of the vice-presidents, and for many years the most active manager of the Dublin Society. In the published letter, after the description of the rose, there are some remarks on specimens of wood he had sent to the General, particularly the locust tree of North America, and the chestnut. In other letters he gave the General accounts of antiquities in the north, especially of the Giant's Ring, which he measured for him. Of Gen. Vallancey Mr. Templeton appears to have had a high opinion; and the intercourse I had with the General during many years, and the kind attention I experienced from him, whilst acting for the Cork Institution, enable me to say that this opinion was well founded. Those who only knew the General as an antiquary, were apt to ridicule what they regarded as extravagant in his opinions; but whatever errors any may suppose him to have fallen into on this subject, he was a well-informed and amiable man, anxious to promote the advancement of knowledge, and politely attentive, at the Society, to every person engaged in the pursuit of it.

In 1804, Dawson Turner, Esq., of Yarmouth, published *Muscològiæ Hibérnicæ Spicilègium,* in which he acknowledges his obligations to Mr. Templeton, in conjunction with Drs. Scott and Stokes. Of the former, Mr. Turner says that he has investigated the north of Ireland with indefatigable labour (labore improbo indagavit), characterising it as a country mountainous and rich in the productions of nature. He also intimated, that from Mr. Templeton a Flòra Hibérnica was to be expected. In the same year, Dr. Wade published his *Plántæ rarìores in Hibérnia invéntæ;* and in the preface, speaking of a Flòra Hibérnica, observes: "I am well aware that there are some genuine and valuable materials for such a Flora in the hands of a gentleman in the northern part of this kingdom,—a person every way qualified from industry, information, and acuteness, for such an undertaking; and it is much to be lamented he does not gratify the botanical world with the result of his researches." This work he sent to Mr. Templeton, as a mark of "respect for his botanical abilities and private worth." I do not find, however, that an intimacy ever took place between these gentlemen, though nothing is so apt to lead to friendly intercourse as a real attachment to the same pursuits. Several botanists, about this time, urged Mr. Templeton to prosecute the work alluded to; and from a letter to Mr. Brown, before mentioned, then quartered with his regiment at Derby, it appears that he seriously engaged in it; but his diffidence, and his desire of rendering the work perfect, still delayed the publication. It may here be mentioned, that Mr. Templeton was a frequent contributor to the *English Botany* published by Sir J. E. Smith and Mr. Sowerby, to the *Fùci* published by Mr. Dawson Turner, to the *Conférvæ* of Mr. Dillwyn, and to the *Muscològia* of his friends Drs. Hooker and Taylor. He also furnished many remarks on the cultivation of plants to Professor Martyn, for his folio edition of *Miller's Dictionary,* and to the Rev. Messrs. Dubourdieu and Sampson for their *County Reports,* though much was admitted in these which his better judgment would have disapproved, and which was afterwards the subject of severe but just censure. To *English Botany* he sent, besides the *R*òsa hibérnica and *O*robánche rùbra, Funària Templetòn*ia*, *C*onférva paradóxa, and Jungermánn*ia* gracíllima, original discoveries of his own; and twenty other plants found in Ireland, all cryptogamic except the *E*uphórb*ia* hibérnica. But Mr. Templeton did not confine his attention to botany. Skilled, like Linnæus, in the various departments of natural history, his comprehensive mind planned, what he was peculiarly well qualified to execute, a general natural history of Ireland. His preparations for this work were considerable, and he continued to labour at it to the last, being withheld from publication by his desire to render it complete. Though never instructed in the art of drawing, he acquired such skill in representing the various objects he saw, that his delineations are remarkable for their fidelity; and his anxiety to impart knowledge made him particularly attentive to whatever would tend to illustrate the subject. He has left behind him lists, in each department, of the native productions which came within his knowledge, with references and original remarks, and often illustrated by drawings made by himself from the object, which he often gratified his friends, and even strangers, with liberty to examine. It will naturally be expected that some of these should be more full than others. Ornithology was, I believe, the first object to which Mr. Templeton paid attention, and whilst no department has been neglected, this is peculiarly rich and interesting.

The author of an address to the managers of our Belfast Institution, on the cultivation of natural history, after speaking of Mr. Templeton as a botanist, adds: "As none of the branches of natural history has escaped his penetrating research, much of the natural history of our island has received elucidation from his pen; and very many of its natural productions have been beautifully delineated by his spirited and able pencil. His labours would form a most valuable present to the public."

His reason for drawing so many figures was, the having observed so few correctly given in published works.

Natural science will, indeed, sustain a heavy loss, should these accumulations of his genius and industry be withheld from the public; but his son may be reasonably expected to accomplish his father's design; and though these valuable remains will want that finish which, had life been spared, the author was himself so well qualified to give, yet they were so much advanced, that there seems no objection to their publication. As this, however, will be attended with heavy expense, it may be hoped that those who respected the author while living, as well as those who are interested in the pursuit of natural history, will give it all the countenance in their power, and that the publication will take place as early as possible. When, in 1808, the *Belfast Magazine* was undertaken, Mr. Templeton supplied it with two monthly articles, entitled, the Naturalist's Report, and the Meteorological Report, nearly as long as the work was continued, besides occasional articles. The object of the former appears to have been, to notice such circumstances as would serve to denote changes of weather, &c., for the use of the husbandman and the gardener. In the introduction, after pointing out the modes which the ancients had of foretelling changes in weather, he proceeds thus: "But the celebrated Linnæus was the first who endeavoured to establish a calendar for the husbandman and the gardener, independent of astronomical signs, which, in our northern and variable climate, seldom prognosticate the changes of the weather with such certainty as might be expected. As plants, however, vegetate according to the temperature which prevails, and flowers blow in a regular and never varying order, we have certain means, which can never fail, for directing us when to begin and leave off the various operations in husbandry and gardening. Should we, therefore, find, after a few years' experience, that the best crops were uniformly produced when we sowed or planted at the time a particular tree or plant flowered, we have ever a sure guide, independent of astronomical revolutions, and can direct others to pursue the same plan in whatever country they are placed. Thus if we have found, that, on sowing peas or other seed when the gooseberry flowered, they were ready for gathering when the corn-marigold flowered, we are pretty sure that each succeeding year the same uniformity will prevail, and by a little attention, the times of gathering other crops will soon be known; a matter of considerable importance to all who wish to enjoy the products of their garden in succession. Advantages nearly similar may be derived from attention to the migration of birds. These never fail to bring us the earliest intelligence of whatever changes in the weather we are to expect. When the woodcock, fieldfare, and other winter birds of passage, appear unusually soon, and in uncommon numbers, we have every reason to expect a severe winter; and when wildgeese and swans pass to the southward, we know that the season, being severe, and the waters frozen northward, a change of the wind towards that quarter will be accompanied by similar weather. We should accordingly provide ourselves with shelter, food, and suitable raiment; and the attentive gardener, protection for his tender plants. But when the swift appears, let him turn out the inhabitants of his green-house. By attention to insects, independently of receiving notice of an approaching plenty or scarcity of fish, we may often guard against their destructive effects. Thus may man, by the study of nature, gain new powers, triumph over obstacles which present themselves on every side, and, by means placed by the Deity within his reach, acquire foreknowledge."

Such a report, continued, as it was, for many years, must afford valuable data; and I cannot but think that the collection of them in a separate publication, with such addition as his papers would supply, would be very useful. In the introduction to the meteorological report, he notices what has been done, and especially the tables compiled by our late estimable countryman, Richard Kirwan, Esq., by which the temperature may be calculated for agricultural or horticultural purposes; but observes, "that the husbandman is yet at a loss to know what dependence should be placed on the flitting clouds, whether his hay, when exposed to dry, will meet the long wished-for sunshine." Hoping that at some future day a genius will arise, who will arrange and give to the world a system which shall tend to remove that uncertainty, "we will endeavour," he says, "to present a series of well authenticated observations, which may assist him to complete so desirable an undertaking." Mr. Templeton was admirably fitted for supplying such articles as have been mentioned, because his eyes were always open, and his observation ever keen. Nothing curious escaped his attention; and his journal, regularly kept and preserved from the year 1806 to his last illness, contains a great variety of information, which would supply an interesting work of the same nature as that of Mr. White of Selborne, whom, in some respects, he much resembled. Ever ready to communicate what he knew, he supplied the late Mr. Wakefield with many anecdotes respecting the instinct of animals, and those cases in which they appear to have powers superior to instinct, and there are probably many others occurring in these books. In a cursory perusal of one of them, I met one respecting a gander, which he observed searching for and raising carrots. The gander removed the earth around the root with his bill, which, on becoming clotted with earth, he shook until cleared; and when he had bared the root sufficiently to get a firm hold of it with his bill, he then, with sometimes considerable exertion, pulled it entirely out. I may here, perhaps, recall to your notice some lines of my friend, the Rev. Dr. Drummond, in his poem on the Giants' Causeway. Speaking of the instinct which directs the eel and the salmon, he adds, —

> " Unfold it, then, O Templeton, whose view
> Has roved creation's peopled regions through;
> Thou, who canst speak of all the flowers of spring,
> Of fish of every fin, and birds of every wing;
> Tell, for thou know'st, how Nature has assign'd
> Their times and senses to each tribe and kind;
> And how her laws direct, propel, control,
> So wondrous wise, th' instinctive power of soul.

Mr. Templeton was not a great traveller, but he was well acquainted with Ulster. During the time he spent with Lord Clanbrassil, at Bryansford, he explored the Mourne Mountains, which he afterwards visited with his friends, Dr. Stokes, Fellow of Dublin College, and Mr. J. T. Mackay, the able superintendant of the Dublin College Botanic Garden, whose enthusiasm in the pursuit of botanical knowledge made him a great favourite with our deceased friend. He went frequently to the Giants' Causeway, and has left very interesting details of, at least, two of his excursions to it, which would together perhaps give a more satisfactory account of the coast of Antrim than has yet been laid before the public. He also went over most of Ulster, and as far west as Sligo. He examined the interesting regions of the Wicklow mountains and valleys, but was never in the west or south of Ireland, though he often projected expeditions to both. He made a short tour through some interesting parts of Scotland, in company with the late General M'Kinnon, to whom he was much attached, but does not appear to have made any dicovery in that country. Like Linnæus in general knowledge and in enthusiastic attachment to science, Mr. Templeton differed much from him in one respect; for whilst the great Swedish naturalist was remarkable for vain and ostentatious display, he was very modest and unassuming, so that no person who chanced to meet him would ever have suspected that he was distinguished for knowledge; till, in course of time, his communicative disposition would have discovered the treasures of his mind. The high estimation in which he was held by other eminent botanists is evident from the manner in which they speak of him. By Sir J.E. Smith, Pres. Lin. Soc., of which Mr. Templeton was an associate, he is frequently mentioned, and is spoken of as a most acute and observing botanist. Other instances have been already quoted, and the letters in his correspondence would supply more. In addition to the naturalists already mentioned, he corresponded with the Rev. Dr. Fleming, author of a valuable work on the Philosophy of Zoology; Dr. Berger, the mineralogist, Drs. Ogilby and Kennedy, two young physicians, who promised to render important services to natural history had their lives been spared; Dr. Barker, the Professor of Chemistry in Dublin College, and many others.

I have already pointed out Mr. Templeton as deserving of imitation by naturalists on account of his humanity and tenderness; I would also direct your attention to his candour, and his anxiety to do justice to the claims of others. Whilst no one was more alive to the pleasure of discovery, he disdained to rob any man of his due praise. He took delight in speaking of the acquisitions made by others, and was always ready to communicate his own. He was also free from the faults, which Cowper has so well exposed, of attributing events to second causes, without referring to the Great First Cause. Many instances of this occur in his writings. Thus, in one of the Naturalist's Reports, he says, "To mortal man it is not given to lift the veil which conceals the mysteries of nature, and even after the most careful investigation, he beholds, but in part only, that economy which governs the whole. Our winter birds of passage begin now to leave us, to revisit the northern regions, and amidst the wilds of Lapland, Nova Zembla, and the innumerable lakes within the arctic circle, to enjoy that peace and security denied them in the more populous countries of the south. But by what peculiar sensations they are enabled to hold their unerring course through the pathless air, amidst darkness and storms, the human mind has not been able to conceive, and man is led to look with humility

'From nature up to nature's God.'"

In another report, after noticing a number of striking circumstances, he concludes thus: "Such and so various are the phenomena of the creation, that we are led to exclaim, 'Great is our God, and great is his power; and his wisdom is unsearchable!'"

Reflections of this kind are found in his manuscripts, and in this he deserves our imitation. I shall mention only one other trait in his character,—an anxious desire to promote the diffusion of knowledge. He was an early member, though not one of the first, of the Belfast Society for promoting Knowledge. This was founded in the year 1788, and he was admitted in the year 1792, from which time he continued ever anxious for the prosperity of that society. He was also one of the earliest friends and steady supporters of the Belfast Academical Institution, being appointed a visitor by the act of incorporation. He was the proposer of the liberal grant made by the proprietors of the Linen Hall to establish lectures on chemistry and mechanics; and when lately the Mechanics' Institute was commenced, being prevented by illness from attending, he sent his thoughts on the subject in writing, and was most solicitous for the success of the measure. Of our own Society, though from bad health unable to attend our meetings, he was a zealous advocate, and received much gratification from the thought that the branch of science to which he had so ardently devoted himself, was cultivated in his own native town, and that he left behind him those who would value his labours. May his example animate your exertions, and may the name of Templeton be ever remembered with respect by the members of this Society! And, that our young members may be familiar with it, and led to enquire about him, I would suggest the appropriation of such a sum annually, as our limited income will admit, for the encouragement of exertion in Natural History, to be called the Templetonian prize or medal, according to the plan you may adopt, if the suggestion be approved of. Such prizes are often useful in inciting the youthful mind to exertion, and such encouragement of natural history may lead the young to avail themselves more than they have yet done of the opportunities afforded them for the cultivation of it.

Art. XII. *Obituary.*

Died, on the 23d of May, at Bayswater, aged 59, *Mr. George Caley.* This very remarkable person was born and educated in Craven, in Yorkshire, in an humble station of life; and seems to have contracted an early predilection for natural history, by coming in contact with those excellent practical botanists who do so much honour to their calling in the town of Manchester. His attention was first directed to indigenous plants, and few persons were better acquainted with them. His father's business, which was that of a small farmer and horse-dealer, frequently called him into remoter parts of the country, and gave him a large acquaintance with English localities. No person who has not conversed with some one belonging to the Manchester school of botanists, can have any conception of the ardour and devotedness with which the discovery and cultivation of the rarer species is pursued: they live in a little world of their own, are remarkable for their sobriety and industry, and derive many advantages from that sectarian spirit which, separating the few upon some distinct ground from the many, obliges them to uphold each other, and magnifies the importance of the object that associates them. Every hill and plain within a day's walk (and that none of the shortest) of Manchester has been examined by them with microscopical diligence; and Mr. Caley, the subject of this brief memoir, was not the person to sink the temperature of their zeal in a subject which wholly engrossed him; and, if he received from them some increase of ardour in the first instance, it cannot be doubted but that he transmitted it to them, in return, with redoubled intensity. His pursuits soon brought him acquainted with Dr. Hull and Dr. Withering; and the works of these botanists frequently make mention of him. What was the link of his acquaintance with that munificent patron of science, Sir Joseph Banks, does not appear; but, about the year 1800, he was sent out by him as a collector to New South Wales, and supported there for ten years at his expense. We have heard that he fairly got his appointment by dint of importunity; but knowing as we do the excessive modesty of the man, we can only account for this by the habitual intensity with which he regarded his object, which sank all the intermediate steps as unimportant so that he could but attain to the grand one. Certainly, no man was better adapted for such an undertaking: he possessed a robust constitution, was a stranger to silken ease, and had the power of endurance and of suffering privation to a great degree. He knew how to conciliate the natives by an easy and jocular familiarity, and afforded, at all times, to his companions, a fine example of perseverance. We have heard him say, his spirits never yielded when he had to lead a party through the woods, though they had frequently done so when he was led by others; but these were only his physical qualifications. He had acquired practically an extensive knowledge of plants; and, although but slenderly educated, had made himself sufficiently master of Latin to enable him to make use of such books as were put into his hands. His power of observation was unusually strong, and he seized hold, as if by instinct, of the peculiarities of every thing. He made great accessions to botany and zoology during his residence in this remote quarter of the globe, and was an extremely good preserver of specimens. It was his good fortune to be in the country when Mr. Brown and Mr. Bauer visited it; and the former gentleman, by whom he was highly esteemed, has done honour to his intelligence, by naming after him a fine orchideous genus, Cale*ána.* He calls him "botanicus peritus et accuratus." * He was brought home as an evidence on behalf of Governor Bligh, loading himself with a great store of specimens of plants, and a fine collection of the birds and quadrupeds of New Holland, which was purchased by the Linnean Society. Some account is given of part of it in the 15th volume of the *Linnean Transactions*, where Mr. Caley's merits are attested in every page. Having some claims to settle with the Treasury, on account of his expenses home, it was on this occasion, we believe, that, upon being tendered his expenses to return, he utterly astonished the clerks, who seem not to have been familiar with such instances of ingenuous honesty, by refusing to accept the money, saying it was not his intention to return, and he could not think of taking what was not his due; he asked, however, something which he conceived was his due, but this was refused.

After remaining at home for a few years, he was sent out by the government as the successor of Dr. Anderson, in the superintendence of the botanical garden at St. Vincent's. Here his quick sense of honour would not permit him to continue to incur expenses which he considered unnecessary, and he reduced the establishment so as to save the Treasury some hundreds a year. He involved himself, too, in some litigation to recover a piece of ground which belonged to the garden, in which he succeeded. Poor Caley, however, got no thanks in the island, nor at home, for his unnecessary fidelity; but, after residing there for about eleven years, the establishment was wholly broken up, and he returned to England. For some years past, he resided in seclusion at Bayswater, supported by the scanty pittance he had saved while at St. Vincent's; and, although his income scarcely exceeded that of a day-labourer, he contrived to pick up several hundred volumes at a cheap rate, chiefly of botanical works and voyages, which would have done credit to more ample means. Indeed, the buying of books almost

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* "A skilful and accurate botanist."

amounted to a passion; and it is quite surprising how a man with his slender means could amass such a library, and yet discharge every debt he had in the world: indeed, reading now became his only solace. The accounts of voyages and travels enabled him to fight his own battles over again; and he could always, he used to say, identify himself with his hero in his dilemmas. He knew what it was to be hungered and athirst, to be drenched and to be naked, and to spend day after day face to face with death. Yet, after all, it was the mode of life he delighted in; and, if he had had his will, he would have returned to be a child of the woods again. Though a matter-of-fact man, he was not without imagination, as his modes of expression would often testify. His residence in the West Indies had materially impaired his constitution; and he attributed the complaint which was the cause of his death to an accident he had sustained there. It was a long time before his friends could induce him to call in medical assistance; and he had, perhaps, relied too much on his own judgment in treating a disease which baffled the skill of his very friendly physician. For six long months he suffered under most excruciating pain, yet he bore it with exemplary fortitude; and, instead of seeking relief by dilating upon his own unhappy condition, he took every opportunity to turn to topics in which he knew his friendly visitors took a deep interest with himself; and absolutely, while bedridden, and unable to move himself, set about to correct the errors respecting certain English plants. It may be worth while to record one of them as a memento of this extraordinary person. In one of his walks around Ingleborough, he had gathered in abundance a *H*ieràcium entirely new to him. He showed it to Dr. Withering, who knew nothing of it, and it was agreed to refer it to Mr. Dickson. It was pronounced, very hesitatingly, by " Jemmy," as this lynx-eyed botanist was called among his familiars, to be *H.* villòsum, and it was so published in the 3d edition of Dr. Withering; yet Mr. Caley stated that Dickson had very slender ground for his opinion; and that he was wrong, was shown by the plant turning out to be something else in the following season. As far, therefore, as Withering is concerned, *H*ieràcium villòsum must be excluded from the British Flora.

Although he cheated pain by these little diversions, his strength gradually failed. He felt, and often repeated, that he knew he should die; and he requested the writer of this to assist him in arranging his little worldly affairs. His first desire was to provide for one who had faithfully attended upon him in his sickness; and his second was to repair, all he could, the injury he thought he had done to a poor bird which he had caught in the woods of New Holland, and had deprived of liberty for twenty years. He therefore charges certain persons, who were to be benefited by his property, with the care of his cockatoo. He then bequeaths his freedom to a negro he possessed in the West Indies; and lastly, gives the residue to his nearest relations.* These are slight traits of character, but they mark a nobleness of mind which will for ever distinguish the possessor from the common herd of mankind. If poor Caley had had only the pocket of a beggar, he would have acted with the honour of a prince.

His strength now declined daily, and this declension was succeeded by an abatement of his pain; until at length he was unable to converse, and death came as a welcome messenger to release him from life. He lies buried in the burial-ground belonging to St. George's, Hanover Square, near Connaught Place, with another New Holland traveller, Captain Flinders. — ☞

* He had been married in 1816; but his wife was dead, and he left no children.

THE MAGAZINE

OF

NATURAL HISTORY.

SEPTEMBER, 1829.

Art. I. *Some Account of the Life, Genius, and Personal Habits of the late Thomas Bewick, the celebrated Artist and Engraver on Wood.* By his Friend John F. M. Dovaston, Esq. A.M., of Westfelton, near Shrewsbury.

> "The social, friendly, honest man,
> Whoe'er he be,
> 'Tis he fulfils great Nature's plan,
> And none but he." Burns.

Sir,

The brief and desultory remarks I am about to incorporate amid the congenial pages of your Magazine of Natural History, arise from a fond and fertile memory of much conversation, and a long and frequent correspondence, with my excellent and beloved friend. Thomas Bewick, the celebrated xylographer and illustrator of nature, was born at Cherryburne, in the parish of Ovingham, Northumberland, August 12. 1753. His father, John Bewick, was a collier at Mickley Bank; and Thomas, with his brothers, was early immured in that subterranean, laborious, and loathsome employment. I have heard him say that the remotest recollection of his powerful and tenacious memory was that of lying for hours on his side between dismal strata of coal, by a glimmering and dirty candle, plying the pick with his little hands; those hands afterwards destined to elevate the arts, illustrate nature, and promulgate her truths, to the delight and instruction of the moral and intellectual world. He was, however, occasionally sent to school, to the Rev. Christopher Gregson, minister of Ovingham; where, he says, he was treated with considerable severity, but (as he added, with his constant good-humour, and in his athletic dialect) "I sairly desarved it, for I ware a muckle wild young dog." He always spoke with the deepest gratitude of his master, and, before his death, had the satisfaction of engraving his portrait, which, with those of some of his friends, will hereafter embellish a somewhat voluminous memoir of himself, which he amused his latter years in faithfully and copiously composing. He was frequently sent out among the braes of Tyneside to cut birch rods; and on one of these occasions, being ordered to cut one for himself, he lugged into the school the most ponderous birch bough he could cut, entirely divested of its twigs. In these truant hours of sunshine, he would loiter along the river banks, watching the sand-martens, hovering like butterflies about the precipitous promontories, or the spreckled trout sporting among the flies that streaked the dimpling waters beneath; and in these delicious moments, Nature was busy depositing in his fine and fertile mind those seeds that have since produced such a plenitude of rich blossoms and wholesome fruits to the healthy appetite of taste. His first tendency to drawing was noticed by his chalking the floors and grave-stones with all manner of fantastic figures, and by sketching the outline of any known character of the village, dogs, or horses, which were instantly recognised as faithful portraits. The halfpence he got were always laid out in chalk or coarse pencils; with which, when taken to church, he scrawled over the ledges of the bench with ludicrous caricatures of the parson, clerk, and the more prominent of the congregation. These boards are now in the possession of the Duke of Northumberland, by whom they were replaced; and when his chalk was exhausted, he resorted to a pin or a nail as a substitute. In his *Memoir*, of which I have heard him read a large, thick, closely-written quarto, he relates, with playful spirit, many anecdotes of his juvenile frolics. The church of Ovingham, like most others, in the peaceful simplicity and good-will of our ancestors, ere aristocratic pride had encroached on charity, was not parted into proud pews, but set out in plain and parallel benches, like those of the friendly Quakers, where rich and poor sat, clean and kindly, side by side, in honest and inostentatious gratitude to their common Creator. During service-time, which was tediously wearisome to the active mind of young Bewick, it was one of his tricks to crawl under these benches, and tickle the feet and neat ancles of the young women. One, a more ticklish and winsome lass, on being so handled, jumped up, exclaiming loudly to the parson, "Oh! Sir, *guide* (punish) Thomas Bewick:" upon which she got the young wag tickled with a smart flogging. This lass, whose name was Elliot, he afterwards married. In consequence of this propensity to drawing, some liberal people, of whom, he says, there are many in Newcastle, got him bound apprentice to a Mr. Bielby, an engraver on copper and brass. During this period he walked most Sundays to Ovingham (ten miles), to see his parents; and, if the Tyne was low, crossed it on stilts; but, if high-flowing, hollaed across to enquire their health, and returned. This infant genius (but it was the infant Hercules struggling with the snakes) was bound down by his master to cut clock-faces and door-knockers — ay, clock-faces and door-knockers! — and he actually showed me several in the streets of Newcastle he had cut.

At this time he was employed by Bielby to cut on wood the blocks for Dr. Hutton's great work on *Mensuration*. Hutton was then a schoolmaster at Newcastle (1770). Still his restless enthusiasm for Nature stirred within him; and on his master's "*licking*" him, he one morning gave them all "leg-bail," and marched off, as he intended, for Scotland; but, from his ignorance of the way, he walked to Carlisle, and perambulated the bold, rich, and lovely scenery of Cumberland and Westmoreland, as he says, to his utter amazement and rapture. Having here somewhat slaked his prodigious thirst for Nature, he struck off for Scotland, and for many weeks wandered among the nearer Hebrides and Highlands, living on milk, bannocks, and kebbuck; which, like poor Goldsmith (whom his father once sheltered in his cottage), he repaid the hospitable Highlanders for with his flute. When, on his return, he came to Jedburgh, his heart began to fail, and the walk from thence to his master's bench was the heaviest of all the hundreds of miles he had tramped. I have repeatedly heard him speak of this wild excursion with the most rapturous animation; and, no doubt, it was among that awful, amazing, and stupendous scenery, those seeds of genius vigorously germinated and took most tenacious root, whose branches were strengthened by the subsequent storms of life, and whose luxuriant foliage basked to the latest evening in the sunshine of prosperity, amid the well-earned radiation of success. Happy old man! the means by which thou hast provided for and educated thy amiable family, have been gained by works that delight and instruct millions, and thy example shows the ardent fidelity of thy heart; this fixed thy confidence in thy Creator, and confirmed thy lively hopes of His everlasting reward.

After his apprenticeship, he worked a short time for a person in Hatton Garden; but he disliked London extremely, still panting for his native home, to whose braes and bonny banks he joyously returned; where he was occupied in cutting figures and ornaments for books; and now received his first prize from the Society of Arts for the "Old Hound," in an edition of Gay's *Fables.* A glance at this cut will show what a low state wood-engraving was at, when a public society deemed it worthy a reward; yet even in this are as readily visible some lines and touches of the future great master of this delicious art. He never omitted visiting itinerant caravans of animals, from whose living looks and attitudes he made spirited drawings. This led to his *History of Quadrupeds*, 1790; the first block, however, of which, he cut the very day of his father's death, Nov. 15. 1785. From this work he obtained very considerable celebrity; which led him shortly to draw and engrave the wild bull at Chillingham, Lord Tankerville's, the largest of all his wood-cuts, impressions of which have actually been sold at twenty guineas each; and also the zebra, elephant, lion, and tiger, for Pidcock (Exeter Change), copies whereof are now extremely scarce and valuable. He also executed some curious works on copper, to illustrate a *Tour through Lapland*, by Matthew Consett, Esq.; and his *Quadrupeds* having passed through seven editions, his fame was widely and well established. The famous typographer, Bulmer, of the Shakspeare Press (a native of Newcastle), now employed John Bewick, who, at the age of fourteen, had also been apprenticed to Bielby, in cooperation with his brother Thomas, to embellish a splendid edition of Goldsmith's *Deserted Village* and *Hermit*, Parnell's *Poems*, and Somerville's *Chace.* The designs and execution of these were so admirable and ingenious, that the late king, George III., doubted their being worked on wood, and requested a sight of the blocks, at which he was equally delighted and astonished. It is deeply to be lamented we have so few specimens of the talents of John Bewick, who died of a pulmonary complaint, 1795, at the early age of thirty-five.

I now, in this hasty, feeble, and divaricated biographical sketch, approach the great and favourite work of my admired friend, *The History of British Birds.* The first volume of this all-delighting work was published in 1797, jointly by Bielby and Bewick, but was afterwards continued by Bewick alone, some disputes having arisen, which I need not rekindle here, being determined not to make, as I am deeply grieved to see, your pages, Sir, a vehicle for the records of altercation. This beautiful, accurate, animated, and (I may really add) wonderful production, having passed through six editions, each of very numerous impressions, is now universally known and admired. Open the work where ye will, only look at the bird, his attitude, his eye, — is he not alive? I actually and ardently aver that I have gazed till I have readily imagined motion, ay, colour! Look at the blackbird; is he not just about to stoop for his hurried evening bustle of alarm? do ye not (in the still and fine ear of imagination, your mind's ear) keenly catch his rapid *clink*, *clink*, *clink?* See the alert wren, with cocked tail, just a-stoop for another flurring flight, still wriggling, all a-song, with her *kiss*, *kiss*, *kiss*, *churee*, *kiss*, *kiss*. Look at the clean, peeping, gliding, willow-wren, about to pick an insect amid the green silk leaves, with her few and feeble liquid notes. An the water ouzel have not a brown umber cast on his back, I'm a pepper-corn, yea, a brewer's horse. Do, now, repose your eye on the kingfisher; an he be not alternately green and blue, there's no purchase in money. Wonder (for, in honest sooth, ye well may) at the mothiness of the owls, the sleekness of the falcons, the plumpness of the ducks, the neatness of the larks and *M*otacíllæ. Each bird, too, has his character most physiognomically marked. The honest inoffensive ringdove; the work-jobbing nuthatch; the poet blackcap; the parson crow; the gay-crested silken counsellor chatterer; and the cunning, rogue-attorney magpie; though I am sorry to libel the poor birds. The moral habits of each are as distinctly marked as had he painted portraits of individuals for Lavater. Had he done no more than *draw* the outlines of these figures on paper, it would have ranked him among the most happy of draughtsmen; but to have transferred these to wood, in the finest lines of black and white, to have given light, shade, and almost relief, is beyond all praise, but that of the silent and admiring mind and heart.

The first time I had a *personal* interview with my venerable friend was at Newcastle upon Tyne, on Wednesday, Oct. 1. 1823, after perambulating the romantic regions of Cumberland and Westmoreland, with my friend, John E. Bowman, Esq. F.L.S. We had been told that he retired from his work-bench on evenings to the "Blue Bell on the side," for the purpose of reading the news. To this place we repaired, and readily found ourselves in the presence of the great man. For my part, so warm was my enthusiasm, that I could have rushed into his arms, as into those of a parent or benefactor. He was sitting by the fire in a large elbow-chair, smoking. He received us most kindly, and in a very few minutes we felt as old friends. He appeared a very large athletic man, then in his seventy-first year, with thick, bushy, black hair, retaining his sight so completely as to read aloud rapidly the smallest type of a newspaper. He was dressed in very plain brown clothes, but of good quality, with large flaps to his waistcoat, grey woollen stockings, and large buckles. In his under-lip he had a prodigious large quid of tobacco, and he leaned on a very thick oaken cudgel, which, I afterwards learned, he cut in the woods of Hawthornden. His broad, bright, and benevolent countenance at one glance bespoke powerful intellect and unbounded good-will, with a very visible sparkle of merry wit. The discourse at first turned on politics (for the paper was in his hand), on which he at once openly avowed himself a warm whig, but clearly without the slightest wish to provoke opposition. I at length succeeded in turning the conversation into the fields of natural history, but not till after he had scattered forth a profusion of the most humorous anecdotes, that would baffle the most retentive memory to enumerate, and defy the most witty to depict. I succeeded by mentioning an error in one of his works; for which, when I had convinced him, he thanked me, and took the path in conversation we wished. In many instances, I must remark, though frequently succeeding to the broadest humour, his countenance and conversation assumed and emitted flashes and features of absolutely the highest sublimity; indeed, to an excitement of awful amazement, particularly when speaking on the works of the Deity. I turned to and whispered Bowman, that in Bewick's face was legibly written, "Glory to God in the highest, on earth peace, and good-will towards men."

Thus far, Sir, have I complied with your request, by throwing off the first portion of my sketch, wherein I have been confined to minute reminiscences; to which, indeed, the daily occupation of men of his genius and retirement usually confines its even tenour. But who, when feasting on his multifarious facts and fancies, owns not a curiosity in the mere cut of his coat, or the turn of his lip? What part of biographical history is more eagerly quaffed than the trifles recorded by Drummond and Ben Jonson of the convivial conversation and gentle manners of Shakspeare? A poet so matchless has imparted value to a mulberry tobacco-stopper and a crab-tree snuff-box. Surely, then, may some interest be excited by familiar anecdotes of an artist so absolutely inimitable, and who, in the best and purest sense, has been called a painter; for that glorious art consists no more in colour and contrast, than does poetry in rhyme and metre, but both alike in fertility of imagination, fidelity of apprehension, and felicity of expression. All else that possesses them merely is "such stuff as madmen tongue, but brain not."

I am equally aware of the disadvantage to *myself* in dividing my narrative, and to *you* of swelling your book with too heavy an article. I shall, however, proceed with pleasure to my next portion in due time, hoping (which is my sole and cordial motive) through your vehicle, by somewhat extending his honest fame, to promote the interests of his honoured offspring (for his blocks are in their hands, and cannot be copied), whose friendship, I trust, through life will be inseparable with that of

JOHN F. M. DOVASTON

Westfelton, near Shrewsbury,
August 12. 1829.

ART. II. *A Dissertation on the Ancient Hebrew Names of Animals.* By Mr. ARCHIBALD GORRIE, Annat Gardens, Perthshire.

Sir,

To those acquainted with Hebrew literature, it is well known, that nouns, in that primitive language, are generally expressive of some real or supposed quality in the object; thus

אדם *Adam*, man, from דמה *deme*, likeness, or similitude. See *Genesis*, i. 26.

ארי *Ari*, a lion, from the verb ארה *are*, to pluck or tear off; the manner in which the lion tears its prey.

גמל *Gemel*, a camel from גמל *gemel*, retribution; the animal's revengeful temper. (*Bochart*, vol. ii. p. 75.)

סוס *Shush*, the horse, from שש *ses*, to be brisk, active, sprightly. (Parkhurst's *Heb. Lex.*, שש.)

בקר *Beker*, a herd of bulls and cows, from בקר *beker*, to look steadily; from the attentive or steady manner in which cattle survey objects, whence Homer's epithet, applied to Juno, *βοῶπις*, ox-eyed.

ארנבת *Arnbet*, from ארה *are*, to crop, and ניב *nib*, the produce of the ground. Bochart says that hares have at different times desolated the islands Leros, Astypalæa, and Carpathus. (See his works, vol. ii. p. 63. and p. 995.)

חלד *Heled*, the weasel, from חלד *heled*, to creep in. (Park. *Heb. Lex.*, חלד.)

Although the English translation of the bible may be sufficiently correct, as far as regards the names of domesticated animals which have acquired a degree of notoriety, by being made subservient to the use of man, or the names of beasts of prey which were objects of universal terror; yet the native birds of Palestine do not excite so general interest, and hence the many different opinions entertained by writers on that subject. The translators of the authorised English version of the bible seem to have paid much attention to the well known fact, that birds, as well as other living creatures, were named from something connected with their habits, call, or appearance; thus

נשר *Neser*, an eagle, from the verb נשר *neser*, to tear.

פרס *Peresh*, the ossifrage, a species of eagle which, it is said, not only tears the flesh, but also breaks and swallows the bones; from פרס *peresh*, to break. (See *Bochart*, vol. iii. p. 186.)

עזניה *Oznie*. In the English translation of our bible it is translated osprey. (*Lev.*, xi. 13.) Parkhurst says, "Whatever bird was intended, I think it was so named from עז *on*, strength, and ניה *nie*, moaning." (See his *Heb. Lex.* on עזניה.) Bate calls it the whining kite.

דאה *Dae*, supposed to be our glede, from its sailing manner of flying; it is called vulture. (*Lev.*, xi. 14.)

איה *Aie*, Parkhurst supposes this to mean a vulture, and that it has been named *aie*, from its cry. (*Heb. Lex.* at איה.) It is called kite in the English Bible. (*Lev.*, xi. 14.)

ערב *Oreb*, the raven, from the glossy black colour of its feathers, said to be a mixture of darkness and splendour. ערב *oreb*, the evening, a mixture of light and darkness, from ערב *oreb*, to mingle.

בת יענה *Beth ione*, translated the owl. (*Lev.*, xi. 16.) Parkhurst seems to think it means the ostrich, from their loud crying to each other; from בת יענה *beth ione*, daughter of the response.

תחמס *Tehemesh*, translated the night hawk. (*Lev.*, xi. 16.) Parkhurst considers it a species of owl described by Hasselquist (*Travels*, p. 196.); from חמס *hemesh*, violence, rapine, outrage.

שחף *Sehep*, translated the cuckoo. (*Lev.*, xi. 16.) In an old translation, printed at London in 1599, it is called the sea-mew, a very lean bird, with which Parkhurst seems to agree, from the noun שחף *sehep*, a wasting consumption.

נץ *Nets*, a hawk, from נצה *netse*, to shoot forth; its mode of flying.

כוס *Cush*, the little owl (*Lev.*, xi. 17.); from hiding itself in the daytime; from כסה *kese*, to conceal.

שלך *Selek*, the cormorant. (*Lev.*, xi. 17.) Parkhurst says, "the cataract or plungeon;" the LXX, καταράκτης *kataraktes*, from שלך, to cast down. When the bird sees in the water the fish on which it preys, it flies to a considerable height, collects its wings close to its sides, and darts down like an arrow on its prey. (*Heb. Lex.*, שלך.)

ינשוף *Inesup*, the great owl. (*Lev.*, xi. 17.) Parkhurst thinks it should be the bittern. (*Heb. Lex.*, נשף.)

תנשמת *Tenesmet*, the swan. (*Lev.*, xi. 18.) Parkhurst thinks the goose is meant, from its hissing when provoked; from נשם *nesem*, to breathe. (*Query*, Do the Jews reckon the goose an unclean bird?)

רחם *Rehem*, translated the gier eagle (*Lev.*, xi. 18.), from רחם *rehem*, to love tenderly; supposed to be some bird remarkable for its attachment to its young.

חסידה *Heshide*, also a term expressive of kind attachment, the stork. (*Lev.*, xi. 19.) The חסידה *heshide* is a bird of passage. גם חסידה בשמים ידעה מועדיה, (*gem heshide besemim idoe muodie*), the stork also in the heavens knoweth her appointed time (*Jer.*, viii. 7.), hath large wings (*Zech.*, v. 9.), and has the fir tree for her house, חסידה ברושים ביתה *heside berusim bite*. Supposed to have got her Hebrew name from the affection the stork has for its young, and, what is rather uncommon, for the attachment the young bear to the old, whom it is said they carry on their backs during their migrations. The old, being unfit to fly, are said to be thus borne to their destination, when the feeble are laid in the nest and fed by the young. (Parkhurst's *Heb. Lex.* at חסידה.) In Parkhurst's *Hebrew Lexicon*, Doctor Scott's opinions respecting the Kath (קאת) of the ancient Hebrews are well supported. (*Mag. of Nat. Hist.*, vol. ii. p. 137.) From what is stated above, it will appear that the Kath is not the only bird of Palestine, about the modern name of which much uncertainty prevails.*

Arch. Gorrie.

Annat Gardens, May 26. 1829.

Art. III. *On the Red Snow of the Arctic Regions.* By Thomas Nicholson, Esq.

Sir.

The cause of truth, and the remarks of your correspondent Δ on the red snow of the arctic regions (Vol. I. p. 306.), have induced me to trouble you with a few observations on this subject. In the summer of 1821, I had an opportunity of examining this substance, which has excited so much interest amongst naturalists, in its native situation, and I am only surprised that those gentlemen who first discovered it should have had any doubt as to the nature of its origin.

On the 24th July, whilst our ship was beset with ice near Bushman's Island, I made a journey, accompanied by two other

* In expressing the Hebrew nouns by Roman characters, it will be observed that no attention is paid to the Masoretic points.

gentlemen, to Sowallick Point, in quest of the meteoric iron, which we understood was to be found in this quarter. We were disappointed in the object of our visit, but our mortification on this account was somewhat lessened by meeting, for the first time, with the crimson snow, which was described by Captain Ross.

Sowallick Point is formed by the projection of a small hill from the high mountainous coast which bounds Prince Regent's Bay. The summit of this hill is covered with huge masses of granite that have been precipitated at various periods from the cliffs above, whilst the side, which forms a gentle declivity towards the bay, was covered with crimson snow. It was evident, at first view, that this colour was imparted to the snow by a substance lying on its surface. This substance lay scattered here and there in small masses, bearing some resemblance to powdered cochineal, surrounded by a lighter shade, which was produced by the colouring matter being partly dissolved and diffused by the deliquescent snow. During this examination, our hats and upper garments were observed to be daubed with a substance of a similar red colour, and a moment's reflection convinced us that this was the excrement of the Little Auk (A'lca mìnor), myriads of which were continually flying over our heads, having their nests among the loose masses of granite, which I have before described as covering the ridge of this little hill. A ready explanation of the origin of the red snow was now presented to us, and not a doubt remained in the mind of any that this was the correct one. The snow on the mountains of higher elevation than the nests of these birds was perfectly white, and a ravine at a short distance, which was filled with snow from top to bottom, but which afforded no hiding-place for these birds to form their nests, presented a uniformly white appearance. On the 2d of August I landed on Cape York, and procured a bottleful of red snow, and collected some of the dung of the Little Auks from the stones among which they had their nests; and my intention was to have submitted both to the examination of some eminent naturalist. But on my arrival in England, a hasty summons to this country dissolved the red snow from my memory, and all recollections of the arctic regions were lost among the new scenes which opened to my view under a tropical sun.

That there does exist a genus of plants of the order *A'*lgæ, that occasionally may impart their colour to snow and other substances, I would not have the hardihood to deny; but that the red snow of the arctic regions owes its colour to this cause I have some reason to doubt. Deference to the opinion of many learned men forbids my speaking positively on this subject, but I cannot agree with your correspondent, that "there can be no doubt that the colouring matter of the famous red snow, brought from the arctic regions by Captain Ross and Captain Parry is a true vegetable." There is still a doubt, and until this doubt is removed, I would suggest that the trivial name of the Protocóccus nivális should be changed to that first adopted by Agardh, namely, Protocóccus kermesìnus.

I have seen nothing in any work that I have had access to that could subvert the opinion that I have now advanced. If I recollect aright, Wollaston declared that during combustion it emitted the odour of burnt animal substances. The microscopic observations of Bauer and Agardh prove nothing since those of Brown have been made known; and indeed Professor Agardh concludes his Memoir on the subject with a doubt, whether, after all, the colouring matter of the red snow may not be of animal nature; whilst your correspondent mentions that Nees Von Esenbeck was inclined to think that the minute red globules were the vegetable state of bodies that had gone through a prior animal existence. The specimen examined by Dr. Greville was procured from the Island of Lismore, and, of course, may be quite a different thing.

I shall conclude by hoping that if any of your readers should ever make a voyage to Baffin's Bay, that he will not fail to procure a portion of the red snow, and of the dung of the Little Auks, or *Cockroaches* (as they are called by our Greenland seamen), for further examination. I am, Sir, &c.

Antigua, *May* 28. 1829. THOS. NICHOLSON.

ART. IV. *On the Wheat Fly.* By Mr. ARCHIBALD GORRIE, C.M.H.S., &c.

Sir,

IN September, 1828, I submitted to your readers a query concerning the wheat fly, which appeared in the Magazine of Natural History (Vol. II. p. 292). At that time I did not know that a yellow fly had deposited the eggs within the glume, which became maggots. Observing numbers of black flies on the ears of wheat, I believed they had been the produce of the caterpillar; and, as will appear by my query, I supposed they deposited their eggs about the grain. I have this season, however, observed the yellow fly (described by the Rev. W. Kirby in Vol. I. p. 227.) deposit its eggs in the wheat ear, and, what is remarkable, in the ear of the *T*ríticum rèpens, and in that of *no other grass.* The fly has not known that modern botanists no longer ranged the couch grass amongst the wheat tribe, but, like myself, it is most attached to the Linnean names and system. The black fly deposits its eggs in the larvæ *when it can get at them;* but a tithe of them are not touched in this way. The maggots have all left the ears, and are now in the ground, about half an inch deep, where they will likely pass the winter in a pupa state. It is, therefore, to their destruction in their winter quarters, and not to that of the eggs about the grain, as I formerly supposed, that attention should be directed. In this quarter they have destroyed from 3 to 5 bolls per acre.

I am, Sir, &c.

ARCHIBALD GORRIE.

Annat Gardens, Errol, Perthshire,
August 1. 1829.

ART. V. *On Vessels made of the Papyrus.* By JOHN HOGG, Esq. M.A. F.L.S., &c.

Sir,

IT must always be an agreeable and interesting subject, to prove that very ancient customs are still in use among the same people of the world, as nothing can tend more to elucidate their history, and to explain difficult and obscure passages in authors who have written on those countries and on their inhabitants.

In tracing coincidences of this sort, I have been induced to make the following hasty observations, extracted from ancient and modern authorities, in order show that vessels have, from the earliest times, been formed of the papyrus, and that they are at present in use in Egypt and Abyssinia.

The papyrus, paper reed, or Egyptian reed, the *C*ypèrus *P*apy̆rus of Linnæus, or *P*apy̆rus antiquòrum of Sprengel, is a plant so well known, that it will be superfluous to add here any detailed account of it. It is the Πάπυρος of Theophrastus (lib. iv. cap. 9.) and Dioscorides (lib. i. cap. 116.), the Papyrus of Pliny: it is called βύϐλος by Herodotus, Strabo, &c.; and Biblus by some Latin authors. In Scripture, Rush, and Bulrush; in Hebrew, *Goma;* in Arabia, *El-babîr;* and, in Egypt, *El-berdi*, are its different appellations.

We find mention of ships, and boats or canoes, being made of the *P*apy̆rus in Exodus, Job, Isaiah, Herodotus, Theophrastus, Diodorus Siculus, Strabo, Lucan, Pliny, and

Plutarch, among the ancient writers; and by some modern authors, as Shaw, Bruce, &c.

Let us first consider what the earlier writers observe on these vessels.

Theophrastus says that, in Egypt, "they make boats of the papyrus, and weave both sails and ropes of the bark." *

Pliny states the same; "of the papyrus itself they make sailing vessels; and of its bark, sails and cables." † Again, he mentions "papyrine ships and equipments of the Nile" (papyraceis navibus, armamentisque Nili. lib. vi. c. 22.); and, in another place, he speaks more distinctly of their Egyptian origin, as, "ships were first invented from papyrus in the Nile in Egypt." ‡

Also, according to Plutarch: — "Isis, having heard of it, sought about for the fragments (of *Osiris*), and sailed through the midst of marshes, in a ship (*baris*) made of the paper reed. From whence it is, that they who sail in boats of the papyrus do not receive any harm from crocodiles, which either fear or honour them for the sake of the goddess." §

But Herodotus has given a good account of the ships of burthen, called *baris* (*fig.* 88.), which were commonly used on the Nile; and he thus describes the ancient Egyptian method of building them: — "Cutting planks from the thorn tree (most probably the Mimòsa nilótica *Lin.*), about two cubits large, they place them together in the form of bricks, building the vessel after this manner: they bind these planks of two cubits around thick and long stakes; when they have thus put them together, they place benches upon them: they never make use of carved ribs; but they fill up the joints on

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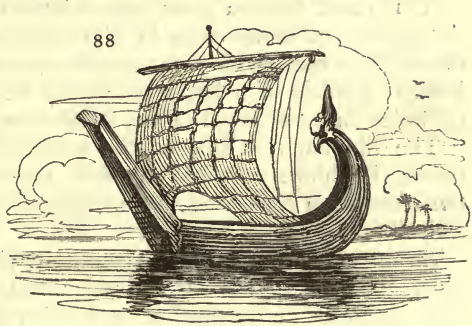

* Πλοῖα ποιοῦσιν ἐξ αὐτοῦ, καὶ ἐκ τῆς βίβλου ἱστία τε πλέκουσι, ... καὶ σχοινία τε. (Lib. iv. cap. 9.)

† Ex ipsâ quidem papyro navigia texunt, et è libro vela .... ac funes. (*Hist. Nat.*, lib. xiii. cap. 11.)

‡ Naves primùm repertas in Ægypto in Nilo ex papyro. (Lib. vii. cap. 56.)

§ Τὴν δὲ Ἶσιν πυθομένην ἀναζητεῖν ἐν βάριδι παπυρίνῃ, τὰ δὲ ἕλη διεκπλέουσαν. Ὅθεν οὐκ ἀδικεῖσθαι τοὺς ἐν παπυρίνοις σχάφεσι πλέοντας ὑπὸ τῶν κροκοδείλων, ἢ φοβουμένων, ἢ σεβομένων διὰ τὴν θέον. (*De Iside et Osiride*, p. 358.)

the inside with papyrus. They make one rudder, which passes through the keel; and they have a mast formed of the thorn tree, and sails of the paper reed." *

Of our modern travellers in Africa, Bruce observes: "Pliny says that the whole plant together was used for making boats, a piece of the acacia tree being put in the bottom to serve as a keel; to which plants were joined, being first sewed together, then gathered up at stem and stern, and the ends of the plant tied fast there; and this is the only boat they still have in Abyssinia." (*Travels*, vol. v. p. 6.)

Also, Belzoni describes a curious boat which he hired on the Lake Mœris, and compares "to old *Baris*, or boat of Charon (the boat in which the Egyptians carried their dead to the grave). The outer shell, or hulk, was composed of rough pieces of wood, scarcely joined, and fastened by four other pieces, wrapped together by four more across, which formed the deck; no tar, no pitch, either inside or out; and the only preventive against the water coming in was a kind of weed, moistened, which had settled in the joints of the wood." (p. 380.)

This vessel bears a great resemblance to the baris of Herodotus, and its seams were in like manner stuffed with a sort of weed, or reed, which we consider to be the paper reed, the head or panicle of it being extremely well adapted for filling up holes and crevices, as Pliny testifies in the following words: "The filaments or hair of the panicle, beaten and put between the joints of ships, cements the weaving, being more tenacious than glue, and firmer than pitch, in closing up the leaks." †

Strabo concisely, but very accurately, characterises the plant thus, "The papyrus is a slender rod, bearing a head of hair (panicle) on its top" ‡; and Pliny likens this head to a thyrsus (thyrsi modo cacumen).

The ship Baris appears in all the hieroglyphics of Egypt; and, as the learned Kircher states, "this most celebrated ship of the Egyptians, *Baris*, is a sailing vessel made of papyrus,

* *Ἐκ τῆς ἀκάνθης κοψάμενοι ξύλα ὅσον τε διπήχεα, πλινθηδὸν συντιθεῖσι, ναυπηγεύμενοι τρόπον τοιόνδε· περὶ γόμφους πυκνοὺς καὶ μακροὺς περιείρουσι τὰ διπήχεα ξύλα· ἐπέαν δὲ τρόπῳ τούτῳ ναυπηγήσωνται, ξυγὰ ἐπιπολῆς τείχουσι αὐτῶν. νομεῦσι δὲ οὐδὲν χρέωνται· ἔσωθεν δὲ τὰς ἁρμονίας ἐν ὦν ἐπάκτωσαν τῇ βύβλῳ. πηδάλιον δὲ ἓν ποιεῦνται, καὶ τοῦτο διὰ τῆς τρόπιος διαβύνεται· ἱστῷ δὲ ἀκανθίνῳ χρέωνται, ἱστίοισι δὲ βυβλίνοισι.* (*Euterpe*, cap. 96.)

† Paniculæ coma .... contusa et interjecta navium commissuris ferruminat textus, glutino tenacior, rimisque explendis fidelior pice. (Lib. xvi. cap. 36.)

‡ Ἡ *μὲν βίβλος ψιλὴ ῥάβδος ἔστιν ἐπ' ἄκρῳ ἔχουσα χαίτην.* (*Geogr.* l. xvii.)

according to Plutarch; which kind, on the testimony of Herodotus, was used in their sacred rites." * It is frequently represented carrying the sacred ox, or Osiris, on board †; and there was an annual festival among the Egyptians, in honour of the ship of Isis.

Likewise, Diodorus Siculus has recorded that "river boats were built of reed ‡; but we would conclude that this reed (κάλαμος) signifies more correctly the reed papyrus, because the *A*rúndo *D*ònax §, generally intended by κάλαμος, is not so suitable a plant to construct vessels with, since it is too liable to split, and is of too brittle a nature.

Strabo, mentioning the marshes and the beds of reeds near the Euphrates, observes: "From their reeds all sorts of vessels are formed; those which are fit to receive water are daubed over with pitch (bitumen), but others are used without any; they also make sails of reeds, after the manner of mats or hurdles." ||

Now, the ark of the child Moses was a small vessel of this kind, "an ark of bulrushes, and daubed with slime and with pitch." (*Exod.*, chap. ii. v. 3.) Clemens. Alexand. (*Strom.*, i. 343.) properly interprets this ark to have been "a vessel of the indigenous paper reed" (ἐκ βίβλου τοῦ ἐπιχωρίου σκεῦος).

Again, Strabo (*Geogr.*, lib. 16.) says that "rafts made of reeds" (σχεδίας καλαμίνας) were used on the Lake Sirbonis; and Isaac Casaubon remarks that Diodorus calls these "bundles of reeds" (δέσμας καλάμων).

We learn from Denon that mere bundles of reeds are at this day in use amongst the people of Upper Egypt, see *fig.* 89. which is explained in the following words: — "The manner of passing the Nile, sitting upon a double bundle of straw, with a short and double paddle, the legs serving for oars. The inhabitants of Upper Egypt make their voyages in this way, going up and down the Nile; they keep it in the water

* Navis hæc celeberrima Ægyptiorum *Baris*, est navigii papyracei, teste Plutarcho, genus quo in sacris, Herodoto teste, utuntur. (*Œdip. Ægypt.*, vol. iii. cap. 5. p. 138.)

† There is a remarkable coincidence between this religious custom of the Egyptians and that of the Mexican Americans. The great god and leader of the Mexicans, called *Mexitli*, or *Vitzliputzli*, was carried about in a sacred ark *made of reeds*. Compare *Faber's Origin of Pagan Idol.*, vol. ii. p. 311., and vol. iii. p. 120. 305.

‡ Ἐκ τοῦ καλάμου κατεσκεύασε πλοῖα ποτάμια. (*Bib. Hist.*, lib. ii. cap. 17.)

§ According to Dr. Sibthorp, the *A*rúndo *D*ònax is still called, in modern Greece, only κάλαμο; and Theophrastus says it was the most common of the καλάμοι.

|| Ἐξ ὧν καλάμινα πλέκεται παντοῖα σκεύη, τὰ μὲν ὑγροῦ δεκτικὰ, τῇ ἀσφάλτῳ περιαλειφόντων, τοῖς δ' ἄλλοις ψιλῶς χρωμένων· καὶ ἱστία δὲ ποιοῦνται καλάμινα, ψιάθοις, ἢ ῥιψὶ παραπλήσια. (*Geogr.*, lib. xvi.)

two or three hours, even till the sheaf be perfectly soaked through." *

This faisceau de *paille*, doubtless, signifies a bundle of *straw*, or *stalks*, of the common Egyptian reed.

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a, Front view of the double bundle of reeds. *b*, Short double paddle.

Moreover, a later traveller (Belzoni, p. 301.), describing the inundation of the Nile, says, "some crossed the water with reeds tied up in bundles;" and the poet Lucan notices the same circumstance: "when the Nile overflows, the Memphian boat is constructed of the thirsty (or soaking) paper reed."

——— " Cum tenet omnia Nilus,
Conseritur bibulâ Memphitis cymba papyro." Lib. iv. 136.

Or, as Rowe has well rendered it,

——— " When fruitful Egypt lies afloat,
The Memphian artist builds his reedy boat."

Bruce "imagines, also, that the junks (from *juncus*, a bulrush) of the Red Sea, said to be of leather, were first built with papyrus, and covered with skins." (vol. v. p. 6.) Compare Herodotus, *Clio*, chap. 194., where barks, made of a framework of osiers, and covered with skins, are said to have gone

* Manière de passer le Nil assis sur un double faisceau de paille, avec une courte et double rame, les jambes servant d'avirons. Les habitans de la Haute Egypte traversent ainsi montant et descendant le Nil, ils tiennent à l'eau deux et trois heures jusqu' à ce que la fascine soit absolument imbibée. (*Voyage dans Egypte.*)

from Armenia to Babylon. Likewise, Belzoni (p. 62.) mentions crossing to the Island of Elephantine "in the ferry-boat, which is made of branches of palm trees, fastened together with small cords, and covered on the outside with a mat, pitched all over."

This very simple method of forming a float, δέσμη καλάμων, is evidently most ancient and primeval, and, at the same time perfectly well adapted for passing and repassing rivers, as well as for taking short voyages.

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But, after a time, the Egyptian began to improve his art of ship-building, by tying together the ends of the bundles of papyrus, in order to give his vessels somewhat the shape of a canoe (*fig.* 90.); he then daubed them over with pitch, or covered the reeds with skins or mats (*fig.* 91.); his ropes he twisted from the bark of the same plant, and of which he made his sails like matting. (*fig.* 92.) These skiffs being so light and portable were very swift in the water, either when impelled by a paddle, or by oars, or with a fair wind.

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His larger vessels, or ships of burthen, at first had only a keel of thorn tree (Mimòsa nilótica), and their sides of the paper reed; afterwards, the framework altogether consisted of that wood, having their joints and crevices calked with that plant. Finally, indeed, his favourite reed was suc-

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ceeded by the more solid and durable materials, timber, iron, canvass, hempen ropes, and such like modern equipments.

The curious mosaic pavement discovered in the celebrated temple of Fortune at Præneste, now in the Barberini palace at Rome, represents numerous objects relative to the manners, customs, and natural history of Egypt and of Ethiopia. It is engraved and described in the 14th volume of Montfaucon's *Antiquities.* Of the above engravings, *figs.* 88. 90, 91, 92. exhibit some of the different forms of the ancient Egyptian vessels, taken from that pavement. *Figs.* 90, 91, 92. are three canoes or skiffs made of papyrus; *fig.* 91., in particular, bears a near resemblance to the bundles of reeds at *fig.* 89., and is tied together with bands in a similar way. These boats are of the kind called by the Greeks ναῦς ἀμφιπρυμνὸς, by the Romans, navis biprora, *two-prowed*, having both ends alike; and are of the shape of a crescent, or half-moon, μηνοειδής. *Fig.* 88. most probably is meant for the ship *Baris*, as described by Herodotus. Vessels of the same form and nature with these may be seen in the hieroglyphics, sculptures, gems, intaglios, and drawings of the ancient Egyptians; and, according to Bruce, " this is the only boat they still have in Abyssinia, which they call Tancoa, and from the use of them it is that Isaiah describes the nations, probably the Egyptians, upon whom the vengeance of God was speedily to fall." (*Travels*, vol. v. p. 6.)

The passage alluded to here is this (*Isaiah*, ch. xviii. v. 1, 2.): " Woe to the land shadowing with wings, which is beyond the rivers of Ethiopia: that sendeth ambassadors by the sea, even in *vessels* of *bulrushes*, upon the waters, saying, Go, ye swift messengers, to a nation scattered, and peeled; to a people terrible from their beginning hitherto; a nation meted out and trodden down, whose land the rivers have spoiled."

" The vessels of bulrushes," in vasis *Goma*, here mentioned, Symmachus, with Aquila and Theodotion, have well translated — ἐν σκεύεσι βιβλίυ, διὰ σκεύων παπυρίνων, ἐν σκεύεσι παπύρου. (See *Celsii Hierobot.*, vol. ii. p. 146.)

Likewise, Bishop Lowth remarks, " it is well known that the Egyptians commonly used, on the Nile, a light sort of ships, or boats, made of the reed papyrus."

" 'Go, ye swift messengers;' for the papyrine boats were admirably light. Achilles Tatius relates that they were not larger than what a person could carry each of them. If they had been of any other kind, they would stick fast by remaining in the mud: wherefore it was sufficient for them to have small and light vessels, and a little quantity of water, so that, if it ever happened there was no water, they convey the skiff on their shoulders wheresoever they could find any water. (*Ach. Tat.*, lib. iv. p. 248.) Hence Prudentius against Symmach. (lib. ii. p. 242.) calls them 'slender barks and weak canoes.'

"The Rabbies observe the same things on this passage of Isaiah, whose words R. Solomon Ben Melech has abridged into the following head: — '*Goma* has a very light wood; and our learned men observe that small boats are made of the paper reed, which are daubed over with pitch, that they may not admit water; and which, moreover, may be carried on the waters with a swift course, by reason of their lightness.' Tremellius and Junius notice 'skiffs constructed of papyrus, such as the Egyptians and the Ethiopians, near Catadupa, the cataracts, and dangerous fords, make use of; both because they were smaller, and also that they gave way to rough waves and rocks, with which the Nile abounds, and did not split and break in pieces like wood.'" *

"In this chapter of Isaiah, if Egypt be the country spoken to," says Bishop Horsley, "'vessels of bulrushes' might be understood of those light skiffs; but, if the country spoken to be distant from Egypt, those vessels may only be used as an apt image of quick-sailing boats of any material."

But the learned and elegant Dr. Lowth adds: "this is one of the most obscure prophecies of Isaiah: the end and design of it, the people to whom it is addressed, the person who sends the messengers, and the nation to whom the messengers are sent, are all doubtful."

There is one more passage in the Old Testament where these vessels are alluded to, in the 26th verse of the 9th chap. of Job, "as the swift ships," or "ships of Ebeh," that is, according to Parkhurst, of the Egyptian papyrus, which seems here to be meant, the woody part of which was anciently used to build light vessels with. Schultens, also, very ingeniously

* "Ite, leves nuntii;" nempe fuerunt cymbæ papyrinæ admirandæ levitatis. Refert Achilles Tatius, majores non fuisse, quam ut singulos vectare possent. Si aliusmodi fuerint, limo præpeditæ, retinentur. Quare parva iis ac levia navigia, et exiguæ aquæ satis sunt: quod si quandoque aquam deesse contingat, sublatam humeris naviculam asportant, quousque aquam inveniant." (*Ach. Tat.*, lib. iv. p. 248.) Inde "tenues cymbas fragilesque phaselos" appellat Prudentius contrà Symmach. (lib. ii. p. 242.)

Eadem ad locum Esaiæ annotant Rabbini, quorum verba in summam contraxit R. Salomon Ben Melech. "*Goma* est lignum admodum leve. Et observant doctores nostri b. m. quod ex papyro parva navigia fiant, quæ pice oblinuntur, ne aquam admittant; quæ et jam ob levitatem celeri cursû in aquis feruntur." Tremellius et Junius: "naviculis è papyro contextis; qualibus Ægyptii, Æthiopesque, propter Catadupa, catarhactas, et periculosa vada, utebantur, tum quod breviores essent, tum quod adversis fluctibus, scopulisque, quibus Nilus abundat, cederent, ac non dissilirent, aut frangerentur sicut lignum." (*Celsii Hierobot.*, vol. ii. p. 147, 148.)

suggests that Job compares the days of his prosperity, in three several degrees, with what we esteem the swiftest in the three elements: namely, with the quick despatches of the post by land; with the more expeditious motion of papyrine vessels by sea; and, which exceeds them both for swiftness, with the flight of the eagle in the air to his prey. (*Chappelow.*)

Omitting the many and various other uses of the papyrus, as Theophrastus calls it, πρὸς πλεῖστα χρήσιμος, I will conclude these observations in the following words of Dr. Shaw: — "The vessels of bulrushes, or paper reeds, that are mentioned both in sacred and profane history, were no other than larger fabrics of the same kind with that of Moses, which, from the late introduction of plank and stronger materials, are now (for the most part) laid aside." (See *Travels*, p. 437.)

Yours, &c. John Hogg.

St. Peter's College, Cambridge, March 21. 1829.

Art. VI. *On the Anatomy of the Ventriculites of Mantel.* By C. B. Rose, Esq., Swaffham.

Sir,

These fossil bodies were formerly considered to be the petrified remains of oranges, figs, nutmegs, and mushrooms. Volkman figured and described one as Núx moschàta frúctu rotúndo. (*Silesiæ subterraneæ*, tab. 22. fig. 6.) Scheuschzer adopted the same figure and description. These opinions possess some plausibility, if contemplating the external form only of these remains; and display some advance towards rational investigation, in comparison with the barbarous notion, of fossils formed "in the sportive moments of Nature;" or, "by some latent plastic power of the earth;" or a fortuitous arrangement of materials.

As natural history became more an object of scientific enquiry, so became our views of Nature's works more enlarged; and men saw in these remains the components of a once animated body. About the middle of the last century, M. Guettard published, in the *Mem. Acad. Scien. à Paris*, a memoir entitled "Sur quelques Corps Fossiles peu connus;" in which he states that he had examined these bodies, and found them composed of reticulated coats, and tubes that passed from the peduncles into their bodies. He was inclined to think them more allied to Madrepores than *A*lcyònia.

Lhwyd, in his *Ichnogràphia*, tab. 2. 176., has figured a Ventriculite somewhat resembling my figure (*fig.* 100.), and designated it an Astroite; he has reversed the natural position of the original.

Parkinson in his great work on Oryctology, brought together all that had been published deserving of notice, relative to these bodies; and gave an elaborate account of them, accompanied with some investigations of his own; from which he was led to conclude they were not Alcyònia, nor Sponges, but that there required a new genus to be formed for their reception. Since that period he has published *Outlines of Oryctology*, in which really *multum in parvo* work * he has divided the fossils before known under the common term Alcyònia into four distinct genera, viz. Spongites, Syphonites, Mantellites †, and Alcyonites.

But to Mantel we are indebted for the most scientific examination of, and rational conclusions on, the anatomy and physiology of these organic remains. His observations were first published in the eleventh Volume of the *Trans. Linnean Society*, and afterwards more fully in a very interesting and excellent work on the fossils of the South Downs. He has there shown they were the remains of a zoophyte, the general form of which was that "of a hollow inverted cone, having numerous ramose fibres proceeding from the base, by which it was attached to other bodies; and internally it possessed a surface covered with the apertures of numerous tubuli, in all probability the openings of absorbent vessels, by which its nutrition was effected; . . . . that the substance of the original must have been soft and elastic, susceptible of spontaneous expansion and contraction." He further observes, "whatever may have been the nature of its aliment, it seems probable that it underwent a certain degree of digestion and assimilation before it was fitted for its support, and that the nutritious particles were taken up by the openings so numerously distributed on the inner surface of the ventricular cavity." He was also disposed to believe that, "like the Alcyònia and Actíniæ, they were permanently fixed to the rock upon which they grew." Mr. Mantel gave them the appropriate name, Ventriculite, and formed a genus for their reception, possessing the following characteristics: —

General Character — Body inversely conical, concave, capable of contraction and expansion; original substance spon-

* Outlines of Oryctology, &c. by James Parkinson, 1822, from p. 50. to p. 62.

† The Ventriculites of Mantel. I adopt Mr. Mantel's very appropriate name for this genus of zoophytes, in preference to the complimentary one given by Mr. Parkinson, principally for its conveying an idea of a very characteristic part of it; yet partly because I consider this fashion in the choice of names should be confined to the trivial or specific name.

gious, gelatinous; external surface reticulated; internal surface covered with openings or perforated papillæ; base imperforate, prolonged into a stirps, and attached to other bodies."

The following observations, offered as contributions to the anatomy of this zoophyte, are the results of repeated examinations of an extensive series of specimens, chiefly impregnated with, and enveloped in, flint. They are in various states of preservation; and, although from the fragile nature of the matrix their structure has been much deranged by fracture, still I find the silicified remains exhibit the original structure more distinctly than the calcareous; and from the former (except in one instance, *fig.* 100.) I have taken the accompanying sketches.

These bodies are commonly found enveloped in flint, forming the nucleus of nodules of that substance, and assuming various forms, usually pyriform, but occasionally that of the mushroom; in the former case, they are readily distinguished by a spongoid circle bordering the smaller extremity, which is the margin of the mouth of the contracted original, and numerous perforations around the opposite extremity, exposing the terminations of the diverging radical processes; in the latter case, the spongoid structure appears on the margin of the summit, and the perforations at the bottom of its stalk. Mr. Mantel has given some faithful representations of these flints in tab. 10. of the work above referred to; and *he* has observed, that, "the *margin* is marked with *semilunar* indentations, the impressions of the fibres of the external integument; . . . . these markings are peculiar to the fossils of this genus, and attention to this circumstance will frequently enable the collector to distinguish the silicious specimens of Ventriculites from those of Spóngus Townséndi."

From my dissections (if I may so term my investigations), I am led to describe the original zoophyte as constructed of various coats or layers, which may be separated into an *internal*, an *external*, and a series of *concentric laminæ*, through which pass transversely, and afterwards longitudinally, a number of *tubes* destined to contain the materials for the support and growth of the body. I proceed to describe these parts separately as they have appeared to me.

Inner Coat. — This appears of a spongious texture, and lines throughout the ventricular cavity. It is probable that this coat is nothing more than the inner layer of the reticulated substance forming the chief mass of the animal, having gelatinous fibres irregularly interwoven, and forming a complete spongious texture. In the contracted and elongated form of the animal, this spongious surface only is exhibited: but, upon its full expansion, numerous openings appear in all parts of the surface, regularly arranged in a quincuncial order; and in silicious casts form the papillæ described by Mr. Mantel. I have been so fortunate as to procure some specimens exhibiting the inner surface uninjured, see *figs*. 93. and 94. *Fig*. 93. is a magnified view of a fragment of a contracted

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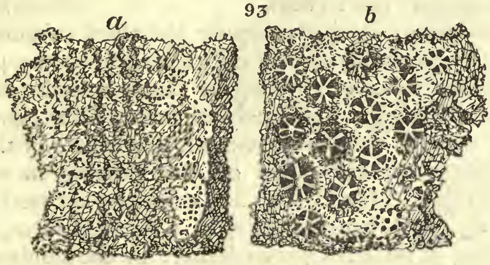

specimen: *a* shows the *inner* surface, not covered with the openings or mouths of the tubes; *b* shows that those tubes are formed *in* that portion, appearing on its outer surface, and probably becoming exposed on its inner surface when the structure becomes unfolded by expansion or distention. The figures are magnified views of one fragment; *a* the inner

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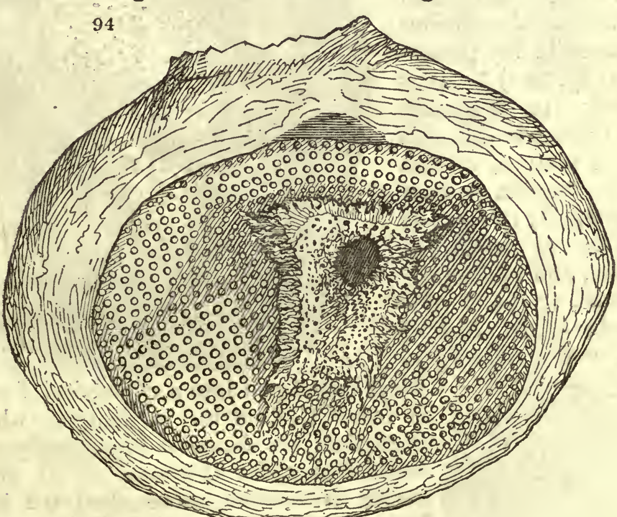

surface, and *b* the surface broken from the substance of the body. *Fig*. 94. exhibits the fossil in about a half degree of expansion; a portion of the mineralised animal is seen at the bottom of the conical cavity of a nodule of flint; and, in this degree of expansion, the orifices of the tubes still remain concealed; the cavity of the nodule displays the arrangement of those orifices, and renders the representation of a fully expanded animal unnecessary. In Mr. Mantel's work (tab. 14. fig. 1.) a *chalk* specimen is represented, where the animal is in complete expansion, exhibiting the perforated papillæ. I possess a similar one in flint.

The *concentric laminæ* compose the chief substance of the animal; the inner layers are cribriform, from the passage of the numerous tubes originating in the ventricular cavity, and passing transversely, previously to taking their course longitudinally towards the lower extremity or centre of the animal. These laminæ are composed of *fibres* passing in a radiated form, from the centre to the circumference, crossed by others transversely, and, consequently, in a circular form, and thus constructing a retiform parenchyma; in the contracted state of the animal, these fibres are moniliform, being thus exhibited in silicious specimens, as shown in *fig.* 95. *a.* The concentric arrangement of these layers is exhibited in a slightly magnified delineation of a silicious specimen in my possession. (*fig.* 96.)* It is difficult to ascertain the thickness of this middle texture, or that of the perfect animal mineralised; its remains varying so much in density, and in the proportions, or parts preserved. Mr. Mantel says, " this zoophyte,

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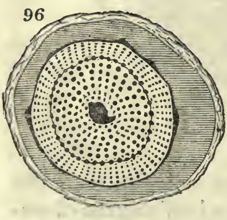

when contracted into a cylindrical form, is from 1 to 6 in. in length; when expanded, its diameter occasionally exceeds 9 in.; the thickness of its substance is seldom more than 0·2 in." I possess a fully expanded silicious specimen whose diameter is 7½ in.

The *tubes* originate in the texture of

* It is a transverse section of a specimen in flint.

the inner coat, on the surface of the ventricular cavity; they at first pass transversely through some laminæ, and afterwards, in the contracted state of the animal, take a longitudinal direction towards the stirps, or radical processes (*fig.* 97.); and in the expanded state, towards its centre; they may be considered as *vessels* passing in rays from the circumference to the centre, with which the short transverse tubes unite in the manner shown at *fig.* 97. *a.* A fragment (*fig.* 98.) shows silicious casts of these tubes broken off in the upper part of the specimen at their junction with the longitudinal vessels; and, in the lower part, three vessels are preserved, running in an exterior layer to that of the upper part. These tubes are not mere pores in a spongious substance, but true membraneous hollow cylinders, as distinctly shown in a silicious specimen in my collection, and delineated in *fig.* 99. The tubular parietes are beautifully preserved by silicious infiltration. The quincuncial arrangement is displayed in the chalk specimen *fig.* 100. It will be seen, on referring to *fig.* 97., that the longitudinal vessels have anastomosing branches: from the brittle nature of the matrix, casts of these lateral branches are rarely preserved; they are better preserved in the specimen *fig.* 101., and appear to occur more frequently about the lower, than in the upper, part of the animal. These vessels are continued along the radical processes. In delicately preserved specimens, short processes are observed to pass from the transverse tubes to the substance of the animal, in

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a

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a somewhat radiated manner, as seen in *fig.* 93. *b*; and similar processes pass from the longitudinal vessels, but are rarely well preserved: they may possibly be mere membranaceous or spongious processes, for the purpose of keeping the tubes *in situ*; but I am much more disposed to consider them as tubuli performing the office of nutrient arteries, and entering the substance of the animal to deposit the assimilated pabulum for its support.

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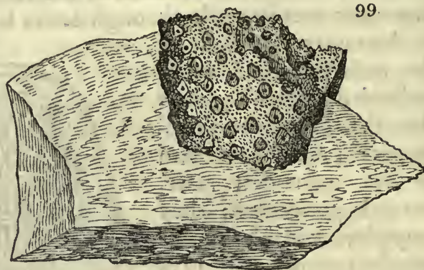

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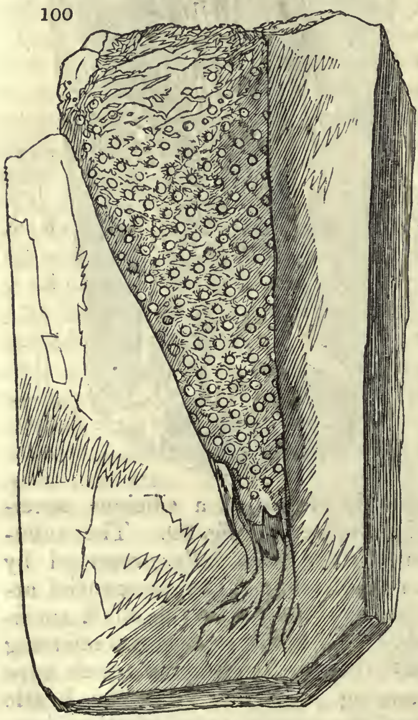

The External Coat. — Of the structure of this coat I have, from my examinations, been led to form a different opinion from that of Mr. Mantel; he describes it as "composed of cylindrical fibres, that extend in a radiating manner from a centre or base to the outer margin, and, by frequently subdividing and anastomosing, constitute a reticulated integument, capable of very considerable contraction and expansion. The fibres are solid, and when viewed through a lens, exhibit a porous structure, bearing considerable resemblance to dried sponge. The meshes, or interstices between the fibres, are narrow and elongated in the specimens that are expanded, but very irregular in those which are corrugated by contraction. In some instances, slender transverse filaments extend from one fibre to another, by which the entire plexus is more firmly connected together."

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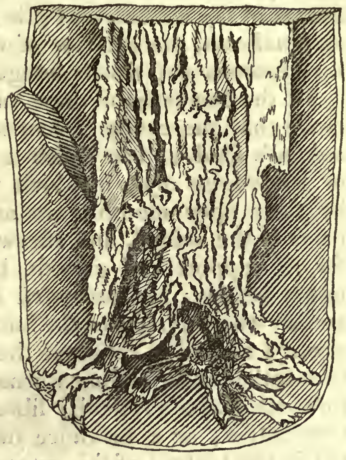

The external coat, as it appears on the best preserved specimens in my collection, may with propriety, I think, be described as composed of two laminæ: the *internal* spongious, and if there be any particular course of its fibres, it is from the base to the circumference, but the general character is a confused distribution, indeed truly spongious; it is delineated at the lower part of the specimen *fig.* 95. *b*: the *external* lamina is a dense tissue, partaking more of the nature of a coriaceous membrane or integument; it is extended from the upper margin of the zoophyte to the base, and continued over the radical processes; it is so beautifully delineated on the specimen in the plate given as a frontispiece to vol. ii. of Parkinson's *Organic Remains*, that I have not thought it necessary to increase the number of figures in this place.

I have with much attention compared Mr. Mantel's figures of the external surface with the specimens I have collected, and I feel persuaded that what he has given as the external surface are *the concentric laminæ*, divested by fracture of some of their exterior laminæ at the point where the transverse tubes terminate. In a state of great condensation by silicious infiltration, these concentric laminæ are so agglutinated that they lose all their delicate fibrous character; the openings in them for the passage of the transverse tubes vary also in form in different specimens, being either circular, oval, or rhomboidal; and it is these circumstances combined that produce the appearance of an arrangement of large cylindrical fibres, and which Mr. Mantel has been led to believe constitute the external covering.

It appears, then, that this zoophyte is in the form of an inverted cone, and possesses a single cavity occupying its entire body, in its contracted and elongated state resembling the finger of a glove, in its expanded state becoming a disk; and its base terminates in a pedicle that gives off radical processes (*fig.* 100.) by which it affixes itself to other bodies. Its structure is, *an inner coat*, from which arise with open mouths *the transverse tubes* that enter a reticulated parenchyma in concentric layers (*the concentric laminæ*) constituting the chief substance of the animal, and this parenchyma is enveloped in *an external coat*, the exterior of which possesses the character of a coriaceous and elastic integument.

Of the economy of these various parts, we may fairly conclude that the *cavity* is ventricular, for the reception of the animal's food, and in which it is digested: the *tubes* are a sort of *receptácula chÿli*, in which the nutrient particles, absorbed by their open mouths, are assimilated and conveyed to all parts of the animal, and afterwards deposited in the substance for its support and growth, by *the tubuli* radiating from the larger vessels: *the concentric laminæ* are the portion of the animal which possesses the function of contraction and expansion; I am led to conclude these properties reside in this texture rather than in the external integument, from the moniliform state of the reticular fibres of these laminæ when under contraction; an appearance never observed (that I am aware of) in the texture of the external coat, and, therefore, *the external integument* I consider as little more than a defence to the softer parts beneath it. The pedicles are similarly constructed to the body, except that the ventricular cavity is not extended into them, and consequently the inner coat makes no part of their structure.

In our specimens the different parts are found in various states of preservation, and exhibit varying features according with the portion of structure that may be exposed to view. The pyriform and fungiform nodules of flint before mentioned, upon fracture with a well-directed blow of the hammer, sometimes afford you a complete cast of the ventricular cavity, exhibiting the arrangement of the open mouths of the absorbent vessels: but, in many instances, the organic body is so infiltrated with silicious matter, that all traces of organisation are obliterated, and you can only distinguish the outline of the substance, and its ventricular cavity, by the different shades of colour of the mineralised body and its matrix; the former sometimes having a reddish brown colour, at other times a grey or lighter shade than the usual black of the latter. In some cases, the organised body is less impregnated with silex, and being usually hydrophanous, the spongious texture is beautifully displayed on wetting the specimen with water.

It remains for me now but to enquire in what portion of the scale of animated nature, we are to place this organic remain. Mr. Mantel was "led to conclude that the Ventriculites were more nearly related to the Actíniæ than to the *A*lcyònia, and that each individual was a perfect animal *, capable of performing those motions which were necessary for its preservation and assistance." I perfectly agree with this gentleman; and when we consider its structure and economy, and, particularly, that this zoophyte does not appear to have possessed tentacula, this simple expansive pouch must be placed among the gelatinous zoophytes, below the Actínia and *H*ydra. The Ventriculites are met with in this country, in every part of the chalk formation, from the uppermost beds to the grey chalk-marl.

I must defer my observations on the species of this genus to a future leisure.

Yours, &c.
C. B. Rose.

November 10. 1828.

* Mr. Miller, the author of the elaborate work on the *C*rinoídea "thinks this opinion is erroneous, and that each ventriculite should be regarded as an aggregation of polypes." I cannot but think, that when this talented and indefatigable naturalist has given to this fossil body the same minute and patient examination he bestowed on the Encrinites, he will coincide with us.

PART II.

REVIEWS.

Art. I. *Picture of Organised Nature, in its spreading over the Earth.* By Wilbrand and Ritsen. Pamphlet, in 12mo, pp. 90., and a Map, or Picture, 2 ft. by 4 ft. 3 in., coloured. London. Translated from the German. 15*s.*

With every disposition to profit from this pictorial view of organised nature, we fear we have not been very successful. The object of the production is useful, as leading to comprehensive views; but the plan not sufficiently clear and obvious for general comprehension. The authors, as it appears to us, have failed in their objects, by endeavouring to show the influence of two laws, latitude and elevation, in one picture, instead of making use of two pictures. The distribution of organised beings, according to the laws of latitude, would have been rendered clearer by writing the natural orders on a map of the world on a large scale; and their distribution, according to the law of elevation jointly with latitude, by sections of the principal mountains of the different zones of both hemispheres; or by sections of an imaginary mountain for each zone. Useful general ideas, we think, might be communicated in this way; but the only effectual manner to convey through the eye a correct knowledge of the geographical distribution of plants and animals, is by devoting a map of the world to each particular order. As natural history advances, and the art of writing books on it improves, it may become the practice to accompany the description of each particular order, or even genus, with a map, and sections of the earth's surface, and the proportion and particular parts of them occupied by that order or genus delineated and rendered conspicuous. Thus, supposing the geographical distribution of any order, any Dulgodiàceæ for instance, were to be delineated, the place which that order occupied on the flat or general surface of the earth, i. e. its distribution according to the laws of latitude, would be represented by shading, or marking with colours or dots on the plan (*fig.* 102. *a b c d*); and its distribution in both

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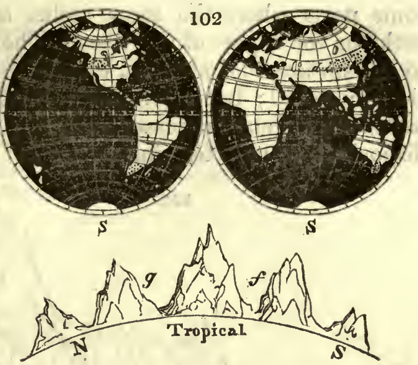

hemispheres, according to the law of elevation, by similar markings on the elevations of the typical mountains where it was found (*f g*). Types might be formed for the printer, representing skeleton maps and sections, such as we have described; and the situation of the order or genus might be filled in with other types representing dots, so that this description of illustration would cost little more than common printing. The distribution of plants and animals, according to the laws of soil and civilisation, is of much less consequence, and much more easily described and remembered, than their geographical distribution.

We shall now endeavour to give some idea of the plan adopted by MM. Wilbrand and Ritsen. A correct idea of their picture may be formed by imagining our figures 103. and 104. joined in one by the line *a a*. These figures, when joined together, represent an island of mountains rising out of the ocean, with imaginary straight lines radiating from a centre, and imaginary elliptical lines forming parallels above and below the base line of the island.

The Chimborazo mountain (*fig.* 104. *b*) is the highest in the centre; the Himalaya mountains of Asia (*fig.* 103. *c*), upwards of 25,000 ft. in altitude, are the highest to the left; and the Descabezado (*fig.* 104. *d*), in Chile, is the highest to the right. The snow line, or that which in every part of the globe sets the limit to organised beings, as regulated by latitude, begins at 75° N. L. (*fig.* 103. *e*), and 60° S. L. (*fig.* 104. *f*); as governed by elevation, it begins under the equator at a perpendicular height of say 17,000 ft. (*figs.* 103. and 104. *g*); in the 19° N. L. 15,000 ft., in the 35° N. L. 11,000 ft., in the 43° N. L. 8,600 ft., in 62° N. L. 6000 ft., gradually decreasing to 75° N. L., where it is at a level with the sea. The snow line in the southern hemisphere, whether as influenced by latitude or elevation, is little known; but in the picture it is regulated so as to harmonise with the line in the northern hemisphere, and with such facts as have been discovered. The sea at both poles is covered with ice; in the southern hemisphere (*fig.* 104. *h*) in a larger, in the northern (*fig.* 103. *i*) in a smaller, proportion. The land, if any exists under this ice, is without organised life, except in some parts where the snow melts, and exposes the surface rocks or soil a part of the year. There minute lichens adhere to the surface, and animals, chiefly insects and birds, are occasionally found; but where the surface is enveloped with eternal snow, vegetation ceases, animals die, and the inquisitive disposition of man terminates.

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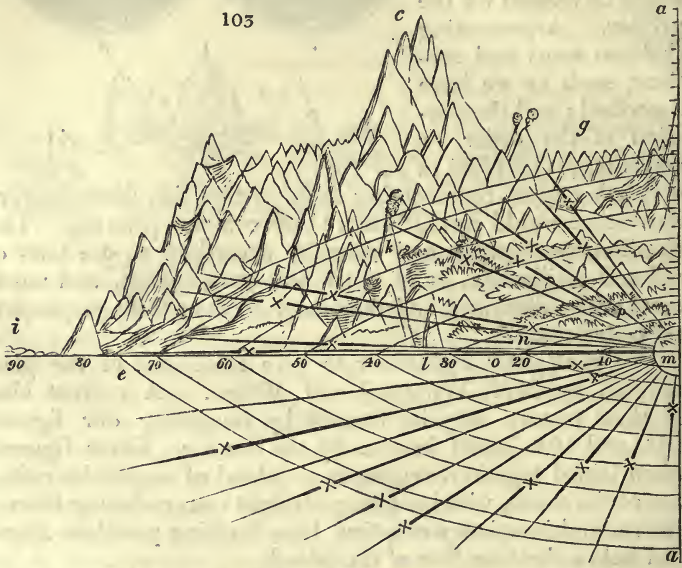

"But besides this perpetual line of snow, there is another, constantly varying according to the seasons. In the northern hemisphere, after the autumnal equinox, this line gradually becomes lower; being in the winter, according to circumstances, even in the middle of the temperate zone, at the level of the sea; on the contrary, in the southern hemisphere, as the sun reaches the southern tropic, the line rises, till it joins the perpetual snow; and as the sun returns towards the northern tropic, it again gradually descends towards the sea. Thus organic life fluctuates perpetually from north to south, and from south to north. It is this varying line of snow which intimates to birds of passage their time of migration."

In the picture, the detached mountains, as well as continuous ranges, which are, in the five parts of the globe, elevated above the perpetual line of snow, are delineated according to their latitude, and their names and height are marked on them; but of course in such a picture it is impossible to give any idea of their longitude. Thus the Himalaya Mountains of Asia (*fig.* 103. *c*), the highest in the world, are placed between the 30° and 40° N. L. from the meridian, or centre of the picture (*a a*); and Mount Etna, a small part of which is above the summit of the snow line, is shown in 37° N. L. (*fig.* 103. *k*), with a part of the Mediterranean Sea at its base (*fig.* 103. *l*). To preserve a sort of harmony in the appearance of the picture, a line (*e a a f*) is drawn to represent the boundary of organic

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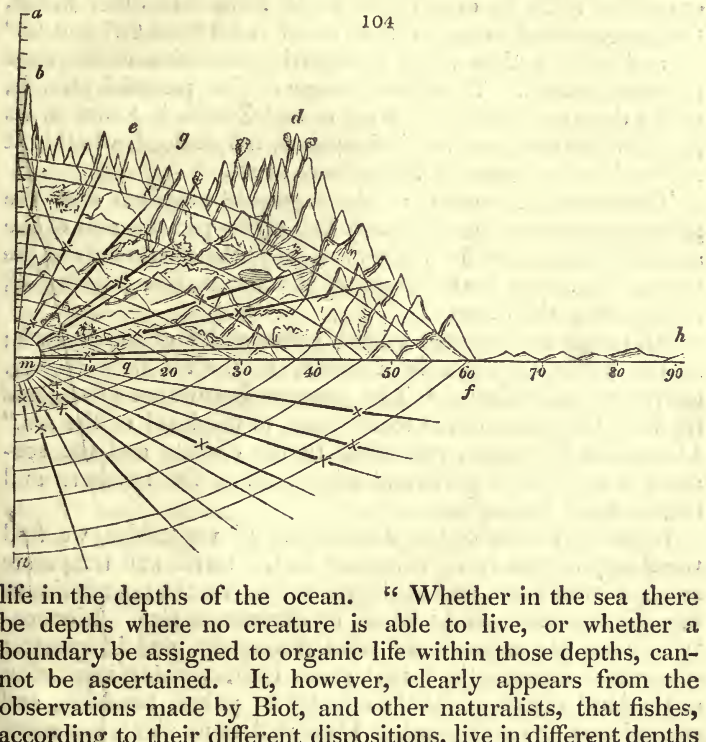

life in the depths of the ocean. "Whether in the sea there be depths where no creature is able to live, or whether a boundary be assigned to organic life within those depths, cannot be ascertained. It, however, clearly appears from the observations made by Biot, and other naturalists, that fishes, according to their different dispositions, live in different depths of the ocean." Curved lines parallel to this line of depth are drawn, to correspond with the parallels on the land, which are drawn to coincide with the snow line; but it is evident they must be almost entirely imaginary.

As the equator appears to be the centre of organic vigour, from which the vivifying principle of heat extends to all parts of the organic world, so lines are drawn from an imaginary point (*m*) representing the equator, and on these lines the natural orders of plants and animals are marked; the lines being thickened (×) where the order is supposed to be most abundant. These lines being supposed movable, like the radii of a circle, are intended to point out by the space they would traverse in their imaginary motion, the district within which the order, tribe, or family, either is found exclusively, or more particularly; or to which they might be transferred by man with the greatest probability of success. Thus the Zàmiæ, or palm ferns (*fig.* 103. *n*), which are found between 20° and 30° N. L. will be found, or might live, in the same parallel (*n o p q*) in both hemispheres, but not at an elevation exceeding 3000 ft., even in the torrid zone. In other words, the geographical range of that order is between 20° and 25° N. and S. L., and its range in regard to elevation in this zone is under 3000 ft. The disadvantage of this pictorial plan is, that it does not indicate to what extent Zàmia is found in its peculiar latitude in either hemisphere, nor, indeed, whether it is found in the southern hemisphere at all.

The general extension of the vegetable kingdom over the globe is shown on the left-hand half of the picture, and of the animal kingdom on the right-hand half; the inhabitants of the sea are shown on both halves of the flat surface (*i e a a f h*), representing the ocean.

All plants and animals inhabit either water, or air, or both; in the water they are in a lower, in the air in a higher, degree of perfection. "The greatest luxuriance of organic life is in the plains of the torrid zone, at the level of the sea." Hence life fluctuates, according to the climate and the seasons, to the line of perpetual snow both in the northern and the southern hemisphere.

In taking a view of the distribution of vegetables, we find the Acotylédones in all climates; in the torrid and temperate zones as tree ferns, and at the snow line, on the boundaries of organic existence, as *L*ichènes of diminutive size. Monocotyledonous plants are found most frequently, and in greatest luxuriance towards the torrid zone, characterising vegetation at the level of the sea at the equator by palms, bamboos, and scitaminous or reedy plants. Dicotyledonous plants are more uniformly spread over the whole surface of the earth; but still herbaceous plants are prevalent towards the snow line, and arboreous ones in warmer countries. All marine plants are Acotylédones, and among these the *F*ùci and *U*'lvæ are the most generally diffused. They extend from the equator to the region of perpetual ice, but grow principally in the seas of warmer climates. The acotyledonous plants which come nearest to the monocotyledonous are the genera *L*émna, *C*eratophýllum, *M*yriophýllum, and *C*hàra, which form the natural order Näìades; these are common inhabitants of fresh water in the temperate zone.

Of all monocotyledonous plants, and even of all flowering plants, the grasses are the most abundant, the most universally distributed, and those which extend the nearest to the snow line. Grassy plains are found in the torrid, temperate, and frigid zones, adjoining the region of lichens. Next to the grasses, the monocotyledonous order Orchídeæ is, perhaps, the most universally distributed. It occurs in Lapland at 800 ft. below the snow line, and abounds as epiphytes in the woods of the torrid zone. "It is remarkable that the Orchídeæ, like the lichens, keep on the ground in the cold and temperate zones, but grow out of the stems of trees, as parasitical plants, in the torrid zone." The *A*sphodèleæ are almost as far diffused as the Orchídeæ, and next the order *A*sparagíneæ, the *A*röídeæ, the liliaceous plants, the *I*rídeæ, the Hydrocharídeæ, the *J*únceæ, and the Cyper*öídeæ*.

Dicotyledonous plants have a large proportion of shrubs and trees, while the Monocotyledòneæ have very few, and the Acotylédones scarcely any. Of all the Dicotyledòneæ, the *S*axifrâgeæ occur most frequently, and in the greatest numbers on the snow line; thence they extend, as herbaceous plants, towards the temperate zone, where the only shrubs and trees that have any affinity to them are Hydrángea and Weinmán*nia*. Caryophýlleæ are in general peculiar to the cold and temperate zones, and also Genti*àneæ* and *R*anunculàceæ. Labiàtæ spread to a great extent, beginning in the vicinity of the snow line with A′juga alpìna, and passing thence to the torrid zone, increasing in number, magnitude, and beauty. The Crucíferæ, or podded plants, begin with some herbs at the snow line, and extend over the cold, and greater part of the temperate, without reaching the torrid, zone. This order probably reaches its utmost perfection between 50° and 60° north latitude. Leguminòsæ, a very numerous order, begin near the snow line, and extend, with a continually increasing abundance, over the temperate and warm zones, where they produce tall trees with winged leaves and beautiful blossoms. Many of the alimentary herbs of the temperate zones are of this order, as clover, peas, beans, &c. The Syngenesious plants, or plants with combined anthers, are for the most part herbaceous, and are spread over the whole earth, attaining their greatest perfection in the temperate zone. The Umbellíferæ commence at some distance from the snow line in herbaceous plants, and spread over the temperate zone to the warmer climates, increasing in that direction in number, size, and beauty. Umbelliferous plants are seldom found nearer the equator than 30°. The Scrophularíneæ are herbaceous at some distance from the snow line, and in the temperate zone, and become shrubby in the torrid zone. *R*osàceæ commence with herbs at the snow line, and, in the temperate zone, include some of our principal shrubs and fruits. The Amentàceæ consist of shrubs and trees, beginning with Sàlix herbàcea in the neighbourhood of the snow line, and extending to the leaf-wood forests of the temperate zone, terminating again with the Sàlix babylónica at the equator. The Coníferæ begin with the juniper, at the same distance from the snow line as the Amentàceæ, and end in the warm countries with the Casuarìna; the order is in the greatest perfection at 50° N. L. Caprifòliæ commence at some distance from the snow line, with Córnus and Linnæ`a, and extend through the temperate zone, with Lonicèra, Sambùcus, &c., to the torrid zone, where large groups of trees are formed by Rhizóphora *Mángle*. Boragíneæ extend from the limit of snow to the torrid zone; Onàgreæ from the snow line to the warm countries, where they are in the greatest degree of perfection at 40° N. L. Ericeæ commence in the vicinity of the snow line, and increase towards the warmer countries in variety, size, and beauty; the most luxuriant are in the African islands, and the greatest variety at the Cape of Good Hope. Geraniàceæ begin in Lapland with Gerànium sylváticum, and terminate among the Ericeæ in the warmer parts of the temperate zone. Rubiàceæ commence with Gàlium boreàle, some degrees south of the snow line, and pass into the torrid zone, where they contain the coffee, &c. Malvàceæ and Solàneæ are found both in the temperate and torrid zone. Convolvulàceæ commence in the vicinity of the snow line with herbs, continue herbaceous in the temperate countries, and end with some shrubs within the tropics. Urticeæ begin with the common nettle, on the plains of Lapland, and end with the fig and bread fruit in the torrid zone. Cucurbitàceæ begin with the Bryònia in 58° N. L., and increase in perfection, through Cùcumis, to the passion flowers on the boundary of the torrid zone. Apocýneæ are of similar extension. Papaveràceæ spread over the temperate zone, and also Jasmíneæ, commencing with the privet, and ending with Nyctánthus. The Cácti are almost exclusively natives of the warm zone. The Lauríneæ and Myrtàceæ extend from the torrid to the middle of the temperate zone. Sapindàceæ, Melastomàceæ, Mèliæ, Guttíferæ, Aurántiæ, and Ficoídeæ belong chiefly to the torrid zone. We pass over a number of small orders, the distribution of which will be found exactly indicated in the second part of our *Hórtus Británnicus*.

Animals differ from plants, in not adhering or being bound to the soil. They change the country they inhabit in an arbitrary manner, and the more so as they approach man in perfection. Man extends through all the zones, passes beyond the limit of eternal snow, and descends into the earth, below the limits of terrestrial life. Next to man, in partaking of life, are the mammàlia, birds, amphíbia, fishes, mollúsca, insects, worms, and zoophytes. A certain portion of the earth is appointed to each class, order, or genus, and particularly to each species of animal. In such situations only does each species display its particular properties. A sufficient knowledge of an animal's condition cannot be learned, unless that animal be considered relatively to its own peculiar and natural situation. "The polar bear lives only on and between the frozen plains of the north pole; the lion, only in Africa's burning deserts. The inhabitants of the snow line of the mountains, between the tropics, never descend to the warm level, nor do those of the level ascend the mountains as far as the snow line; each altitude having its peculiar animals. The mammàlia remain always in their native country, during the whole year; but birds are subjected to the change of seasons. They for the most part keep at a certain distance from the snow line; and, in the northern hemisphere, accordingly migrate, at the fall of the year, southward, following the apparent motion of the sun, and flying from the approaching fall of snow; but they return in the spring, as fast as the receding snow line will permit. Subjected to the caprice of nature, their dwelling-place is much limited, although the very same species seem to extend over immense districts." The native country of the more perfect animals is better known than that of many genera of plants, though this part of the study of natural history was paid little attention to before Humboldt enumerated the animals of the tropics, conformably to the different altitudes at which they live above the level of the sea.

The marine mammàlia are met with in all the seas of the world, but principally in the polar seas. Quadruped land mammàlia extend from the snow line to the torrid zone. Apes and monkeys belong to the torrid zone, but extend over a small part of the temperate zone. The whale (*B*alæ̀na) belongs chiefly to the frozen sea. The spermaceti whale (*P*hysèter) chiefly inhabits the seas of the southern hemisphere. The unicorn fish (Mónodon) inhabits the same seas as the whale. The dolphin is found in all seas, but chiefly in the north; the walrus and the seal in the frozen seas of both hemispheres. Ruminating mammàlia are common to those parts of the earth of which the grasses are native. The hart family (*C*érvus) extends from the snow line to the torrid zone; the reindeer and the elk being the most northern species, and the Mexican roe and hart of the Andes the most southern. The camels of the Old World belong to the warmer half of the temperate zone; those of the New World, including the lamas, to the grassy plains of the Andes. The ox tribe abounds in the middle of the temperate zones of both hemispheres, but they are domesticated as far north as 60°, and buffaloes are found in the torrid zone. Sheep and goats extend from the snow line to the torrid zone, but extend in the greatest perfection over the colder half of the temperate zone. The horse is common to temperate and warm climates, and is found wild in Arabia and Java. The limit to the spreading of the horse by domestication is 66° north latitude.

Carnivorous animals extend over all the zones, but are most numerous and terrific under the scorching sunbeams of the torrid zone. The dog extends from the limit of perpetual snow to the torrid zone in both hemispheres, terminating with the jackall and hyæna. The bear belongs to the coldest half of the temperate zone, but some species are found in the Andes. The cat genus is fiercest and most numerous in the hottest countries of the globe; towards the middle of the temperate zone it diminishes into the wild cat. "In Kamtchatka, Greenland, Lapland, and Iceland, there are no cats, nor does the lynx in Europe extend farther than Norway." The civets and weasel belong to the torrid and the warmer half of the temperate zone; sables, martens, ermines, storks, and the common weasel, spread northwards in great numbers, but as they prefer woody tracts they are seldom found beyond 70° north latitude. Moles, shrews, and hedgehogs inhabit both the temperate and torrid zones. The common mole lives throughout Europe, in Barbary, and in Northern Asia. The common hedgehog lives in the warmer parts of Europe; it is found in Norway, but not in Lapland or Iceland. Opossums inhabit the warm countries of America and New Holland. Bats extend over the whole earth. Dormice are most numerous in the torrid, but are also frequent in the temperate, zone. The families of mice, squirrels, and hares are found in every part of the habitable globe. Beavers belong to the colder half of the temperate zone, cavies to the warmer parts of the New World, porcupines to the warmest part of the temperate zones of both hemispheres. The swine genus is much diffused; it belongs to the warmer half of the temperate zones, but extends in a wild state beyond 60° north latitude, and domesticated to 63° north latitude.

Marine birds, of both hemispheres, are most abundant in the polar seas, and among the icy plains on the limits of organic life. The tropical birds (Phàeto*n*) inhabit the regions between the tropics. The albatross (*D*iomedè*a*) inhabits the seas of the frigid and temperate zones of both hemispheres.

Pelicans are found over the three zones of both hemispheres, and in fresh water as well as in the sea. Gulls and cormorants are peculiar to the northern hemisphere. Ducks and geese are spread over the whole earth, but are most numerous in the colder half of the temperate zone. Moorfowl, and other Grállæ, spread over both hemispheres, from the snow line to the torrid zone. Herons are plentiful in the temperate and warm zones. The common rail is met with in most countries in Europe, and in North America. The plover spreads over the zones of both hemispheres as far as the snow line. The snipe appears to be peculiar to the northern hemisphere, and the *I*'bis Tántalus, which is related to the snipe, is numerous in warm countries.

The land birds, *V*últur and Fálco, extend over both hemispheres, perhaps even farther than the snow line. The owl is spread over all the habitable parts of the globe. The butcher bird is found in the warm and temperate zones of both hemispheres. The parrots, a numerous family, are almost confined to the tropical regions. Ravens, like owls, are spread over both hemispheres. Nuthatches, bee-eaters, and humming-birds, chiefly belong to warm climates. Sparrows are diffused over the whole of the habitable globe, but are most abundant in the warm zone. The family of finches is very abundant in the colder parts of the temperate zone. The nightingale is met with throughout Europe, from Sweden to Greece, and also in Siberia. The family of the thrush extends from the temperate to the warm zones. The family of larks inhabit the warm countries, but the field lark is found in Kamtchatka. Swallows spread over the frigid, temperate, and torrid zones. "Our chimney swallow (*H*irúndo doméstica) is found from Norway to the Cape of Good Hope, from Kamtchatka to India and Japan; and in all the regions of North America. The house marten (*H.* úrbica) is found in Europe and America: the swift marten (*H. A*'pus) inhabits the whole of Europe, and is met with at the Cape of Good Hope, and in North America." Hens, partridges, and woodcocks are diffused over all the zones, and met with near the snow line. Pigeons inhabit both hemispheres as far as 60°. Pheasants do not extend beyond 46° north latitude. The domestic hen lives in Greenland, but does not breed there, or in any cold country. It is found in its wild state in the forests of India. The turkey is wild in the woods of America, and the peacock in those of Africa and Asia.

Frogs and toads are the most numerous amphíbia in the colder portion of the temperate zone, and lizards are the most numerous in the direction of the snow line: but lizards belong chiefly to the torrid zone, because there they attain their greatest size as crocodiles. Most snakes are natives of the torrid zone, but some species are spread throughout Europe. Tortoises are peculiar to the warm parts of the temperate zone.

Fish, whether of land waters or the ocean, gradually increase in number, size, appearance, and quickness, from the cold to the torrid zones. Marine fish, by swimming under the ice, approach nearer to the poles than any other animals, or than plants.

Insects are handsomest and largest in the torrid zone; but they are spread over every part of both hemispheres, and winged insects sometimes pass beyond the snow line.

Crabs and shellfish are met with in Greenland, and in the southern hemisphere beyond 80°. How far they are diffused in the intermediate space cannot be ascertained.

Snails and worms of the land and of fresh water approach near the snow line, and are most numerous in the temperate zone. Mollúsca and worms of the sea are most plentiful within the tropics, where they attain the largest size; but they are also found in the snow line. Marine zoophytes, and especially coral polypes, are peculiar to the seas between the tropics, where the beds of coral in time become islands; but zoophytes are also found about Iceland and Greenland.

ART. II. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

BRITAIN.

Faúna Boreàli-Americàna, or the Zoology of the Northern Parts of British America; containing Descriptions of the Objects of Natural History collected on the late Northern Expeditions, under the Command of Capt. Sir John Franklin, R.N. By John Richardson, M.D. F.R.S.F.L.S., Member of the Wernerian Natural History Society of Edinburgh, and Foreign Member of the Geographical Society of Paris, Surgeon and Naturalist to the Expeditions; assisted by William Swainson, Esq. F.R.S. F.L.S. &c., and the Rev. William Kirby, M.A. F.R.S. F.L.S. &c. Illustrated by numerous Plates. Published under the Authority of the Right Hon. the Secretary of State for Colonial Affairs. London. Murray. 1829. pp. 300.

The volume at present before us has been expected from its highly talented author with the most intense interest, not only by those more immediately attached to zoology for the valuable additions to that science which it was certain of making, but by all who, remembering the dreadful privations and acute sufferings of the party of which Dr. Richardson was one of the few survivors, felt a wish to contemplate in a complete form how much had been achieved by men surrounded with such difficulties as, to minds less ardent in the pursuit of knowledge, would have proved insurmountable barriers to its attainment.

From the Zoological Appendix to Captain Franklin's First Voyage, by Mr. Sabine, and from several brief scientific notices of the new species and genera of animals met with in both expeditions, published in the *Zoological Journal*, we were in a great measure prepared for the contents of this work. In general such preparation in the reader is disadvantageous to the author, by raising the expectations of the former too high to be satisfied: but, in this instance, such is decidedly not the case; for, whether we consider the condensed mass of novel information, the number of species for the first time introduced to our systems, the accuracy of the scientific details, the beauty and correctness of the illustrations, and the whole appearance of the book, it reflects the highest degree of credit upon the authors, the artist, and the government, the liberality of which we are most happy to see extended to the rewarding of meritorious perseverance, and to the diffusing over the world that knowledge which Englishmen especially love to acquire, and which England, of all the nations upon the face of the globe, possesses the greatest power of accumulating.

In the Introduction the general plan of the work is detailed, by which we learn, with pleasure, that the present is only the first of a series of volumes, which will embrace the whole zoology and botany of the districts visited by the expeditions. In furtherance of this useful and laborious design 500*l.* has been appropriated by government to defray the expense of publication of the first two portions, which consist of the Mammàlia (the present volume) containing twenty-seven plates, and of the Birds which will be illustrated by fifty coloured ones; and to the Fishes, Insects, and Plants, an equal sum has been dedicated.

A condensed and simple sketch of the districts traversed by the voyagers forms the bulk of the Introduction, which, by furnishing lists of the quadrupeds found in each, presents a most valuable table of their geographical distribution in this part of America, and forms a clue to the observations upon that most difficult of all questions in the science, the discrimination between species and mere varieties produced by difference in climate and food, which are scattered through the body of the work.

After describing the rapidity with which the expeditions passed to the north-eastern arm of Lake Huron, and the consequent impossibility of collecting more than a very few animals during that stage of their progress, the author informs us that, "with these slight exceptions, the specimens brought to England were entirely collected to the north of the Great Canada Lakes, beyond the settled parts of Upper Canada, and, in fact, in a widely extended territory, wherein the scattered trading posts of the Hudson's Bay Company furnish the only vestiges of civilisation." The work may therefore be termed *Contributions to a Fauna of the British-American Fur Countries.*

This territory is artificially divided into five districts: —

1. The Rocky Mountains (the Shining Mountains of Pennant), which are supposed by Dr. Richardson to be continuations of the Andes, giving rise to the four principal rivers, Columbia, Missouri, Saskatchewan, and Mackenzie, besides many smaller streams. They contain 1 species of bat, 1 shrew, 12 carnivorous quadrupeds, 21 gnawers (Rodéntia), 3 deer, 1 goat, 1 sheep, and the bison.

2. The Barren Grounds, so named from their containing no wood, form the north-eastern corner of America, bounded on the west by the Copper Mine River, the Great Slave, Athapescow, Wollaston, and Deer Lakes; on the south by the Churchill, or Mississippi River; and on the north and east by the sea. "Being destitute of fur-bearing animals, no settlements have been

formed within the Barren Grounds by the traders, and a few wretched families of Chipewyans, termed from their mode of subsistence 'Caribou-eaters,' are the only human beings who reside constantly upon them. Were any one to penetrate into their lands, they might address him with propriety in the words used by the Lapland woman to Linnæus, when he reached her hut, exhausted by hunger and the fatigue of travelling through interminable marshes, "O, thou poor man! what hard destiny can have brought thee hither to a place never visited by any one before? This is the first time I ever beheld a stranger. Thou miserable creature! how didst thou come, and whither wilt thou go?" (Introd. p. xxiv.) This inhospitable tract furnishes 9 species of Carnívora, including bears and foxes, 9 gnawers, a variety of the reindeer, and the musk ox.

3. The Eastern District, lying between the western border of a range of low primitive rocks, which skirt the Barren Grounds, and the coast of Hudson's Bay, contains 2 or 3 bats, 3 shrews, 17 Carnívora, including a few *M*ustèlæ, 12 Rodéntia, among which are the the flying squirrels, the elk and reindeer.

4. The Limestone Tract, in which, being well wooded and well watered, fur-bearing animals are abundant, is inhabited by 1 bat, 3 Insectívora, 17 Carnívora, 15 Rodéntia, including the Canada porcupine, the elk, reindeer, and bison.

5. Prairie Land, situated between the Limestone District and the Rocky Mountains. This "is in general level, the slight inequalities of surface being imperceptible when viewed from a distance; and the traveller, in crossing it, must direct his course by the compass or the heavenly bodies, in the same way as if he were journeying over the Deserts of Arabia. The soil is mostly dry and sandy, but tolerably fertile; and it supports a pretty thick sward of grass, which furnishes food to immense herds of bisons. The abundance of pasture renders these plains the favourite resort of various ruminating animals. They are frequented throughout their whole extent by buffalo and wapiti. The prong-horned antelope is common on the Assinaboyn, or Red River, and the southern branch of the Saskatchewan, and extends its range in the summer to the northern branch of the latter river. The black-tailed deer, the long-tailed deer, and the grisly bear, are also inhabitants of the plains, but do not wander further to the eastward." (p. xxviii. et seq.)

The quadrupeds found in the Prairies are 3 species of Carnívora, consisting of the genera *U*'rsus and *C*ànis; 7 Rodéntia; the horse, in herds, having wandered from the neighbourhood of Mexico; 4 deer; the prong-horned antelope; and the bison.

The species described in the work are 92 in number, of which 22 were nearly unknown to science prior to Dr. Richardson's examination of them, Mr. Sabine and himself having, with the greatest care and accuracy, compared the specimens with the description and figures of former travellers and scientific writers, in many instances confirming and amplifying the slight notices of them by Lewis and Clarke, Ord, Say, &c., and in others either demonstrating their entire novelty, or fixing, as far as the present state of zoological knowledge will allow, their situations in a natural system. To attempt the further compression of so condensed a work, would be a hopeless labour; we can therefore present our readers with little more than a few notices of the rarer animals, and very limited extracts from the interesting anecdotes and judicious observations of the author.

The two bats described by Dr. Richardson have both been named by Say. Of the three shrews, two are new, but are uninteresting, except for their novelty. Of the shrew-mole (Scàlops canadénsis), the following history is given: — "The shrew-mole resembles the common European mole in its habits, in leading a subterraneous life, forming galleries, throwing up little mounds of earth, and in feeding principally on earthworms and grubs. Dr.

Godman has given a detailed and interesting account of their manners, particularly of one which was domesticated by Mr. Titian Peale. He mentions that they are most active early in the morning, at mid-day, and in the evening, and that they are well known in the country to have the custom of coming daily to the surface *exactly at noon.* They may then be taken alive by thrusting a spade beneath them, and throwing them on the surface; but can scarcely be caught at any other period of the day. The captive one in the possession of Mr. Peale ate considerable quantities of fresh meat, either cooked or raw, drank freely, and was remarkably lively and playful, following the hand of its feeder by the scent, burrowing for a short distance in the loose earth, and, after making a small circle, returning for more food. When engaged in eating he employed his flexible snout in a singular manner to thrust the food into his mouth, doubling it so as to force it directly backwards." (p. 12.)

As we are in possession of various excellent accounts of the forms, manners, and habits of the American bears, it would be superfluous to extract any of the author's observations upon them, they principally confirming the information previously derived from Hearne, Lewis and Clarke, &c., except to notice that, according to the statements of Dr. Richardson, the carnivorous propensity of the bears of America is diametrically opposite to that of those of Europe, the Brown Bear in the former country living more on flesh than the black species. This observation principally relates to a brown variety, much resembling the Norway Bear, which inhabits the Barren Grounds, and has, by Hearne and others, been confounded with the Grisly Bear (*U*rsus fèrox). The following short anecdote presents us with a characteristic trait of the simplicity of some of the natives of these regions: — "Keskarrah, an old Indian, was seated at the door of his tent, pitched by a small stream, not far from Fort Enterprize, when a large bear came to the opposite bank, and remained for some time, apparently surveying him. Keskarrah considering himself to be in great danger, and having no one to assist him but his aged wife, made a speech to the following effect: — 'O bear! I never did you any harm; I have always had the highest respect for you and your relations, and never killed any of them except through necessity. Go away, good bear, and let me alone, and I promise not to molest you.' The bear walked off, and the old man, fancying that he owed his safety to his eloquence, favoured us on his arrival at the fort with his speech at length." (p. 22.)

Dr. Richardson appears rather more than to doubt the specific identity of any animals, however closely they may resemble, which, as inhabitants of the great continents of the world, are separated by intervening oceans; hence, with Mr. Sabine, he considers the American Badger (*M*èles labradòria *Sabine*) and the Wolverene (Gùlo lúscus *Sabine*), as well as the Canadian lynx, and the whole tribe of wolves, dogs, foxes, marmots, elks, reindeer, &c., as specifically distinct from their European representatives, although their formation and consequent habits as nearly approximate as is possible, allowing for the natural differences of climate and food, which exist in their localities. However great are the authorities for this opinion, we cannot hastily adopt it. When we consider how completely not only the form and colour, but even the osteology and relative proportions of the viscera, are altered in our domestic animals, new races with marked peculiarities daily arising before our observation, we cannot believe but that the same agents, over which man possesses a certain power to produce regular changes in animal structure to contribute to his convenience, are ever active under the control of Nature herself. To make ourselves more distinctly understood, we might state that the same plastic and compensatory power, existing throughout all nature, which enables man to produce gradually a greyhound or a pug from the original type of the canine family, whatever it may have been, would of itself act, more slowly, perhaps, but not less certainly, in producing all the different wild breeds (or species, as they appear *in our systems*) of dogs, foxes, reindeer, &c., precisely in accordance with their localities, whether hot, temperate, or cold, dry or moist, elevated or low. But to apply this argument to the innumerable variety of forms in creation, so as to draw a strict line of demarcation between apparently identical species, will be the task of future centuries; and, in the meantime, it would surely be less objectionable to consider them only as varieties, than to add to the perplexing myriads of technical terms with which the science is already overwhelmed. These observations, we wish it to be understood, apply only to those animals which Dr. Richardson terms the *representatives* of such species as are found in the old world; to other tribes, as monkeys, antelopes, &c., the individuals of which are numerous but well defined, they are inapplicable.

In mentioning the Americal Glutton, or Wolverene, our author takes occasion to contradict the absurdities promulgated by former writers respecting the European animal of the same name, such as its watching on the branch of a tree, until a deer passes beneath, to drop upon the unsuspecting prey, tearing its eyes out to impede its flight, &c., and eating with such voraciousness, that it is obliged to squeeze itself between two trees to get rid of the effects of its inordinate meal. These stories originated at a very early period, and, being handed down to the time of Buffon, were, with every thing strange and marvellous, adopted by that eloquent but incorrect writer, and, of course, admitted into almost every subsequent compilation. Dr. Richardson naturally believes the habits of the European closely to resemble those of the American Gùlo, which, he says, feeds chiefly on the carcasses of beasts which have been killed by accident, chases meadow mice and hares, and attacks larger animals only when they are disabled. (p. 43.)

Of the principal "fur-bearing animals" belonging to the genus *M*ustèla (including the martens, weasels, and otters), which are well known, accurate descriptions are given, of which it is necessary for us to notice only one, the Pekan, or *Fisher*-weasel, which has derived its English appellation from its habits having been confounded, particularly by Pennant, with those of the Vison, which animal, although not web-footed, spends much of its time in the water, and preys upon small fish, spawn, fresh-water muscles, &c., whilst the Pekan leads the same kind of life as the Pine Marten, preferring, however, damp places, where it partly subsists upon frogs, but its favourite food being the Canada Porcupine, which it kills by biting it on the belly. (p. 53.)

A very ample account of the wolves commences a consideration of the genus *C*ànis, in which the white, pied, dusky, and black are considered as mere varieties of the common grey wolf of America (*C*ànis *L*ùpus occidentàlis); but the Prairie Wolf (*C*ànis làtrans), "from differences in its size, voice, and manners," is adjudged to form a separate species. Our author appears to hold the opinion that the dog has been originally derived from the wolf, and in the three principal varieties described (the Esquimaux, Hare-Indian, and North American or Canadian), he draws a parallel between them and the three chief varieties of wolves. Of the foxes Dr. Richardson gives a very minute and interesting account, in which eight varieties are described, of which five are considered as distinct species.

We must now pass on to the Rodéntia, of which order the species are so numerous in the fur countries, and so many new ones have lately been discovered, that nearly half the volume is occupied by their description.

As in other cases, Dr. Richardson very properly combats the absurdities which have been related by Buffon and others respecting the beaver, and transcribes the account of the habits of that quadruped from Hearne, as the most accurate. Of the Musquash, a kindred animal in manners and instinct, a very ample and excellent description is presented, and of the Meadow-Mice (Arvícula) and Lemmings (Lemùrus) several new species are introduced; but of the genera which have been recently established, those of Spermóphilus, which has been separated from that of *Marmótta* in consequence of the animals composing it possessing cheek-pouches, and Diplóstoma, or Camas Rat, both established by Dr. Richardson, are the most interesting. From the combined characters of the former, it appears to unite the marmots with the hamsters, and in it are contained eight American species, seven of which are severally named after the adventurous explorers of these inhospitable regions, Parry, Richardson, Franklin, Beechey, Douglas, Say, and Hood. Whilst we utterly disclaim the slightest wish of detaching a single laurel from such brows, we cannot forbear taking this opportunity of entering our protest against this wholesale complimentary nomenclature, which, in these instances, appears peculiarly inappropriate, since the reputation of our gallant discoverers, indelibly engraven on every chart in the world, can scarcely be supposed to derive any material addition from having their names bestowed upon rats and mice; the compliment, if any, seems here in fact to be reversed, infinitely greater honour being thus conferred upon the Spermóphili. The other new genus Diplóstoma is extremely peculiar, inasmuch as the cheek-pouches, which are lined with hair, do not communicate with the mouth, which is a mere perpendicular slit behind the exserted incisors, but open in front of it.

Other genera of recent foundation, as Neótoma (divided from the Lemmings), Merìones (formerly a *Jerbòa)*, Tàmias (the Ground Squirrels), Geòmys (Sand Rats), Aplodóntia (nearly allied to the last, and scarcely established from living specimens), Lagòmys, and Lipùra (both separated from the hares) differ, more or less, in their teeth, from genera formerly acknowledged. Were it possible for man, with his imperfect faculties, to fabricate a perfect system, these minute subdivisions might materially expedite so desirable a consummation; but as that is confessedly beyond the reach of human power, it becomes a question worthy of serious consideration, whether they do not rather impede than hasten the progress of science by overburthening the memory. It is by no means established what precise characters of an animal ought to be considered as sufficiently influential to warrant its generic separation from others nearly allied to it. The shape and arrangement of the teeth have been usually selected as forming the most important; but the order Rodéntia appears to us an exception to the rule. Of large groups of these animals the mode of life is precisely similar, and the presence or absence of two or three bands of enamel on the crowns of the grinders, or a different direction of their waving lines, which do not seem to affect their manner of using them, appear to be characters of scarcely sufficient consequence to divide them into separate types. In the more general divisions, such as squirrels, mice, hares, porcupines, &c., so much difference is at once observable in *the aggregate* of their characters, which positively and materially influence their modes of subsistence, that the correctness of their separation from each other admits of no dispute; but if the form of the teeth alone be considered as generic distinctions, each individual species throughout this extensive order might become a new type, as no two are precisely similar in their dentition.

The Canada Porcupine (*Hýstrix* pilòsus *Catesby*), which lives on the bark of the larch and spruce fir, willow, &c., is described as a sluggish and unsightly animal, seldom moving far from one spot, provided its food be abundant. The following account of the use of its spines is an important fact: — "It is readily attacked by the Indian dogs, and soon killed, but not without injury to its assailants; for its quills, which it erects when attacked, are rough with minute teeth, directed backwards, that have the effect of rendering this seemingly weak and flexible weapon a very dangerous one. Their points, which are pretty sharp, have no sooner insinuated themselves into the skin of an assailant, than they gradually bury themselves, and travel onwards, until they cause death, by wounding some vital organ. These spines, which are detached from the porcupine by the slightest touch, and probably by the will of the animal, soon fill the mouths of the dogs which worry it, and unless the Indian women carefully pick them out, seldom fail to kill them. Wolves occasionally die from the same cause." (p. 215.)

We regret that we have not space for making any extracts from the valuable observations on the hares of America, to clear the former accounts of which from a labyrinth of confusion, Dr. Richardson has effected much; and we must express the same regret at being obliged to pass over the genus *Cérvus*, of which the moose, two varieties of reindeer (the Wood-land and Barren-ground Caribou), the Wapiti, the Black-tailed Deer (*C.* macròtis *Say*), and the Long-tailed Deer (*C.* leucùrus *Douglas*), were the species met with by the expeditions. Of the Prong-horned Antelope (*Antilòpe* fúrcifer *Smith*), an animal principally known from a paper in the 13th volume of the *Linnean Transactions*, by Major H. Smith, an ample account is given. But we must omit further notice of these highly interesting animals, as well as of the bison, the musk-ox, and the argali, or Rocky-Mountain sheep, to extract a brief notice of the Rocky-Mountain Goat (*Càpra* americàna *Harlan*), which has hitherto been regarded as an antelope (*A.* lanígera *Smith*) bearing wool like a sheep. This animal is of the size of the domestic ram, having the form of body and robust neck with the manners and habits of the common goat. Its colour is totally white, except the horns, hoofs, lips, and margins of the nostrils, which are black; the wool which it produces, intermixed with long coarse hair, grows principally upon the back and hips, hanging down the sides like that of the Merino variety of the sheep. Its flesh is so hard and dry, as to be held in little estimation as food; but its wool and skin are highly useful, the latter being manufactured by the Indians into caps and saddles. A specimen of the fleece having been sent by the Hudson's Bay Company to the Wernerian Society of Edinburgh, was reported, by the person appointed to examine it, to be unlike that of the sheep, of equal fineness throughout, that on the fore part being similar to ordinary wool, and on the back much resembling cotton, the whole being of the first rate quality. The animal frequents the loftiest peaks and steepest precipices of the Rocky Mountains, probably extending from the 40th to the 64th or 65th degree of latitude." (p. 268. et seq.)

We cannot dismiss this most valuable and interesting volume, without paying a just tribute to Mr. Thomas Landseer for the spirit and accuracy with which his illustrations are executed, and which, as the best performances of his pencil we have yet seen, must, we are certain, add materially to his deserved reputation. One figure, however, we consider to be a failure: it appears as if the artist were determined to destroy all the antelopean characters of the new *C*àpra americàna, that it might never again be mistaken for an antelope, By comparing this figure with the specimens in the museums of the Linnean and Zoological Societies, the body appears much too short, the beard and the outline of the throat too well defined, and the appearance of wool wholly omitted.

There are two plates of osteological illustrations (the skull of *U*rsus fèrox, and two crania and teeth exemplifying the new genera Diplóstoma and Aplodóntia), of which we can only observe that the style of etching is totally unfit for the scrupulous accuracy requisite in displaying minute anatomical detail. — *H. W.*

Griffith, Edward, Esq. F.L.S. A.S., and others: The Animal Kingdom described and arranged in Conformity with its Organisation. From the French of the Baron Cuvier. With additional Descriptions of all the Species hitherto named, and of many not before noticed; and other original Matter. London. In 8vo Parts. XVIII. and XIX.

Carus, C. G., Med. et Phil. Doct.: An Introduction to the Comparative Anatomy of Animals, compiled with constant reference to Physiology; with an additional Appendix on the Discovery of a Circulation in Insects.

Translated from the German, by R. T. Gore, Mem. of the Royal College of Surgeons in London. 2 vols. 8vo, and a 4to vol. of 20 pls. *3l.* bds.

Cuvier, Baron *George*: A Discourse on the Revolutions of the Surface of the Globe, and the Changes thereby produced in the Animal Kingdom. Translated from the French. London. 1 vol. 8vo.

Price, the Rev. *T.*: An Essay on the Physiognomy and Physiology of the present Inhabitants of Britain, with reference to their Origin as Goths and Celts; together with Remarks upon the Physiognomical Characteristics of Ireland, and some of the neighbouring Continental Nations. London. 8vo. *6s.* bds.

Le Keux, J., Conductor, and R. Sands, Engraver: Illustrations of Natural History; embracing a Series of Engravings, and descriptive Accounts of the most interesting and popular Genera and Species of the Animal World. London. 8vo Nos. monthly, *1s.*; and 4to Nos., every two months, with proofs of the plates, *4s.*; or on India paper, *5s.* Nos. I. and II.

The engravings are on steel; but, though they are most beautifully executed, and make pretty pictures, they cannot be called good or characteristic figures of the species. The letter-press is compiled in a popular manner, and the work may certainly be considered the cheapest of its kind. It is proposed to devote 30 numbers to 240 species and varieties of quadrupeds, one volume to 130 birds, one volume to fishes and amphibious animals, and one volume to reptiles and insects. "Thus the purchaser will be possessed of a cyclopædia of natural history, at the moderate price of *3l.*, embracing beautiful representations and historical accounts of more than 600 species of the animal creation." (*Address on the Cover.*)

Horsfield, T., M.D. F.R.S. &c.: A Descriptive Catalogue of the Lepidopterous Insects contained in the Museum of the Hon. East India Company, illustrated by coloured Figures of New Species, &c. London. Part II., in roy. 4to, *1l. 11s. 6d.*; or with proof impressions, and all the plates coloured, *2l. 2s.*

Burrow, the Rev. *E. J.*, A.M. F.R.S. F.L.S. Mem. Geol. Soc.: Elements of Conchology, according to the Linnean System. London, 1829. 1 vol. 8vo, 28 plates from nature. *16s.* bds. plain; col. *31s. 6d.*

Anon: The Conchologist's Companion, comprising the Instincts and Constructions of Testaceous Animals; with a General Sketch of those extraordinary Productions, which connect the Vegetable and Animal Kingdoms. London, 1829. 12mo. *6s.*

Lindley, John, Esq. F.R.S. L.S. G.S. &c. Professor of Botany in the London University: An Introductory Lecture to the Course of Botany to be delivered in the London University. London. 8vo. *1s.*

After tracing the origin and progress of botany, and its important uses, directly and indirectly, in the arts of life, the professor announces his intention of teaching this science by the Jussieuean method, as alone worthy of the present age, the present state of science, and the London university. Professor Henslow at Cambridge, we believe, is the only other botanical teacher who follows in his lectures the same system. We think both gentlemen entitled to the highest praise, and we doubt not they will be followed by all the professors in the country.

Henslow, the Rev. *J. S.*, M.A., Professor of Botany in the University of Cambridge: A Catalogue of British Plants, arranged according to the Natural System, with the Synonyms of Decandolle, Smith, and Lindley Cambridge. 8vo. 1829.

Murray, John, Esq. F.S.A. F.L.S. F.H.S. F.G.S., &c.: A Glance at some of the Beauties and Sublimities of Switzerland; with excursive Remarks on the various Objects of Interest, presented during a Tour through its picturesque Scenery. London, 1829. 12mo. 7*s*.

This is a most agreeable little book, which no body will be sorry for having purchased. The author seems to have been accompanied by his wife, which must have greatly enhanced the enjoyments of that delightful region at the time, and laid the foundation for the most interesting and agreeable associations and recollections. Of all ways of enjoying the honeymoon, none appears to us at all comparable to that of travelling in a foreign country; not flying through it in a close carriage, in the manner of the English nobility, but taking the public conveyances, now and then hiring a post-chaise, a cabriolet, or char à banc, and stopping a day or two at the most interesting towns or situations, and examining them and the neighbourhood on foot, as did Mr. and Mrs. Murray.

Conversations on Vegetable Physiology; comprehending the Elements of Botany, with their Application to Agriculture. By the author of "Conversations on Chemistry," "Natural Philosophy," &c. London, 8vo, 2 vols. 12mo.

An excellent work, which we shall notice more at length in next No.

Anon.: The Wonders of the Vegetable Kingdom displayed. In a series of Letters. London, 1829. 2d edit. 12mo. 6*s*.

France.

Cuvier, M. le Baron, &c.: Le Règne Animal distribué d'après son Organisation, pour servir de Base à l'Histoire Naturelle des Animaux, et d'Introduction à l'Anatomie comparée. Nouvelle édition, revue et augmentée. Paris. Five vols. 8vo.

The present, or second, edition of Baron Cuvier's "Animal Kingdom arranged according to its Organisation," is extended to five volumes, only four of which have reached this country. The third volume, containing the Mollúsca and Radiàta, will complete the work, and is expected shortly to appear. It is now twelve years since the first edition of this valuable work was published. If the Paris editions of distinguished works do not exceed in number of copies those of the London booksellers, we cannot but express our surprise that so long a period should elapse between the publication of the first and second editions of the *Règne Animal*, a work which forms an epoch in the science of zoology. Our surprise is further increased when we consider the moderate price of the former edition of four volumes (about 20*s*. English), and that a large number of copies must have been sold to different parts of Europe. This fact proves that, out of Paris and its immediate vicinity, the number of scientific readers in France is comparatively very small. In Paris and other large cities in France, from the houses being generally occupied by several families, there is little accommodation for forming private libraries: it is the same in Geneva; we were informed, when there, that only two or three gentlemen in the place had any number of books which could deserve the name of a library. This inconvenience is partly remedied by public libraries, which are open almost every day throughout the year, and to which readers have free access. Making due allowance for this, still the great length of time which is required for the sale of a single edition of many valuable works that we could mention, shows that scientific readers are more rare in the provinces of France than in Great Britain. The provinces of France are in respect to science, what England was a century ago, when Addison informs us that "few country squires knew that they were living upon a planet."

To return to the *Règne Animal.* In the first volume, which contains Mammiferous Animals and Birds, the same arrangement is preserved as in the former edition, except of the quadrumana, or monkeys. New genera, which have been recently discovered, are added in some of the other orders, but these are not numerous. In the second volume, the arrangement of the Reptiles is nearly the same as in the preceding edition, but there is a considerable alteration in the arrangement of the various orders of Fish. The fourth and fifth volumes comprise the Crustàcea, Arachnìdes, and Insects, or what Cuvier denominates, *Articulated Animals.* This part of the work is greatly enlarged, and in many respects new. It is not written by Cuvier, but by M. Latreille, who was also the author of the fourth volume of the former edition, the occupations of Baron Cuvier not admitting him to extend his labours to the animals in this division. As we shall particularly advert to whatever differences may occur between the first and second editions of the *Règne Animal,* in the essays we are giving on the Cuvierian system, in the Magazine of Natural History, we do not think it necessary to enlarge upon them in the present notice. It may be useful to some of our readers in the country, to inform them that French books may be purchased in this country on more reasonable terms than formerly; the booksellers in London charge now one shilling for what is sold in Paris for a franc or tenpence. The four volumes already published of the *Règne Animal* sell for 28*fr.* in Paris, and 28*s.* in London. — *B.*

Guérin, F. E., Membre de la Soc. d'Hist. Naturelle de Paris, de l'Acad. Roy. des Sc. de la Rochelle, de la Soc. des Sc. de Lille, de la Soc. Linnéenne de Bordeaux, &c. &c.: Iconographie du Règne Animal de M. le Baron Cuvier, ou Représentation, d'après Nature, de l'une des Espèces les plus remarquables, et souvent non encore figurée, de chaque Genre d'Animaux; Ouvrage pouvant servir d'Atlas à tous les Traités de Zoologie. Paris. 8vo, in 25 livraisons with 10 plates each. 6*fr.* plain; 15*fr.* coloured.

We have here the commencement of a work of considerable interest to the student in geology, as enabling him to obtain, at a moderate expense, correct representations of all those forms of the animal creation which have appeared to MM. Cuvier and Latreille to deserve the rank of genera. To those distinguished naturalists M. Guérin has dedicated it, and they have charged themselves with the general superintendence of his production. They have undertaken to point out to him such subjects in nature, for the whole of the figures are original, as are most illustrative of each genus, or most worthy of being represented; and each plate is submitted for their approval, previously to its publication. These arrangements would alone have constituted a sufficient guarantee of the usefulness and fidelity of the work, and its possession of these requisites is fully confirmed by an inspection of the first number, the only one that has yet reached us.

In the ten plates contained in the number before us, M. Guérin furnishes us with upwards of fifty figures, which may be regarded as specimens of the mode in which he proposes to illustrate the whole of the animal kingdom. There are two plates of Mammàlia, representing seven monkeys of the Old Continent, the types of an equal number of genera of that interesting tribe. The figures of the animals themselves are accompanied by those of their skulls, and by such other details as the authors have judged necessary for the illustration of the several groups. By means of these, the leading characters of each genus, as well as the individual features of the species figured, are rendered obvious to the eye. There is, however, one disadvantage inseparable from the plan of giving a complete work methodically arranged, the impossibility, namely, of figuring living subjects alone, and the consequent loss, in many instances, of those characters of expression which are extinguished with the life of the animal. This may be in a great degree remedied by the skill of an artist like M. Guérin, thoroughly acquainted with all the intricacies of his subject, but can never be entirely overcome; and in the monkeys especially, in consequence of the peculiar mobility of countenance with which they are endowed, and the complete change produced in their features by death, forms a stumbling block scarcely to be surmounted. On this account, in one or two of the figures before us, the Mòna for instance, although the zoological characters are well preserved, the expression of the physiognomy is entirely lost.

Of Birds there is only one plate, representing four of the groups of the vulture family, with additional views of their beaks and talons. The Reptiles, also in one plate, comprise the five genera of the tortoises admitted by M. Cuvier, with their details, extremely well figured. There are no Fishes given in the present number, the artist intending, perhaps, to defer the publication of the plates illustrative of that class, until M. Cuvier's extensive work on the subject, carried on in conjunction with M. Valenciennes, shall have more completely developed the views of that great zoologist, with regard to this his favourite branch of the science. The Mollúsca figured are Cephalópodes, including the animals found in the shell of Argonaúta, the shell of *N*aútilus, and the animal and shell of Spirórbis; and with their details are well represented. The Crustàcea too, four in number, and of the decapodous or crab-like form, are drawn with the hand of a master, and furnish a very elegant plate. One of *A*rachnìdes (spiders), and three of Insects, exhibiting also dissections of the mouths, complete the present number, and are finished in a style very superior to that which we have been accustomed to in most of the works on entomology published in France. If M. Guérin proceed as he has begun, and find imitators in this department, the French school of entomological artists will soon vie in accuracy and general effect, if not in minuteness of finish, with the best productions of the German or the English.

In twenty-five such numbers as the one which we have just described, M. Guérin calculates that he shall be able to furnish representations of every genus contained in the recently published edition of the *Règne Animal.* To that standard work his publication may properly be regarded as a complete series of illustrations: but it is equally adapted to illustrate any other general system of zoology, and will be found especially serviceable to those who are desirous of obtaining correct views of the forms of the whole of the animal kingdom, but who are precluded, by their distance from extensive museums, from opportunities of frequently and freely examining the objects in nature which they contain. — *E.*

Faune Française, ou Histoire Naturelle, Générale, et Particulière, des Animaux qui se trouvent en France, constamment ou passagèrement, à la Surface du Sol, dans les Eaux qui le baignent, et dans le Littoral des Mers qui le bornent; par MM. L. P. Vieillot, A. G. Desmarest, H. M. Ducrotay de Blainville, S. Audinet-Serville, Lepeletier de Saint-Fargeau, et C. A. Walckenaer. Paris. In Monthly Numbers, 8vo. Uncoloured plates, 4 *fr.*; coloured, 10 *fr.*; and 4to col. plates, 15 *fr.*; proofs, 20 *fr.* The 22d Number was published in June last.

Both in design and execution, this extensive and useful work is highly deserving of commendation. Its object is to describe the whole of the "animals found in France, constantly, or for a season only, whether on its surface, in its waters, or on its coasts;" and to accompany these descriptions by "original figures drawn, wherever it may be possible, from the living specimen." In this manner it is proposed to represent every species of the vertebrated division of the animal kingdom; and, among the invertebrated, all those which belong to groups of superior interest, as well as a large proportion of the remainder. Several thousand species will consequently be figured in the 900 plates which the work will contain when completed; and a mass of original illustrations, more extensive and more comprehensive than almost any other that has yet been given to the world, will be accumulated for the use of the zoological student. Of these plates, upwards of two hundred have already appeared; they are executed in a style which reflects great credit on the artists employed, and leave little to be desired on the score of accuracy and neatness of delineation. They have no pretensions, it is true, to be compared with our friend Audubon's stupendous work on the birds of America; nor can they be put in competition, as works of art and of luxury, with the beautiful *Planches Coloriées* of M. Temminck, or the splendid *Histoire Naturelle des Mammifères* of MM. Geoffroy Saint Hilaire and Frederic Cuvier: but, as natural history engravings, they are equally faithful and equally valuable with the two latter works; and what is of infinite importance to the zoologist, whose purse is not always of the heaviest, are to be obtained at a fraction of their cost. It is for this reason, more especially, that we feel called upon to recommend the present publication to our readers; for we are convinced that nothing has contributed in a greater degree to retard the progress of natural science and its general diffusion, than the splendid mode of publication adopted by many of its professors, and the consequently enormous price at which their labours, or rather those of the artists employed by them, are rated by the booksellers. We could name many excellent works that have, on this very account, remained utterly unknown to the world at large, and have scarcely met the occasional glance of the scientific naturalist, who has endeavoured to satisfy himself by a hurried inspection of their contents in some public library; whereas, had they been published with less pretension, in a moderate form and at a reasonable price, they would have contributed most essentially to the advancement of the science, to its spread among the people, and to their own real and substantial fame.

Of the letter-press we may also speak in terms of commendation. The names of the writers are indeed of themselves a sufficient guarantee of the scientific value of their labours, which are distributed in the following manner: — M. Desmarest undertakes the Mammàlia, Reptiles, and a portion of the Insects; M. Vieillot, the Birds; M. Blainville, the Fishes, and all the invertebrated animals, with the exception of the Insects and Spiders; the latter are described by M. Walckenaer, and the remaining Insects are divided between MM. Serville and Lepeletier de Saint-Fargeau. There is, perhaps, rather too much succinctness in the descriptions, which are seldom relieved by the introduction of details relative to the habits and economy of the species; a fault which we were the less prepared to meet with, as the work was originally announced to be "designed for all classes of society;" and it was, consequently, made an especial feature of the prospectus, that the authors "would enter at greater length into the history of those animals which were remarkable either for their advantages or disadvantages, so as to fulfil one of the principal objects proposed, that of utility and application." For want of a little of this kind of matter, to render it readable, the work has somewhat too much of the uninviting character of dry technical definitions, which have nothing in them to interest any but the professed zoologist. It is, however, announced, that general observations on each division will hereafter be published in the form of an introduction to the respective parts; and it is probably the intention of the authors to render these preliminary essays the vehicles for communicating information of a more generally interesting kind.

We heartily wish success to this work, and such success as may dispose others to imitate the example that is here set before them. Why have we not in England a Fauna of our own? We have long been in possession of the most perfect Flora that has ever been published, and yet we have nothing like a general Fauna of our country. Pennant's *British Zoology*, at the time of its original appearance a most excellent work, and a model in many respects for all similar undertakings, is now grown in a great measure obsolete, and is, besides, defective, as regards the lower animals; the illustration of which, with the exception of the shells of the Mollúsca, formed, in fact, no part of its plan. Donovan's works are by far too expensive for general circulation, and contain only partial illustrations of the subject. We have, it is true, several enumerations, such as Turton's and Fleming's, unaccompanied by figures; but these are, in the greater part of their contents, little more than compilations from previous writers, and the want of plates renders them unattractive to the mass of mankind. Of publications devoted to a single branch of the science, we have a few that are excellent in their kind. Montagu's *Ornithological Dictionary* and Bewick's *Birds*, for example, have rendered that department of natural history popular throughout the land. Other works, of a more expensive kind, illustrate other departments. Our native shells, for instance, are better known, through the labours of Montagu, of Maton and Rackett, and of Turton, than those of any other country: but we have yet no Fauna. Such a work can be creditably executed only by a union of naturalists, each especially qualified by his previous studies for the department he undertakes; and we would willingly hope that at no distant time a *British Zoology* may be produced worthy of a place on our shelves by the side of the *English Botany*. Until that time arrives, we can only recommend, as a substitute for a Fauna of England, that of the country most nearly adjacent, and, consequently, most closely resembling our native soil in its animal inhabitants. It is well executed; and although the price of the whole work, even in its least costly form, will necessarily be considerable, is as cheap as a work so extensively illustrated by copper-plates can possibly be. Wood-engravings, and a greater share of popular information, might perhaps, by insuring a more extensive circulation, enable a similar work to be produced in this country at a lower rate; although for this we are scarcely prepared to answer.

It is right to add, that the publication of the *Faune Française* has been once suspended, owing, as we are informed, to the long illness and subsequent death of the first editor. At that time seventeen numbers had been published. In June of last year the publication was resumed, and six or seven numbers have since appeared; and it is stated that the mass of materials which has been accumulated is such as to secure the appearance of at least one number per month. It is in the 8vo form, and each number contains five sheets of letter-press and ten plates; its price being, on common paper, with the plates uncoloured, 4 francs; coloured, 10 francs; on fine paper, with coloured plates, 4to, 15 francs; and with proofs in addition, 20 francs.

Cuvier, F.: Histoire Naturelle des Mammifères, avec des figures originales coloriées. Livr. 59. Paris. Folio. 15*s.*

Duperrey: Voyage autour du Monde, en 1822—1826. Première division: Zoologie. Livr. 9. 4to, fig. col. 12*s.*

Werner: Atlas des Oiseaux d'Europe. Livr. 11. Paris. 8vo. Fig. col. 6*s.* 6*d.*; noir. 3*s.* 6*d.*

Lesson:

1. Histoire Naturelle des Oiseaux-Mouches. Paris. Gr. 8vo. Livr. 1. et 2. Fig. col. 5*s.* each.

2. Complément des Œuvres de Buffon, ou Histoire Naturelle des Animaux rares, decouverts par les Naturalistes et les Voyageurs depuis la

Mort de Buffon. Paris. 8vo. Tom. 2. Races humaines. Paris. 8vo. *3s. 6d.* Planches, *2s. 6d.*; idem color. *5s.*

Ajassou de Grandsaigne: Resumé d'Ichthyologie. Paris. 32mo, 2 vols. fig. *7s.*

Duponchel: Histoire Naturelle des Lepidoptères de France. Paris. 8vo. Tom. 7. 2de Partie, Livrs. 1, 2, 3. *3s.* each.

Roux:

1. Crustacées de la Mediterranée et de son Littoral. Marseilles et Paris. Gr. 4to. Livr. 1. 5 fig. col. *8s.* each.
2. Iconographie Conchyliologique. Livr. 1. Gr. 4to, 8 fig. col. *10s. 6d.* each.

Humboldt et Bonpland, Voyage de: 6me Partie: Botanique. Révision des Graminées, par S. Kunth. Paris. Folio. Livr. 1. et 2. fig. col., to be completed in 20 livrs., *2l. 8s.* each. Grand colombier, *3l.* each.

Descourtilz: Flore Pittoresque et Médicale des Antilles. Paris. 8vo. Livr. 114, 115. *4s.* each.

Brongniart: Prodrome d'une Histoire des Végétaux Fossiles. Paris. 8vo. *5s.*

Elie de Beaumont: Observations Géologiques sur les différentes formations qui, dans le Système des Vosges, séparent la Formation Houillère de celle de Lias. Paris. 8vo. fig.

Germany.

Nenning, S. V.: Lehrbuch der Gesammten Naturlehre. Winterthur. Gr. 8vo. *9s.*

Naumann, Dr. *C. F.*, &c.: Encyclopädie der Speciellen Naturgeschichte. Berlin. 3 bd. 8vo. *10s.*

Dierbach, Dr. *J. H.:* Beiträge zu Deutschlands Flora. Heidelberg. 8vo. 2r. thl. *4s.*

Link, Dr. *H. F.*, and *F. Otto:* Icones Plantarum rariorum Horti Regii Botanici Berolinensis. Berlin. 4to. 1r bd. 3r hft. *7s. 6d.*

Sprengel, Ad.: Tentamen Supplementi ad Systematis Vegetabilium Linnæani. Gottingen. 8vo. Edit. XVI. *1s. 6d.*

Bischoff, Dr. *G. W.:* Die Kryptogämischen Gewächse, 2te lief. Nurenberg. Gr. 4to. *12s.*

Fingerhuth, Dr. *C. A.:* Tentamen Florulæ Lichenum Eiffliacæ. Nurenberg. Gr. 8vo. *2s. 6d.*

Walchner, Dr. *F. A.:* Handbuch der gesumamten Mineralogie. Carlrushei. Gr. 8vo. 1ste abthlg. *1l. 5s.*

Holland and the Netherlands.

Blume: Flora Javæ, nec non Insularum adjacentium, cum tabulis lapidi ærique incisis. Folio. Fascic. 1, 2, 3, 4. *14s.* each, plain; *18s.* each, coloured.

Russia.

Ledebour, C. F., Phil. Dr. Botan. Professor in Universitate Dorpatensi, Rossorum Imp. August. a Consiliis Status, Ordinis S. Annæ Secundæ Classis Eques: Icones Plantarum Novarum, vel imperfecte cognitarum, Floram Rossicam, imprimis Altaicam illustrantes. To be published in 10 Livrs. with 500 figs. 5*l.* 10*s.* each, plain.

Italy.

Zanon, Bartol.: Del nuovo Solfato di Soda et Magnesia, &c. Bellune, 1824. 8vo, pp. 21.

North America.

Lea, Isaac, Esq., of Philadelphia, Member of various European Societies: Description of Six new Species of the Genus Unio, embracing the Anatomy of the Oviduct of one of them, together with some Anatomical Observations on the Genus. Read before the American Philosophical Society, Nov. 2. 1827. Philadelphia. 4to, plates.

Art. III. *Literary Notices.*

Révision des Graminées. — Professor Kunth has announced a new contribution to botanical science, entitled *Révision des Graminées*, being an enlargement of what appeared in his *Nòva Génera et Spècies Plantàrum Americànæ Septentrionàlis.* The introduction will contain some original views respecting the organisation of this most useful class of vegetables, establishing their relation with others, and discussing the opinions previously entertained on the subject. The author will then notice the generic characters, point out those which are best established, and add some new ones resulting from his own observations. This introduction will be followed by the complete genera. The work will be illustrated by 100 finely coloured engravings, and, with the descriptive text, will form a folio volume of the same size as the *Nòva Génera* and the *Mimòses.* (*For. Quart. Rev.*, Jan.)

Casual Botany, or an Elementary Treatise descriptive of the Changes of Plants, by D. Bishop, is publishing by subscription in 1 vol. 8vo. 7*s.* Subscriptions are received by Mr. Wright, agricultural bookseller, Haymarket.

Petrificàta Suecàna Formatiònis Cretàceæ has lately been commenced by Professor S. Nilsson of Lund. Professor Nilsson is already advantageously known, both in his own country and abroad, as an eminent naturalist, and has added not a little to his fame by this work. A knowledge of the petrifactions is necessarily of great importance to the students of geological science; and the author has, in preference, chosen those of the cretaceous formation, as having been (though they constitute a number of about 200 species) least examined by previous authors. The plates are executed with great care, so as to give a clear idea of each species, and the descriptions are concise and accurate. The continuation of this work will be anxiously looked for by all the lovers of this interesting branch of science. (*For. Quart. Rev.*)

Bakewell's Geology is reprinting in the United States, under the direction of Professor Silliman, of Yale College, who states it as his opinion, that it is "the most intelligible, attractive, and readable work on geology in the English language." — *S. T. Jan.* 26. 1829.

PART III.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Natural History in Foreign Countries.*

ITALY.

Cavern containing Fossil Bones. — Professor Savi has discovered, near Cassana, in the mountains surrounding the Gulf of Spezia, a cavern containing bones of deer, bears, and other animals, very similar to those found in the bone caverns in England, Germany, and France. M. Savi infers that these bones belonged to animals previous to the deluge. (*Nuovo Giorn. de Litterati*, 23., p. 123.)

Should a few more of these bone caverns be discovered in Italy besides this solitary instance, we could better determine whether the antediluvian hypothesis, or that of Mr. Ranking who refers them to the animals killed in the Roman amphitheatres, is the most tenable. We perceive that another similar grotto has been discovered near Miremont, by M. J. Delanoue, who has given an account of it in the *Annales des Mines*, vii. p. 597. — *J. R.*

SPAIN.

State of Natural History in Spain. — The king of Spain, amongst the few acts of liberality which he has condescended to perform, instituted, in 1815, public courses of mineralogy, zoology, chemistry, botany, agriculture, and astronomy. The influx of students to these courses has been so great, that the halls cannot contain them. On the month of September last, above sixty presented themselves for examination, to obtain certificates for their proficiency in general botany, of which Don Vicente Soriano is professor. The king has instituted prizes for those who distinguish themselves.

A number of distinguished individuals attend Professor Sandalio Arias's course of agriculture; and, both in this and horticulture, great improvements have been introduced. The junta of Aranceles have received the king's commands to import 30 pair each of our long-wooled Southampton and our Leicester sheep, to be distributed, at the public expense, over the Peninsula. (*Gaceta de Bayona*, Oct. 1828.)

SWEDEN.

Temperature at Christiania and at Leith. — From the tables kept at Christiania by Professor Flansteen, it appears that the daily variation of temperature is there much greater than at Leith, especially in winter.

	February		*July.*	
	Christiania.	Leith.	Christiania.	Leith.
Minimum	11° 07	39° 23	54° 93	55° 15
Maximum	23° 08	42° 80	67° 02	64° 83
Difference	12° 01	3° 57	12° 09	9° 68

The yearly variation from February to July is also much greater at Christiania; probably on account of the mist from the sea and the unclear sky at Leith, tempering the cold of the night and of the winter, and absorbing the sun's rays in the day and in the summer.

	Christiania.	Leith.
Mean of February	16° 224	40° 621
Mean of July	61° 690	60° 361
Difference	45° 466	19° 740

(*Brewster's Journal.*)

ASIA.

Natural History in China. — According to M. Abel Remusat, the celebrated French Orientalist, the hieroglyphic method of writing amongst the Chinese has led them to form a very tolerable classification of natural objects, in the form of families, such as cereal plants, ruminant and carnivorous animals, salts, metals, &c. According to this plan, they write *rice-corn*, *dog-fox*, &c. It was precisely this method, which has been known in China for four thousand years, that Linnæus followed in forming groups of natural objects. The Chinese classification, however, is in some respects exceedingly erroneous and imperfect, the Mollúsca, for example, as well as whales, being classed among fishes, and lead among the precious metals. Their best treatise on natural history consists of forty volumes, in which are coloured figures, very exact, as well as a regular nomenclature. With respect to economical details, anecdotes of instinct, &c., this is more copious than correct. (*Revue Trimestrielle*, iii. p. 351.)

Wild Poultry (*Phasiànus Gállus*).—In the forests through which we passed we saw several flocks of wild poultry. One of these, not far from a village, appeared so little shy, that we at first imagined it consisted of domestic fowls, and hesitated to fire. In the winter, or cold season, innumerable flocks of ducks and other water-fowl are described as visiting Cochin-China. These had not yet arrived, but we observed preparations making for ensnaring them. These consisted of a number of artificial birds, intended for decoys. (*Crawford's Embassy to Siam and Cochin-China.*)

Leaf Insects. — There are also the leaf insects, which assume the shape, size, and general appearance of the leaf on which they feed, so exactly, that it is only on examination one becomes aware of their real character. I saw several, but the most extraordinary was one which lived on a thorny plant, the body of which resembled a stick, and was covered with thorns. (*Heber's Tour in Ceylon.*) [Similar appearances are by no means uncommon even among British insects, as in the caterpillars of Geómetra syringària and G. cratægària. — *J. R.*]

The Flying Leech is common in the jungles in the interior (Ceylon), and the native troops, on their march to Canely, suffered very severely from their bite, occasionally even to the loss of life or limb: their legs were covered with them, and streamed with blood. I saw one of these animals in a horse's leg. It is much smaller than the common leech, the largest, when at rest, being not more than half an inch long, and may be extended till it becomes a fine string; the smaller ones are very minute. They possess the power of springing, by means of a filament, to a considerable distance. (*Heber's Narrative.*)

Zoology and Botany of the Indian Archipelago. — The manuscripts of Drs. Kuhl and Van Hasselt, who recently travelled over the islands of the Indian Archipelago, for the purpose of exploring their botany and zoology, and who died in the midst of their researches, have been transmitted to Europe; and the first part of their botanical discoveries, forming the most interesting portion of their labours, published by command of His Majesty, and edited by Professor von Brede, has recently appeared. The work will contain the genera and species of the *Orchídeæ* and *Asclepiàdeæ*, and will be completed in eighteen livraisons, containing five plates each. (*For. Quart. Rev.*, June, 1828.)

NORTH AMERICA

Niagara. — The Duke of Saxe-Weimar, who lately visited the Falls of Niagara, thus describes the scene : — " The roaring of the water directed our steps. We came suddenly upon the precipice, and beheld the immense mass of water rushing impetuously downwards, with a dreadful noise, to a fearful depth. It is impossible to describe the view; it is impossible to convey the mingled feeling of weakness and sublimity that arises in the human breast at the sight of this stupendous work of nature. We can only wonder, admire, and adore. The rocks on both sides are very steep; there are, however, covered wooden steps, by which we descended to the lower part of the stream; but the spray, caused by the foam of the fall, deprived us of the beautiful view we had anticipated. We, therefore, soon re-ascended, and enjoyed, from above, the contemplation of the majestic and the sublime." (*Reise durch Nord America*, 1825–6, vol. i. p. 732.)

Colúmba migratòria (*the Wild Pigeon*). — On December 13., from about nine o'clock in the morning till two o'clock in the afternoon, immense flocks of pigeons, extending as far as the eye could reach, were seen passing over our village (Rochester) from the north. Their numbers, which were incalculably great, and the novelty of the circumstance, excited considerable attention. Some few of them were taken; and, what is very singular, they were found to be very fat. It is an interesting enquiry, where have they been, and what have they been doing? It is a very unusual season to see birds of passage on their journey. We would suggest to Mr. Symmes the possibility of drawing, from this singular fact, an argument in favour of pleasant weather at the North Pole. (*Rochester, N. Y., Genesee Co. Reg. Dec.* 1828.)

We have never before witnessed such multitudes of wild pigeons as have appeared amongst us (Montrose) at the present season. Flocks, extending miles in length, have many days been seen passing over the hills, and presenting a novel and interesting appearance. But what is most extraordinary, and causes us now to notice them, is their encampment, about ten miles from this place, in a south-west direction, where they have built their nests and are raising their young. This encampment is upwards of nine miles in length and four in breadth, the lines regular and straight, within which there is scarcely a tree, large or small, that is not covered with nests. They cause such a constant roaring, by the flapping of their wings, that persons, on going into the encampment, have great difficulty in hearing each other speak. Every thing throughout their camp appears to be conducted in the most perfect order. They take their turns regularly in sitting and in feeding their young; and when any of them are killed upon their nests by the sportsmen, others immediately supply their places. We are inclined to believe that they have, in part, adopted Mr. Owen's " community system," as the the whole appears to be a " common-stock business." The *squabs* (as the young are called) are now sufficiently large to be considered, by epicures, better for a rich dish than the old ones; and they are caught and carried off by waggon-loads. (*Susquehanna County Register*, May, 1829.)

The late De Witt Clinton of New York shows, that Mr. Wilson's opinion, respecting the American wild pigeon laying only one egg at a time, is wrong. These birds often lay two eggs for the same sitting; one pair produced seven, and another eight, times in one year. In twenty-three days from the laying of the egg, the young ones could fly. In eight days from their being hatched, they are completely feathered, and fly from the nest.

(*New York Med. and Phys. Journal,* vol. ii. p. 210.) — *J. M. Philadelphia, May* 13. 1829.

A Den of Rattlesnakes. — An emigrant family inadvertently fixed their cabin on the shelving declivity of a ledge, that proved a den of rattlesnakes. Warmed by the first fire on the hearth of the cabin, the terrible reptiles issued in numbers, and, of course, in rage, by night, into the room where the whole family slept. As happens in those cases, some slept on the floor, and some in beds. The reptiles spread in every part of the room, and mounted on every bed. Children were stung in the arms of their parents, and in each other's arms. Imagination dares not dwell on the horrors of such a scene. Most of the family were bitten to death; and those who escaped, finding the whole cabin occupied by these horrid tenants, hissing, and shaking their rattles, fled from the house by beating off the covering of the roof, and escaping in that direction. (*Flint's Geography and History of the United States,* vol. i. p. 115.)

The Mammoth Cave, in Warren County, Kentucky, is a cavern in limestone, which has been explored by gentlemen of science for the astonishing distance of ten miles, without finding the end. (*Amer. Quart. Rev.,* March, 1829.)

SOUTH AMERICA.

The Birds of Demerara are surpassed by those of no country in the world. Almost every one of those singular and elegant birds, described by Buffon as belonging to Cayenne, are here to be met with, but only by an indefatigable naturalist. (*Waterton.*)

Migration of Butterflies. — On the coast of Brazil, for many days in March, a great number of white and yellow butterflies take their flight from the north-west to the south-east. They are never observed to alight in their course, and are not impeded by forts or other extensive buildings crossing their path. As the sea is in the direction towards which they fly, it is probable they perish there. (*Lindley's Brazil.*)

The Electric Eel. —That most singular animal, the electric eel (Gymnòtus eléctricus), abounds in the river Orinoco in South America, and is caught, as we are informed by recent travellers, by driving a number of wild horses into the pools which they frequent. They exert their benumbing powers on the horses till exhausted, when they may be taken without danger. (*Bulletin des Sciences Nat.*)

Coal fields in Peru. — M. Mariano de Rivero, director-general of the mines belonging to the Republic of Peru, is employed in drawing up a memoir on the coal fields of his district, which promises to be of considerable interest. Near to Cerro, he informs us, from four to ten leagues, there are numerous beds of fossil charcoal, of which the chief deposits near Raucas are of very good quality, and are situated on the slope of a hilly ridge several leagues in extent. The principal bed lies north and south between strata of fine sandstone. He has found in these coal fields a considerable quantity of yellow amber, but he could not discover any impressions of the organic remains of plants and animals. The coal is used for heating steam-engines, &c. (*Annales des Scien. Nat.* for March.)

The Cordilleras. — The great mountain chain of the Andes is divided, between the 14° and 20° of south latitude, into two longitudinal ranges, called by the Creoles Cordilleras. These ranges are separated by an inter-alpine longitudinal valley, the lowest part of which is about 12,000 or 13,000 ft. English above the level of the Pacific. At the northern extremity of this valley is situated the celebrated Lake Titicaca, upon whose banks the empire of the Incas originated. The western Cordillera lies between the Pacific Ocean and the Valley of Desaguadero, appropriately named the Tartary of the New World; and here are situated many volcanoes in a stated of activity. The eastern Cordillera, composed chiefly of transition and secondary rocks, separates the same valley from the vast plains of Chiquitos and Moxos.

The eastern Cordillera, between the 14° and 17° of south latitude, presents an almost continued series of pics, whose summits are covered with snow, and many are above 20,000 ft. in height. It is in this mountain chain that the highest mountains hitherto observed in America are situated, particularly Nevadas de Illimani and Sorata, which surpass even Chimborazo, Antizana, and Cayambé. (*Humboldt.*)

WEST INDIES.

Coral Rocks. — In the West Indies, it is common to mistake tertiary limestone above chalk, and filled with coral petrifactions, for old coral beds; but in the larger mountains of the Antilles, genuine madrepore rocks occur, surrounding, to a considerable height, rocks of primary formation. The common opinion of the extent of coral formations, founded on the vague observations of voyagers, is generally carried much farther than the facts will warrant. (*Humboldt, Tableau de la Nature.*)

Art. II. *Natural History in London.*

Zoological Gardens, July 18. — The additional ground obtained by the Zoological Society in the Regent's Park lies to the north of the present gardens, and across the road. Retaining a part of the woody belt which now exists on that (the northern) side, there is to be a gentle sweep up to the gates, to admit of the ingress and egress of visitors; while the communication between the two gardens will be effected by means of a sufficiently spacious tunnel under the road. The whole space will be about 15 acres; and thus, what may be considered the public exhibition part of the establishment will be much extended and improved, the sights more numerous, and the habitats of the various animals better suited to their natures, as well as to the convenience of those who come to view and study them. This seems to be more] requisite, from the increasing popularity of this lounge, to which the mature crowd to gratify their curiosity, and the young are taken to inform their minds. So great, indeed, has the resort become, that 2000 visitors have been calculated in one day! Among the novelties which may partially account for this, is the Brahmin bull, not white, as has been stated in the newspapers, but grey, and certainly a beautiful as well as interesting animal. The alligator died on July 13.; but the beavers, the seal (still living, though not very promising), two opossums, a young scarlet ibis, the macaws in high feather, several species of remarkable dogs, together with the usual tribes, from the lion to the monkey, and from the sea-eagle to the linnet, give great animation to a spot which is in itself a delightful place of recreation. Thus, while what may be called the Metropolitan Show is so eminently prosperous, it may be expected that, in conjunction therewith, the more useful establishment near Kingston may be made productive of real benefit to the country, by improving the breed of animals, by naturalising foreign and exotic specimens which will adorn England, or be valuable for food and commercial purposes. There are a multitude of creatures of every kind, which, if properly cultivated (and this may be done at a distance from London, where they are not everlastingly disturbed in their habits), would enrich our rivers, our fields, our heaths, and our woods: there are even many, once indigenous, which might advantageously be introduced, from the lovely egret, through several excellent varieties of game, to the noble cock of the wood and the bustard. It is to be hoped that the Society, now so largely patronised by the public, will hold these objects in view; and while it administers a laudable amusement to the inhabitants of the capital, pursue the still more scientific ends which such an institution may fairly propose as its chief title to national support and honour. (*Literary Gazette.*)

We should be happy to see the public generally admitted to these gardens on the Sunday afternoons, on the same terms as during the week; for, otherwise, how are many servants to see them, and the poorer description of tradesmen? These, also, have a curiosity to be gratified, affections to be cultivated, and minds to be expanded. — *Cond.*

Art. III. *Zoological Society.*

August 15.—Since the Anniversary Meeting of this Society on the 29th of April, some important accessions have been made to the several collections, and numerous improvements have been effected in the arrangement of the garden, &c. Each department has been enriched with valuable donations, lists of which were laid before the Fellows at their monthly meetings. Among the numerous contributions to the museum may be noticed a collection of reptiles, insects, shells, corals, &c., with the skins of various quadrupeds and birds, presented by Captain Fayrer; two very interesting models of the orang outang, and a skeleton of an elephant, by George Swinton, Esq.; and various subjects of natural history from the Mauritius, by Charles Telfair, Esq. In the garden, the following works have been completed since the period above mentioned: — Cages for foxes, dogs, &c.; pond and enclosure for otters, dens for larger quadrupeds, cage for macaws, appropriate iron enclosures for monkeys, shed and enclosure for deer, cote for dragon pigeons, and numerous smaller buildings and enclosures. Several other works, including a cage for the harpy eagle, presented by the Council of the Horticultural Society, are in progress. The following are among the donations to the menagery recently received: — An Indian elk, a pair of East Indian bears, a paradoxurus, &c., by Captain Fayrer; a Cachmere goat, by C. Towers, Esq.; a four-horned sheep and an axis deer, by Earl St. Vincent; a porcupine and a Fossane cat, by H. Warrington, Esq.; forty gold fish, by Sir Robert Heron; a young tigress, by Captain Mangles; a pair of emeus, by the Right Hon. J. C. Herries; a scarlet ibis, by Viscount Strangford; a long-armed ape, by Dr. Alexander; an Indian deer, from the collection of His Majesty; and numerous other valuable and interesting subjects. Many purchases have also been effected, consisting chiefly of the following: — A young lion from the Cape of Good Hope; three species of hyæna, the striped, the spotted, and the tortoise-shell; a female puma; a pair of young pelicans; a Brahmin bull; a collection of small zebus; a nyl ghaw; a polar bear, &c. &c. These improvements and acquisitions have attracted, during the season, a great increase of visitors, who are admitted, as usual, by orders from the Fellows. The receipts at the gate have, on some days, exceeded 100*l.*, the number of visitors, during one month only, being 34,000.

An adjustment of the difficulties which have hitherto prevented the occupation of the land on the north side of the road has recently been effected; by which the Council will be enabled, during the ensuing winter, to exhibit the collection, in a safe and convenient manner, to the Fellows and their friends.

The works at the farm at Kingston are in progress; the rooms in the house destined for the use of the Fellows are completed; some necessary buildings have been erected, and others are in contemplation. The birds hitherto kept on the islands in the lake at the Regent's Park, with the several varieties of sheep, and the large zebus, for which no accommodation can be at present afforded in the gardens, have been transferred to the farm.

Art. IV. *Linnean Society.*

Mr. Duncan's Address at the Anniversary Dinner of the Linnean Society, on the 25th of May last. — Sir, Your request, founded on Mr. Don's too favourable report of the few remarks which I ventured to utter at the Linnean Society's dinner, is inviting, and I hope something better than flattering. It is inviting to a recapitulation of sentiments rather than of words. I am no orator, and am therefore convinced that my matter must have wanted the grace of rhetoric. If the little which I ventured to say produced sympathy, it was a good feeling ready formed in the kind hearts of those around me, which wanted but small excitement to cause it to break forth. Many, I am willing to believe, most, of those who were present, were much better acquainted with the details of natural history than myself. I perhaps said that I was the last called, and least worthy to be called, a naturalist. I faintly remember to have observed that, although Nature was ever dear to me, as the source of my best and purest delights, from infancy to manhood, I came, as one who reaches a beautiful shore after shipwreck, to the land of natural science. I left the courts of law in a state of extreme ill health, and sought refuge and relief, for body and mind, in Nature's garden.

> —— "Not that fair field
> Of Enna, where Proserpine gathering flowers,
> Herself a fairer flower, by gloomy Dis
> Was gathered; . . . . nor that sweet grove
> Of Daphne by Orontes, and the inspired
> Castalian spring, might with this paradise
> Compare."

I sought it, not as a child, to pick up rare and gaudy flowers, to hunt butterflies, or to ensnare newts or fish, or birds or mice, but as a man, not unused to trace important conclusions through a chain of complicated evidence. I could not regard the wide prospect of beauty and magnificence before me, even for a moment, and witness the manifest adaptation of means to ends, the multitude of diversities which distinguish objects into larger and smaller groups, into kingdoms, classes, &c., the analogies which demonstrate a unity of intention pervading every part, without perceiving the traces of that Great Power, in attestation of whose glory

> "All nature cries aloud through all his works."

"They want not speech nor language, but their voices are heard among them. Their sound is gone out into all lands, even unto the ends of the world."

Yet, again and again have I been asked, *Cui bono?* I admit the importance of this business-like question; and, if I did not feel ready to admit its fairness, and to reply to it to the utmost conviction of my heart, I should feel myself unworthy to be the guardian of the Ashmolean Museum, or to be a member of the Linnean Society. If the question, *Cui bono?* be limited to the consideration of pecuniary profit or lucre, I have, indeed, only to say, correct or systematised knowledge is the only true and solid foundation of all art; is the source of permanent power, and, therefore, of individual and national wealth. The individual who devised the means of supplying half London with wholesome water did not, indeed, reap the benefit by which thousands have been enriched, and from which millions have successively derived comfort. But I contend for a much higher benefit accruing from the mere contemplation of nature, constantly augmented by every accession to the stock of knowledge, and, as I believe and trust, capable of continual advancement from generation to generation to the end of time, and of yielding delight through all eternity. We are conscious of great delight from cheerful and enlightened conversation. The observations and the lectures of learned men send us away full of pleasing thoughts, which divert our minds from ordinary anxieties. We well know that the society in which men and women are conversant influences their manners; that books make full men; discussion, acute men; exertion, strong and active men. If we are thus strengthened, thus polished, thus improved, what must we be if our conversation be not only with the wise but with wisdom itself? not only with the graceful and the glorious among men, but with the Author of all beauty and glory. Knowledge amasses facts, science arranges them. But what does science effect? Has it in itself any arranging and disposing power? Surely none. It can only observe, and compare, and trace out, and announce the observed harmonies, connections, ties, and nice dependencies, the diversities and analogies which the great Ordainer has placed before the view of attentive intelligence. These are the backward traces which show where God has passed. He said to Moses, "Thou shalt see behind me, for man cannot view my face and live." Are we not elevated, are we not enraptured, when we see the great works of Greek and Roman artists? of Phidias, of Michael Angelo, of Raphael, of Corregio, of Wren and Reynolds, of ship-builders and machinists? Yet how mean are their imitations of the mere exterior of scanty portions of God's works! how utterly inadequate to enter into the slightest competition with the least atom of reality! Yet we cultivate a taste for human arts as a source of our highest enjoyments; and what we so seek, we do not fail to find. What, then, ought we not to expect to discover as the result, to expect as the concomitant, of a continual, an attentive, a devoted study of the harmonies of God's creation, — of his great book of primary and perpetual manifestation, stamped by his own impress, displaying universally his undecaying autograph? Some, indeed, have weakly supposed that this assertion of natural theology militates against the Mosaic and Christian revelation; but I appeal to the hearts and heads of all sincere lovers of the beauties and glories of God's works, whether they ever feel more fervently all the good emotions which the bible is uniformly directed to excite and to purify, than when they contemplate the evidence of its fundamental truths in the first great work of the common Author of creation and of revelation. In the latter, how frequent and how beautiful are the appeals to the former! "The invisible things," says Saint Paul, "are clearly seen, being understood by the things that are made; even the eternal power and Godhead." What, then, are the emotions of which every ardent naturalist, by the very constitution of his body and soul, of all his instincts and all his improved faculties, is inevitably conscious? The first emotions, even in childhood, are those of love and wonder: these expand with our growth, and are strengthened with our strength. A conviction that all beings, especially those which, by nature or instinct, we find to have the most powerful connection with the best, the dearest, the most ennobling of our sympathies, are the productions, the children, of a common, mighty, and inexpressibly beneficent Parent, must necessarily impress all whose hearts glow with such heart-exalting heart-purifying conviction with charity, even such as Christ inculcated, one towards another; with peacefulness, with rapture, with devotion to all things that are of God, that manifest him first, him midst, him last, and without end, the omniscient, the omnipotent, the omnipresent. The rapture of the naturalist is accordant with the emotion of Eve, who says to the instant source of her joy,

"With thee conversing I forget all time;
All seasons, and their change, all please alike.
Sweet is the breath of Morn, her rising sweet,
With charm of earliest birds; pleasant the Sun,
When first on this delightful land he spreads
His orient beams, on herb, tree, fruit, and flower: . . . .
But neither . . . . herb, fruit, flower,
Glistering with dew, ... nor walk by Moon,
Or glittering star-light, without thee is sweet."

Indeed, remove from all human studies this one, single, heart-stirring, all-uniting, all-ennobling principle, what are they all but toilsome madness, the vanity of folly; — at the best, delusive dreams; in reality, different modes of restless selfishness! Why perplex our minds with any study, if all sympathy be a mere illusion? The insufficiency of ethical motives, unless something stronger can impel us than the prospective remote improvement of our contemplative energies, is too obvious to need proof. Ambition has no check, licentious selfishness no bounds, if the consciousness of responsibility to an omniscient Governor be once extinguished. But this hallowed and all-sanctifying consciousness must be first preserved and cultivated by continual contemplation of those evidences of his ineffable power and goodness, which it has pleased the Almighty Author of Creation to display around us. Dr. Paley, in his excellent moral arrangement of natural objects, with a strain of eloquence quite foreign to his ordinary close and cautiously argumentative style, thus supports his important proposition, that the Deity has added pleasure to animal sensations beyond what was necessary for any other purpose than the beneficent promotion of enjoyment:—"I shall not," says he, "I believe, be contradicted when I say, that, if one train of thinking be more desirable than another, it is that which regards the phenomena of nature with a constant reference to a supreme intelligent Author. To have made this the ruling, the habitual sentiment of our minds, is to have laid the foundation of every thing which is religious. The world, thenceforth, becomes a temple, and life one continued act of adoration." If this be the certain result of a sincere, ardent, truth-seeking investigation (and what true disciple of Ray and of Linnæus can doubt, after full evidence of his own experience, that it is so), what more abundant answer can or need be given to the question, *Cui bono?* than this? The tendency of our Linnean studies, or our contemplation of the glorious universe, is to tranquillise our minds, to purify our affections, to expand our hearts with veneration and love toward the great Author of our being and of all being; to prepare us to meet the day of our inevitable change, the awful moment in which we know our career on earth must terminate, with calm undoubting confidence in the Creator, that he hath not made us in vain, to glitter like motes in the sunbeam, and sink for ever into shadow, but has enabled us to improve our faculties, and has filled us with high and holy aspirings, with longings after immortality, which will not end in disappointment. The beauty and the wonder with which it has pleased the Creator to invest all his works, the starry firmament, the depths of the sea and its multitudinous inhabitants, the insect tribes, the reptiles, the birds, and the beasts, and the whole of the vegetable kingdom, produce, by all their diversities and analogies, continual excitement, most happily adapted to prevent weariness and languor of attention; they occur in all our paths, before us, beside us, and behind us, above us and below us, by night and by day. He that planted the ear, shall he not hear? or he that made the eye, shall he not see? Whither shall I go, then, from thy Spirit? whither shall I go, then, from thy presence? Thank God! thank God! It cannot be. He has given us the rule of life; he has set before us the miraculous evidence, in his creation, of the wisdom which ordained the rule; he allures us by all loveliness; he compels us by his majesty, and awes us by his terrors. To assist in rendering these glorious mutual relations of all parts of creation familiar to the minds of the multitudes whom daily labours of mind and body too much occupy to allow of due leisure for these contemplations, is the chosen province of the members of the Linnean Society. They are thus devoted ministers of God; and while their labours are duly directed to the vindication of his ways to man, to the manifestation of his glory and goodness, they deserve high honour as useful citizens; they insure to themselves the best of blessings through time, and, in eternity, the approbation of their God.

I believe I said something on the history of natural science; but this I have printed in a slight outline of science, called *Introduction to the Catalogue of the Ashmolean Museum.* Yours, &c.—*J. S. Duncan. New College, Oxford, June* 11. 1829.

June 2. — Read. A communication from Wm. Yarrell, Esq. F.L.S. &c., "On the Organs of Voice in Birds." The author here pursues the subject of his former paper on the tracheæ of birds, and gives descriptions, accompanied by figures, of the numerous muscles by whose action the varied powers of the vocal organs of birds are governed. Their organs of voice consist of four parts: the *glottis*, or superior larynx, the *tube* of the trachea, the *inferior larynx*, and the *bronchiæ.* Great difference exists in the relative length of tube; short ones producing shrill notes, as in singing birds, and *vice versâ* in waders and swimmers. Strong, broad, cartilaginous rings give loud and monotonous voices; and slender rings, with large space between, admit variety of tone. Some of these varieties result from the dilatation and contraction of the membràna typanifórmis, and from the power of altering the form of the bronchiæ. The muscles of the inferior larynx vary from one pair to five.

June 16. — In the remainder of Mr. Yarrell's paper, the reading of which was concluded at this Meeting, a great many curious conformations of the organs of voice, in various birds, were accurately described and compared. The author states that these are least complex in the Falconìdæ, some of the Insessòres, almost all the Rasòres, Grallatòres, and Natatòres; more complex in the *P*sittacìdæ, who alone possess three pair of true muscles of voice; but most complex in the *C*órvi, starling, larks, thrushes, finches, wàrblers, swallows, &c., which all have five. The convolutions in the tracheæ of some species are aptly compared to the additional crooks fixed to the French-horn, in order to play in a lower key. — A part of a memoir, by M. Dumortier, was also read, entitled, *Récherches sur la Structure comparée et le Develloppement des Animaux et des Végétaux.*

ART. V. *Geological Society.*

MARCH 6. — Read. An Account of a remarkable Fossil Plant in the Coal Formation of Yorkshire; by John Lindley, Esq. F.G.S. F.R.S. &c., and Professor of Botany in the University of London.

This plant was described as a fern, resembling, in most respects, the *T*richómanes renifórme, a recent species found in New Zealand, but differing in the nature of its vernation. It was said to exhibit distinct and unequivocal traces of the marginal fructification peculiar to the genus *T*richómanes. After comparing it with the fossils comprehended by M. Adolphe Brongniart in his genus Cyclópteris, and showing that it was not referable to any known species of that group, the author concluded by assigning to it a specific character, and the name of *T*richómanes rotundàtum.

April 3. — Read. A paper on the Bituminous Schist and Fossil Fish of Seefeld in the Tyrol, by Roderick Impey Murchison, Esq. Sec. G.S.

F.R.S. &c., and another "On the tertiary deposits of the Cantal, and their relation to the Primary and Volcanic Rocks," by C. Lyell, Esq. For. Sec. G.S. F.R.S. &c., and Roderick Impey Murchison, Esq. Sec. G.S. F.R.S. &c., was begun.

May 1.—Concluded Reading. A paper "On the tertiary deposits of the Cantal, and their relation to the Primary and Volcanic Rocks," by Charles Lyell, Esq. For. Sec. G.S. F.R.S. &c., and R. I. Murchison, Esq. Sec. G.S. F.R.S. &c.

The authors have selected this district for description, because, although the adjoining fresh-water formations of the Limagne d'Auvergne and of Puy en Velay have been largely written upon, yet this of the Cantal has scarcely been noticed by any geologists, except in a cursory manner by Mr. Scrope, and formerly by M. Brongniart in his general observations on fresh-water deposits. (*Annales du Museum*, tom. xv. 1810.)

A paper by Dr. Buckland was read, stating that he has ascertained that the bony rings of the suckers of cuttle-fish are frequently mixed with the scales of various fish, and the bones of fish, and of small Ichthyosaúri in the bezoar-shaped fæces from the lias at Lyme Regis. These rings and scales have passed undigested through the intestines of the Ichthyosaúri. Dr. Prout has also found that the black varieties of these bezoars owe their colour to matter of the same nature with the fossil ink-bags in the lias; hence it appears that the Ichthyosaúri fed largely upon the sepiæ of those ancient seas.

The author has also ascertained, by the assistance of Mr. Miller and Dr. Prout, that the small, black, rounded bodies of various shapes, and having a polished surface, which occur mixed with bones in the lowest strata of the lias on the banks of the Severn, near Bristol, are also of fæcal origin: they appear to be coextensive with this bone-bed, and occur at many and distant localities. He has also received from Mr. Miller similar small, black, fæcal balls from a calcareous bed, nearly at the bottom of the carboniferous limestone at Bristol; this bed abounds with teeth of sharks, and bones, and teeth, and spines of other fishes: until they can be referred to their respective animals, the author proposes the name of Nìgrum Græ̀cum for all these black varieties of fossil fæces. They may have been derived from small reptiles or from fish, and in the case of the lias bone-bed, from the molluscous inhabitants of fossil nautili and ammonites, and belemnites. In a collection at Lyme Regis there is a fossil fish from the lias, which has a ball of Nìgrum Græ̀cum within its body; for this the author proposes the name of I′chthyo-còpros. He also proposes to affix the name of Saúro-còpros to the so-called bezoar stones of the lias at Lyme Regis, which are derived from the Ichthyosaúri; and the name of Hyaíno-còpros to the A′lbum Græ̀cum of the fossil hyæna.

The form and mechanical structure of the balls of Saúro-còpros, disposed in spiral folds round a central axis, are so similar to that of the supposed fir-cones or Iùli in the chalk and chalk marl, that the author has concluded that these so long misnamed Iùli are also of fæcal origin. On examination he finds many of them to contain the scales of fish; and Dr. Prout's analysis proves their substance to be digested bone. The spiral intestines of the modern shark and ray afford an analogy that may explain the origin of this spiral structure; and the abundance of the teeth of sharks and palates of rays in chalk, renders it possible that the Iùli may have been derived from these animals. For these the provisional name of Còpros ïulöìdes is proposed. In the collection of Colonel Houlton of Farley Castle, are several specimens of the Còpros ïulöìdes from the quarries of Maestricht.

The author has also recognised two other varieties of these fæcal substances, in a collection of fossils brought from the fresh-water formations near Aix in Provence by Messrs. Murchison and Lyell.

The author concludes that he has established generally the curious fact, that, in formations of all ages, from the carboniferous limestone to the diluvium, the fæces of terrestrial and aquatic carnivorous animals have been preserved; and proposes to include them all under the generic name of Coprolite.

The examples he produces from the carboniferous limestone, the lias, the Hastings sandstone, the chalk marl and chalk, the Maestricht rock, the fresh-water deposits at Aix, and the diluvium, are taken respectively from the several great periods into which geological formations are divided.

May 15. *and June* 5.—Read. A paper "On the Hydrographical Basin of the Thames, with a view more especially to investigate the causes which have operated in the formation of the valleys of that river, and its tributary streams;" by the Rev. W. D. Conybeare, F.G.S. F.R.S. &c. &c.

The author has selected this river, not only as being the principal one of the island, but further as exhibiting valleys exclusively the result of denudation, and therefore better suited to illustrate that operation than valleys of more complicated origin, in the formation of which the elevation and dislocation of the strata have cooperated.

He first offers some introductory remarks on the opposite theories of the fluvialist and diluvialist, the former ascribing such denudations exclusively to the operation of the streams actually existing, or rather to the drainage of the atmospherical waters, falling on the districts, which, it is supposed, have become thus deeply furrowed by the gradual erosion of these waters, continued through a long and indefinite series of ages; the latter contending that such a cause is totally inadequate to the solution of the phenomena, and maintaining that they afford evidence of having been produced by violent diluvial currents.

He proceeds to distinguish several different geological epochs, at which it is probable that currents must have taken place calculated to excavate and modify the existing surface. I. In the ocean, beneath which the strata were originally deposited. II. During the retreat of that ocean. III. At the periods of more violent disturbance, which are evidenced by the occurrence of fragmentary rocks, the result of violent agitations in the waters of the then existing ocean propagated from the shocks attendant on the elevation and dislocation of the strata. — Four such periods are enumerated as having left distinct traces in the English strata. 1. That which has formed the pudding stone of the old red sandstone, ascribed to the elevation of the transition rocks. 2. That which has formed the conglomerates of the new red sandstone, ascribed to the elevation of the carboniferous rocks. 3. That which has formed the gravel beds of the plastic clay. 4. That which has produced the superficial gravel, spread alike over the most recent and oldest rocks as a general covering, and which is found to contain bones of extinct Mammàlia: this (it is agreed) may be identified as the product of one era, by the same evidence which is employed to demonstrate the unity of any other geological formation. Although diluvialists have usually directed their principal attention to the effects of the currents of this latest epoch of general disturbance, they by no means exclude the cooperation of any of the causes above enumerated.

In the body of his paper, the author considers the physical history of the Thames as divisible into the following sections. I. The collection of its head waters from the drainage of the Cotteswold uplands. II. The passage which it has forced across the Oxford chain of hills. III. That opened in like manner across the Chiltern Hills to the London basin at Reading. IV. The re-entry of the river among those hills by the Henley defile. V. Its course through the plains of London to the sea.

I. The head waters of the Thames are collected from the drainage of the Cotteswold uplands, over a tract about 50 miles in length, constituting the rivers Isis, Churn, Colne, Lech, Windrush, Evenlode, and Cherwell; this chain of hills being entirely broken through by the Colne, Evenlode, and Cherwell, which rise from sources in the lias plains beyond its escarpment. The height of most of these sources is calculated at about 400 ft. above the sea.

Each of these valleys is separately described, and the general features of denudation presented by the Cotteswold chain are pointed out; these, it is asserted, bear traces of the most violent action, and they are contrasted with the state of repose which has evidently prevailed in the same districts from the period to which our earliest historical monuments ascend. In the most exposed situations, and those which appear to have suffered most from the action of the denuding causes, earth works of British and Roman antiquity are frequently found, attesting by their perfect preservation that the form of the surface has remained unaltered since the time of their construction. The drainage of the atmospherical waters has here produced no sensible effect for more than fifteen centuries: it is inferred, therefore, that to assign to this cause the excavation of the adjoining valleys, 600 or 700 ft. deep, is to ascribe to it an agency for which we have no evidence; the evidence, indeed, as far as it can be examined, being adverse.

The disposition of the water-worn debris, drifted against the Cotteswold chain and through the breaches opened in it, is also examined; and much of it is shown to be derived from rocks situated to the north of the valley of the Warwickshire Avon, and to be completely cut off by that valley from the Cotteswold district. It is contended that pebbles of this origin can never have been transported by the actual streams, because the drainage of these streams is, and always must have been, from the escarpment of the Cotteswolds to the valley of Avon; whereas the course of the pebbles is directly opposite, viz. across the Avon, and thence to that escarpment and through its breaches. The valley of Shipston on Stour, which is described as a species of bay in the escarpment of the Cotteswold, is stated to contain the most remarkable instance of this disposition.

II. The river collected from these head waters flows through the plain of Oxford, which is covered to a great extent by water-worn debris; these are diffused over situations inaccessible to the present floods, and, if produced by the actual streams, we must suppose that they have repeatedly changed their channel, so as to have flowed successively over every portion of the plain where these debris are now found; the oldest historical monuments attest, however, the permanence of the actual channels, and the floods at present bring down no pebbles whatsoever.

On the south of the plain at Oxford, the progress of the river is opposed by a chain of hills, called by the author the Oxford chain. This is passed by a defile broken through it. Were that defile closed, an extensive lake would be formed above Oxford, and the waters would be turned into the valley of the Ouse; by which they would empty themselves into the estuary of the Wash.

The author enquires how this configuration of the valleys could have been produced on the fluvialist's theory. He argues, that if the Oxford chain originally (as at present) formed a barrier of superior elevation to the tract intervening between itself and the Cotteswolds, that barrier must have turned all the drainage of the Cotteswolds into the vale of Ouse. Under those circumstances, the crest of the Oxford chain could never have been eroded by waters which would have flowed off in another direction. There is, however, another alternative; and the interval between these chains may be supposed to have formed originally a uniformly inclined plane, from the summits of the one to those of the other, along which the waters once flowed, and which they have since furrowed (by perpetually deepening their channels) into the present valleys. The author calculates the mass of materials which must, on this supposition, have been excavated and washed away, and contends that the drainage of atmospherical waters along such an inclined plane (which would have a fall of 10 ft. per mile) does not afford an agent adequate to such vast operations.

The Oxford chain has suffered greatly from denudation, being broken into several detached groups.

Among these, some insulated summits are capped by patches of gravel, partly derived from transition rocks, partly from the chalk formation. These prove the extent to which denudation must have proceeded since they were lodged in their present situation; as they must have been transported from their native habitats along uniformly inclined planes, which have subsequently been excavated.

III. Issuing from the defile of the Oxford chain, the river flows through the plain of Abingdon and Dorchester, being joined by the Ock and the Thame. This plain, like that of Oxford, is deeply and extensively covered with water-worn debris. It is also similarly bounded by a lofty chain (like that of the Chilterns) on the south. An enormous breach is opened in this barrier for the passage of the river. All the same arguments apply in this case, which were previously urged with regard to the passage of the Oxford chain.

The Chilterns, like most other chalky districts, abound with dry valleys, the rifted and absorbent structure of that rock not permitting the rain waters to collect into streams; these valleys agree in every other feature with those containing water-courses, and have been obviously excavated by the same denuding causes, which, in this case, it is self-evident could not have been river waters. The surface of the chalk has been deeply and violently eroded, and is deeply covered with its own debris; this action appears, in part, to have taken place during the epoch of the plastic clay formation.

IV. The river having passed this defile, enters, for the first time, the London basin, near Reading, where it receives the Kennet, of which the course is shortly described. It rises in the chalk marl, beneath the chalk escarpment, a few miles beyond Marlborough; that escarpment being broken through in several places, to give passage to its head waters. The author insists, again, on the contrast between the extensive denudations which must have occurred in this district and the permanence of its surface, as attested by the preservation of the numerous druidical and other British monuments scattered over these downs.

A little below Reading, the Thames (first having received another small tributary, the Loddon) quits for a time the London basin, to re-enter, by a sudden bend, another deep defile among the chalk hills, ranging by Henley and Marlow to Maidenhead, when it finally enters the plains of London. It is difficult to account for this deflection of the river, as a straighter course appears open to it by White Waltham to Bray. This line was surveyed for a canal by Mr. Brindley, and appears to be level to White Waltham, and thence to fall 47 feet to Mankey Island, near Bray; so that a dam of a few feet across the river below Sunning, at the mouth of the Loddon, would turn the waters into this channel. The author conceives, the most natural mode of explaining this deflection of the river is, by the supposition that a higher range of tertiary strata once extended from the ridges of Bagshot heath in this direction, forming a bar to the progress of the stream in this line.

V. The plains of London are covered with enormous accumulations of water-worn debris, chiefly of chalk-flints, and often abounding in fossil remains of elephants, hippopotami, &c.; the gravel is not confined to the low grounds, but caps the highest summits of the district; e. g. Highgate on the north, and Shooter's Hill on the south, of the river. To explain this distribution of this gravel by the operation of the actual rivers, the author observes that it is necessary, first, to suppose that a uniform plane originally existed from the summit of Highgate to the Hertfordshire chalk downs, and from the top of Shooter's Hill to those of Kent, on the surface of which the rivers once flowed; secondly, that these rivers have subsequently washed away all that immense mass of materials which would be requisite thus to reconstruct the surface; and, thirdly, that, having worn down that surface into nearly its present form, the rivers perpetually shifted their channels, so as to distribute the gravel equally over the whole plain of London, yet remained long enough in each channel to lodge there deposits of this gravel 20 ft. or 30 ft. thick.

A paper was also read, entitled "A few Facts and Observations as to the Power which running Water exerts in removing heavy Bodies," by Matthew Culley, Esq. F.G.S. &c., in a letter to Roderick Impey Murchison, Esq. Sec. G.S. F.R.S. &c.

The heavy rains which fell during three days of August, 1827, swelled to an unusual height the small rivulet called the College, which flows at a moderate declivity from the eastern watershed of the Cheviot Hills, and caused that stream not only to transport enormous accumulations of several thousand tons' weight of gravel and sand to the plain of the Till, but also to carry away a bridge then in progress of building, some of the arch-stones of which, weighing from one half to three fourths of a ton each, were propelled two miles down the rivulet.

On the same occasion, the current tore away, from the abutment of a mill-dam, a large block of greenstone porphyry, weighing nearly two tons, and transported the same to the distance of a quarter of a mile. Instances are related, as occurring repeatedly, in which from one to three thousand tons of gravel are in like manner removed to great distances in one day; and the author asserts, that, whenever 400 or 500 cart-loads of this gravel are taken away for the repair of roads, one moderate flood replaces the amount of loss with the same quantity of rounded debris.

Parallel cases of the power of water are stated to occur in the Tweed, near Coldstream.

June 19. A paper "On the occurrence of Agates in the Dolomitic Strata of the New Red Sandstone Formation in the Mendip Hills," by the Rev. W. Buckland, D.D. V.P.G.S. F.R.S. &c. &c., was read. These agates are ploughed out of the surface of the fields at Sandford, near Banwell, and are nearly allied to the potato stones, which abound in the new red sandstone formation that surrounds the Mendip Hills. Their prevailing colours are various shades of grey; their internal structure resembles that of the bird's-eye agate, presenting alternate bands of chalcedony, jasper, and hornstone, disposed in irregular and concentric curves; some specimens from Worle and Clevedon are of the nature of fine jasper agates, and of a bright red colour.

A shallow pit, from which the agates are extracted at Sandford, presents the following section:—

1. Yellow clay, mixed with magnesia and carbonate of lime - -	6 in.
2. Yellow dolomite, used as firestone in linekilns; it crumbles readily to a soft powder, and is filled with specks of manganese, and contains veins of small nodules of chalcedony - -	6
3. Yellow clay, falling to powder, in water, like fuller's earth, and containing much carbonate of lime and magnesia. In this clay the agates are dispersed irregularly, like nodules of flint in chalk -	6
4. Yellow clay and earthy dolomite, to the bottom of the pit -	12

The author adduces a parallel example of beds and nodules of jasper and jasper-agate in the mountains of dolomite, near Palermo, in a formation of the same age with the new red sandstone of the Mendip Hills. He also gives examples of agates formed in cavities of chert of the green-sand formation, near Lyme Regis, and in cavities of silicified wood and silicified corals and shells. The most beautiful specimens of the two former are from the tertiary strata of Antigua. Shells converted into chalcedony, and containing agates in their cavities, occur near Exeter, in the whetstone pits of the green-sand formation at Black Down Hill; and shells, entirely converted to red jasper, in sand of the same formation, at Little Haldon Hill.

A paper was next read "On the Tertiary Fresh-water Formations of Aix, in Provence, including the Coal field of Fuveau," by Roderick Impey Murchison, Esq. Sec. G.S. F.R.S. &c., and Charles Lyell, Esq. For. Sec. G.S. F.R.S. &c.; with a description of fossil insects contained therein, by John Curtis, Esq. F.L.S.

The oldest and fundamental rock of this district is a highly inclined and contorted secondary limestone, containing Belemnìtes, Gryphìtes, and Terebrátulæ, on which is uncomformably deposited a vast fresh-water formation, the relations of which are shown in a section from N.E. to S.W. The escarpment of white marl and limestone, N.E. of the town of Aix, is first described in descending series. The upper beds, consisting of white calcareous marls and marlstone, calcareo-silicious millstone and resinous flint, contain the Potamìdes Lamárck*ii*, Bùlimus térebra and B. pygmæ`us, with a new species of Cỳclas named C. gibbòsa, and the subjacent strata run out into a terrace, beneath which gypsum is extensively worked. Of these beds (minutely detailed), some are peculiarly characterised by their abundance of fossil fish, and others by a profusion of plants; amongst which, Mr. Lindley has recognised Flabellària Lamanòn*is* of M. Ad. Brongniart, and the leaves of *L*aúrus dúlcis? Podocárpus macrophýlla? and *B*úxus baleárica? the terminal pinna of a leguminous plant, referable to *L*òteæ or *P*haseòleæ of Decandolle, the branch of a *T*hùja nearly related to *T.* articulàta, and what appears to be the fruit of some unknown plant, &c. In this upper system of gypsum, the fossil insects occur exclusively in a finely laminated bed of about 2 in. thick; and still lower are two other ranges of gypsum, the upper one of which alone is worked; and the marls associated therewith contain nearly as great a quantity of fossil fish as those of the upper zone. Beneath these are beds of white and pink-coloured marlstone and marl, inclined at 25° to 30°, and distinguished by Potamìdes Lamárck*ii*, and a new species of Cỳclas, named C. A`quæ Séxtiæ, and these pass downwards into a red sandstone (Molasse) and a coarse conglomerate (Nagelfleu), the town of Aix being situated at the base of the whole of the above series.

In continuing the sectional line to the S.W., all the district between Aix and Fuveau is made up of parallel ridges of fresh-water rocks; the most northerly containing red marl and fibrous gypsum, with Limnæ`æ and Planórbes (P. rotundàtus); the intermediate range is of mere earthy limestone, containing Limnæ`æ and Gyrogonìtes, with micaceous sandstone and shale; and, lastly, the coal field of Fuveau is described as composed of grey, blue, and black compact limestone and shale, with stony bituminous coal of good quality; the united thickness of the different seams of which amounts to about 5 ft. The fossils characterising the carboniferous strata are two new species of Cỳclas, named C. cuneàta and C. concínna, a Melània named M. scalàris, Planórbis córnu, and a large species of U`nio. Casts of Gyrogonìtes were observed even in the coal itself; and the charcoal seemed, in some instances, to be made up of a plant resembling Endogenìtes bacillàre of Brongniart.

The authors remark that these lower members of this great tertiary deposit differ in character from any other fresh-water group examined by them in central France, and have so much the aspect of the most ancient secondary rocks, that the presence alone of fluviatile and lacustrine shells, with Gyrogonìtes, compelled them to recognise the comparatively recent date of the whole group.

This notice was accompanied by observations on the fossil insects mentioned in the preceding memoir, by John Curtis, Esq. F.L.S. These insects are all of European forms, and are most of them referable to existing genera.

The greater portions belong to the orders Díptera and Hemíptera; the Coleóptera are next in number; there are only a few Hymenóptera, and but one Lepidópterous insect. "As a larger collection," says Mr. Curtis, "might greatly change the proportion of the different orders, no positive inference, as to climate, should be drawn from the present assemblage; but there is nothing in the character of the insects to warrant the supposition of a higher temperature than that of the South of France." The great portion of these remains were very probably brought together from different localities by floods, mountain torrents, or rivers; yet there is no insect among them that might not be found in a moist wood. The antennæ, tarsi, and other parts whereby the characters would be best distinguished, are often wanting; yet enough characters frequently remain even then to distinguish the genus. The sculpture, and even some degree of colouring, are preserved in several specimens. The wings of some beetles are extended beyond the elytra, showing that when they perished, they were flying or attempting to escape by flight.

Art. VI. *Natural History in the English Counties.*

Kent.

Museum of the Canterbury Philosophical and Literary Institution. — At the commencement of the year 1825, while yet this institution was in its infancy, certain of its members conceived the idea of establishing a museum, as the most desirable means of diffusing information on various subjects connected with general knowledge, and more especially with the several departments of natural history. In a short time, and before any actual formation existed, an opportunity occurred of obtaining the collection of Mr. Crow, late of Margate, who had expended a long life in the acquisition of fossils, to which some other miscellaneous articles were appended; and thus a basis was formed for the present arrangement.

Mr. Crow has been a most persevering collector of fossils, &c., through the whole of his long life, and many rare specimens will attest his acumen as a collector. Scientific arrangement he did not affect, and most of the specimens came even unnamed from him to the Society. Many departments have since been commenced by the industry and perseverance of some of its members, aided by the liberal contributions of the public.

Where it could with propriety be followed, the arrangement of Linnæus has been adopted; and where it is departed from, the name of the system is either furnished on the ticket, or in the article which treats of the subject in the *Synopsis*.

The museum comprises models of Egyptian and Roman architectural antiquities, and also of the Leaning Tower of Pisa, the Bastile, the Pagoda at Pekin, Kits Coty House, remarkable for the combat between the Britons and Saxons in 445, and the singular arched rock at Tologa Bay, New Zealand. It also possesses an interesting collection of antiques, Greek and Roman, together with the curfew bell which hung in Dover Castle from a short time anterior to the battle of Hastings. There is a collection of Greek, Roman, British, and Saxon coins; and, among the more modern English coins, is an Anglo-Gallic penny of Henry IV., and one of the current farthings of Queen Anne, in fine preservation. As illustrative of the manners and customs of different nations, it possesses various articles, religious, warlike, and domestic, from the East Indies, South Sea Islands, north-west coast of America, New Zealand, China, and Lapland. — In adopting an arrangement for the minerals, it has been considered most advisable to select that which should offer the greatest facilities for the general information of the public, and, at the same time, be sufficiently scientific for all the objects of the institution. Professor Jameson's, erected upon the system of the illustrious Werner, has been found best calculated to effect these objects; more especially as it will permit accumulations to be thrown into the respective families or groups of which it is composed, without deranging the series. But as no system of mineralogy, strictly speaking, embraces the numerous aggregates so extensively scattered throughout the regions of the earth, a class has been appended to the four forming the system of Jameson, for the purpose of comprehending them, and of making the arrangement complete. All the objects, therefore, forming this department of the museum are arranged under the five following classes: — 1. Earthy minerals; 2. Saline minerals; 3. Inflammable minerals; 4. Metallic minerals; 5. Aggregates. Under each of these classes there is an instructive assemblage of specimens. With regard to aggregates, it is observed that isolated specimens are of themselves of but little value; but when in assemblage with a natural series of bodies mutually related they become singularly interesting and instructive. It is therefore hoped that the lovers of science, possessing objects of this description, will favour the institution, by presenting such as they may have, to be arranged with this collection. The Society is largely indebted to Dr. Carter and Mr. Alderman Browne, who have considerably augmented the number of European specimens; and to General Miller of Wingham, for a valuable case of South American minerals. — The museum is rich in fossils, from the gigantic mammoth to the minute zoophyte. During the formation of the new road at Boughton Hill, a period of nearly four years, a great number of fossils were found through the unremitting industry of Mr. H. Wrighte, which he has since presented to the Society. Amongst them is a common hazel nut, so perfectly mineralised that sparks may be elicited from it by concussion with flint or metal. This specimen was seen by the late Dr. Clarke, Professor of Mineralogy at Cambridge, and pronounced by him to be perfectly unique. One of the most interesting is the strobilus, or cone, of some tree of the fir or cypress family, with its footstalk: it looks as perfect in its detail as if fresh from the tree; as do also the catkins of some of the amentaceous trees. Amongst the fossils is a lobster, remarkable as being one of the most perfect specimens hitherto met with. It was very highly valued by its late possessor, and has been eagerly enquired for by the scientific who have visited the present institution. It does not appear to differ in any particular from the species at present used as an article of food.— There are a collection of dried specimens of plants, and several vegetable skeletons principally executed by Mr. Crow.—In the conchological department there is a complete collection of British shells, presented by Henry Boys, Esq., of Eastry. — The present collection of insects has been arranged on the system of Linnæus, as being the most simple, though it must be acknowledged that some of the genera of the order A′ptera contain insects that ought to have been referred by him to other classes. Later naturalists have done this, and it is intended to arrange the present collection again, for this purpose, at some future period. — The birds are arranged according to the Linnean classification, and are exhibited as they stand in the *Systèma Natùræ.*

The foregoing slight outline of a museum, which bids fair to rival any provincial museum in the kingdom, we have been enabled to give through the kindness of the curator, Mr. William Masters, F.H.S. — ¶

Chatham Philosophical and Literary Institution. — At the Annual Meeting of the shareholders, held at the Sun Tavern, Chatham, on Tuesday the 29th of September, 1828, W. A. Davies, M.D. V.P., in the chair; the Secretary, Mr. T. Baldock, read the report of the Committee, and the Treasurer, Mr. T. Atkinson, the accounts for the past year. The Curator read the list of the donations presented to the museum during the year. Officers were elected for the year ensuing, and various resolutions passed.

From the report of the Committee, we find that the library contains upwards of 600 volumes, 200 of which have been purchased by direction of the Committee, at the expense of 96*l*. These include several standard and voluminous works, indispensable to a public library. The remainder of the library is composed of volumes presented by proprietors, annual subscribers, and friends to the Institution; and amongst them there are many works adorning English literature, which could not have been expected thus early upon the shelves without the assistance of those proprietors, who have taken so effectual a method of demonstrating their anxiety for the prosperity of the Institution. In addition to the above works, the reading-room has been regularly supplied with all the most useful reviews and magazines. The museum contains upwards of 2000 specimens of natural history, &c., many of them of great rarity and value.

Upon the general affairs and future prospects of the Institution, the Committee can speak with great pleasure; and "they cannot close their labours without a cordial expression of their gratification at the success which has thus far attended the Institution. They have a confident hope that, by the collective and individual exertion of the proprietors, and by unanimity amongst those to whom the direction of the affairs is intrusted, every prospect that was, in the first instance, contemplated, will be fully and speedily realised." — ¶

Essex.

Plants collected by the Rev. S. Palmer of Chigwell, Essex. The rather uncommon marked with a star (*), the more rare with a cross (†). — †*M*elampȳrum cristàtum: this rare plant was gathered in a wood between Linton and Saffron Walden. **T*hȳmus *N*épeta, near Audley End. *Veró-nica* scutellàta, officinàlis, spicàta, Epping Forest, near Thoydon. Lycòpus europæ̀us, common in ditches in the neighbourhood of Chigwell. Bìdens tripartìta and cérnua, common in ditches in the neighbourhood of Chigwell. *E*upatòr*ium c*annábinum, common in ditches in the neighbourhood of Chigwell. †Aspídium *T*helýpteris, *F*ìlix Mas, aculeàtum, and lobàtum, common in ditches in the neighbourhood of Chigwell. *P*ìcris *e*chiöìdes and *h*ieraciöìdes, common in ditches in the neighbourhood of Chigwell. *L*ysimàchia némorum, Hainault Forest, near Chigwell Row. **V*erbáscum *B*lattària, Epping Forest, near Loughton. † Tormentílla réptans, hedges, Mr. Palmer's, Chigwell. **A*ntirrhìnum *E*latìne, common in ditches in the neighbourhood of Chigwell. †*T*hláspi arvénsis, on a dunghill in the lane leading to Hainault Forest from Abridge. †Bárts*ia* alpìna, Epping Forest, near Thoydon. *H*ypéricum †*A*ndrosæ̀mum, *púlchrum, humifùsum, and other plants of the same family, Hainault Forest. *V*erbèna officinàlis, Loughton Hall. †*T*ordýlium officinàle, in a field by the lane leading from Thoydon to Loughton. *A*strágalus hypoglóttis, Forest, near Woodford Bridge.

It is evident, from the above list, that a more promising field than this neighbourhood, for botanical researches, will not be found in the vicinity of London. I did not commence my search till after the middle of September, before which time many flowers had disappeared; but, from what has been accomplished, an estimate may be formed of what remains to be done when the proper season arrives.

These forests, with the neighbouring country, afford great diversity of soil, and endless variety of shade, exposure, and surface. Numerous marsh and aquatic plants grow about the rivers Lea and Rodon; besides, there are many purling streams, in various parts of the forest, whose deep margins and turfy banks will amply gratify, with their modest beauties, the most enthusiastic admirer of flowers and sylvan scenery. — *S. P. Sept.* 1828.

Hertfordshire.

Plants collected by the Rev. S. Palmer of Chigwell, Essex. The rather uncommon marked with a star (*), the more rare with a cross (†). — Aspérula odoràta, common in a copse near Leverstock Green, Hemel Hempstead. Menyánthes trifoliàta, marshes near Two Waters. *Campánula hýbrida, corn fields, Hemel Hempstead; this is the original of the favourite garden annual, Venus's Looking-Glass. **H*yoscỳamus nìger, road-side near the Swan, below Two Waters. **N*arcíssus Pseùdo-*N*arcíssus grows spontaneously in the meadows near Leverstock Green. *Pàris quadrifòlia, Hon. —— Ryder's park, near Hemel Hempstead. †*T*ragopògon *p*orrifòlius, edges of fields near Hemel Hempstead. *O*'rchis bifòlia, copses near Hemel Hempstead. **O*'phrys *m*uscífera and *a*pífera, on the chalk bank of a field between the Swan and the Hon. —— Ryder's Park. **O*'phrys *a*ranífera was found in a copse near a brick-work, on the side of the lane leading from Two Waters to Leverstock Green. — *S. P. Sept.* 1828.

Huntingdonshire.

Plant collected by the Rev. S. Palmer of Chigwell, Essex. — *S*tratiòtes *a*lòïdes, ditches near Molesworth. — *S. P. Sept.* 1828.

Cambridgeshire.

The Cambridge Philosophical Society have lately purchased an extensive collection of British birds. The money for the purpose was raised by subscription; and it is highly gratifying to observe that nine tenths of the subscribers are clergymen.

The wild Cochineal Insect found in the Botanic Garden at Cambridge. — Dr. Gorman discovered, a few weeks ago, the *Gròna* sylvéstris, or wild species of the cochineal, living among the leaves of the coffee plants, the acacia, &c., in the botanic garden at Cambridge. This is the kermes, or gronilla of Spain, about which so much has been said; some endeavouring to identify it with the Grona fina, and others as strenuously denying such identity.

At all events, this is the same species as the gronilla found on the leaves of the green oaks in the Ronda Marisca, in Andalusia; and, in some years, large and valuable crops of the gronilla are gathered in that part of Spain by the peasantry, and sold to the Moors to dye their scarlet.

The gardener at Cambridge could not inform Dr. Gorman how long the insects had been there, or whence they came; but they went there by the appellation of "Amelca bug." The gardener found these insects very destructive to plants upon which they fastened; and although he tried every means, short of injuring the plants, to remove them, he found it impossible, as they adhere to the leaves and parts of the stem with such tenacity, and are so prolific, that the young ones are often found spreading themselves over the neighbouring plants. On this account, it would be worth while to attempt the cultivation of the prickly pear in the open air in this country, and place the insects upon them; for, in all probability, the insects would, by good management, do well. — *A Traveller*, in the *Times*, January 26. 1829.

Plants collected by the Rev. S. Palmer of Chigwell, Essex. — *D*elphínium Consólida, corn fields on the roads between Loham and Fordham. *C*entaurèa Calcítrapa, near Newmarket. Bùtomus umbellàtus, ditches near Chatteris. — *S. P. Sept.* 1828.

Suffolk.

Bungay Botanical Society. — This Society was established in April 8. 1826 Its rules have been transmitted to us, and from them we learn that the members meet once a month, at 7 o'clock in the evening from April 1. to October 31., and at 6 o'clock from November 1. to March 31. At each meeting every member pays eight-pence to the treasurer, to form a fund for the purchase of books, for the expenses of the annual feast, &c. Members are admitted by ballot. The feast is held on the Tuesday preceding the longest day, when *5s.* is allowed to each member, for that purpose, from the fund. Members may invite friends, on giving due notice to the president, and paying *5s.* for such admission. The money remaining, after the expenses of the feast and other contingencies are disbursed, is laid out in books, which are kept for the use of the members. When any plants are brought to the meeting, they are shown to the members; and those who state their correct names in writing are entitled to a mark. The member who gets most marks is chosen president for the following year, and vice-president for the one succeeding; and, while in office, he is expected to give the members every information in his power, without claiming any marks for himself. No more than thirty members are allowed to belong to the Society at one time, and while four attend its meetings it is to remain undissolved. Expulsion of members, alterations in rules, &c., are decided, as usual, by majorities. We observe that a *Hortus Siccus* was to be commenced on the formation of the Society, and kept with the books, for the inspection of the members. — ¶

The Discovery of Plants varying with white Flowers seems to be quite fashionable, and I must, of course, do something in that way. A short time since a friend of mine took me to two meadows about five miles from this place, in which there was a profusion of the Cólchicum autumnàle, and the variety with white flowers was equally abundant with the purple. It was a truly delightful spectacle. — *Daniel Stock. Bungay, Nov.* 17. 1828.

Triòdia procúmbens. — I have also, since I wrote to you last, found a grass growing on Bungay Common, which was new to me and to our botanists here; it was the Triòdia procúmbens of Smith, in tolerable abundance. — *Id.*

Gloucestershire.

A White Rook, in full feather, was taken at Eyford rookery, on the estate of Vernon Dolphin, Esq. The eyes were blue, with two white rings, and the legs and bill perfectly white, as well as the body. — *Cheltenham Chronicle,* May.

Herefordshire.

Pìcus mìnor. — You mentioned in your Magazine (Vol. I. p. 395.) the *Pìcus* mìnor as being a rare bird. In the large oak groves of Herefordshire it abounds, and may constantly be heard emitting its jarring note, though difficult to be seen. — *William Henry Hill. Newland, Gloucestershire, Sept.* 10. 1828.

Northamptonshire.

Plants collected by the Rev. S. Palmer, the rather uncommon marked with a star (*). — *H*yoscỳamus nìger, Barnwell, All Saints, near Oundle. *A'*trop*a Belladónna,* road-sides near Peterborough, also in Blatherwicke Park, at Kingscliffe. **C*ynoglóssum sylváticum, the same. **A*quilègia vulgàris, woods between Wansford and Kingscliffe. **Datùra* Stramònium, Blatherwicke. **S*ambùcus *E'*bulus, Rockingham Forest, near Kirby House. — *S. P.*

Northumberland.

Newcastle upon Tyne Literary and Philosophical Society. — The Museum Committee commence their Report for May, 1827, by informing the Society, that, in consequence of the acquisition, by Mr. Fox, of the original manuscript catalogue of the museum, they have it in their power to contradict the report that only a part of the museum had come into the possession of the Society.

Considering the real value of the museum to depend upon the facility it affords to students to acquire knowledge with ease and precision; and that to become thoroughly acquainted with British, is the sure road to the more extensive field of foreign, natural history, the Committee have particularly directed their attention to the obtaining and arrangement of the productions of this kingdom; and with this view they had printed and circulated a list of *desiderata* of British birds. By this measure 26 species, out of 115 which were wanting, were almost immediately procured, and the ornithologist may now have an opportunity, by inspecting the collection, of ascertaining above two thirds of the British species, besides several varieties, and 152 species of foreign birds.

Of the British shells, two thirds have been presented and are arranged in the cabinets, together with a considerable number of exotic specimens, and some corallines; and one half of the phænogamous plants may be consulted in the herbarium.

In the geological department the museum is rich, possessing not less than 3000 specimens; and the Committee feel warranted in saying, that there is scarcely a formation in the kingdom which has not contributed to the collection. In this department, as well as that of the plants, the museum also possesses several foreign specimens.

Independently of the British, there have been arranged into genera, by the curator and other gentlemen conversant with the subject, nearly 1000 foreign species of insects; and, in consequence of the very liberal donation of jars, by the Northumberland Glass Company, the valuable collection of reptiles and snakes will, by the same assistance, be also ready for inspection in a short time.

The Committee conclude by stating the decisive opinion of Mr. Sabine, whose knowledge in these branches of science few will venture to dispute, that the Literary and Philosophical Society of Newcastle upon Tyne had done great service to naturalists in general, by preserving entire so curious and valuable a collection as the Wycliffe museum, and to those of this district in particular, where these specimens are now safely deposited.

126 distinct presents have been made to the museum since the last anniversary, many of them containing a great variety of subjects of natural history; in all, amounting to considerably above 200.

The following is the list of *desiderata:*—*Land Birds.* Ring-tailed eagle, Fálco fúlvus; Honey buzzard, Fálco *a*pívorus; Goshawk, Fálco *p*alumbàrius; Lanner, Fálco lanàrius; Spotted falcon *Penn.*, Fálco versícolor; Ash-coloured falcon, Fálco cineràrius; Woodchat, Lànius rùfus; Mountain bunting, Emberìza montàna; Lapland finch, Emberìza calcaràta; Parrot crossbill, Lóxia Pytiopsíttacus; Spotted flycatcher, Muscícapa *Grísola*; Rock lark, *A*'nthus aquáticus; Dusky lark, *A*laúda obscùra; Richard's pipit, *A*'nthus Richárd*i*; Red lark, *A*laúda rùbra; Grasshopper warbler, Sýlvia Locustélla; Reed warbler, Sýlvia *a*rundinàcea; Lesser whitethroat, Sýlvia Sylviélla; Wheatear, Sýlvia Œnánthe; Alpine warbler, Accéntor alpìnus; Crested titmouse, Pàrus cristàtus; Rock dove, *C*olúmba *L*ívia. — *Water Birds.* Black stork, *A*'rdea nìgra; Crane, *A*'rdea *G*rús; Gardenian heron, *A*'rdea Gardèn*i*; Purple heron, *A*'rdea purpùrea; Squacco heron, *A*'rdea comàta; Little egret, *A*'rdea *Garzétta*; Great white heron, *A*'rdea álba; Freckled white heron, *A*'rdea lentiginòsa; Cayenne night heron, *A*'rdea cayanénsis; Ibis, Tántalu*s* fancinéllus; Pygmy curlew, *N*umènius pygmæ'us; Curlew dunlin, Trínga subarquàta; Temminck's knot, Trínga Temmínck*ii*; Little stint, Trínga minùta; Black sandpiper, Trínga lincolniénsis; Brown sandpiper, Trínga fúsca; Varieties of the knot, Trínga Canùtus; Varieties of the ruff, Trínga púgnax; Courland snipe, *Tótanus* fúscus; Wood, or long-legged, sandpiper, *Tótanus* grallatòrius; Spotted sandpiper, *Tótanus* maculàtus; Greenshank, *Tótanus* Glóttis; Gambet, *Tótanus* Cálidris; Cinereous godwit, Scólopax canéscens; Greater snipe, Scólopax màjor; Brown snipe, Scólopax grísea; Sabine's snipe, Scólopax Sabìni; Turnstone, Strépsilas collàris; Alexandrine plover, Charàdrius alexandrìnus; Kentish plover, Charàdrius cantìacus; Cream-coloured plover, Cursòrius Isabell*ìnus*; Long-legged plover, Himántopus melanópterus; Pratincole, Glarèola torquàta; Olivaceous gallinule, Gallínula Foljámbei; Minute gallinule, Gallínula minùta; Grey Phalarope, Phalàropus platyrhínchus; Red-necked grebe, Pódiceps rubricóllis; Sclavonian grebe, Pódiceps cornùtus; Spotted guillemot of Latham, young of black guillemot; Black-throated diver, Colýmbus árcticus; Gull-billed tern, Stérna ánglica; Glaucous gull, Làrus glaúcus; Iceland gull, Làrus islándicus; Great black-backed gull, Làrus marìnus; Ivory gull, Làrus ebúrneus; Winter gull, Làrus hybérnus; Tarrock, Làrus tridáctylus jùnior; Black-headed gull, Brown-headed Gull, and Brown gull, different stages of Làrus ridibúndus; Pomarine gull, Làrus Pomarìnus; Arctic gull, Làrus parasíticus; Fulmar petrel, Procellària glaciàlis; Leach's petrel, Procellària Leáchii; Wild swan, A'nas Cýgnus; White-fronted goose, A'nas álbifrons; King duck, A'nas spectábilis; Eider duck (female), A'nas mollíssima; Black duck of Hudson's Bay, A'nas perspicillàta; Red-breasted Shoveler, A'nas rùbens; Bimaculated duck, A'nas glócitans; Velvet duck (male), A'nas fúsca; Castaneous duck, A'nas *Nyròca.*

We have inserted the English, as well as the systematic, names, because specimens may fall into the hands of many who know no other. But while we publish the desiderata of a flourishing museum, it must not be forgotten that notices of many institutions may, from time to time, appear in our pages, whose possessions would be much more easily enumerated than their wants. These should not be overlooked by the sportsman or the traveller; and we hope that wealthy societies, having for their end the spread of science, will give of their abundance to those which, in the present diffused state of knowledge, may reasonably be supposed to have neither funds for purchase nor duplicates for exchange. — ¶

LANCASHIRE.

Manchester Banksian Society. — This Society, the object of which is the acquisition of knowledge in the sciences of entomology, botany, mineralogy, geology, &c., was established so recently as the 5th of January, in the present year, when a code of laws for its government was adopted, and a president, treasurer, secretary, and committee, were appointed for the transaction of business. The intentions of the Society are to be effected by means of a library of books, conversational discussions, reading of papers, and occasional lectures, illustrated by collections of specimens in the several sciences. The collections of specimens are to be formed by the members, each of whom is annually to contribute at least three perfect specimens. In collecting specimens, and in the method of arranging them, the following plan is to be observed: —

Entomology. The insects to be arranged according to the most approved system; and, in collecting British specimens, it is expected that members will, as often as practicable, observe their localities, habits, times of appearance, &c., that memoranda may be kept of every thing interesting to the naturalist, or useful to society. The foreign insects to be kept carefully distinct from the British, and labelled "foreign."

Botany. A herbarium of the plants of Great Britain, and a distinct one for a general collection. Specimens of seeds, gums, sections of woods, or of any other miscellaneous articles, fossil as well as recent, which may tend to illustrate the science. As often as possible, the habit of each specimen, distinctly written, and the time at which it was gathered, must accompany it.

Mineralogy and Geology. The minerals and geological specimens to be methodically arranged; and, as often as practicable, labelled with their names, and the situations in which they were collected.

At the first Meeting, an appropriate address, embracing the views of the Society, and pointing out the motives which should stimulate the members to exertion, was eloquently delivered by Mr. R. Detrosier. The interest of the proceedings of the evening was further heightened by a beautiful display of recently cut specimens of plants.

From the address of Mr. Detrosier, we cannot, though straitened for room, resist the pleasure of making a few extracts. After stating the objects of the Society, viz. mineralogy, geology, botany, and entomology; and answering the absurd objection that such pursuits are of little practical utility, he exclaims: —

"How striking is the difference between the man of intellect and the mere sensualist, in the appropriation of their leisure hours! The one increases his means of happiness, and preserves his health, whilst the other wastes his property, and hastens his death. One finds his greatest pleasure 'in holding sweet converse with the mighty dead;' in tracing over the living sentiments of those mighty minds whose bodies have long since mingled with the dust; or in learning, with avidity and delight, the imposing discoveries of modern times. The other passes over the surface of this beauteous world, with eyes open indeed, but seeing not; and with a mind that seems incapable of performing any higher office than that of a mere caterer for the body's wants. This difference of taste, which principally, nay, I may say solely, arises from the difference in education, gives birth to the distinguishing opposites, in conduct, of virtue and vice in various degrees. Man, in a state of ignorance, becomes the dupe of artifice, the victim of error, and is destroyed by the operation of those very causes which would, under a proper discipline, become the principal administerers to his happiness. His passions and his appetites, which, in a state of ignorance, are the tempests that hurry his deluded bark to destruction, when properly directed become the motives to good and great actions, as they are the true and only sources of human pleasure. They are the elements of life; to destroy which is out of our power, to attempt it criminal. It is perfectly within our power, however, to subject them to the dictates of knowledge and experience, and thus to engage them in the cause of usefulness and virtue. They have long since been engaged in the cause of vice. The ambition of a dog-fighter or a pugilist differs only in its object from that which governed a Cæsar, a Cromwell, or a Bonaparte. It is precisely the same in its nature; and had it been directed to other and more worthy objects, might have produced a Locke, a Milton, or a Franklin. Strong natural powers are the sources of strong natural passions, which seek, as naturally as the eagle seeks the sky, or rests him on the towering and lofty rock, objects calculated to call forth the exertion of their energies, and on which they can rest with self-satisfaction. They are the strong and restless spirits of the age, that must be active in vice or virtue; and that they have not been engaged in the cause of the latter is the fault of circumstances rather than of themselves. Were the mental powers of the poor man properly cultivated in youth, were his energies properly directed, and his pride engaged in the love of that distinction which arises from the possession of knowledge, how different would be the conduct of thousands who are lost to a sense of their degraded situation, because they have never been elevated above it."

Having shown, by a series of elucidations which we regret our limits preclude us from inserting, how replete with interest and instruction are the sciences proposed, Mr. Detrosier proceeds: —

"Living at a time when truth is no longer shunned, except by those who are interested in error, and when the progress of learning is no longer dreaded, save by those who profit by the ignorance of the multitude, whatever useful knowledge we may gain by mutual instruction, whatever new or interesting facts we may be so happy as to discover, the fate of a Galileo need not deter us from communicating to each other, nor from publishing to the world. Happily for mankind, the consideration of what is true, in every thing which relates to the existence, prosperity, and mental culture of man, is becoming more and more paramount to the consideration of that which is merely expedient; and the liberal and enlightened portion of the rich and more fortunate class of mankind contemplate the rising talent and increasing knowledge of the industrious artisan, not merely with complacency, but with pleasure. Still more happy, however, will it be for this latter class, which constitutes by far the greater portion of the human race, when the redeeming influence of knowledge shall be more largely felt and more duly appreciated amongst them, and when their leisure hours shall be consecrated to the attainment and communication of useful knowledge. Nor can I conceive any thing more calculated to secure the realisation of this happy state of society, than the establishment of institutions like the present. Time has led to the acknowledgment of the gratifying fact, that in the empire of mind wisdom constitutes the only true riches; and experience, that best of all teachers, has confirmed the sister truth, that industrious poverty may attain to its possession. And how gratifying is the fact, to those who have little else besides their attainments of which to be proud, that the possession of a full measure of talent is not confined to any particular class of society; that wisdom is not hereditary, nor yet, like the unprincipled sycophant, found exclusively in the train of the rich and the powerful."

Mr. Detrosier concludes the address, from which we have taken the foregoing extracts, much injured in beauty by their displacement, as follows: —

"Brief, however, as this sketch has been, it has, I trust, been sufficient to convince those to whom conviction was necessary, that the subjects contemplated by this Society, as the basis of its labours, are worthy of their attention. Of the utility of such studies no man will doubt who is conversant with his own nature; for so long as man is possessed of mental energies, those energies will exert themselves on subjects either prejudicial or favourable to happiness; and as relaxation is necessary to the wearied frame, that cannot be useless which combines interest and instruction with bodily ease. 'And even in the limited view which these sciences exhibit to the philosophic mind, it may catch from them a glimpse of the general economy of Nature; and, like the mariner cast upon an unknown shore, who rejoiced when he saw the print of a human foot upon the sand, it may be led to cry out with rapture, A Deity dwells here!'" — ¶

A large Whale, of the beak-nosed kind, was taken last week on this coast, near Liverpool. (*Bolton Chron.*, May 2. 1829.)

Somersetshire.

Bristol Philosophical and Literary Society. — The General Annual Meeting of the Society was held on May 29. 1828, when the report of the Council was read; from which it appears that a variety of papers, on subjects of great interest, have been read before the Society at its public meetings. Among these have been essays relating to experimental and natural philosophy, to polite literature and the fine arts, and to various topics of antiquarian research. Nor have the private meetings been without their interest and advantages. The inspection of various productions of nature and of art, of ingenious models of machinery, of specimens illustrative of the several branches of natural history, and of numerous objects of archæological enquiry, have given rise to interesting conversations, and suggested matter for entertaining and useful discussion. Nor should it be unnoticed that these meetings have drawn together men of varied and extensive attainments; that they have been a point of attraction and union to those who, however congenial may have been their studies and characters, would probably not otherwise have had either opportunity or inclination to meet and interchange their respective views, or to communicate the results of their private investigations and insulated pursuits.

The full attendance at these meetings must be regarded as an unequivocal proof that much interest has been excited in their favour; that a taste for scientific and literary pursuits is rapidly spreading among the inhabitants of this great city and its vicinity; and that the love of trifling amusements is giving way to a relish for pleasures of a more refined and elevated character. To the still wider prevalence of these indications of intellectual improvement, the Council look forward with increasing satisfaction. Nor can they contemplate the extent of what has been already effected, without a confident anticipation of the period when the leisure of the superior classes will be devoted yet more generally to the cultivation of rational and intellectual pursuits, and when such relaxation as is hurtful, or at least unprofitable, to the mind will be exchanged for that which will tend to give it health and vigour.

On taking a retrospect of the transactions of this Society from its establishment, and on considering the list of its distinguished honorary members and associates, and its numerous friends and supporters, from whose ingenious and learned communications it has derived so much credit and advantage, the Council cannot but entertain a pleasing confidence, that its resources will furnish such an unfailing supply of scientific and literary contributions, as will enable it to persevere in its dignified and honourable career. (*May* 29. 1828.) — ¶

Art. VII. *Natural History in Scotland.*

Birds on the Sea Coast of Gomrie, in Aberdeenshire. — Sir, The sea coast along the parish of Gomrie, in Aberdeenshire, is one of the boldest and most interesting to be found in the kingdom; and to the mineralogist, in particular, it affords examples of the leading truths of his science in the most diversified manner, and on the most gigantic scale. The rocks, which at intervals arise in rugged majesty along the shore, are of great height, and of a most formidable appearance, and stand perpendicularly from the ocean as striking monuments of those tremendous convulsions which at different times have agitated the world which forms our present abode. Nor is their interest confined merely to the student of mineralogy; for to the ornithologist, likewise, they are attractive in no ordinary degree. They are annually resorted to by immense numbers of those birds which are properly denominated *sea-fowl;* and it is remarkable that the various tribes of which the general body is composed are most punctual with regard to the particular period at which they respectively and yearly return from the cold regions of the north, for the important and pleasing purposes of incubation. The varieties which appear in greatest numbers are the Kittiwake (*Làrus* tridáctylus *Temminck; Làrus Ríssa* Linnæus, provincially *Kitty*); the Razor-bill Auk (A'lca

Torda Linnæus, provincially *Coulter*), the Guillemot (*Uria Troïlle* Latham and Temminck, provincially *Queet*), and, lastly, the Puffin (Alca árctica *Linnæus*, Fratércula árctica *Fleming*, provincially *Tammy norie*).* To a stranger who visits, for the first time, the scene of their vernal abode, the spectacle presented is striking and interesting in no ordinary degree. On the various portions of the immense rocks, which rise in sublime magnificence before him, sit thousands and tens of thousands of the birds to which we are now directing our attention. And it is curious to observe the regularity with which the different species attach themselves to the places most suited to their various wants and capacities. The Kittiwakes and Guillemots inhabit the firmest and most precipitous of the rocks, on the ledges of which they form their nests. These ledges, when viewed from below, appear to the spectator as scarcely presenting an inch's breadth of surface, and yet the birds contrive to form their nests, which, in the case of the kittiwake, is done with grass, and to hatch their young in this seemingly impracticable situation; although it sometimes indeed happens, that, on being suddenly startled, their eggs tumble down into the sea. Although associated together, however, no actual intermixture takes place between the two species; for they have each their own particular ledges on which they sit, drawn up like regiments of soldiers, in the most imperturbable manner, and if startled, by a more than ordinary alarm, from their nests, they nevertheless return, after a single evolution in the air, to the important duties from which they had been with difficulty aroused. The two species are easily distinguishable. The kittiwake is at once conspicuous by its snow-white head and breast, its yellowish bill, and its pearly blue mantle; while the guillemot is recognised by its upright figure, the legs being placed very far back, as is the case with most sea fowl, and by the great portion of brownish sleek black with which its plumage is diversified. The peculiar nature, indeed, of the configuration of this latter bird, by which, when sitting or attempting to walk, its whole leg appears as if it were its foot, has given rise to the popular but erroneous idea that it hatches its eggs by means of covering it with the part of its body in question. On a promontory immediately adjoining, and composed of softer materials, are assembled the Puffins, or, in the language of this part of the country, the Tammy nories, who, laying their eggs in holes burrowed in the earth, cannot, of course, take up their abode on the hard ledges occupied by the birds whose position we have already described. In the same manner the Razor-bills, although occasionally associating with the guillemot, occupy, in general, a separate and somewhat soft and perforated part of those enormous precipices, which, in the busy season of spring, teem with life in all directions. These birds (the razor-bills) very much resemble the guillemots in appearance, especially when seen at a distance on wing. They may, however, on a nearer approach, be distinguished from the latter by the broad form of their bills, and by the superior length of their wings, which are, moreover, marked by a conspicuous streak of white along their outward extremity.

Some of this enormous body of sea fowl (probably males) are constantly in motion, either gracefully and lightly swimming about in detached groups on the sea, or, by their circular evolutions in the air, indicating to the yet distant visitor the particular rock where he may hope to encounter them in congregated thousands. And on a fine day, and under the mild influence of a vernal and unclouded sun, the scene is particularly beautiful. The ocean lies tranquil, and stretched out before the spectator like an immense sheet of glass, smiling in its soft and azure beauty, while over its surface the kittiwake, the guillemot, the razor-bill, and the puffin, conspicuous by the bril-

* The provincial names here given are those used by the inhabitants of the coast in question.

liant orange and scarlet of its bill and legs, are beheld wheeling with rapid wing in endless and varying directions. On firing a gun, the effect is even startling. The air is immediately darkened with the multitudes which are aroused by the report; the ear is stunned by the varied and discordant sounds which arise; the piercing note of the kittiwake (from which its name has been derived); the shrill cry of the tammy norie; and the hoarse burst of the guillemot, resembling, as it were, the laugh of some demon, in mockery of the intrusion of man amid these majestic scenes of nature; all these combined, and mingled occasionally with the harsh scream of the cormorant, are heard high above the roar of the ocean which breaks at the foot of these tremendous and gigantic precipices.

It is a remark which cannot be too frequently nor forcibly repeated, that, in natural history especially, it is of the utmost importance to judge from actual observation and experience, and not implicitly to rely on the descriptions and speculations of writers who are often obliged to describe productions of nature which they have never had an opportunity of beholding, and with regard to which they have not unfrequently relied on information at best but vague and unsatisfactory. This is particularly the case with Buffon. There is no author more likely, from the insidious and specious graces of his eloquence, to captivate and influence the youthful mind; and yet, in those branches of natural history to which my own observation extends, I have often, with regard to a correct statement of facts, found him egregiously deficient. And the truth of this remark I am in no case able to substantiate more fully, than with respect to the varieties of sea fowl at present under consideration. I find from his writings, then, that he represents the razor-bill auk as utterly incapable of flight, and the puffin as enabled with the utmost difficulty to transport itself from one place to another, by razing, as it were, with its almost useless wings, the surface of the sea; and, in like manner, the guillemot is described as being scarcely able to fly above the surface of the sea, and, in order to reach its nest, as being obliged to flutter, or rather to leap, from cliff to cliff, resting a moment at each throw. These errors I do not find corrected, except in the case of the puffin, by Bewick, and other subsequent and popular naturalists, who must, I should think, have known better, and who ought to have been at pains to rectify the blunders of an author so captivating and universally read as Buffon. Now, I have myself been repeatedly a witness, at one of their greatest breeding stations, of the powers of flight possessed by those birds who have thus been confidently represented as being incapable of flight at all. The fact is, that, while on the wing, they fly with singular rapidity and vigour, and often at a very considerable elevation; nor have I been able to discover any of that difficulty in reaching their nests, which, in the case of the guillemot, is described as being so painfully great.

With regard, likewise, to the eggs of these birds, it appears to me that naturalists have fallen into mistakes. Donovan, for example, in his fourth, and to all appearance his last, number [No. V. has lately appeared.] of the *Eggs of British Birds*, has figured, for the egg of the razor-bill auk, what I know from ocular inspection is not the egg of that bird; and what, from all accounts, I have reason to think (although I have never seen a specimen) is the egg of the great northern auk, the A'lca impénnis or gairfowl. I am, Sir, &c. — *A. C. R. June* 5. 1829.

Art. VIII. *Natural History in Ireland.*

Rare Birds killed in different Parts of Ireland. — Golden Eagle (Fálco Chrysaëtos). A very fine specimen was shot in the County Wexford, Dec. 1828. It measured upwards of 8 ft. across the wings. — Peregrine Falcon

(Fálco peregrìnus). Breeds on the Gobbin Rocks, in Island Magee, County Antrim. — * Cinereous Shrike (Lànius excùbitor). Shot near Belfast in Nov. 1826, after a severe snow storm. It is the first specimen, I believe, noticed in the northern part of our island. — * Jay (*C*órvus glandàrius). Though so common in England, it is but seldom met with in Ireland, and then only in the southern counties. — Waxen Chatterer (*A*'mpelis gárrulus). A beautiful male was shot in the neighbourhood of Dublin, in January 1829. — Hoopoe (*U*'pupa *E*'pops). One specimen was shot in the County Dublin, and another in the County Tipperary, in 1828. — Crossbill (Lóxia curviróstra). A few birds of this species were shot in the County Dublin in Dec. 1828. — * Grosbeak (Lóxia *C*occothraústes). Several were shot near Dublin in Nov. 1828. — Siskin (*F*ringílla spìnus). Frequently shot in the County Wicklow. — Great Plover (*C*haràdrius Œdicnèmus). One specimen was shot on the sea shore near Dublin, on 27th January 1829. It seemed to have undergone a long journey, and was very much emaciated. — Water Crake (Rállus *Porzàna*). Has been shot once or twice near Belfast, and also in the County Wicklow. — Red Godwit (*S*cólopax lappónica). I observed three birds of this species in Belfast Lough, on June 12. 1828, but they were so shy as not to be approached within gunshot. — * Greenshank (*S*cólopax *G*lóttis). Two or three specimens are annually shot in September, near Belfast. — * Common Sandpiper (Trínga hypoleùcos). Breeds near Belfast. — * Spotted Sandpiper (Trínga macularia). One specimen was shot near Belfast in July 1828, and another in September. — * Grey Phalarope (Trínga lobàta). Two specimens of this rare bird were shot near Dublin in the spring of 1828. — * Arctic Tern (Stérna árctica). Shot on one of the Copeland Islands, at the entrance to Belfast harbour, in July 1828. — * Roseate Tern (Stérna Dougàl*ii* Montagu). Shot on the same island. Numbers of eggs of (it is supposed) the two foregoing species of tern were found on the rocks. The principal food of these birds was herring fry The common tern was likewise very numerous on the island. — Stormy Petrel (Procellària pelágica). This specimen was found the day after a severe storm, seven miles inland from Belfast, in 1827. — Wild Swan (*A*'nas *C*ýgnus fèrus). Shot near Dublin in the winter of 1828-9. — Golden Oriole (*O*rìolus *G*álbula). A specimen of this bird was seen, some winters ago, a few miles from Belfast; and another specimen was shot since. — Common Bee-eater (*M*'erops Apiáster). One specimen was killed in the County Wicklow a few years ago. — Ruff (Trínga púgnax). A female of this bird (a reeve) was killed in 1827 near Belfast. — * Northern Diver (*C*olýmbus glaciàlis). Three or four specimens of this bird were shot in Dec. 1828, near Dublin. I procured two, both young birds, but of different ages; on one of them the white spots on the back were becoming distinct; the other entirely wanted them. It is occasionally shot in Belfast harbour, but only in severe winters. — *J. D. M.* *Belfast, July* 18. 1829.

Art. IX. *Hints for Improvements.*

A Natural History Society. (p. 286.) — Such would bring together many, who, like myself, are ardent admirers of nature, but who want to acquire some *practical* knowledge of those scientific arrangements which tend to promote clear views of the various departments. The works, too, which are published, though not dear as respects their merit, are yet, in many instances, too expensive for individuals like myself, but who could afford a guinea or two for such an object as the one proposed. Though one of the earliest promoters and supporters of two or three institutions now flourishing, my

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* The birds marked with a star are at present in my possession. — *J. D. M.*

name is too humble to add any weight to the recommendations of K. or to my own; but should any thing of the kind be seriously undertaken, the little time and talent I have, if acceptable, will be cheerfully devoted to its promotion. — *J. R. St. John Street Road, July 3.* 1829.

Chinese Ornithological Literature. — In the public library at Petersburgh there is a Chinese work on ornithology, most beautifully drawn and painted. (*Jones's Travels.*) Now the Chinese are well known to excel in drawing and painting subjects of natural history, and it would be well worthy of the greatest exertions to endeavour to obtain permission to copy this work. — *Rusticus in Urbe.*

Art. X. *Retrospective Criticism.*

Ascent of the Aerial Spider. — Sir, Your Magazine for July last (p. 299.), I perceive, contains a second letter from Mr. Murray on the "ascent of the aerial spider." Altthough I have distinctly announced that the principle upon which I explain the ascent of the spiders which produce gossamer has long been familiar to men of science; that I make no pretensions whatever to the discovery of any new principle; but that my claim to originality is founded solely on the application of one already known, to the solution of this interesting problem in natural history; still Mr. Murray reiterates his charge of want of novelty; remarking, that I apply the principle to the ascent of the spiders, exactly as M. Gay Lussac applied it to the soap bubble. The question to be decided is, whether the application which I have made of this principle had been made previously by M. Gay Lussac, or any other individual. I believe that it had not. My claim to originality, therefore, holds good, and I am not at all induced to forego it. Let Mr. Murray submit his electrical hypothesis to the same test, and see what will become of its novelty. His principle is not new; and the fact, that excited bodies, in different electrical states, mutually attract each other, is not new. What then is left for Mr. Murray, but the application of the principle to the ascent of the spider? but, according to his mode of reasoning, he cannot avail himself of this circumstance. Controvertists should be careful not to entangle themselves in the snares which they spread for their antagonists.

In alluding to my comments on the experiment made with the spider in his library, Mr. Murray proceeds thus: — "Because I did not *mention* the temperature within and without, *ergo* I had not taken it, and had not ascertained the direction of the current. Now, Mr. Blackwall may have, if he presses for it, all the benefit that may arise from his illogical conclusion." What! does Mr. Murray, who has evinced so much anxiety to impress his readers with the idea, that he has "not ventured beyond the pale of sound and sober reasoning in the true spirit of inductive science," unhesitatingly admit, that, in giving publicity to this experiment through the medium of the press, he has designedly withheld particulars calculated to exercise an important influence on the result? Perhaps Mr. Murray is desirous that a tacit assent should be given to the conclusion at which he has arrived, independently of any examination of the premises from which it is deduced. If so, I can easily conceive, that he may have weighty reasons for giving an imperfect detail of circumstances calculated only to mislead. In what manner the promulgation of partial evidence, and the intentional withholding of facts essential to a correct estimate of his experiment, are to promote the cause of truth, the principal object which Mr. Murray professes to have in view, I leave for him to determine; and, if I mistake not, it will require *all his skill in logic* to extricate him from the dilemma in which he has so rashly involved himself.

The doctrine of the composition of forces, which I have introduced to explain the various oblique directions in which spiders are conveyed through the atmosphere, Mr. Murray seems to think "sadly complicated and confused;" yet in his former letter (Vol. I. p. 321.) he allows that spiders, when afloat, obey the direction of the breeze, and that they frequently move in lines inclined at various angles to the plane of the horizon. Now, supposing that they are raised into the atmosphere by the agency of electricity, as Mr. Murray conjectures, and are also liable to have their motions influenced by currents of air, which he does not attempt to deny, *complicated and confused* as the doctrine may appear to him, I do maintain, that, on his own showing, spiders, so circumstanced, are subject to the laws of compound forces. How, indeed, can he account for the oblique directions in which he has seen them sail through the atmosphere, except on the principle which I have pointed out? Let him reject that, and his electrical hypothesis will avail him little.

Mr. Murray's felicitous manner of stating his experiments is again illustrated in the following example: — "Last autumn," he writes, "I let go an aeronautic spider, together with some *thistle down*, simultaneously from the same spot in the open air. They *moved in exactly contrary directions!* I must leave the phenomenon with Mr. Blackwall, to be adjusted by the laws of compound forces." It may be very convenient for Mr. Murray to leave to the explanation of others, those phenomena of which his own hypothesis affords no satisfactory solution; but then the least he can do is to supply the requisite data. Did the objects submitted to this experiment move in the same vertical line, or in horizontal or oblique directions? On these points Mr. Murray gives no information, and yet it is essential that they should be understood, before an explanation can even be attempted, as several widely different cases immediately present themselves to the mind of the investigator. I beg to inform Mr. Murray, however, that I am not in the habit of essaying the exposition of imperfectly described phenomena, the accuracy of which I have no means of verifying. Nothing can be more amusing than the satisfaction with which Mr. Murray affects to sneer at my application of the laws of compound forces, since it will be perceived, from the preceding paragraph, that, in so doing, he is directing his sarcasms against the employment of a principle, the influence of which he himself has unwittingly admitted.

It is somewhat remarkable, that Mr. Murray should let my "asserted facts," as he thinks proper to term them, remain so long without investigation; especially as they must, if established, totally subvert his electrical hypothesis. Such an omission is the more extraordinary, as there can be no obstacle to the repetition of my experiments, which are circumstantially detailed, and may be conducted without difficulty. I still continue to multiply them on all occasions, and uniformly with the same success. I am confident therefore in affirming, that, in motionless air, spiders have not the power of darting their threads even through the space of *half an inch*. Let not Mr. Murray complain that my last letter leaves this question exactly as it was; while the above decisive fact remains unshaken, it would be perfectly useless to embarrass him with any new matter.

However reluctant Mr. Murray may be to satisfy himself of the accuracy of the facts which I have advanced, I can assure him that no such feeling has existed, on my part, with regard to the examination of his experiments, whenever this has been practicable. I have carefully repeated several of them, and am compelled to say that the results at which I have arrived differ widely from those obtained by him. In his *Experimental Researches*, p. 125., Mr. Murray asserts that the ascent and movement of the aeronautic spider in the atmosphere are *essential to its very existence;* and again, p. 128., he observes that he has invariably found that it is impatient of confinement, "and will *die*, whether imprisoned in a chip box or glass tube (showing that *light* does not affect the question), sometimes in *twenty hours*, or at most in *two or three days*." In order to try the soundness of these opinions by the test of experiment, on the 14th of December, 1828, I captured eighteen spiders of this species, twelve of which were enclosed in glass phials closely corked; and the other six were put on an upright twig whose base was immersed in water; which twig was placed within an inch of the perpendicular side of the vessel containing the liquid. Both the phials and the vessel containing the twig were then carefully locked up in a book-case, where they remained till the 4th of January, 1829. During this period, five only, of the twelve spiders put into the phials, died; the remaining seven, with the six placed on the twig, which were quite unable to effect their escape, not only survived, but retained their wonted vigour and activity. They were then all set at liberty but one, which accidentally remained on the twig till the 23d of February, when it also was suffered to escape. So much for the report of the speedy dissolution of these spiders in a state of confinement, and for the assertion founded upon it, that their ascent in the atmosphere is essential to their existence. Perhaps, the result of this experiment might be influenced, in some degree, by the season of the year, as I readily admit that spiders enclosed in glass phials do not always survive so long as those did in the instance given, though the average term of their existence in captivity greatly exceeds the limits assigned to it by Mr. Murray; and I have repeatedly kept spiders on the twig alluded to above, for three weeks and a month, without any very sensible change being produced either in their physical powers or their external appearance.

In treating upon the electrical character of the lines of this species of spider, Mr. Murray observes (*Experimental Researches*, p. 136.), that "when a stick of excited sealing-wax is brought near the thread of suspension, it is evidently *repelled;* consequently the electricity of the thread is of a *negative* character;" and that "an excited glass tube brought near seemed to *attract* the thread, and with it the aeronautic spider." Here, again, my experience is opposed to that of Mr. Murray. Like other light substances, I find that the lines and spiders are *attracted* both by excited *sealing-wax and glass tubes;* and that when uninfluenced by the contact, or vicinity of excited bodies, they appear to be neutral with regard to electricity, or rather, not to be in a state of excitation themselves, being affected neither by the approximation of the *finger*, nor of *metallic* conductors. That an electrical atmosphere will impart electricity to the lines of spiders floating in it, is highly probable, but then it is plain that the ascent of the spiders cannot be occasioned by this circumstance.

As it is almost impossible that observations and experiments on the ascent of spiders in the open air should be repeated under circumstances precisely similar to those under which they were originally made. Instead of recapitulating and enforcing my former statements relative to this fact, I beg to refer Mr. Murray to a work of great interest, which I have recently perused for the first time; I allude to the *Tableaux de la Nature* of M. de Humboldt, the most scientific traveller of the present day, where he will find (tome ii. p. 4. & 59—62.), that not only insects of various kinds, but inanimate objects also, are sometimes carried to an astonishing elevation in the atmosphere by the mechanical action of ascending currents of rarefied air.

There are several other points of minor importance respecting which I entirely dissent in opinion from Mr. Murray, but I have not leisure to enter into an exposition of them at present; I trust, however, that I have sufficiently elucidated some of those particulars which it would be most advisable for him to correct in the intended new edition of his *Experimental Researches.* On them I recommend him to bestow a careful and impartial consideration without delay, and my sincere wish is, that he may derive all the advantage from them which they are so eminently calculated to afford him. I am, Sir, &c. — *John Blackwall. Crumpsall Hall, July* 18. 1829.

Influence of Fresh Water on Marine Animals. —It may be remarked that Dr. Drummond's experiments on the Nereïs cærùlea, as recorded in your

Magazine (p.121. et seq.), do not conclusively show that that animal will not live in fresh water; for there are many marine animals that die on being immersed in fresh water, which may be made to live in it, if the sea water, which is their natural element, be gradually *diluted* with fresh water, until the whole has, in fact, become fresh. Dr. Drummond will perform a useful service to this branch of zoological enquiry, by subjecting the Nèreïs cærùlea to experiments of this description.

With respect to the cause of the deleterious effect of freshwater upon this animal, it is probably referable to the carbonic acid gas, which exists in fresh water in a much greater proportion than in sea water, and is destructive of the life of all animals. The Nereïdes, in common with all the other Annellìda, or red-blooded worms, respire the air contained in the water in which they live, by means of a respiratory apparatus, intermediate in its nature between the gills of fishes, and the spirácula and tràcheæ, or breathing pores and air vessels, of insects. The cavities in which their blood is exposed to the influence of the air admit the water and air by openings in the sides of the animal. Hence, when fresh water, containing carbonic acid gas, is sprinkled upon them, or when they are immersed in it, the gas excites a spasmodic action by its deleterious effect on the animal economy, when introduced, as in this case it probably is, into the circulation. If Dr. Drummond, as is probable, used spring water, or rain water, which usually contain more carbonic acid gas than river-water, this effect would the more readily follow. The circumstance that the mouth extremity of the Nèreïs cærùlea was more sensible to the touch of the poison than any other part, as mentioned in p. 123., is confirmatory of the foregoing explanation; for there is a more direct and speedy communication with the air cells at the anterior part of the animal. It would be interesting if Dr. Drummond would compare the effect, on the animals, of water recently boiled for a considerable time, so as to expel the gaseous matter it contains, and also that of carbonic acid gas itself, with those of ordinary fresh water and atmospheric air.

Dr. Drummond's remarks on the deleterious effects of fresh water on the marine plants he mentions, as indicative of the impossibility of their existence in lakes and rivers, or other collections of fresh water, are open to the same objection as applies to his inference respecting the Nèreïs cærùlea. Whether the carbonic acid in fresh water is also the cause of the alteration they undergo when placed in it, it would be unsafe to surmise, without direct experiment. — *E. W. B. May* 7. 1829.

The Water Shrew. — Sir, Until I read your last Number, I was not aware that the Water Shrew (*S*òrex fòdiens) had been supposed to have been lost, or was thought an uncommon animal in England. I have frequently met with them; and in a neglected fish-pond at Risby, a few miles from this, they are very commonly to be seen diving from old stumps, which rise a little above the surface, and returning again, and then reimmersing themselves so quickly as almost to make one doubtful of the cause of their return to the stump; but having repeatedly noticed them whilst I was angling, I observed a quick nibbling motion of the jaws for the few moments they were out of the water, I am therefore satisfied that those momentary returns were to masticate the food procured by diving. The one seen by Mr. Dovaston seems to have been remarkably shy; those at Risby, however, are very bold little animals. On the 27th of June last, one continued its search for food within a yard of me for about ten minutes, during which it several times dived and returned five times in a minute, and then, whilst resting a few moments longer than usual, turned and looked full at me; then sat nearly upright, placing one foot behind the ear, where it smoothed the fur as cats do, and then commenced diving again. I endeavoured to discover what was the food it found, but it was so minute, I was unable to do so. Unlike Mr. Dovaston's specimens, those at Risby feed in the middle of the day as well as early and late, and that constantly. As the ponds I have generally seen them in are, however, but little frequented, that may have rendered them more bold than usual there. — *Thomas Thompson. Hull, July* 20. 1829.

Stúrnus Cínclus. — In Vol. II. p. 301., Mr. Thos. Thompson of Hull complains that of the specific name he can "make nothing;" and thinks it ought to be written cíncius: fancifully, this may do, and I like his wit well. Cínclus, however, is undoubtedly right, and derived from the Greek for a thrush, κίχλη; which word, Mr. Editor, if you can *hit* in English type, you shall "be clapped on the shoulder," (as honest Benedick says) "and called Adam" clever fellow! — It may be pronounced *kink-lé*, and is spelt in Latin with a *c*, because *k* is one of the letters not used by the Romans. By many ornithologists it was, and is, incorporated with the *T*úrdi, and the present specific is probably retained for no other reason. *C*ínclus was, therefore, an "excellent good word, till it became ill-sorted." That the bird dives there is no doubt, and for which we have the authority of Linnæus, who expresses his wonder thereat, being digit-footed. "Hyeme (habitat) ad cataractas, fontesque non congelandos, ubi *mirè* descendit per rapidos voragines, voratura oniscos aquaticos insectaque alia: emergitque *non palmipes*."* With regard to this gentleman's (Mr. Thompson's) unbelief of its *walking* at the bottom of water, I can with confidence inform him, that my excellent friend, Mr. Joseph Warren, now of Bryn-Morda, once lived in a house directly overlooking that bright and rapid little river, and tells me, that he has occasionally, but rarely, seen it do so, but in a very awkward, tumbling, and shuffling wriggle. Its song is very singular and infrequent, which I have heard (as I find by my notes) late in October. I have seen this bird dart through the broad, powerful, and heavy waterfall of a mill-dam, on the property of my just-named friend, which he, in consequence, caused for a few minutes to be stopped, and behind it we found the nest, in shape and materials very like that of the common wren; being made of dry leaves, bents, and moss: I say dry, for the leaves were not only dead of the last year, but so placed that the spray of the vast over-shoot could scarcely wet them. This bird is very common about the rapid rivers of Wales, and on our Border here; and I have seen it very frequent in Cumberland and Scotland, as far north as the Falls of Foyers, near Inverness. It has been generised with the *M*otacíllæ; and indeed Linnæus says it can hardly be distinguished from them in the beak and nostrils. Long before I knew this, it had often struck me, that this bird very closely resembles the merry *Troglodite* in habits and motions; and facetiously to my friends I have called it the Brook-wren; and in Westmoreland (where their brilliant rapids are called *Becks*), the Beck-wren. Pardon the pun (for I hate *puny* wit), as it well suits the "becks and nods" of this neat, nimble, and lively bird, who, like his more illustrious companion, the king-fisher, and their happy admirer, myself, loves the streams and glades inglorious. — *John F. M. Dovaston. Westfelton, near Shrewsbury, July* 21. 1829.

Antirrhìnum Cymbalària in Wales. — Sir, T. F. (Vol. I. p. 378.) found the *A*ntirrhìnum Cymbalària, which he calls Toadflax (*A*. Linària), on a rock near Barmouth, North Wales. That neither this gentleman nor others be thereby misled in imagining it a native, I here declare that several years ago, in one of my numerous tours through that and other mountainous regions, I carried a box of the seeds of this beautiful, graceful, and tenacious plant, which I distributed in appropriate places, on rocks, ruins, churches, castles, and bridges, where I have since beheld it thriving in tresses and festoons to my fullest satisfaction. I particularly remember sowing it on the rock he men-

* "In the winter it frequents waterfalls and wells that freeze not, where it *wonderfully* plunges through rapid whirlpools, to feed on water-*onisci*, and other insects: and, though *not web-footed*, reascends."

tions. Though this pretty brilliant plant is usually looked on as a native, it is said the seeds were originally brought in some marble sculptures from Italy to Oxford. I can bear cordial testimony to its fringing and mantling, with its elegant drapery, the walls of colleges and gardens in that splendid university. And every one knows how likely the plant is to be desired and removed, and when sown, how readily spreading, and impossible of eradication. It may inform some of your readers (and I am one who highly approve your giving derivations, though I could wish the Greek appeared in its own type, from the impossibility of otherwise expressing their variety of vowels), I say, it may amuse your readers to know that Antirrhìnum (snapdragon), is compounded of a Greek preposition and noun, signifying *lip to lip*. Cymbalàris is an ancient epithet for a plant, and is (I presume,— for I could show another, denoting the *gadding* nature of the plant, only "Priscian would be a little scratched") derived from the Greek for a small boat. In this *poikilonomizing* (various-naming) age (or rage), some botanists retain Linària as a genus, distinguishing it by the greater length of its spurs. A verse in Juvenal's *Satires* (iv. 45.) has both the words together, the *boat* and the *flax;* "*cymbæ linique magister;*" speaking of a fisherman and his apparatus. — *John F. M. Dovaston. Westfelton, near Shrewsbury, July* 21. 1829.

Erratum.—Page 259. lines 13 to 16. *for* "Mr. William Phillips, one," &c. *read* "Mr. William Phillips, one of the authors of *Geological Outlines of England and Wales*, and author of an *Elementary Introduction to Mineralogy* and of various other works, and Dr. Wollaston who has left 1000*l.* to the Society," &c.

Art. XI. *Queries and Answers.*

FLÒRA Virgiliàna, and other Matters. — Can you not give us a *complete* Flòra Virgiliàna (Vol. I. p. 484.), by the aid of Martyn's *Georgics,* and other works? I should like to see all the *weeds* included, and verified with their Linnean names, when I shall recur with a new pleasure to my old acquaintance: —

"Lappæque tribulique; interque nitentia culta
Infelix lolium et steriles dominantur avenæ.
. . . . . . et amaris intuba fibris." (*Georg.* i. 153. 120.)

In the mean time, until difficulties be cleared away, let us rejoice in the

——— "biferique rosaria Pæsti:
Et virides apio ripæ, tortusque per herbam
. . . . cucumis; nec sera comantem
Narcissum, aut flexi . . . vimen acanthi,
Pallentesque hederas, et amantes littora myrtos." (*Georg.* iv. 119.)

I should delight to know more about even "graveolentia centaurea," but especially as to the

——— "flos in pratis, cui nomen *amello*
Fecêre agricolæ," (*Georg.* iv. 270.)

which puzzles me dreadfully, as I contemplate every species of the genus A'ster in a nursery garden which I frequent. As to Dictamnus (*Æneid.* xii. 412.), I am sufficiently contented when I pore over a plant of "Orìganum Dictámnus" in flower, and let it be described as

"Dictamnum genitrix Cretæâ carpit ab Idâ,
Puberibus caulem foliis et flore comantem
Purpureo:"

as for the

"non illa feris incognita capris
Gramina, cum tergo volucres hæsêre sagittæ,"

I let that pass, as I was taught it at school, requiring no evidence to prove its truth, but admitting that a mass of classical authority is in favour of it, and of the skill in simples manifested by animals in general. I should greatly delight in idling away some days in a good library, and sending you a *real paper* on this subject, instead of a hurried scrawl, despatched even uncorrected. Can you tell your readers what is the Linnean name for a fish (caught on the coast of North Carolina, I believe) called by the natives " Devil *Stingarree*. It has a long tail like a coach whip, and a barbed bone about 4 in. long, which it strikes into an opponent. — *W. April* 24. 1829.

Various Questions. — Where can I procure lives or memoirs of the following naturalists, Buffon, Jussieu, Ray, Pennant, and Azara? Is there any translation of *Azara's Memoirs* in English, and if so, is it from the French or original Spanish edition? Where can I procure plates and descriptions of the blindworm, and which is the best treatise on the *S*ímia tribe? The *General Gazetteer*, speaking of Devonshire, mentions that "In the western parts there is a bird so very small, that it is reputed to be a humming-bird, and, like that bird, builds its nest on the extreme branches of trees." Pray, Sir, can you, or any of your correspondents, inform me what bird is here meant? — When, Sir, do you intend to notice the menageries of the King's Mews and the Tower? Might you not also give some account of the travelling collections, for the instruction of your country readers? I am, Sir, &c. — *Perceval Hunter. June* 4. 1829.

Effects of Salt Water on some Marine Animals, and Scientific Descriptions of these Animals. — Sir, In your useful and entertaining Journal (p. 121.), there is an excellent paper by Dr. Drummond, on the effects produced by fresh water on some marine animals and plants. The facts which he has adduced are very curious, and having witnessed the same, or very similar ones, I have no doubt whatever of their accuracy. On dropping, for example, the Polýnö*e* imbricàta (*Zool. Journ.*, iii. 332.) into a glass of fresh water, it instantaneously casts off its scales, and drops dead to the bottom. The same is the case with the Lycòri*s* margaritàcea of Dr. Leach. These are worms, and belong to the class Annelìdes of modern zoologists; but fresh water is no less poisonous to some molluscous animals. The Tritòn*ia* pinnatífida and the Eólida papillòsa are immediately killed by it, and lose their branchial processes.

My object in addressing you at present, however, is not to corroborate Dr. Drummond's facts, but to solicit from him a scientific description of two of the animals on which his experiments were made. The first is the Aphrodìt*a* squamàta. The descriptions of this given by British authors are quite insufficient to enable any one to tell what they intend, and it would be doing a good service to our Fauna to have it correctly ascertained. Is it the Polýnö*e* squamàta of Lamarck, or is it not rather the P. imbricàta above mentioned? What is the Nèreï*s* cærùlea of Linnæus, the second animal experimented on? The descriptions of Linnæus and of Pennant, and the figure of the latter, are good for nothing; and I very much suspect that Pennant intended to figure what is now called Lycòri*s* margaritàcea, and of which Dr. Leach is presumed to be the discoverer. Dr. Drummond will, I trust, excuse me for soliciting an answer to these queries. — *G. J. May* 14. 1829.

Active Molecules. — About Christmas last I placed, for preservation, in a small phial (filled with an equal mixture of hollands and water), a dead fleshy grub of the Musk Beetle (*C*erámbyx moschàtus *Lin.*) found on willows. The animal had experienced some injury, part of the skin near the head being broken. On examining the phial, in the course of two months afterwards, I perceived a quantity of very fine white sediment at the bottom of the phial, and partly extending up its sides, which I immediately supposed was a portion of the matter forming the body of the grub, which had escaped through the wound on the neck, as there was nothing else in the bottle from which it could have been produced. For the purpose of investigating its nature, I emptied the whole contents of the phial into a shallow white saucer, which enabled me to perceive by the assistance of a high-powered glass, that these minute portions of matter were of irregular forms, and without individual life. Although, to my great surprise, they appeared to be endowed as a mass, or rather as numerous small masses, with very great motion, moving about in various directions or currents, now slowly, now briskly, advancing, retreating, coming into contact with each other, then gradually becoming motionless, then again (without any additional motion having been given to the saucer), coming into active life, as it were, as before, and resembling, individually, to the naked eye, the minute animalcules found in putrid water, which are just perceivable without the assistance of lenses. These motions I observed for at least a quarter of an hour, but as I felt convinced that they in some manner or other were the effect of some motions in the substance of the fluid, and not of the particles of sediment, I did not think it necessary to continue my observations.

Might not the motion have been produced in the same manner as that which we perceive when we mix spirits with water? and may not many of the motions heretofore observed have originated from a similar cause? and has the result been the same when pure rectified water has been employed, as when pure spirit? I am, Sir, &c. — *J. O. Westwood, F.L.S. &c. Chelsea, June,* 1829.

The Cause of Goître. — Sir, I should be glad to be informed, through the medium of your useful Magazine, what is the most generally received opinion as to the cause of that distressing disease, the goître, with which the inhabitants of Switzerland and other countries are afflicted. It has been attributed to some peculiar quality in the water of mountainous districts; but this appears to me to be totally inadequate to account for a disease which appears under such different circumstances of climate and habitation. May it not, with more probability, arise from some peculiar disposition in the muscles of the throat, which certain habits of life have, by time, rendered hereditary? If it be true that the absence of this deformity in the neighbourhood of Lucca, in Italy, is to be attributed to the iodine with which the water is there impregnated, how is this supposed to operate? and what noxious qualities of the water would it tend to neutralise? Is the disease curable without having recourse to the knife? Yours, &c. — *Obscurus. June,* 1829.

The Dark-looking Water Bird (fig. 21. p. 101.) shot at Fowey, I think, must be the young female of the *A*'nas nìgra, or Scoter, the peculiar formation of the bill marking the particular species. — *Walter Henry Hill. Newland, July* 14. 1829.

The Young of the Raven. — In March last, a nest, containing five young ones and two unhatched eggs, was brought to me. The young ones were of various sizes; the largest covered with down, the smallest quite naked, but all of them blind. The place for the eye being very indistinctly marked, query, are all the young of the genus Córvus expelled from the egg blind; and if so, how long after their expulsion do they remain without sight? — *Id.*

The Small Dover. — I shall be obliged for some certain information respecting a bird shot by me in May last, figured by Bewick as the Lough Diver. On my taking it to Ledbetter's to be set up, his son pronounced it to be the female of the *A*'nas Clángula, or Golden Eye; but I pointed out circumstances, both as to appearance and otherwise, which convince me that it is a distinct species. I begged he would have it dissected, to ascertain the sex, but I have not yet heard the result. The velocity with which it dived, after being slightly wounded in the wing, exceeds belief; and the length of time it continued immerged, and the distance it dived to, are remarkable. Nor was it till I had fired eleven shots at it that it was killed. The following is the description of it: — Length, when stretched out, 16 in.; breadth, from tip to tip, about 25 in.; the head a bright chestnut-brown, with a slight crest of the same colour, but a shade darker; the scapulars pencilled with a bluish grey; the back and rump dusky; the tail dark brown, with hoary edge, and consisting of sixteen feathers, the centre ones the longest; the chin and fore part of the throat white, inclining to grey; breast pencilled with grey; belly brilliantly white; the lesser coverts barred with white, in a large patch; the greater coverts ash colour, with two white bars; the primaries ash colour. The eye, bright yellow iris, surrounded by white, and very brilliant; the bill bluish brown; the legs inclined to dusky blue; the webs particularly large and spreading. This bird was shot in the river Stour, near Sandwich in Kent, and is there known as the small *Dover*. Any information respecting its habits, place of breeding, or other circumstance connected with it, will be interesting to, Sir, yours, &c. — *Walter Henry Hill. Newland, July* 14. 1829.

The Black-headed Bunting (in answer to T. G. p. 289.) — Sir, Permit me to refer T. G. to Bewick's *History of British Birds*, where he will find an exact engraving of that small bird called the blackcap (M. Atricapílla *Lin.*), and by some the mock nightingale, from its imitation of the notes of that sweet songster. The blackcap arrives early in the spring, with the many other small birds which visit us at that season; it frequents orchards and shrubberies, and builds its nest in a bush about 4 ft. from the ground. The male bird has a singular habit of warbling its notes while sitting on the nest, in which situation I have often seen him. The specific distinction between the male and female is, that the spot or cap on the head of the former is coal black, and of the latter a dark brown. Yours, &c.— *A Constant Reader. July* 3. 1829.

A Nest containing a dirty greenish white Egg. — Sir, This nest, of which the following is a description, was taken by a boy in Essex, during the first week of this month (July). The nest was built in a kind of hedge of elms, or the shoots from elms growing by the side of a village road; it stood 6 or 7 ft. from the ground. The bulk of the nest was formed of moss and wool intermixed, and outside of this a *very few* pieces of dried grass were thinly scattered. The inside was composed entirely of horse and cow hair. In size it was not quite so large as the nest of the greenfinch. The egg (which was about the size of a skylark's, though not so tapering at the small end) was of a dirty greenish white, marked with eccentric dark spots, like the egg of a yellow bunting. It cannot be the egg of that bird, nor of any of the wagtails, for reasons which, on considering the above description, will, I think, be apparent. I shall feel obliged if you or any of your correspondents can enlighten me upon this subject. I take this opportunity of expressing my regret that some gentleman does not undertake a description of the nests and eggs of British birds: it is a work much wanted; and, if executed carefully, would, I am convinced, repay his exertions. [There is Donovan's *Nests and Eggs of British Birds*. Nos. I. to V. 4to. *3s. 6d.* each.] I have seen some periodical containing coloured engravings of insects, so excellently done, that I am sure the same artist might be employed to advantage upon the engravings for such a work as that I have mentioned. Is there any person in London or elsewhere who collects and sells nests and eggs? Yours, &c. — *T. F. R. Essex, July* 13. 1829.

A curious Ball containing Bees. — Sir, Some little time back a curious ball was discovered suspended from the roof of a hen-house, which, on being opened, proved to have been the habitation of a species of bee. The cells, in one of which was an injured specimen of the insect, were enveloped in three distinct coverings, composed of a brownish substance resembling paper in appearance, thin and rather brittle. The whole was hung by a thread of the same material. If you or one of your correspondents would, through the medium of your valuable Magazine, favour me with the name of the species which inhabits this curious structure, with some particulars connected with its natural history, it would oblige yours, &c. — *H. Gunt. Missenden, Bucks, July* 7. 1829.

The Harvest Bug. (p. 290.)—This is one of the most teasing little animals in nature. Though bred and intended, like its congener the red spider (*A'carus vìtis*), to live on vegetables, as currants, raspberries, and French beans, yet it will desert these, whether by accident or design, to live on and annoy the most delicate and sensitive portion of the human race. These insects are so minute, that they are only visible to the keenest eyes, and then only when placed on any very smooth white surface; in course, they are only known by their effects. Ladies and children are the first to complain of their attacks; and chiefly where any part of the dress fits closely to the skin. There they seat themselves at the intersection of the lines, and lay such firm hold with their feet and jaws, that they cannot be displaced by rubbing, nor by washing, unless a powerful spirit or acid is used. A microscope readily detects them; and, by its assistance, they may be dislodged with the point of a muslin needle, and, if placed on writing paper, will be seen to have eight legs, two tentacula or feelers, and an abdomen something egg-shaped; colour livid red; and in size no bigger than the point of a small needle. They lacerate the epidermis in some way or other, as a small hole is observable where they have been seated; and cause extreme itching and considerable inflammation of the part. — *J. M. Chelsea.*

The Superstition respecting Bees prevails in some parts, as to informing them of any great public event that takes place. — *Anon. Bishopsbourne March* 26. 1829.

The Eggs of Butterflies. — Sir, Amongst your numerous correspondents, unquestionably there are many, no doubt, willing to give any information that might be considered useful to the pursuit of natural history. Should there be any that can assist me, I should feel obliged by their communication. Most generally, collectors find no difficulty in obtaining the eggs of moths, by the readiness of these insects to copulate and deposit them. With the butterflies (that portion of Lepidóptera called day-flies) the case is very different, it being impossible to make them copulate or deposit their eggs when bred from the chrysalis. At any rate, I have found it so; nor do I know any one who has been able to effect it. I have succeeded in obtaining a few eggs by going into the woods, and catching them whilst in copulation, and carrying them home. On the separation of the male, having placed the female in a box, with some of the food of the caterpillar, and tied it on with green gauze, I placed it in the sun, and thus obtained only a few. Should any of your friends be able to assist me, they will oblige me by their information. Yours, &c. — *D. G. Kerridge. Ipswich, July* 15. 1829.

The Nidus on a Rush. (p. 104.) — Sir, The illustrious De Geer has given, in detail, an account of some similar ones that he met with both in Holland and Sweden. The first he observed were suspended in a hay chamber, and he noticed others afterwards in similar places. He describes them as composed of silk of a dirty white, in the form of little oval bags, suspended by a slender but strong thread. They were nearly of the shape of hen's eggs, and were so thin that the eggs they contained might be seen through them. When the eggs hatched, they produced a spider, which he names *A*rànea tuberculàta.* He afterwards found, suspended to stalks of grass, &c., other nests, more nearly resembling those figured in your Magazine, which he

* De Geer, vii. 227. plate xiii. fig. 5.

describes as of the size of a small pea, of the shape of a bottle, with the bottom flat, containing about a dozen eggs, which also produced spiders.* I have in my cabinet a similar nest, suspended to the stalk of some grass, which was given me by my friend the Rev. Revett Sheppard, and is noticed in the *Introduction to Entomology* (vol. iii. p. 71. fifth edit.). Most probably, the nidus described by your correspondent contained the eggs of some spider frequenting the water. Yours, &c. — *Wm. Kirby. June*, 1829.

The Glowworm.—In October, 1828, I met with a luminous insect, under circumstances similar to the statement of A. A. (Vol. I. p. 299.), and I believe the insect to be the Scolopéndra eléctrica. (*fig.* 105.) I have an exact drawing of the insect, and the insect itself is preserved in spirits. I will lend you both, if you wish it. — *T. N. P. May*, 1829. [The figure is from the drawing. — *Cond.*]

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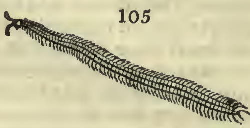


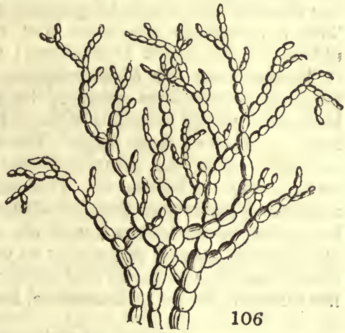
Marine Plants. — What is the greatest depth at which aquatic or marine plants have been observed to grow beneath the permanent level of the surface, and what are the modes of fructification in those plants which grow too deep to send flowers to the surface? — *L. Hampstead, July* 23. 1829.

The Starwort of Graham's British Georgics. — Has not J. R. (p. 293.) been rather hasty in deciding that the Pinguícula vulgàris is the starwort mentioned by Graham? Is it not more probable that the poet, for a moment, forgetting that he was writing *British* Georgics, inserted the passage (a translation from Virgil) without considering that Italian meadows were *not* British? The incorrect translations of this passage by Dryden, Addison, &c., describe the starwort of Virgil (*A'*ster *A*méllus) as a plant with purple *leaves* and golden-coloured blossoms, instead of describing the blossoms as purple in the circumference, with a disk of "golden hue." The lines in Graham have so evidently the same origin, that I should suspect the "husbandmen" of this country would be very unlikely to be acquainted with it, as the produce of an English meadow. I should doubt whether *An Apiarian* would do well to offer an infusion of the Pinguícula to his sickly bees. — *E. K. July* 13. 1829.

A singularly brilliant golden green Light. — Sir, About a month ago, while exploring the gritstone hills of Derbyshire, with a botanical friend, I observed, in the shady recesses of some of the rocks, a singularly brilliant *golden green light*, which interested and puzzled me exceedingly. It was perfectly phosphorescent, and rivalled in splendour the gorgeous reflected tints of the humming bird, or the elytra of some beetles of the *B*upréstis tribe. It was seen to the greatest advantage at the distance of a few yards, and when it met the eye in one particular direction, out of which it became dim or was entirely lost, even on a close inspection. Irregular patches of it covered the surface of moist stones near the ground, and the loose sand accumulated in the crevices from disintegration. When brought into the full light for examination, its resplendent character was nearly if not quite gone, nothing being visible upon the surface of the stone or sand but a filmy irregular network of green, scarcely visible from its delicacy of texture. Jungermánn*ia* pusílla and J. minutíssima (as I judged by the fronds), and the beautiful and rare Gymnóstomum osmundà*ceum* in full fructification, grew occasionally interspersed with it; but, after close and repeated scrutiny, we both agreed that the green light was not emitted from any of these. We spent above an hour in unavailing efforts to ascertain from what it *did* proceed, though I had little doubt it owed its origin to some minute vegetable furnished with a peculiar organisation. I brought away some of the best spe-

* De Geer, vii. 229. plate xiii. fig. 10.

cimens I could collect. These I have since examined with a powerful microscope, after keeping them for several days in a very humid atmosphere, in hopes of their swelling out from reabsorbing moisture. In this I was only successful where some small depressions in the surface of the stone had protected this tiny vegetable from the unavoidable pressure of the package; but to my regret, it did not, with its shape, resume its splendour under any circumstances in which I could place it. The fronds of the two Jungermánn*ia* expanded beautifully; and as the inter-reticulations were singularly convex and pellucid, I thought they might have acted as lenses to condense the light; but as some of the stones, which were most splendent, had no vegetable substance on them but the green film already spoken of, this could not be the case. That portion of the film which expanded and resumed its shape, had very much the habit of a *C*onférva with cylindrical jointed stems and branches, and of it the annexed sketch (*fig.* 106.) is a correct though highly magnified representation. It approaches so nearly to *C*onférva velutìna (Býssus velutìna *Linn.*), that I should at once have referred it to that species, could I find any allusion any where to its excessive brilliancy. I shall feel highly obliged to any of your correspondents, who may have observed this striking property, to inform me whether it proceeds from this *C*onférva, or, if not, from what other minute plant, as I am not aware of its being named by any botanist. Indeed, the metallic lustre, so common on the feathers of birds and on insects, occurs so rarely in vegetables, that I know but of a single well-defined example of it, viz. the capsules and under sides of the fronds of the rare Targiòni*a* hypophýlla. Yet I scarcely doubt but the phenomenon I have described has a vegetable origin. It is, I conceive, the effect of light concentrated by the convex form of the inter-reticulations of the pellucid fronds or jointed stems of some very minute plant, and thence transmitted to the eye through the transparent cuticle; as a glass globe or cylinder, filled with any coloured fluid, will reflect its peculiar colour when placed in the shady corner of a room. If the lucid appearance proceeded from minute particles of dew condensed on the *surface*, it would be either entirely colourless, or tinged with the various hues of the prism, according to the direction in which it was viewed, like the flat gauzy mass of web of the weaving spider, similarly circumstanced. It is, however, always of a vivid golden green, which is the general colour of the juices in mosses, and is only in excess when viewed in one particular angle. Where it occurs, the brilliancy seems to be uniformly diffused, as on a plane; though it by no means follows that it is so, as the same effect would be produced by a number of minute, *detached*, lucid points thickly studded on a dark background. The different appearance of the lenses of the gold-eyed fly, *H*emeròbius Pérla, when viewed by the naked eye and through a microscope, will illustrate this. Its splendour is, doubtless, enhanced by the surrounding twilight gloom; but its existence in so obscure a situation adds great weight to my opinion, that it is caused by rays of light concentrated by, and reflected from, the innumerable and inconceivably minute lenses of the leaf, many thousands of which, as the cryptogamic botanist knows, are often collected within an area no larger than the transverse section of a grain of wheat. The idea that it is reflected from the silicious particles of the gritstone could not possibly be entertained by any one who has witnessed its most singular and brilliant character.



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I had almost forgotten to give its precise locality. It occurs among the singularly romantic rocks called Robin Hood's Stride, Crackcliffe, and Rowter (particularly in the latter), which are interrupted portions of the same range of the millstone-grit series, near the junction of that formation with the limestone shale, and trending N.W. and S. E. a mile or two north of Winster. On Rowter rock are some huge detached blocks, which I suspect to have been of some importance in times of druidism. — *J. E. Bowman. The Court near Wrexham, July* 21. 1829.

Laudanum not a Species of Dew (in answer to R. S. p. 298.) — Sir, In the last Number of the Magazine of Natural History (p. 298.) is a paragraph, entitled, " Laudanum a species of Dew ;" and, after an erroneous statement which follows, your correspondent enquires, " Can any of your readers explain this ? " Now, the explanation is not difficult. Instead of " laudanum " the name of the article in question should be *ladanum*, or rather *labdanum*. This is a resinous substance that exudes from several species of *Cístus*, natives of the Greek Archipelago; those that furnish the largest quantity of ladanum are the *Cístus* créticus, *C. l*aurifòlius, and *C.* ladánifer. The ladanum is sometimes collected by means of the goats who browse on the leaves and young branches of these cistuses: the resin sticks to their beards, and is scraped off from them. The story of its being " a species of dew " is so absurd, that I am astonished that any one, at this period, can be found weak enough to believe it. The ladanum which is procured by means of the goats is purer than that in cakes, owing to its exuding from the plant, and being free from admixture with the other juices of the plant. It nevertheless contains a small proportion of wax, obtained, probably, from the secretion of wax by the leaves and surface of the *Cístus*. M. Guibourt analysed the purest ladanum of commerce, and found it to contain

86 parts of resin and volatile oil,
7 parts of wax,
1 part of extractive, and
6 parts of earthy matter and hairs,

in 100 parts.

It was formerly employed as a tonic and stimulant medicine, but is now rarely administered. Yours, &c. — *A. T. Thomson, M.D. 3. Hinde Street, Manchester Square, July* 1. 1829.

The Corn Spring mentioned in Vol. II. p. 297. is similar to those called, in Kent, nailbournes, one of which joins the Little Stour at Bishopsbourne. Hasted, in his *History of Kent* (folio ed. vol. iii. p. 333.), says, their time of breaking forth and continuance is very uncertain; but they are held, by the common people, to be the forerunners of scarcity of corn. They sometimes break out for one or two successive years; at others, with two, three, or more years' intervention; sometimes they flow for a few months, at other times for three or four years. I can certainly say, from observation, that they are sometimes dry in wet seasons, and I think the assertion that they often run in dry seasons, is equally correct. I have somewhere seen an opinion, that they proceed from subterranean reservoirs in the chalk hills, which require to be filled to a certain height before they overflow; and, therefore, a long continuance of rain may take place without any water appearing in the nailbourne. Why they should break out in dry weather, I confess, puzzles me; and I should like to have the causes of these springs investigated by some one competent to explain them. — *Anon. July,* 1829.

THE MAGAZINE

OF

NATURAL HISTORY.

NOVEMBER, 1829.

Art. I. *Some Account of the Progress of Natural History, during the Year* 1828, *as reported to the Academy of Sciences at Paris by the Baron Cuvier.* By Mrs. Bowdich.

Sir,

In compliance with your request, I send you some account of the yearly report made to the Academy of Sciences by Baron Cuvier, in his quality of perpetual secretary to that body, and entitled *Analyse des Travaux de l'Académie Royale des Sciences pendant l'année* 1828. In doing this I have purposely avoided those subjects which might not be interesting to the readers of natural history; and even in those which are noticed, I have been obliged to curtail much from the original work. Baron Cuvier is most elaborate in his explanations, and carries his readers back to the discoveries of former years to elucidate those of the present moment, and I much regret that the limits of your Magazine will not allow of a closer translation. I have, however, done the best I could in so small a space, and should be very glad to see the example of this great man followed by some one of his learned cotemporaries in this country.

The *Partie Physique* commences with Meteorology, and contains some particulars, communicated by M. Moreau de Jonnès, of the earthquake which took place in the West Indies, on the 29th of March, 1828. Twelve shocks had been felt in the space of eight months, but the most violent was at the above period. The movement was from east to west, and it extended across the Atlantic and American continent in the space of twenty-three hours, when it caused great destruction at Lima, and where the shock was violent, and lasted from thirty-five to forty-five seconds.

Under the head of Chemistry and Chemical Sciences, are two or three discoveries which may be generally interesting. The first is that of the son of the M. Raymond who substituted Prussian blue for indigo in dying silk, thread, and cotton. M. Raymond the younger has improved on his father's process by imparting the same colour to woollen materials. The dye thus given is brighter than that from indigo, remains uninjured by water, fresh air, and light, but changes immediately when it comes in contact with boiling soap-suds and alkaline liquids.

M. Chevreul, so long known for his experiments on greasy substances, has been enabled to extract the greasy matter contained in wool, by the action of alcohol and ether. In this state wool is more difficult to dye, but if dipped into subcarbonate of soda, it regains its power of absorbing colouring matters.

MM. Chevalier and Lenglumé have been of essential service to the art of lithography, by the composition of two substances: the one for preparing the stone to receive the drawing, and printing from it when drawn upon, and the other for effacing the drawing. The first is an acid, which renders the surface of the stone more capable of imbibing the water which resists the printing-ink, and abstracts every thing like alkali from the material used for drawing. The receipt is as follows: — 3lbs. of hydro-chloric acid mixed with white marble. Filter the solution, and add 3 lbs. of water. Then melt 12 oz. of gum arabic in this mixture; and lastly add 3 oz. more of hydro-chloric acid, which can be increased if more strength be required. This liquid spreads itself more equally over the stone, and preserves humidity longer than any other yet in use. The second substance spoken of above, is potash, rendered caustic by lime, and dissolved in sixteen parts of water. The stone is washed, and then left in this liquid for four hours, which operation is repeated, as often as necessary, upon the whole or part of the stone. This, by entirely taking out the drawing, supersedes the use of pumice, sandstone, &c., which in time wear away the stone.

M. Beudant, who has long devoted himself to the relative weights and proportions of minerals, has ascertained that the specific gravity of these bodies is not as uniform as hitherto supposed. Carbonated lime, for instance, varies between 2·7 and 2·5; arragonite between 2·9 and 2·7. The state of crystallisation has a sensible influence over these variations. The specific gravity of small crystals is the greatest, and it probably diminishes in larger crystals from their internal vacuities being greater than in a more homogeneous mass. The varieties of lamellar, or fibrous structure, are also the lightest, and decrease still further in weight as the fibres increase in size. The specific gravity is also less in those varieties which are produced by decomposition. The great proof, that the specific gravity depends on the quantity of vacant space in minerals, is, that when all the varieties are reduced to powder they weigh alike.

Among the notices on Geology are the following: — M. Roset has been continuing the researches of Dr. Fitton, in the Bas Boulonnais, and confirms the English geologist's theory, that the strata of this district are exactly similar to those of the opposite county in England, both in composition and position. To these researches M. Roset has added many new details and maps. — A bed of manganese, situated at Romanèche, near Mâcon, has attracted the attention of geologists, and some (among whom is the celebrated Dolomieu) have thought it to be a vein, and others have supposed it to be a heap or mass placed upon the granite. According to the recent observations of M. Bonnard, it appears to accord with each opinion. At Romanèche, where it is worked, it certainly lies in a heap above the granite; but to the south of this village, and in the same direction, it forms a true vein, which traverses the granite, and in every respect resembles the heap in substance: a circumstance which M. Bonnard looks on as likely to substantiate the theory, that certain formations are caused by subterranean overflowings. The same author conjectured that the deposits of manganese at Dordogne were similarly situated; a supposition which has been confirmed by M. Dufresnoy, who, with his companion M. Elie de Beaumont, is preparing a geological map of France.

Several caverns, which were supposed to be destitute of fossils, have, since Dr. Buckland's instructions on the manner of finding them, produced a number of very interesting remains. M. Delanoue has just found a new instance of their constant occurrence in subterranean caves, in the grotto of Miremont, in the Dordogne department. This grotto appears to have been hollowed out in an intermediate formation, between chalk and Jura limestone. The galleries are 2000 paces long, and end in a multitude of low, narrow ramifications, where the bones are deposited. They are enveloped in red clay, and are principally those of bears. Some pits, dug from two to four hundred paces from the mouth, exposed different layers of marl, which appeared to be more recent than the red clay. In these were found some broken pieces of pottery, similar to those contained in the ruins and alluvial earth of the neighbourhood, and which are supposed to be prior to the introduction of Roman arts into France.

Since the discoveries of M. Delanoue, M. Tournal, a chemist of Narbonne, has made other researches at Bize, in the Aude department. The cave is in the Jura concretion. Part of the bones are enveloped in a stony concretion, and, according to him, belong to those extinct species usually found in caves. Others are in black mud, and wholly different to the former. Besides these, not only in the black mud, but among the calcareous concretions, are human bones and pieces of pottery. M. Destrem, who has examined the same cave, only found some remains of ruminating animals, principally of the deer kind, and several bones of rabbits and birds. He does not consider the human bones worthy of attention, as they are neither impregnated with clay, nor covered with the ferruginous crust, which both distinguish true fossils. M. Destrem supposes them to have been recently lodged in these caves, as they have several times been the resort of malefactors.

MM. Marcel, Deserre, Dubrueil, and Jean Jean, professors at Montpelier, have begun publishing their description of the caves of Lunel Vieil, long celebrated for the abundance and variety of their fossil remains. There are three of them in the same garden, and penetrating into the same hill, which is formed of tertiary marine limestone, and which is more recent than the coarse limestone of Paris. The remains are found in a mud, which is full of rolled flints, and all mingled together, without any regard even to the skeleton to which they belonged. These have not been rolled, but broken by some violent shock, and have numerous fissures on their surface, which have induced the belief that they have been a long time without flesh. There are fourteen species of Carnívora, seven of Ruminántia, seven of Pachydérmata, and five of Rodéntia. In the first order are three species of hyænas, similar to those found in England, and mingled with excrements and other bones, which bear the marks of the teeth of these animals. Notwithstanding this, the above gentlemen believe them to have been brought thither by an inundation, which has swept with it the bones of the whole neighbouring soil: a belief which explains some extraordinary contradictions; for it is well known that hyænas could not live in the same cave with tigers, nor dogs with hyænas; and yet, in the lapse of years, these animals may probably have inhabited the same spot at different periods. Another place, abounding in these remains, exists in Auvergne, in a mountain near Issoire, which has been explored with much zeal and labour by MM. Devèze de Chabriol and Bouillet, and M M. l'Abbé Croiset and Jobert. The first two have already published their observations, but the last two have not yet terminated this part of their labours. The structure of the mountain is of fresh-water limestone, resting upon granite, with strata of sand alternating with layers of volcanic remains, and crowned by enormous masses of these same remains. Notwithstanding the volcanic productions all round, the formation of this mountain must be referred to that named diluvium, as the bones found are the same as those which characterise this formation, and it is so rich, and contains so many species, that it must always be one of the most remarkable monuments of a former world. But in this same country are still older formations, made by fresh water, and containing layers of sand, which present us with different genera. Among these are found many remains of birds (in which Auvergne is generally abundant), and even some of their eggs, in beautiful preservation. In these places there are no marine beds, the bones are scattered, not rolled, and are often mingled with fresh-water shells.

M. Adolphe Brongniart, who has devoted himself with such extraordinary zeal and perseverance to fossil botany, has been obliged to create a new method of ascertaining the nature of vegetable deposits, and has formed it from the surface and composition of the stems, the nerves of the leaves, &c. &c. He has commenced publishing a new work, where he describes more than 500 fossil species, with their positions. By help of these species, he establishes a certain number of successive formations, in which vegetables succeed each other with few changes, and in almost equal numbers of genera; and other formations, where genera and families undergo the most sudden changes and bear no affinity to each other. By means of these rapid changes, he has fixed certain vegetable geological periods, which he has reduced to four; during each of which vegetation has presented but few remarkable changes, but the passages of which from one to another have been strongly marked. The first comprehends transition earths and coal, the second speckled sandstone, the third extends from the upper part of shelly limestone to the under chalk, and the fourth corresponds with the tertiary formations. These are separated by strata, which contain few or no vegetable remains; as the red sandstone and the alpine limestone, which intervene between the first and the second; the secondary limestone, between the second and third; and chalk between the third and fourth. In the first period the ferns and the larger vegetables predominate; in the second is an equal number of ferns, monocotyledons, and Coníferæ, but of a smaller size than in the first; in the third the *Cycàdeæ* are most abundant, and there is a dearth of dicotyledons in all three; but in the fourth is a remarkable predominance of dicotyledons, and a similarity to the vegetables of the present day. Thus, as in the animal kingdom, an affinity may be traced between each succession and the state of vegetation in the different zones of the present globe. The Flora of the first period approaches to that of the small islands between the tropics, and far from continents; which induces the author to think, that during this period the temperature of the earth was higher, and that it was formed of small islands, scattered in a vast ocean, and that no great continent existed; a result which, in other respects, agrees with the disposition of coal formations, and at which Deluc and others have arrived by different means. The second and third periods have some of the characters of the larger islands and the coasts; and, lastly, the fourth period, or tertiary formation, is analogous to the vegetables of the temperate zones, especially the forests of Europe and North America. Many of these vegetables have been developed before we find any traces of animals; but, as we advance, we perceive cold-blooded animals; but it is only in the middle of the fourth period that animals with warm blood are found in any number, and their appearance coincides in a remarkable degree with the multiplication of dicotyledons. With such facts before him, the young author has been unable to resist the temptation of trying to account for these wonderful vicissitudes, and he thinks they are owing to the action of these vegetables upon the atmosphere. He supposes that the carbon now employed in organic life was at first, under the form of carbonic acid, an integral part of the atmosphere, from which it was extracted by vegetable absorption. "Being surcharged with this acid," says M. Adolphe Brongniart, "the atmosphere was as favourable to the rapid growth of plants, as it was injurious to that of animals with warm blood; and it is before these animals show themselves, that we find these enormous masses of vegetables. Animals with cold blood do not require so pure an air, and have appeared when much of this carbonic acid has been absorbed; and the animals with warm blood have only existed when the air has been more completely purified by the long continued action of vegetation, and especially vegetation consisting of large forests, spread over vast continents."

In that portion of M. Cuvier's report devoted to Vegetable Physiology and Botany is an account of a new discovery made by M. Dutrochet, which has been deemed so new and important, that the Academy has voted him the physiological prize founded by M. de Monthyon. M. Dutrochet calls his discovery Endosmosis *, or that property which, in two fluids of different natures or density, separated from each other by a thin porous division, produces the effect of the one penetrating the division rather than the other, and with sufficient power to raise the latter much above the level at which it would remain agreeably to the laws of equilibrium. M. Dutrochet has taken great pains to verify the quickness and force of this new power, as well as all the circumstances which favour or oppose it; and he has made the happiest applications of his discovery to those questions in vegetable physiology, the solution of which has been despaired of by physiologists. He has invented a very simple instrument, which he calls an endosmometer, and which consists of a tube, larger at one end than the other, and which is closed at the largest end by a bladder, or some other thin substance. This tube is filled with a fluid, and the closed end is plunged into a vase filled with another fluid, the action of which is to be ascertained, on that contained in the tube. In general, when the liquid in the vase is water, and that of the tube is more dense than water, the liquid rises in the tube, because the water goes up into it; and this ascension will extend several feet, and constitutes endosmosis. If the position of the fluids be changed, the movement will take place in an inverse direction, the water in the tube will descend towards the denser liquor in the vase, and will then form exosmosis. † There are even, properly speaking, two currents in opposite directions: the endosmosis and the exosmosis will take place at the same time, but one of the two will have the ascendency. The quickness of the endosmic action is proportioned to the excess of density in the interior liquid (that of the tube) over that of the exterior (in the vase). It is supposed that this discovery will not only greatly elucidate the ascension of vegetable fluids, but vegetable irritability. By way of exemplifying this, we will observe, that the valves of the capsule of the *B*alsamina have a strong tendency to curve inwards, and as soon as the fibre which unites them weakens, they curve in this manner with as much force as rapidity. This is caused by their exterior cells being larger than those of the internal surface, and consequently by their containing most water, and swelling into convexity. This elasticity of the valves diminishes by a partial

* Derived from two Greek words, the one implying inward, and the other impulse; which, together, accurately describe the singular phenomenon illustrated by the physiologist.

† This is the reverse of the phenomenon described in the previous note, and the term is also derived from the Greek, only expressing the outward instead of the inward motion.

evaporation of the internal fluid, and returns again, when the valves are plunged into water before they are entirely dry. According to M. Dutrochet, after incomplete evaporation they still contain a dense fluid, and endosmosis will take place; but after entire desiccation, the water only effects common absorption. If we plunge these same valves of the *B*alsamina into a denser fluid than that which they contain, syrup for instance, exosmosis takes place, they immediately cease to curve inwards, and soon turn back, because their larger exterior vessels lose more of their fluid than those of the interior. By applying even the little that has been already said, and which does not contain more than half of the details entered into by M. Cuvier, it will be seen that this power acts on the direction of the stem and radicle of the embryo in germinating seeds, even on the tendency of stems and roots to ascend and descend, and also on the curvature of stems, which are upright as long as their proper equilibrium is retained.

The structure and developements of the vegetable ovulum, which have for many years excited the attention and study of the first botanists in Europe, and which, after so many scientific observers, might be thought exhausted subjects, have again been the object of M. de Mirbel's researches, who in some respects confirms, but in others contradicts, the assertions of his learned predecessors. He considers the ovulum from its birth, follows it through all its developements, even through its changes of position and exterior forms, by which he has been led to divide seeds into three classes: first, the "Orthotropes," which retain the position they had in the first instance, and which is that of the base exactly opposite to the summit; secondly, the "Anatropes," which change their position so completely as to be reversed; and, thirdly, the "Campulitropes," which curve in an arch or circle, so that the summit approaches the base. A long time ago M. de Mirbel observed, that in square stems with opposed leaves, there are four vascular and ligneous bundles, which correspond with the four angles, and that at the extreme point of insertion of each pair of leaves, these bundles communicate with each other by means of lateral ramifications, which form an annular pad round the stem. The trunk of an old Calycánthus flóridus has furnished the author with a fresh confirmation of this fact. The four vascular bundles at the angles of this Calycánthus have grown with the stem, and formed four projections outside, which appear like cords the size of the fourth finger. Each of these has a cortical covering of its own, ligneous layers placed one above another, large vessels in a circular series in the wood, radiations which proceed from the centre to the circumference, and a medullary canal. Thus the organisation of the four bundles, and consequently their growth, are exactly similar to those of the ligneous stems of cotyledon plants. This unexpected fact has appeared so strange to several people, that they fancied these bundles had been engrafted on the stem. They were, however, undeceived by a close examination.

M. du Petit Thouars, when observing the flowers of the wild poppy, was struck with the disposition of the stamina, none of the anthers of which touch each other, notwithstanding their great number. This probably arises from the regularity with which they radiate from a common centre. In some flowers, such as those of the *R*osàceæ, where the stamina are not quite so numerous, we can trace a rectilinear arrangement, arising from their insertion and their unequal lengths. These divisions generally accord with the number of the petals, and all the observations of M. de Thouars confirm the assertion of Grew, that the arithmetic of nature always accords with its geometry. They also prove the position of Linnæus, that the flower is but the transformation of the leaf; and another, that the number five is most employed by nature in dicotyledons, and three in monocotyledons. M. de Thouars traces these last two to the manner in which the bundles of vessels proceed from the scion into the leaves. The remark, that five was a favourite number in nature, was made by Thomas Brown in 1656.

M. Adolphe Brongniart last year made some observations concerning the pollen of flowers, which led him to state, that every grain is an organised bladder, filled with corpuscles, themselves organised, and gifted with separate movements. On the other hand, M. Raspail, one of the most skilful observers of microscopic phenomena, has presented a memoir to the Academy, declaring that these bodies are only moved by external causes, and that they are resinous, or oily drops, which dissolve in alcohol. M. A. Brongniart, supported in his opinion by the celebrated English botanist, Robert Brown, has defended his previous statement in a second memoir, and repeated his experiments. The Committee of the Academy have determined, that M. A. Brongniart has proved that external causes have nothing to do with the movements observed by Mr. R. Brown and himself, and the Committee at the same time declare, that similar movements have been clearly demonstrated to them, as existing in many different bodies. This phenomenon, however, varies very much, even when the circumstances are alike, and the question of fecundation is wholly independent of these movements.

M. Moreau de Jonnès has communicated an extensive memoir on maize. He first contradicts the opinion, that it was known to the inhabitants of the old world before the discovery of the new, over the whole of which it is now spread, and known under various names. M. Moreau's researches have been profound, and he proves that human agency introduced it into the ancient continent, and that, by the same means, rice, millet, and wheat have been carried to the Americans.

M. Delille has described the structure of the flower and fruit of the *Thelýgonum Cynocrámbe*, belonging to the family of *Chenopodiàceæ*, observed by him in the neighbourhood of Montpelier, and hitherto unknown to botanists. When grown in a damp soil, the fruit loses its pulp and epidermis, and is covered with a white dust, which looks very much like amianth, and which resists decomposition much longer than any vegetable substance. This dust consists of a prodigious number of needle-shaped crystals, pointed at each end, thicker in the middle, and having a flat facet on each side, which is only to be seen with a microscope. These crystals, larger than those of most other vegetables, are agglomerated in bundles, so as to make the surface of the fruit appear wrinkled.

The great descriptive works on botany are continued without intermission. M. Decandolle has published a monograph on Crassulàceæ; M. Auguste St. Hilaire one on *Polýgalæ*; M. Kunth announces a work on grasses, which will doubtless be full of the most important observations. This learned botanist has also published a special description of the *Balsamìna* of our gardens. M. Cambessèdes has presented a memoir to the Academy, containing numerous details concerning the Ternström*iàceæ* and Guttíferæ, in which two families he proposes several new genera, and rejects others as not belonging to them. M. Bory St. Vincent has minutely described the Agàmia and Cryptogàmia collected by the ship Coquille, in her voyage round the world. M. Guillemin has given a collection of drawings of rare plants in Australia. M. Descourtils continues his medical Flora of the West Indies, and has published a familiar treatise on edible and poisonous mushrooms.

In treating of Anatomy and Animal Physiology, Baron Cuvier tells us, that M. Magendie has collected into one work, all his scattered observations on the brain and the liquid which bathes it, and the medulla spinalis. According to M. Magendie, adult women have more of this fluid than men; but it abounds most in the skull of old people, whose brain is diminished by age. Idiots are said to have even a larger proportion of it. It forms a layer all round the brain, one or two lines thick; but, under certain circumstances, and in certain places, it is the thickness of an inch, which appears to M. Magendie to be a strong objection against a system which establishes a close affinity between the form of the skull and the brain.

M. Flourens, who made important experiments on the effect produced by taking away different parts of the encephalon, has this year applied his observations to the medulla spinalis and medulla oblongata, with a view of ascertaining their exact limits, and comparing their action upon the respiration of the four classes of vertebrated animals. The results of these experiments are, that the medulla spinalis may be abstracted with less injury from Mammàlia than from birds; still more may be taken from certain reptiles, and fishes may be entirely deprived of it. This proves, says M. Flourens, that the medulla oblongata is the essential and primordial organ of all mechanical respiration, and the exclusive organ in fishes. The same author has renewed his experiments on the canals of the ear, which produced such extraordinary movements in the animals on whom they were performed, and who, in spite of the disorder thus produced, continued in perfect health. The section of a horizontal canal constantly keeps the head in motion from right to left, and left to right; and, when two canals are cut, this movement becomes so rapid and impetuous, that the animal loses its equilibrium, and turns round and round, without the power of stopping. If, on the other hand, the external semicircular canals be divided, the movement is up and down, and frequently with such violence as to throw the animal back, head over heels. If the internal canals be cut, the same movements take place, except that the animal is thrown forwards, heels over head. These movements cease when the animal remains perfectly still; but, if it tries to move from one place to another, they immediately recommence, and render both walking and flying impossible. M. Flourens and M. Magendie have also tried experiments upon uniting nerves which have been separated; they have even brought the ends of different nerves together, which have completely united, and, in some cases, even the functions have been entirely restored.

M. Giroux de Buzaraingue has invented a peculiar method of determining the functions of the encephalon. It is from the inspection of the changes occasioned in sheep, by the malady known under the name of "tournis," and finding the place in the brain occupied by the parasitical animal which caused the disease. Assisted by the curious researches of M. Magendie on the cerebellum, as connected with the movements of animals, he has arrived at some important conclusions. Intoxication, which alters the powers of motion nearly as much as injury to the cerebellum would do, deadens almost all sensations; and several known facts relative to the sleep of those affected by wine or opium, the nature of their dreams, the walking while asleep, &c., appear to M. de Buzaraingue to prove the active part which the cerebellum takes in producing sensations, and the recollection it retains of them. According to him, it is the cerebellum which presents the part to the cerebrum, and it is thus that the successive actions of animals cooperate with each other; but the cerebellum has no direct influence on these actions, and the brain alone can command them.

Dr. Foville, physician to the lunatic hospital at Rouen, has also presented to the Academy a memoir concerning the brain, in which he places the connection of the different parts of this organ, both between themselves and the medulla spinalis, in a new light.

MM. Isidore Geoffroy St. Hilaire and Martin have made some very interesting observations on the canals in the corpus cavernosum of tortoises and crocodiles, which communicate with the interior of the abdomen, and even, as it would appear, with the exterior.

In the article on Zoology, M. Cuvier first states, that M. Geoffroy St. Hilaire, in his lectures on Mammàlia, which have been published, has given a detailed account of the mole, and communicated to the Academy several of those parts which concern this animal. Among a number of anatomical details, he has endeavoured to explain the causes of the diminutive size of the eyes and optic nerves, and states them to be the immense developement of the olfactory apparatus, the size of the nasal conchs, the thickness of the nerve of the upper jaw, and the extraordinary volume of the olfactory lobe of the brain. M. Geoffroy believes that the optic nerve does not exist within the skull, but that it is placed outside, close to the eye, and, being unable to penetrate into the skull by the usual method, on account of the compression of the sphenoid, according to the words of the author, is obliged to get in by the nearest way, and this nearest way is by attaching itself to the trunk of the fifth pair. What is very remarkable, and what contradicts several theories concerning the special functions of different lobes of the brain, is, that those lobes which are believed to be the optic thalami, are, in the mole, above rather than below the proportionate size of those animals who have the clearest and strongest vision. Added to these observations, the author favours us with some very interesting particulars on the habits of the mole. Among others is the surprising quickness with which it escapes, when frightened, through its subterranean chambers, and in which are openings for air placed at certain distances. It is a cruel voracious beast, satisfied only with animal substances, and easily killed by hunger. None of them can remain more than twelve hours without food, and even after an interval of six hours they are much exhausted. They generally eat worms and insects, but if they can catch a bird, a small quadruped, or a frog, they precipitate themselves on it with fury, open the belly, devour the entrails, pulling the edges of the wound asunder and penetrating as far as possible into the body without being diverted from their purpose by the presence of man, or noise. They do not even spare their own species, and if two are shut up together without food, there will shortly be nothing left of the weakest but its skin, slit along the belly.

M. Isidore Geoffroy has presented a memoir on those Cheiróptera which feed on fruits, hitherto comprehended in the genus Ptéropus. To this genus he adds a new species to those properly called Ptéropus, and another to Pachysòma, which has lately been separated from that genus.

It is well known how many remarkable differences exist between animals that have been tamed and those living in a wild state. Interesting as it has been to trace these changes, it has been quite as much so to mark the alterations in animals who, after having been domesticated, again become wild. Dr. Roulin has given an account of some transported to South America by the Spaniards, and now living in their natural condition. He first observes the return of these races to the uniformity of their fur. All the horses are of a dark brown, the asses are all of a dark grey, and the hogs are black. The ears of the latter stand upright, and their skull is enlarged, the courage of the ass is revived, and yet some few traces of domesticity still remain. The horses amble, because they are descended from ponies who were taught this pace; the dogs, who spring from hounds trained to hunt the peccary, still preserve the same means of attack and defence; but the cows give milk no longer than necessary for the nourishment of their calves.

M. Cuvier has added to M. Lemaire's great collection of Latin classics, by explanations of those books of Pliny which treat of animals. His object has been to determine the species mentioned by Pliny as known to him only by report. In order to accomplish this, M. Cuvier has brought to his assistance all that has been said by the other ancient authors concerning each animal, he has endeavoured to point out all that may be regarded as fabulous in the narratives and descriptions of travellers in distant countries, at a period when the most enlightened were comparatively ignorant of natural history; and he has tried to identify those animals with those inscribed by modern naturalists in their catalogues; and, in doing which, he has obtained some new and interesting results. The same author, in conjunction with M. Valenciennes, has published the first three volumes of their great work on ichthyology. The first contains the history of the science, and a general and detailed account of the organisation of fishes. The second begins with the family of perches, and contains the descriptions of 245 species, divided into 20 genera. The third volume terminates this family, and contains 182 species, divided into 32 genera. These volumes are accompanied by figures of 63 species, and eight large anatomical plates.

Among the works devoted to the representation of natural history in different countries, that of M. Audubon, on the birds of South America, surpasses all others both in colouring and engraving. The plates are the largest ever yet published, for the eagles and the tetraos are all the size of life, and when the bird is not large enough to fill the paper, it is represented in its various attitudes. M. Audubon's is a work in which the Academy, in common with all the friends of science, take a deep interest, and they with pleasure see the naturalists of the New World profiting so amply by the instruction they have derived from a more ancient source.

Two memoirs have been read to the Academy on the distinguishing characters and natural history of lizards, one of which was written by M. Dugèz, and the other by M. Milne Edwards. In the first, the author sets forth some anatomical observations on the nérvus accessòrius, and states his conviction that these animals breathe like frogs and tortoises, by a sort of deglutition of the air, facilitated by suckers or valves placed at the orifice of the nostrils, and especially by the six cornua of their os hyoïdes, which support and move the pharynx. M. Dugèz has also studied the phenomenon of the reproduction of the tail, in which the last vertebræ are constantly replaced by a tubular cartilage, in which the spinal marrow is prolonged. This memoir terminates with a particular description of six indigenous species, observed by the author at different periods of growth, by which observation he has been enabled to recognise, among those supposed to be distinct species, the young ones of others: as the *L*acérta lépida of Daudin, which, when aged, assumes the characters of the *L*acérta ocellàta; the *L*acérta víridis, which becomes like the

L. bilineàta; and the *L.* sèpium, which takes the appearance of the *L.* arenícola.

M. Milne Edwards has arrived at the same results as M. Dugèz with regard to indigenous species, but has invented a new method of characterising all kinds, which is by the scaly plates of the head. Their number, shape, and proportions are generally constant in each species, and sufficiently different from others to adopt this method.

M. Dugèz has also been observing the deglutition of reptiles in general, and gives some new details on the changes which take place in the tongues of frogs, &c., which are short and immovable in the tadpole, but which in the frog, and especially in the toad, become organs of extreme mobility. When still, they are folded back towards the throat, but can be unfolded with astonishing rapidity. The author describes the muscles of this singular mechanism, and those which produce the darting and vibrating movements of the tongues of adders.

M. Dugèz, professor at Montpelier, has composed a memoir on the respiration of that family of the Annelìdes which is destitute of branchiæ, as the fresh-water worm, the leech, and the Nàïsa. The Nàïsa has a dorsal vessel, which makes a fold at each ring of the body, and carries the blood from behind to before; and a ventral vessel, less in size, and less flexible, which conveys it in a contrary direction. These two communicate by anastomoses, and on each side is a contractile bladder, which appears to receive the blood of the dorsal vessel, and, as it contracts, to send the blood into the ventral. The network of anastomoses in the tail, which is constantly in motion, forms a very complicated vascular apparatus, which appears to M. Dugèz to be the organ of respiration. Leeches have a dorsal, a ventral, and two large lateral vessels, all of which communicate in different manners. As to their respiration, besides that which is effected by the skin, another way exists by means of a number of bladders, placed on each side, and communicating with the exterior by a small pore. The same author makes a number of other valuable observations on the circulation of the blood, and the generation of these animals, and proves that the *L*umbrìcus is not viviparous, as generally supposed; and that which has been taken for a fœtus, is nothing but an intestinal worm. In another memoir the author treats of a genus but little known, called by naturalists Planària; the body is flat and thin, and of a parenchymatous substance. The author forms these animals into a family, which he names Planàriæ, which family he divides into several genera. Although very quick in their movements, they are so soft and glutinous that the least pressure will crush them. When divided, they continue to advance in the direction pursued by the primitive mass. In some it has been impossible to discover any nerves, or orifices; in others, there is one opening. The alimentary cavity is like a bag, from which issue numerous branching ramifications. M. Dugèz thinks he has discovered something like a system of circulation. Some of them are oviparous, and others are reproductive, like *Pó*-lypi. From this it would seem that M. Cuvier's suspicions of their near approach to the Fascìolæ are confirmed.

M. de Blainville has published and presented two works to the Academy, partly extracted from his contributions to the *Dictionnaire des Sciences*. The first is a monograph on *H*irudinàceæ, in which he considers their anatomy, their natural history, and their uses. He divides them into twelve genera or sections.

M. Moquin Taudon has also published a monograph on the same family, but he only divides them into eight genera.

The second work of M. de Blainville is on worms, part of which is printed under the title of *Manuel d' Helminthologie*, but it is impossible to enter into the details of this voluminous subject.

M. de Blainville is employed with M. Vieillot in editing the French *Fauna*, which will contain the history and figure of all the animals existing in France. Twenty numbers in 8vo have already appeared, with coloured plates.

MM. Audouin and Milne Edwards, who have combined their efforts for the progress of comparative anatomy, have turned their attention to Crustàcea. Their memoir contains a description of the breathing organs of this class, with their mechanism; but these gentlemen do not confirm the opinion started a little while back, that Crustàcea have, besides their branchiæ, an organ more or less analogous to the lungs of those classes which breathe the open air. MM. Audouin and Edwards, in the hope of facilitating their researches, established themselves on the rocks of Chaussey, frequented only by stone-workers, where, sheltered by a mere hut, they collected more than 600 species of the Crustàcea, Mollúsca, and Zoophytes of the English Channel, 400 of which are either new or imperfectly known. They have ascertained that the Ascídiæ are all born separately; they swim rapidly, and, at the end of a few days, some fix themselves to the mass from which they sprung, and others form new colonies. These naturalists have, as well as M. de Blainville, confirmed the idea, that the animals called Flústræ approach the Ascídiæ much more than the *Pó*lypi, as Spallanzani imagined. They have also strengthened the remarks of M. Cuvier upon the Veretílla, Pennátulæ, and *A*lcyònia. Other masses, till now confounded with *A*lcyònia, are not even *P*ólypi, and the living matter is distributed among them as in sponges. Their only sign of vitality is, that they slowly contract and close when irritated.

M. Milne Edwards has described four new Crustàcea, which are very interesting, as they form links between the genera of this class. Almost all are microscopic.

M. Guerin has described two larger species, one belonging to the family of crabs, which he has named Eurýpoda; the other to shrimps, the eyes of which occupy nearly the whole head, and which he calls Themísto.

M. de Blainville has made some new and important observations on the Physàlia, which has been hitherto looked on as a zoophyte, and made the type of one of the orders by M. Cuvier; but from its orifices, its intestine, and muscular crest or foot, M. de Blainville thinks it ought to rank with Mollúsca. To do this, however, it must possess a nervous and a vascular system, a heart, a liver, &c., all of which have been searched for in vain by M. Cuvier.

Zoology continues to receive vast accessions from the nautical expeditions ordered by the government. Five successive collections, sent by MM. Quoy and Gaymard, who have visited several parts of the South Sea and the coasts of New Guinea, present thousands of animals. The Chevrette, commanded by Captain Fabré, who has traversed the Bay of Bengal, and touched at the Sunda Isles, has acquired great treasures, thanks to the zeal of the chief surgeon, M. Reynaud, and other officers.

In the report on Agriculture, &c. M. Giroux de Buzaraingue is said to have published a memoir, stating, that wheat grows much better when its roots do not penetrate too far into the ground; therefore, when the soil is prepared to receive it, care should be taken to leave it in a coarse, lumpy state. M. Giroux also observes, that when wheat is sown thickly, the grain is better, the epidermis thinner, and the straw finer.

M. de Beaujeu, after many years' attention to the manufacture of sugar from beet-root (and which has by many been thought for the last twenty-five years the most likely means of checking the slave trade), has established a manufacture on his own property, and communicated some of the results of his labours. His experiments are very similar to those lately adopted for sugar canes in the colonies, and he considers the making of beet-root sugar in France a lucrative speculation.

The *Annales Agricoles de Roville*, by M. Mathieu, of Dombasle, are continued. The particulars concerning the experimental farm at Roville are not only useful to the pupils, but to agriculturists in general.

M. Huzzard, the son, has communicated a manuscript treatise on the breeding of horses.

M. Warden has sent to the Academy some most interesting facts concerning the advancement of the Cherokee nation. Encouraged by the government of the United States, guided by Anabaptist and Moravian missionaries, instructed by the example of white men married to Cherokee women, they have made the most surprising progress during the last twenty years. Their villages consist of commodious dwellings, several of which have from twenty to forty well-cultivated acres attached to them. They have flour and sawing mills, they weave their own broad cloth, they export their cattle and maize, and receive sugar, coffee, and other commodities in return. One hundred thousand acres of land have been devoted to the expenses of public education, their schools are frequented by more than 500 children, who all read, write, and speak English, and one of whom has invented an alphabet of 96 characters, by means of which the pupils correspond among themselves in their own language. The nation has adopted a constitution; the present population consists of 15,000 souls, divided among sixty villages, and their movable property is estimated at half a million of dollars.

The *Partie Mathematique* of the *Analyse*, &c., has been supplied by Baron Fourrier, also secretary to the Academy; but as the readers of natural history are not likely to feel interested in it, I have now but a few words to add, and those on subjects connected with natural philosophy.

M. Ampére has presented two papers to the Academy, containing a theorem for the propagation of light in the middle of crystals, in forming which he has continued the researches of M. Fresnel, though he pursues rather a different method of deduction.

M. Chevreul has also sent a memoir to the Academy, which bears the following title: "The Optical Influence which Two Coloured Objects have upon each other, when seen simultaneously, and the Necessity of considering this Influence in Dyeing, in order to judge of Colours, their Solidity being abstracted." M. Chevreul has established this general fact; that two objects differently coloured, and in juxta-position, constantly undergo a modification of colour which arises from their vicinity. If one is lighter than the other, the first will become still lighter, and the latter darker. M. Chevreul has, by experiment, fixed the reciprocal modifications undergone by the seven primitive colours, and black and white. He has tried to find the law of these modifications, and arrived at this remarkable result. "When two colours, A and B, are seen simultaneously, the complementary colour of B is added to A, and the complementary colour of A is added to B." The colours appear quite different, and besides, as white appears more brilliant, and a light colour becomes lighter, when seen simultaneously with a dark colour, which in such a case itself acquires intensity, it results, that the contrast takes place in the colour, and in that which dyers call depth of tone. M. Chevreul remarks, that in explanations which several natural philosophers have given of accidental colours, two very different cases have not been sufficiently distinguished. The first is that in which the eye, for instance, having long looked at a little square of red paper, placed on a white ground, suddenly moves to a part of the white ground. It then sees a little green square, which is the complementary colour of red. We can very well conceive, with M. S. Scherffer, in this case, how that part of the retina, on which the image of the red square is painted, being fatigued with this sensation, ceases to look at it, and still seeing the white, that part of the retina fatigued with the red must receive a much stronger impression of the complementary colour of the red, and thus must see a green square. But in a case where M. Chevreul has studied accidental colours, there are two equal zones, contiguous, and differently coloured, which are seen simultaneously, and the complement of one of the colours acts, not on that part of the retina which sees this colour, but on the part which sees the other colour. The learned author intends to return to the study of these phenomena, to the consideration of which he has been led by accident.

M. Fourrier read a memoir, entitled "Experimental Researches on the Conducting Faculties of Thin Bodies exposed to the action of Heat, and a description of a new Thermometer of Contact."

The literary undertaking of the Baron de Ferussac, which has now existed for five years, is still continued, and, by being in general circulation throughout France, greatly contributes to the endeavours which are constantly making towards the perfection of science. The object of this work is to publish "A Universal Bulletin of Science and Useful Arts;" and the different subjects contained in it are indicated by the following titles:—

Mathematical, Astronomical, Physical and Chemical Sciences. Geology and Natural Sciences. Medical Science, Anatomy, and Physiology. Agriculture and Economy.

Technological and Constructive Science. Geographical Science. History, Antiquities, and Philology. Military Sciences. I am, Sir, &c.

S. Bowdich.

London, September, 1829.

Art. II. *Some Account of the Life, Genius, and Personal Habits of the late Thomas Bewick, the celebrated Artist and Engraver on Wood.* By his Friend John F. M. Dovaston, Esq. A.M., of Westfelton, near Shrewsbury.

(*Continued from* p. 319.)

> "He — in a general honest thought,
> And common good to all, made one of them.
> His life was gentle, and the elements
> So mix'd in him, that Nature might stand up,
> And say to all the world — *This was a man!*" Shakspeare.

Sir,

With pleasure I resume the brief and broken narrative of my friend Bewick; yet not without considerable diffidence in my own power to make it interesting to all; being well aware it will be read by many, not feeling my own keen relish for his productions; and by many more not having, like me, enjoyed the blessings of his friendship.

I left myself happily seated in the alehouse, on the 1st of October, 1823, between my lamented and my living friends, Bewick and Bowman: and what with the wit of one, and the science of the other, I paid little attention to the iron tongue of the neighbouring steeple of St. Nicholas, whether he *told* the long and loud "hour o' night's black arch the keystane," or the wee bit ane ayont it. The fine old fellow, this jolly old Cock o' the North, as I facetiously called him, would persist in seeing us to our hotel, where we renewed our libations even to "sangs and clatter." Very early in the morning he kindly came again with his great cudgel to our chambers; and removed us to his neat and hospitable residence amid the fields and gardens above Gateshead, on the opposite bank of the Tyne. Here we brokefast with his family, consisting then of his good old dame (who died February 1. 1826, aged 72), one son, and three daughters. He now conducted us amid the curiosities of Newcastle, public buildings, pictures, and libraries; and, what is more to my present sketch, his own workshops. Here we saw his manner of producing his beautiful art; and his nests of almost numberless drawers, each filled with one layer of finished blocks, with their faces upward, on many of whose maiden lineaments, fresh and sharp from the graver, the ink-ball had never been pressed. They are all cut on box-wood, which is procured from abroad of as large circumference as possible, at a great expense, and is paid for by weight. This is sawn across, at right angles to the cylindrical growth of the tree (I mean as a cucumber is sliced), in pieces, when finished, exactly the thickness of the height of the metallic types, with which the blocks are afterwards incorporated in the pressman's *form*, or iron frame. One surface of this block is made extremely smooth, on which is traced in black and white lines, the figure or design; the white is then cut out, and the black left. Though this was the method he took with his pupils, of whom he had constantly a numerous succession, he had early acquired so ready a facility himself, that simply with the graver on little, and often no, outline, he worked the design on the blank block at once. His tools, many of his own contrivance and making, were various in sizes and sorts. Some, broad gouges for wide excavation; some narrow, for fine white lines; and some many-pointed for parallels, which, either straight or wavy, he cut with rapidity, by catching the first tooth of the tool in the last stroke, which guided it equidistant with the former. He spoke with great approbation of the graphic talents of his late brother John; and repeatedly said, that, had he lived, he might have attained to greater eminence than himself. When they both began, the art was almost lost, and totally neglected; but has, through his hands and ingenuity, been almost, as it were, re-invented, and brought to its present high pitch of perfection: and many of the most celebrated wood-engravers have been his pupils. Here he gave us his opinion of the old method of cross-hatching, a style not now used, or even known, and, he said, useless; as every effect may be produced by parallel lines, broader or narrower, at greater or less distances; and in the lighter parts, by a little sinking of the surface of the block. The latter is one of his own inventions, and by it a judicious pressman can produce every gradation of shade from very black to nearly white; between which he preferred those of intermediate strength, being decidedly against a black impression. He thought the old engravers effected the cross-hatching, either by covering the block or metal plate with wax, through which the lines were cut, and an acid then applied to eat into the surface; or by the use of cross or double blocks, requiring two impressions to produce a single figure. Numberless specimens of this cross-hatching may be found in the great old edition of

Fox's *Book of Martyrs*, where it is often widely and wantonly thrown away, even where not required; a proof, that it must have been executed without much art or labour: in honest old Gerard's valuable *Herbal*: in that of Parkinson: and in Felix Valgrise's beautiful folio edition of Matthiolus's *Commentaries on Dioscorides*, Venice, 1583: and many other ancient books in my collection. Mr. Bewick's own Horse-traveller in a Storm, where he shows black and white rain, is a specimen of the use of two blocks. A person acquainted only with the common method would be at a loss to conceive how the union of the absolutely opposite styles of engraving, on copper and wood, could be effected. The black diagonal lines, particularly those on the foreground, constitute its great curiosity as a wood-cut. In many of his tail-pieces, he has given imitations of etching, and cross-hatching; but these are all worked in the usual manner, the surface of the wood being picked out, with infinite labour and surprising skill, from between the lines. He very seldom engraved from any other copy than nature, having the bird (always alive if possible), or other subject, before him, and sketching the outline on the block, filling up the foregrounds, landscapes, and light foliage of trees, at once with the tool, without being previously pencilled. It was curious to observe his economy of box-wood; the pieces being circular, he divided them according to the size of his design, so as to lose little or none; and should there be a flaw, or decayed spot, he contrived to bring that into a part of the drawing that was to be left white, and so cut out. He said, blocks, in durability of lines, incalculably outlasted engravings on copper, which wear very much in cleaning, for every impression, with chalk; but editions of wood-blocks must be very remote indeed before they show any feebleness. In early life he had cut a vignette for the Newcastle newspaper; and this year it had been calculated that more than *nine hundred thousand* impressions had been worked off; yet is the block still in use, and not perceptibly impaired. A faint impression therefore, is by no means to be attributed to the wearing out of the block but to the feebler pull of the pressman; and this may be proved by observing that when any one is remarkably black or light, all that are pulled off that same *form*, partake of a similar degree of strength or faintness. I have now in my library a copy, though, I am sorry to say, spoiled with my having written the margins all over with ornithological observations, of the very first edition of the *Birds*, in which many of the impressions are far feebler than the corresponding ones in the very last edition; and in the same edition the same blocks vary in all shades. Let not collectors, therefore, yet despair, who have missed becoming purchasers in the rapid, and now, since the good man's death, more rapid, sale of his valuable works.

At his table we had the pleasure of dining with several gentlemen of distinguished literary character, whom he had most politely invited on our account. After dinner, having largely enjoyed the full flow of his friends' conversation, and launched on its tide many a full and sunny sail of his own, our good host for a moment fell asleep in his elbow-chair; during which interval a gentleman narrated the following little anecdote, which, I find, my venerable friend's modesty has omitted in his own Memoir. The Duke of Northumberland, when first he called to see Mr. Bewick's workshops, was not personally known to my friend; yet he showed him his birds, blocks, and drawings, as he did to all, with the greatest liberality and cheerfulness; but, on discovering the high rank of his visitor, exclaimed, "I beg pardon, My Lord, I did not know Your Grace, and was unaware I had the honour of talking to so great a man." To which the duke good-humouredly replied, "You are a much greater man than am I, Mr. Bewick." To which my friend, with his ready wit that never failed or offended, resumed, "No, My Lord; but were *I* Duke of Northumberland perhaps I could be."

Having a considerable part of our tour yet to make in Yorkshire, and my friend Bowman, on account of his bank, being somewhat under the control of time, we tore ourselves from this delightful society on a much earlier day than accorded with our inclinations. On my return, however, to my peaceful and pleasant groves here at Westfelton, I renewed my ornithological and other communications to my aged and honoured friend, and sent him curious birds of the neighbourhood and our Welsh border, if not with more attention, with redoubled ardour: for I had borne away in my satchel many valuable proofs of his art and his attachment, and in my mind many impressions that mightily enhanced their value, that flung around my reflections a brighter halo of happiness, embodying into dreamy shapes the airy nothingness of my sylvan hamadryads, and giving them, in the Elysium of my bosom, a something more than merely poetical habitation. Our correspondence consequently became far more full and frequent; from his part whereof it was my wish to have given some extracts, but that during this my hasty composition, my full memory is continually oscillating between the desire of dilation, and the propriety of compression.

In 1818 he published his first edition of the *Fables of Æsop and others*. Of the utility and sweetness of fables the universal world in all ages has been sensible, as his admirable preface and introduction amply illustrate. My business is with his "designs on wood," as he modestly calls some of the most masterly productions of invention, drawing, and execution the progress of the fine arts has ever displayed. Herein his figures and animals have their usual life, motion, spirit, and expression; their passions are visible, and their very speech audible. Yet excellent as are the actors, the scenery is nothing less so. Landscapes, trees, buildings, towered cities, still life, interior walls and utensils, streets and towns, with all the intricacy and accuracy of perspective, are profusely depicted, with interminable variety, in the back-ground of these minute engravings; and, though cut on wood, their excellence absolutely becomes enhanced by the application of a moderate lens. I could dilate with rapture on each, nay, on the snatches of sunny views that are shown through the open doors and windows, did I not feel it an incumbent duty to drop a word or two on a most important department of this mighty master's imaginative and executive powers. A life of Bewick, without a word on his numberless and enrapturing VIGNETTES, would be the story of Aladdin without his Lamp. He is the very Autolycus of tail-pieces, which he flings out faster and more profusely, in ribands of all ramifications, than a fire-eater at a fair; ay, "he utters them as if he had eaten ballads, and all men's ears grew to his tunes." Do, reader, whatever be thy temperament, open any one of his books, and thou wilt touch a key accordant. Look at the boy-soldiers riding on gravestones, with rush-caps and swords of seg: the two hindermost blackguard ragamuffins, tattered and bare-legged; the next a great awkward booby, son of some scoundrel attorney; and the captain, smallest of all, well clothed, and in good shoes and stockings, he is the squire's son, whose hall is seen behind; a pretty emblem of incipient aristocracy. Twenty years hence that little fellow will blow his twopenny trumpet among the Tories, and cry "the church in danger;" the next rascal will bamboozle him out of his money, and the two villains behind poach in his covers. If thou lovest a good ghost story, as I do marvellously, look at the terrified thief, mistaking the stumps and grey *ranpikes*, in the gloomy moonshine, for devils and horned goblins, with white wicker ribs and lanky skeleton arms. Wouldst thou know the cause of his terror? look into the back-ground: he has just passed a gallows. I have heard a great painter say that Hogarth might feel proud of this piece. — Ha! that is the murine phaeton, drawn by four cocked-tailed mice: Sir Whisker and Lady Mousellina with her parasol, of MOUSE-COTTAGE; their mouse footman, and the mouse arms emblazoned with mouse supporters on the panel, in all the boast of mouse heraldry: they are going to make a call on Lord Frittertime and Madam Twaddle. — See how that heartless and coarse-minded tanner grins a brutal laugh at the poor dog to whose tail the naughty boys have tied a tinned kettle: you may hear that it has just had a bouncing bang. — Those five methodists, listening to the call of their master, scarce occupy two inches; yet look at their faces, male and female — special grace and election !!! — and were it not for the horns and claws of the preacher, by his clerical attitude you might take him for a very parson. — Cast your eye on the gipsies and their bear; are not thief and harlot marked in their physiognomies? That first fellow's coat is too big for him, a world too wide; he has stolen it. — Look with luxury on the light and buoyant cutter, dancing on the dashing waves, in pursuit of the heavy smuggler, straining and creaking in the breeze, laboriously making off in the misty moonlight. — The lame man has left his crutch behind, having mounted the back of the blind, who has let go his dog: hasty attachments imagine friendship eternal. — That poor spaniel bitch has been howling all night, and has just broken her string, and found her drowned puppies: look at her sudden pause and sorrow ! — Ay, friend Bewick, many a lobster handles a pencil, and piddles on a set palette. — Do stop your ears at opening to the two fiddlers, with their jangling, discordant scrapings. — I truly pity their hearts who hear not the howling of that scalded dog who has overturned the pot; and the cackling of that hen who has just been laying. — Oh ! what a feast of diverting and instructive amusement for an idle summer's day, or a long winter's night ! What a rich and exhaustless succession of grotesque figures, funny groups, comical scenes, pithy inscriptions, delicious landscapes, village farmsteads, rocky caverns, tufts of fern, river glens and cascades, quiet pools and sedgy knolls, lovely trees and woody dells, towns and towers, ivied ruins, sea-side views, with sermons in every stone; dreary snows, stormy waves, rolling ships, and screaming sea-fowl; quiet fountains, forest glades, and woodland solitudes; fairy haunts,

——" Right seldom seen,
Lovely, lonesome, cool, and green."

The commonest capacity might read a history in every one of these rich and romantic *tale*-pieces, and a mind of wit and fancy may open to each, and feel arise from it the simultaneous power of delivering a bright or blooming narrative of melancholy or mirth. Thus the copious, capacious, and bountiful mind of Bewick, not merely content to fling around each bird and figure the most beautiful and appropriate scenery, but revelling in exuberance of imagination, drops, on almost every leaf, some gem of genius, "to point a moral or adorn a tale." These fling on our sunny memories gleams and glances of nature, that impulsively shed on the feelings a delicate mental and bosom emotion, indicating the presence and influence (and probably constituting much) of that fine but indefinable power called genius; whence emanating on congenial dispositions, like rich tones on accordant vibrations, awaken, in successive combination, all the melodious harmonies of the heart.

"Now the storm roars around me; now the bloom
Of earth, her greenery, and her pleasantries,
Are shrunk once more into their wint'ry tomb,
And the fire sparkles, and the lamp supplies
Its evening gleam — where is my paradise?
With White my spirit finds beloved employ,
A sage who cared not how the world would prize
His sylvan strolls, so naught might him annoy,
Roaming through Selborne's woods, in loneliness and joy.

With Bewick's comic burin next enchanted,
I pass, through groups grotesque, to lonely places,
And find how there his curious spirit panted
For Nature, ev'n in her minutest traces;
Clasping unto our sympathy's embraces
All creatures of her solitary reign;
Dwellers of sedgy pools, heaths, parks, and chaces,
The mountain cliff, and desolated fane,
And all the drear wild charm of northern isle and main."

In his *Memoir* he has detailed his sentiments on the purity of representation and free government, in a manner worthy the pen of a Bacon or Locke; a history of the art of wood-engraving; and observations on the progress of his own mind. Though some of his less important opinions may, to persons who knew him not, appear but as whimsical fancies, they are the levities of a great and benevolent soul, that, like the brilliant air-bubbles of a deep clear fountain, rise playfully to the surface, without sullying its purity. The style is plain and simple, but sinewy and nervous, marking his character as much as his manners and even his dress, and is strongly tinctured, as was his conversation, with broad Northumbrian and Scottish provincialisms, which, particularly when he read it aloud, strengthened the efficiency. The narrative is replete with anecdote, especially in the earlier parts, wittily recorded, and morally applied, and very much reminded me of that of the excellent Benjamin Franklin; indeed, to that good and great man, both in his religious and political sentiments, he appeared to bear a nearer resemblance than to any other. He was indefatigable and intrepid in his search after truth, dauntless and strenuous in the declaration of his matured sentiments, however opposite to received opinions, and fearless of any pains or penalties which the avowal of them might bring upon him from persecuting bigots. But the objects nearest to his heart were, to render the works of the Creator familiar to youth, by dressing them in their most alluring form, and thereby leading to the knowledge and admiration of their great Author, and to the principles of what he believed to be true religion, and what all believe to be those of sound morality. These were his constant aim and study, and to these he considered every thing else as subordinate. The success of his labours in this field he acknowledged, but was unconscious of it till made aware by the voluntary and unsought admiration of the world. When the admired preface to his *Fables* first appeared, letters from eminent men poured in upon him, particularly from the University of Cambridge, and one from the Bishop of Gloucester; numerous letters of thanks for the benefits he conferred on the rising generation, from men of talent and literary eminence, who were total strangers to him, except through his works, but who admired his modesty, his genius, his benevolence, his wit, his ingenuity, and his genuine religious principles.

JOHN F. M. DOVASTON.

Westfelton, near Shrewsbury,
Sept. 3. 1829.

(*To be continued.*)

ART. III. *Some Account of an Ascent and Barometrical Measurement of Wha-ra-rai, a Mountain in the Island of Owhyhee; extracted from the MS. Journal of Archibald Menzies, Esq. F.L.S.* Communicated by Mr. MENZIES.

(*Concluded from* Vol. I. p. 208.)

THE day being clear and serene when we arrived upon the top of the mountain, the extensive and interesting prospect that rushed on our sight on every side may more easily be conceived than described. The whole western side of Owhyhee lay underneath us, with its indented shore, bays, villages, plantations, and forests, depicted, as it were, like a map upon the vast sheet of extended ocean before us; whilst fleecy clouds, hovering at a distance, appeared to the eye like an immense extent of frozen country, with towering mountains, and deep valleys of the softest shades, every moment varying their aërial shapes and situations, and presenting the most beautiful prospects of picturesque scenery, over which the eye could eagerly wander without weariness, and continue imparting to the mind new-felt pleasures. In the afternoon, these clouds drew in towards the island, and bedewed it with refreshing showers.

On the other side, the inland country presented extensive valleys, and two immense mountains capped with perpetual snow; of these, Mowna-kaah is the most rugged and peaked; it bore E. N. E. of us. Whilst Mowna-roa appeared like an immense flat cone, and bore S. E. by E., seemingly at no very great distance; but, perhaps, the rarefaction of the air at this height made it appear to us much nearer than it really was.

We kindled a fire; and, after partaking of some refreshment, the natives took us to see a small crater of a volcano on the north side of the peak, a little below the summit. It formed a rugged hole of 7 or 8 yards in diameter, and apparently of immense depth, as a stone thrown into it was heard striking against the sides, in its descent, for some time after; and it did not appear to have been long extinguished, as the ashes and cinders round the mouth of it were quite fresh.

We found that the natives regard volcanoes as the habitations of evil spirits, who, when any-wise enraged, throw up fire and hot stones; and, to appease their wrath, they conceive it necessary to make some offering to these demons, by throwing cloth, hogs, and vegetables into the volcano; and, on particular occasions, as we understood, they even sacrifice their criminals, by disposing of them in the same manner. In this visit to the crater, we observed that none of the natives came empty-handed, but brought pieces of cloth, *taro*, yams, or plantains, which they threw down at the mouth of the crater, among the rotten remains of former offerings; and they earnestly requested us to leave something too, which we did, such as nails, beads, and pieces of tape, that greatly pleased them, and they seemed to think such offerings would be highly acceptable to these demons.

We remained this and the following day on the top of the mountain, traversing the peak in various directions, every one pursuing his own amusement, and making the summit our place of rendezvous, where we met at meal-times, and reposed at night in small caverns, which the natives soon converted into neat and comfortable habitations, by strewing the bottom of them with long grass, overlaid with mats, and by thatching the exposed parts with plantain-leaves, which had been brought up from the lower parts of the woods for that purpose. So, what with the pure air, the temperate climate, and novelty of our situation, every one allowed that two days more pleasantly spent they seldom experienced.

In my rambles I collected every plant I met with, either in flower, fruit, or seed, which, I was sorry to find, did not amount to a very numerous catalogue, on account of the dormant state of vegetation in these upper regions, at this season of the year; but, from the variety I saw of small plants and low shrubs, in appearance quite new to me, I consider this peak as a very interesting tract for a botanist to explore in the summer months, when, I have no doubt, every cleft and rugged steep will be adorned with flowers innumerable.

Amongst the plants in flower at this time was the *Sophòra* tetráptera, which did not exceed the size of a small shrub, though, lower down the mountain, and particularly on some of the other islands, it grows to a pretty large tree, from the wood of which, the natives informed me, they make their spears; and, when finely polished, it almost equals in hardness and density of grain the most beautiful mahogany. The Dodon*æ̀a* viscòsa grew here very plentifully, and seemed to thrive equally as well as down at the sea-side, where it is not uncommon. I also found here a small shrubby geranium, a new species, and, I believe, the only one of that genus which has hitherto been found in any of the islands of the Pacific Ocean.

At both noons I observed the barometer on the top of the mountain; the first day it stood at 22 in. 40 pts., and the second day at 22 in. 44 pts. So, if we take the mean of these two observations, 22 in. 42 pts., from 30 in. 16 pts., the mean of two corresponding observations on board the ship in Karakakooa Bay, the remainder, 7 in. 74 pts., will show the amount of fall of the mercury in our ascent up the mountain, which gives its height 8457 ft. above the level of the sea.

The thermometer, observed at the same time, was 65° on the first, and 64° on the second, day; and, at seven, on both mornings, it was at 45°: but the first evening, at sunset, it was as low as 38°; and the second evening it stood at 41°; which showed, in these instances, that the evenings were colder than the mornings, just the very reverse of what we experienced in the woody region of the mountain.

We set out from the top of the mountain on the morning of the 21st, accompanied by upwards of sixty of the natives, and descended by a very indifferent route, on the south-east side, into the valley between it and Mowna-roa, as it was our intention to return to Karakakooa by a different direction, in order to explore the country, and vary our scene of observations. This inland side of the mountain was but thinly wooded, with scattered bushes here and there, and much more rugged and steep than the other side; for, in some parts of our descent, we travelled over fields of loose and picked lava, so dreary and rugged, that we conceived ourselves very fortunate, with all our care and caution, in getting over them without any accident or broken bones. Our shoes were so torn and cut to pieces by the lava, that we could scarcely drag them along; and the natives were severely crippled, notwithstanding they had matted for themselves a kind of sandals to defend their feet, and some of us were obliged to have recourse to the same expedient. Our cocoa-nuts and water being expended before we left the top of the mountain, we suffered greatly from want of these articles in our descent, in the sultry heat of mid-day, till we reached near the bottom of the valley, when our guides took us a good deal out of the way, to a spring, where we quenched our thirst and filled our calibashes; and, about four in the afternoon, we arrived in the valley, much fatigued, when we were conducted by the chief to a deep cavern, into which we descended, and found very snug quarters, in small cells, for the night. In the centre there happened to be a small *morai*, or tabooed spot, round which a variety of fruits and vegetables, which had been offered to the Eatooa, lay in a decayed and rotten state, and the natives now added a fresh supply.

On looking up the side of Mowna-roa from this station, the lower edge of the snow upon it did not appear to be far off; and, as the ascent seemed to be smooth and easy, we proposed to make an attempt to reach it. But the chief and the rest of the natives were very much against it, declaring that, if we should chance to succeed in overcoming the difficulties, the cold on the mountain was so intense as to kill us; as we, however, perceived no apparent obstruction in the ascent, we were resolved to try it; and, for this purpose, we examined our stock of provisions, which we found rather low, but, by reducing the number of our party, and adopting a frugal management, there was a sufficient quantity to serve a moderate party for two days, in which time, we conceived, our object might be accomplished. Having, therefore, chosen about twenty of the party, with the chief to accompany us, the rest were sent down to the plantations, with orders for some of them to return with a supply of provisions.

Our reduced party having loaded themselves with water and the remainder of our provisions, set out with us on the morning of the twenty-second very reluctantly; and after pursuing a path to the eastward for about two or three miles, we struck off to the right and began our ascent, as we still perceived no apparent difficulty before us: but we soon found our mistake, and the representations of the natives verified; for as we endeavoured to advance, we found the side of the mountain here and there covered with low scrubby wood and ferns, so very dense in many places, that we were obliged to make a path step by step for the whole party, which rendered our progress slow and fatiguing; and, in some places, the ground was covered over with a fragile crust of lava, which broke under our feet, and we now and then stumbled into chinks and crevices, which were really very dangerous; whilst, in other places, it sounded so hollow underneath us, that we were every moment apprehensive of its breaking in, and swallowing us up, in some hideous fissure or cavern. We, however, persevered under these discouraging circumstances till about three in the afternoon, when perceiving that we had scarcely diminished our apparent distance from the snow, and being quite harassed and exhausted with fatigue, without any prospect of soon overcoming our difficulties, it was agreed upon to relinquish our pursuit, to the no small satisfaction of the natives; and, after taking some refreshment, we returned again to the cavern, where we arrived in the dusk of the evening. The night was very stormy, with high winds and cold showers of sleet; and, next morning, we observed that Mowna-roa was covered much lower down with fresh snow, so that, had we succeeded in our attempt to ascend it, we should probably have suffered severely from the inclemency of the weather, exposed to these rigorous blasts, without any shelter, on the bleak side of this huge mountain.

The centre of the island near which we were now stationed, between the three great mountains, together with the extensive valleys which separate them, forms a flat dreary tract of inland country of considerable extent, and nearly the same elevation, and which is apparently incapable of any kind of cultivation; the trees and brushwood, with which it is here and there thinly covered, indicate the poverty of the soil by their stinted and scrubby appearance; but as the volcanic dregs with which it has been strewed from the adjacent mountains, are continually mouldering away by the busy and constant operations of time, this tract may be said to be in a state of slow and progressive improvement, and future ages will probably find it clothed with a rich carpet of verdure.

To give some idea of the elevation and temperature of this inland region, I observed the barometer on the morning of the 23d at the mouth of our cavern, where the mercury stood at 25 in. 18 pts., and the thermometer was at the same time at 57°. I had also observed both, at the same place, on the evening of our first arrival, when the former stood at 25 in. 15 pts., and the latter at 56°; so if we take the mean of these two observations with the barometer, the result will give our height at this station 5085 feet above the level of the sea.

After making a scanty breakfast out of the last portion of our provisions, we turned our faces homeward by a path which forms a communication, by this valley, from the eastern extremity of the island; and the great cavern which we had just quitted, may be considered as one of the inns upon this road, for the shelter and accommodation of travellers. The only inhabitants we saw in this desert valley were some wild geese, of a size somewhat between our common goose and duck, they were very handsome, and had some distant resemblance, in colour, to the Canadian goose, but a distinct species; we also saw some crows, which, together with the preceding, we believe, are peculiar to those islands, and commonly inhabit the upper regions.

After travelling about three or four miles, we entered the woods at the mouth of the valley, and began our descent in a winding direction: but as the girdle of forest is not here so broad as on the sides of the mountains, and the paths being tolerably clear, we soon got through it, as the cravings of both hunger and thirst made us now anxious to get down to the plantations; for the region above the forest is but scantily supplied with water, and many of the springs, where the natives expected to find a supply, were at this time dried up, which often occasioned disappointment. About the middle of the wood, however, we met with our trusty and faithful adherents, who had been sent down the day before to the plantations, and were now making all the haste they could to our relief, with heavy loads of provisions. This supply came very seasonably, and we instantly sat down to lighten their burdens by partaking of a hearty refreshment; after which we continued our descent, though now with less hurry; and, when we came out of the wood, we found the lower skirts of it, as in other places, adorned with rich plantations of plantains and bananas. Thence we pursued our course in a slanting direction to the southward, till we came to a village amongst the upper plantations, where we took up our residence for the night, about nine or ten miles to the north-east of Karakakooa bay, and where we were surrounded by most exuberant fields of the esculent vegetables of these islands, which, for industry of cultivation and agricultural arrangements, could scarcely be exceeded in any country, and it was pleasant to observe such labour here rewarded by productive crops.

We found we had taken up our quarters in a plantation belonging to our friend Teamotoo; and as that chief had kindly requested, we now made the man he sent with us our purveyor, who readily supplied us with every thing we wanted.

At eight next morning the thermometer was 56°, and the barometer stood at 28 in., which will give our height at this station 1892 feet above the level of the sea. After breakfast, we were entertained with the performance of a young girl who danced in a small area before our door. She was assisted by her father, who beat time on a small drum, and joined her now and then in singing, in reciting, and sometimes in a brisk dialogue; whilst she (encumbered as she was with a grotesque dress) traversed the area with such measured paces and fascinating movements, with such graceful attitudes, such agility and animation of acting, so punctually timed, and so varied by slow and quick transitions, as would have done credit to the most expert attitudinarian, and far exceeded any thing of the kind we had before seen at these islands.

We were given to understand that this actress and her father belonged to a party who strolled about the country from village to village, and gained their livelihood by entertaining the inhabitants with their performances; and if we might judge of her merit from the specimen we had just seen of her acting, we think her possessed of natural powers to entertain, even in a more refined society.

After presenting this young girl with suitable presents of beads, looking-glasses, scissors, tape, and other articles, we descended through the plantations, collecting whatever flowers and seeds their interesting banks produced, that we had not before met with in our journey. Our adherents who had been distinguished on the top of Wha-ra-rai, now wore their little badges round their arms, and were the envied objects of every group of the natives we passed. In the evening, we arrived at a small village on the sea-side, a few miles to the northward of Karakakooa, where we stopped for the night, and where I observed the barometer at sun-set close to high-water mark, when the mercury stood at 30 in. 12 pts., and the thermometer was at 74°. This height of the mercury in the barometer coincides so nearly with what it was when we began our ascent, that the observations made with it may be considered as sufficiently accurate to give a general idea of our height at the different stations, especially as no material changes of weather happened during our excursion that were likely to affect it.

Next morning, we travelled over a dreary tract of rugged lava and very uneven ground along shore, till we came to the village of Kow-rowa, where we hired canoes for the whole party, and arrived on board the Discovery about noon, when all our attendants were rewarded for their services. The king was so pleased with the very favourable report which we were able to make of their conduct, that he himself fixed upon the quantity of articles to be given to them, as the price of their labour and good behaviour, and with his own hand laid out a small piece of iron, fashioned like a chisel, a parcel of small nails, a bunch of beads, two knives, a file, a pair of scissors, a looking-glass, and a few yards of tape, which were handed to each of them; but I observed that all of them gave up the last article to the king, and were so well satisfied with what they got, that they all expressed a wish of setting out with us again the next day. The chief, Harou, was presented with the same articles, but in greater proportions, together with the addition of an axe, and as much red cloth as would make him a cloak; the last, however, we understood he was not suffered long to keep, but was obliged to deliver it up to the king.

Art. IV. *Contributions towards the Natural History of the Dodo* (*Dìdus inéptus* Lin.), (*fig.* 107.) *a Bird which appears to have become extinct towards the End of the Seventeenth or Beginning of the Eighteenth Century.* By John V. Thompson, Esq. F.L.S.

Some philosophers are not disposed to admit of the destruction of any of the species of animals of contemporaneous creation with man. If the remains of animals found embedded and lapidified in the solid substance of rocks, in every explored region of the globe, differ *in toto* from the existing races, those, however, which have become extinct during the latest revolutions of our planet, resemble so closely what are now spread over its surface, as to be considered in the relation of species and varieties. Hence we cannot but admit that the successive destruction and utter annihilation of certain animals form a part of the scheme of creative wisdom. What the conditions may have been, under which any particular species of these lost animals perished, must be matter of mere conjecture, but, with regard to the subject of the present paper (the dodo), those conditions are self-evident. Imagine a bird of the gallinaceous (*gallus*, cock, or pheasant) tribe, considerably larger than a turkey, and consequently adapted for food, totally incapable of flying, and so unwieldy as to be easily run down, and it must be quite obvious that such a bird could not long continue to exist in any country to which mankind extended their dominion. This will account for its being found only in those islands of the Indian Ocean which, on their first discovery by Europeans, were uninhabited, or difficult of access to the nearest people. The group which is situated to the eastward of Madagascar, consisting of Bourbon, Mauritius, and Rodrigue, were almost the only islands of this description met with by the early circumnavigators of the Cape; and it is there that we find the last traces of this very remarkable bird, which disappeared, of course, from Bourbon and the Mauritius *first*, on account of their being more visited and finally colonised by the French; and lastly from Rodrigue, an island extremely difficult of access, and without any bay or safe anchor-

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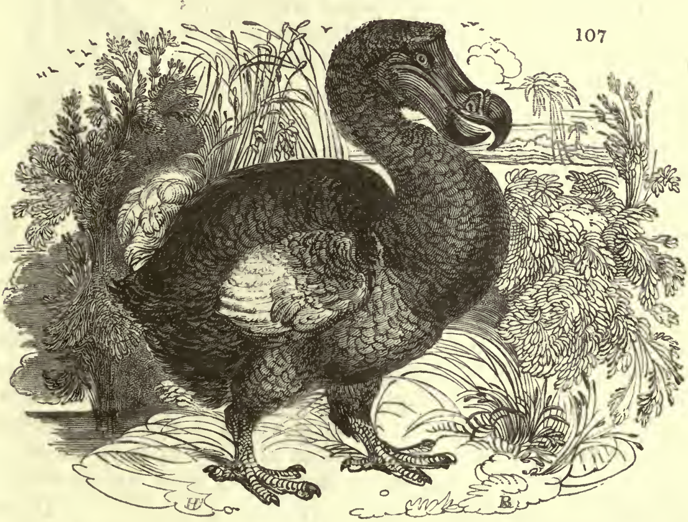

age for shipping. Having resided some years amongst those islands, inclusive of Madagascar, and being curious to find whether any testimony could be obtained on the spot, as to the existence of the dodo in any of the islands of this or the neighbouring archipelagoes, I may venture to say, that no traces of any kind could be found, no more than of the truth of the beautiful tale of *Paul and Virginia*, although a very general belief prevailed as to both the one and the other. I there discovered, however, a copy of the scarce and curious voyage of Leguat, who, and his companions, appear to have been the first residents of Rodrigue; and, although some allowances appear to be necessary on account of the period in which he wrote, for descriptions and drawings apparently from memory, and a somewhat traveller-like stretch of imagination to enhance the value of his book, yet his evidence must be deemed conclusive, strengthened as it is by the collateral testimony of other voyagers, and by all the facts and statements brought forward by Mr. Duncan, in a paper upon this subject, published in the *Zoological Journal* for January, 1828, p. 554., from all which it appears, that a *bird* of corresponding size and character did actually exist, of which the only remains are a *bill* and *foot* in the Ashmolean Museum at Oxford, and a *foot* (*fig.* 108.) in the British Museum, all of which I had the satisfaction of examining on my return from the Mauritius in 1816.

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Mr. Duncan, in the paper alluded to, proves that a specimen of this bird existed in Tradescant's museum at Lambeth (*Mus. Tradescant.*, No. 4., *Dodar; Ashmolean Catalogue*, 1684, No. 29., *Gállus gallinàceus peregrìnus Cùsii*), where it was seen by Ray and Willoughby. This museum being subsequently removed to Oxford by Dr. Ashmole, we find the specimen there in 1700, by the testimony of Hyde, in his *Religionis Veterum Persarum, &c. Hist.*; and in a catalogue of the museum, drawn up since 1755, it is stated that "the Numbers from 5. to 46. (No. 29. being that of the dodo) being decayed, were ordered to be destroyed at a meeting of the visitors, Jan. 8. 1755. It is, therefore, almost certain that the *bill* and *foot* still to be seen in that depository, were those of the above specimen. To verify the painting which is also to be seen in the British Museum, Mr. Duncan appears to have taken all the pains possible, and states it to have been drawn from a living bird, sent from the Mauritius to Holland, the Dutch being the first colonists of that island; to dissipate all doubts as to its accuracy, however, it should be collated with a description taken from the Ashmolean specimen, should such be found to exist.

The following testimonies, set down in chronological order, may be added to those brought forward by Mr. Duncan, viz.;

1497. — Vasco de Gama, after doubling the Cape of Good Hope, found a bay at 60 leagues, Angra de San Blaz, near to an *island*, where they saw a number of birds which the Portuguese call Solitarios, of the form of geese, but with wings similar to those of a bat.

1499. — On their return they touched again at St. Blaz, where they took a number of solitarios.

1614. — In the voyage of Castleton, he touched at Bourbon (Mascarenhas of the Portuguese), at that time "still uninhabited, although occasionally visited by the early voyagers. Amongst the birds, he particularises a kind of bird of the size of a goose, very fat, with short wings, which do not permit them to fly. They have since (he says) been called the giant, and the Isle of France (Mauritius) also produces plenty of them. It is *white*, and naturally so tame as to allow itself to be taken by the hand; or, at least, they were so little afraid at the sight of the sailors, it was easy for them to kill great numbers with sticks and stones."

1691. — We come now to Leguat, who, with seven others, was left upon Rodrigue, with a view to colonisation, May 1691; and we may judge of the impression which this singular bird must have made upon the mind of the narrator, when we perceive that he has introduced figures of it into his frontispiece, his general chart of the island, and his plan of their little colony; in the latter twelve, and in the former sixteen, individuals being distributed over their respective surfaces.

The Island of Rodrigue, or Diego Ruys, although seen by several of the earlier voyagers, after the discovery of the route to India by the Cape, does not appear to have been *visited* anterior to the voyage of Leguat, from its unapproachable appearance, and the apparent continuity of the extensive madreporetic reef which every where surrounds it, and upon which the sea continually breaks, at a very considerable distance from the shore; the same causes still operate in repelling the tide of colonisation, as, at the time of our late conquest of the group to which it belongs, a single French family constituted the whole of its population. Leguat and his companions, then, may be presumed to have seen it in its virgin state; a circumstance which makes his narration doubly interesting, and shows not only the abundance of its animal productions, but the paradisiacal peace and amity which appeared to reign amongst them, and the little dread they seemed to possess at the presence of their destined destroyer. Of the dodo, the subject of this paper, he says: —

"Of all the birds which inhabit this island, the most remarkable is that which has been called Solitaire (the solitary), because they are rarely seen in flocks, although there is abundance of them.

"The *males* have generally a greyish or brown plumage, the feet of the turkey-cock, as also the beak, but a little more hooked. They have hardly any tail, and their posterior, covered with feathers, is rounded like the croup of a horse. They stand higher than the turkey-cock, and have a straight neck, a little longer in proportion than it is in that bird when it raises its head. The eye is black and lively, and the head without any crest or tuft. They do not fly, their wings being too short to support the weight of their bodies; they only use them in beating their sides, and in whirling round; when they wish to call one another, they make, with rapidity, twenty or thirty rounds in the same direction, during the space of four or five minutes; the movement of their wings then makes a noise which approaches exceedingly that of a kestrel (Crécerelle), and which is heard at more than 200 paces distant. The bone of the false pinion is enlarged at its extremity, and forms, under the feathers, a little round mass like a musket-bullet; this and their beak form the principal defence of this bird. It is extremely difficult to catch them in the woods; but as a man runs swifter than they, in the more open spots it is not very difficult to take them; sometimes they may even be approached very easily. From the month of March until September, they are extremely fat, and of most excellent flavour, especially when young. The males may be found up to the weight of 45 lb.; Herbert even says 50 lb.

"The *female* is of admirable beauty. Some are of a blond, others of a brown, colour; I mean by blond the colour of flaxen hair. They have a kind of band, like the bandeau of widows, above the beak, which is of a tan colour. One feather does not pass another over all their body, because they take great care to adjust and polish them with their beak. The feathers which accompany the thighs are rounded into a shell-like form, and, as they are very dense at this place, produce a very agreeable effect. They have two elevations over the crop, of a somewhat whiter plumage than the rest, and which resemble wonderfully the fine breast of a woman. They walk with so much stateliness and grace combined, that it is impossible not to admire and love them; so much so, that their appearance has often saved their life.

"Although these birds approach, at times, very familiarly when they are not chased, they are incapable of being tamed; as soon as caught, they drop tears, without crying, and refuse obstinately all kind of nourishment, until at last they die. There is always found in their gizzard (as well as in that of the males) a brown stone, the size of a hen's egg; it is slightly tuberculated (raboteuse), flat on one side, and rounded on the other, very heavy and very hard. We imagined that this stone was born with them, because, however young they might be, they always had it, and never more than one; and besides this circumstance, the canal which passes from the crop to the gizzard, is by one half too small to give passage to such a mass. We used them, in preference to any other stone, to sharpen our knives.

"When these birds set about building their nests, they choose a clear spot, and raise it a foot and a half off the ground, upon a heap of leaves of the palm tree, which they collect together for the purpose. They only lay one egg, which is very much larger than that of a goose. The male and female sit by turns, and it does not hatch until after a period of seven weeks. During the whole period of incubation, or that they are rearing their young one, which is not capable of providing for itself until after several months, they will not suffer any bird of their own kind to approach within 200 paces of their nest; and what is very singular is, that the male never chases away the females; only, when he perceives one, he makes, in whirling, his ordinary noise, to call his companion, which immediately comes and gives chase to the stranger, and which she does not quit until driven without their limits. The female does the same, and allows the males to be driven off by her mate. This is a circumstance that we so often witnessed, that I speak of it with certainty. These combats last sometimes for a long time, because the stranger only turns off, without going in a straight line from the nest; nevertheless, the others never quit until they have chased them away." *

We have, in this last relation of Leguat, who resided in the midst of them for a considerable period, a detailed, although rude, description, and a natural history of the dodo, probably the only one that was ever penned under such favourable circumstances. No doubt this first colony, in so small an island, considerably reduced the number of the dodo; but when they finally disappeared does not appear to have been any where recorded. From the nature and habits of the bird, it is clear that the duration of the species was wholly incompatible with the dominion of man: had it been capable of domestication, or had it possessed the swiftness of foot of the ostrich, or the aquatic habits of the penguin, to compensate its want of the power of flying, they might still have shared some of the possessions originally assigned to the race; or even like the turkey-cock and goose, have administered to the wants of mankind, in every temperate region of the globe; under existing circumstances, however, they appear to have been what may be truly termed a paradisiacal bird, and predestined to disappear at their proper time. As they are the only vertebrated animals which we can make certain of having lost since the last creation, they furnish an interesting subject of meditation to

* Voyage de Francois Leguat, Gentilhomme, Bressan, 1708.

the philosophic naturalist. If we seek to find out what link in the chain of nature has been broken by the loss of this species, what others have lost their check, and what others necessarily followed the loss of that animal which alone contributed to their support, I think we may conclude that, the first being foreseen by the Omniscient Creator, at least no injury will be sustained by the rest of the creation; that man, its destroyer, was probably intended to supplant it, as a check; and that the only other animals which its destruction drew with it, were the intestinal worms and *P*edículi peculiar to the species. *

W. Thompson, F.L.S.

Cork, August 10. 1828.

Art. V. *Some Account of the Wheat Fly.* By Mr. Patrick Shirreff, Farmer, Mungoswells, East Lothian.

Sir,

Although whatever affects agriculture should be interesting to all, yet, when submitting to the notice of the public, through the medium of the Magazine of Natural History, a few observations on the habits of an insect (Cecidomy̆ia *t*rítici) which has been the cause of extensive injury to the wheat crops in this neighbourhood for years past, it becomes me to apologise for entering upon a science with which I am so little conversant, and to express a hope that anxiety to advance the interests of my profession, which induces me to address you, will in some measure palliate the triteness of my remarks.

Wheat flies were first observed here this season, on the evening of the 21st of June; and, from the vast number then seen, it is probable a few of them may have been in existence some days previous. Their eggs were visible on the 23d, the larva on the 30th of that month, and the pupa on the 29th of July. The flies were observed depositing eggs on the 28th, and finally disappeared on the 30th of July: thus having existed throughout a period of 39 days.

The flies were observed to frequent the wheat plant, only including the thick-rooted couch-grass (*T*ríticum rèpens), a

* Buffon, Latham, and Gmelin have three species under the genus Dìdus, while we find it so difficult to establish the existence of *one;* the evidence upon which the first two of these species have been founded, viz. D. inéptus and D. solitàrius, is contained in the foregoing paper, and in that of Mr. Duncan, before quoted, while the third species, D. nazarènus, rests on that of Cauche, whose veracity has been doubted even by his contemporaries. Besides it is not likely that the three islands of the Mauritius group possessed each a distinct type of so singular and unique a bird

few days after their appearance. They generally reposed on the lower part of the culms during the day, and became active about sunset, except when the wind was high. I have, however, seen them flying about in cloudy mornings, till seven o'clock; and, upon one occasion, witnessed them depositing their eggs, in a shaded situation, at two in the afternoon. I could not determine when the flies retired to rest for the night, as they continued active while light enabled me to distinguish objects, and I doubt if they are in the habit of doing so. Their movements appear to be influenced by the rays of the sun, of which they seem impatient, being active when the sun is below or near to the horizon; they frequent the most umbrageous part of the crop, and shun that which is deficient in foliage.

The flies almost invariably preferred the ears emerging from the vagina to those farther advanced, for depositing eggs on; and as one side only of the ear is exposed when the plant is in this stage of growth, the other side generally remained uninjured. The fly deserted the fields as the crop advanced towards maturity, and were found longest on the spring-sown portion of the crop. It seemed to feed on the gum adhering to the newly emerged ears; and as there is a great diversity in the time of sowing wheat in this neighbourhood, and consequently of the ears escaping from the vagina, I attribute the unusual length of time it has existed this season, to the supply of food thus gradually furnished.

The fly deposits its eggs with much intensity, and may easily be taken when so employed. Upon one occasion, I numbered thirty-five flies on a single ear; and, after carrying it a distance of a quarter of a mile, six of them still continued to deposit eggs. At another time, I shook a fly, then laying, between the face and glass of my watch, where it deposited several eggs, although invariably interrupted by the revolution of the moment hand.

The ovidepositor of the fly is of considerable length, perhaps four times that of the body, and so minute, that it appears doubtful whether the eggs pass along the interior or exterior surface. The depositor can be extended and withdrawn at pleasure, and is seldom visible unless the fly is depositing eggs. The figure of the fly given by Mr. Kirby (Vol. I. fig. 91.), and which has been copied into different periodicals and newspapers, represents it flying, with the depositor extended, and is so unlike the fly when seen, that agriculturists are unable to recognise the fly from the figure.

The hue of the fly is orange; the wings transparent, and of changing colour according to the light in which they are viewed. On several occasions I observed a fly, differing from others in appearance, being of deeper orange, and thicker in the body. One of these flies was secured on the 27th of July; it proved on examination a male, which has not been described before, and the hues of its wings were remarkably brilliant.

The eggs of the fly are generally found in clusters, varying in number from two to ten, upon the inner chaff, in which the furrowed side of the grain is embedded, and are also occasionally to be seen in the interior parts of the flower and chaff. The eggs are deposited by means of a long slender tube (see fig. 91. Vol. I.), and fixed with a glutinous substance possessed by the fly. A thread of glutinous matter frequently connects a cluster of eggs with the style, where the larvæ seem to subsist on the pollen; in one instance, fifteen eggs were numbered on such a thread, several of which were suspended on the portion extending between the chaff and the style. The fly not only seems thus to provide a conveyance for the larvæ to the style, but also food for their support. The anthers are prevented from leaving the style, in consequence of being gummed down by the glutinous matter of the fly, and the pollen thereby detained for the use of the larvæ, which otherwise would, in part, be carried out of the glumes by the expansion of the filaments.* In the exertion of gumming down the anthers, many of the flies are entangled in the vascules of the corolla, and thus become a sacrifice to their maternal affection.

The larvæ are produced from the eggs in the course of eight or ten days: they are at first perfectly transparent, and assume a yellow colour in a few days afterwards. They travel not from one floret to another, and forty-seven have been numbered in one. Occasionally there are found in the same floret larvæ and a grain, which is generally shrivelled, as if deprived of nourishment; and although the pollen may furnish the larvæ with food in the first instance, they soon crowd around the lower part of the germen, and there, in all probability, subsist on the matter destined to have formed the grain.

The larvæ are preyed on by a host of enemies, the most numerous and active of which is an ichneumon fly (figured in the *London Linnean Transactions*). Upon presenting four larvæ to an ichneumon, it soon stung, or, according to Mr. Kirby, deposited an egg in each of their bodies, and stung one of them a second time. The maggot writhed in seeming agony, and straggled on to my thumb nail, where it was again stung three times by the same fly; and, in a second struggle,

* By the expansion of the filaments, the anthers of the wheat plant are forced out of the glumes, and known to farmers by the term bloom.

both fell to the ground. The earwig also destroys the larvæ, three of which I successively presented to a earwig, which devoured them immediately, and fell from the wheat ear before I could offer a farther supply.

The abode of the pupa during winter is a subject of doubt; and with a view of determining this point, a quantity of wheat ears was selected which had been ravaged by the larvæ last summer, and kept in a round stack through the winter. A portion of the ears was kept in the vinery of Mr. John Ferme, Haddington, and the remainder in Mungoswells dining-room; but in neither case was a fly obtained. On the 24th of June, when the flies were extremely numerous, and perhaps when the pupa was assuming the aurelia state, I examined, in the evening, a grass field which had carried a wheat crop, injured by the larvæ in the preceding year, and found the fly abounding; on a grass field adjoining, which had been pasture the preceding year, flies were not found; on a potato field, which had been wheat the previous year, many flies were seen; on one which had been oats, flies were not visible; and on naked fallow, which had been wheat the previous year, there were many flies; on that which had been oats, there were not flies: in short, wherever wheat had grown the preceding year, flies were found, and seldom met with in other situations. From such evidence it may be concluded, the pupæ remain generally in the soil during winter; but probably they occasionally pass the winter in wheat ears. Being unable to devise means for checking the devastations of the wheat fly, and conceiving those that have hitherto been recommended unavailing for the purpose, I am still not without hope that some of your correspondents may be able to supply the desideratum.

PATRICK SHIRREFF.

Mungoswells, East Lothian,
Aug. 1. 1829.

PART II.

REVIEWS.

Art. I. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

Britain.

Wilson's Illustrations of Zoology, &c. No. VII. (See Vol. I. p. 52.)—This number is inferior in execution and in interest to any of its predecessors. It contains, as usual, four plates, the first of which represents the Ternate kingfisher (Tanysíptera dèa *Vigors*), an inhabitant of the Island of Ternate, one of the Moluccas. The bird is drawn standing on a rock, ready and prepared for flight; but the feet are awkwardly and unnaturally placed, and the shorter feathers of the tail have a stiff undulating margin, very like an edging of blue ribbon fitted on by the cunning hand of a little sempstress. The second and third plates are dedicated to the male and female of the pheasant-tailed grouse (*T*étrao Urophasiànus), a fine species, " plentiful throughout the barren arid plains of the River Colombia, as well as in the interior of North California. These plates are beautifully engraved and coloured, but the artist has displayed little skill in the position of the birds, and in the management of light and shade. They are not living but dead birds, well stuffed, and set up. In the fourth plate we have delineated the Jasius butterfly (Nymphàlis Jàsius). The beauty of the insect is great, but, considered as a whole, the plate is unworthy of the work. There is much waste ground in it which might have been profitably occupied. Neither the caterpillar nor chrysalis are delineated; and it would surely have added much to the value, and even to the beauty, of the picture, to have given these, though they had been copies. Further, the grass on which one of the figures is placed, is altogether imaginary! This will never do: we ought to have had the plant on which the insect feeds in its first stage of existence, or the flower which, when a winged being, it loves to hover on, and sip the honied nectar. Such a picture might have been worthy of Mr. Wilson's pencil, and worthy of the elegant and pleasing description which accompanies it. We cannot but remark, likewise, that two of these plates are lithographic; and when the comparative expense of engraving on stone and copper is considered, perhaps the public have a right to complain when this difference is not compensated for, either by an additional plate, or by additional letter-press. Far from us is any wish to depreciate the work; for we, in fact, feel anxious for, and interested in, its success; but that success, we feel confident, will be best secured by making every successive number at least equal to the first specimens. — *N.*

Donovan, E., Esq. F.L.S. W.S. &c., Author of the *Natural History of British Birds*, and of various other approved Works on Natural History: The Natural History of the Nests and Eggs of British Birds. The Descriptions, which are calculated for the Naturalist as well as general Observer, are intended to comprehend every useful Trait of Information respecting the Nidification, Eggs, and Incubation of the numerous Species of the Feathered Tribes that inhabit the British Isles; and are, throughout, accompanied by a Series of elegantly coloured Plates, comprehending Figures of the Eggs of every Species, with their most singular Varieties, so far as they can be correctly ascertained. The whole exclusively executed from Nature, and disposed according to their respective Genera. London. In oblong 4to Nos. *3s. 6d.* Nos. I. to V. have appeared.

An attentive perusal of the above titlepage will enable every one, connected in any way with country life, to form an idea of the utility of the work to all "whose minds delight to participate in the most rational of its amusements, the study of creation." Such a work has long been much wanted, and we hope this veteran author and most worthy and ingenious man will receive such encouragement as may enable him to proceed with it at a more rapid rate than he has hitherto done. In the prospectus it is stated that the work may be completed in 24 numbers, but that it certainly shall not exceed 36. We recommend expedition both to the author and to intended purchasers, and we hope the latter will be numerous.

Bennett's Fishes of Ceylon. In 4to Nos., monthly (Vol. I. p. 162. and 273.) — No. III. of this splendid work has just appeared, containing five coloured engravings of the natural size of the specimens. The number of colours, the variety of their shades, and the singularity of the forms in which these colours are laid on by nature, are altogether extraordinary, and far exceed in singularity and beauty any thing to be met with in the European seas. The plates are admirably coloured. No book can be better adapted for the drawing-room of a wealthy amateur.

Curtis, John, F.L.S., Author of *British Entomology:* A Guide to an Arrangement of British Insects; being a Catalogue of all the named Species hitherto discovered in Great Britain and Ireland. London. Pamph. 8vo. 1*s.*

The objects of this useful little work are thus enumerated in the preface: — "First, It will enable entomologists to arrange their cabinets systematically. Secondly, They may mark off their own insects so as to know instantly whether they have a species or not, by which means their desiderata will be shown. Thirdly, It will form labels for cabinets. Fourthly, It will be a systematic index to *The British Entomology.* Fifthly, It will be a catalogue of the author's cabinet, those without a * being desiderata. The catalogue when completed, it is expected, will not contain more than seven or eight sheets; and, to facilitate their appearance, every sheet will be published as soon as it is printed."

Stephens, James Francis, F.L.S., Author of *Illustrations of British Entomology, A Systematic Catalogue of British Insects,* &c.: Nomenclature of British Insects; being a compendious List of such Insects as are contained in the Systematic Catalogue. 4*s.* 6*d.* boards; or printed on one side, for the purpose of labelling cabinets, 5*s.*

Hooker, Professor, and Dr. *Greville:* I′cones *F*ílicum, &c. — The seventh fasciculus of this work is just published. In these seven fasciculi are figured and described 141 species, of which 52 are new species. The following are the genera already illustrated, with the number of species: —

Acróstichum, 14 species; *A*diántum, 5 sp.; Aneímia, 1 sp.; Angiópteris, 1 sp.; Antròphyum, 2 sp.; Aspídium, 6 sp.; *A*splènium, 10 sp.; Botrýchium, 2 sp.; *Céterach,* 1 sp.; Cheilánthes, 10 sp.; Crýptográmma, 1 sp.; Cyathèa, 1 sp.; Danæ`*a,* 3 sp.; Davàll*ia,* 3 sp.; Gleichèn*ia,* 3 sp.; Grammìtis, 4 sp.; Gymnográmma, 6 sp.; *H*emionìtis, 1 sp.; Hymenophýllum, 14 sp.; Lindsæ`*a,* 3 sp.; Lycopòdium, 10 sp.; Lygòdium, 1 sp.; Meníscium, 1 sp.; Nephròdium, 2 sp.; Niphóbolus, 3 sp.; Ophioglóssum, 5 sp.; Parkèr*ia*, 1 sp.; Pleopéltis, 1 sp.; Polybótrya, 1 sp.; *P*olypòdium, 7 sp.; *P*tèris, 6 sp.; Schizæ'a, 4 sp.; Tænìtis, 2 sp.; Todæ'*a*, 1 sp.; *T*richómanes, 13 sp.; Woódsi*a*, 1 sp.

Conversations on Vegetable Physiology, comprehending the Elements of Botany, with their application to Agriculture. By the Author of *Conversations on Chemistry, Natural Philosophy*, &c. &c. London. 2 vols. small 8vo.

This is a delightful book, written by a lady of high talent, on one of the most fascinating subjects which can engage the female pen. We can hardly conceive any young person reading it without imbibing a taste for the study of plants. In the preface we are informed, that "the facts and opinions" are almost exclusively taken from the lectures of a distinguished professor, of Geneva [Decandolle], on whose mode of treating the subject the following just eulogium is passed in the introductory conversation: —

"*Mrs. B.* M. Decandolle, so far from confining himself to the classification of plants, examines the vegetable kingdom in its most comprehensive and philosophic point of view. In describing the structure, he investigates the habits and properties of plants; and shows, not only how wonderfully they have been formed to answer the purposes of their own multiplication and preservation, but how admirably they answer the higher purpose which nature has assigned them, of ministering to the welfare of a superior order of beings — the animal creation; and more especially to that of man. He turns his attention particularly to point out the means by which the science of botany can promote that with which it is most intimately and importantly connected — agriculture. He prepares the soil and sows the seed for the husbandman; he extracts the healing juices and the salutary poisons for the physician; he prepares materials for the weaver, colours for the dyer; in a word, as he proceeds, there is scarcely an art on which he does not confer some benefit, either by pointing out a new truth, or warning against an ancient error. Thus, throughout his course, his principal aim is to promote, by his vast stock of knowledge, the welfare of his fellow-creatures.

"*Emily.* Treated in this point of view, botany cannot, I think, fail to interest us.

"*Mrs. B.* It is rather the physiology of botany which I propose teaching you; and I shall merely give you such an insight into classification as is necessary to enable you to understand the structure and character of plants."

We wish we knew what to say, in order to introduce this book into every family, either living in the country or having any prospect of ever walking in fields or gardens. We particularly recommend it to mothers and governesses; and we think it might be usefully introduced as a girl's school-book in country schools, and as a prize-book.

Art. II. *Literary Notices.*

A Fossil Flora of Great Britain, or Figures and Descriptions of the Vegetable Remains found in a Fossil State in this Country, by John Lindley, F.R.S., Professor of Botany in the University of London, and Wm. Hutton, F.G.S. &c., is announced.

"The great end of the projected work will be to collect good materials for the use of science, rather than to indulge in speculations, which daily experience often shows to be delusive. At the same time, the important object of determining the analogies (when any exist) between the Flora of the ancient and the modern worlds, will be never lost sight of."

The work will be published in quarterly numbers, 8vo, 10 pls. 6*s*., by subscription. The Geological Society, and a number of our first geologists, have subscribed; and, we have no doubt, a work having such an important object in view will obtain the high patronage it merits.

PART III.

COLLECTANEA.

Art. I. *General Subject.*

The Circular System extended to Events and to the Creation of Organised Beings. — The Stoics (who were ignorant of the power which electricity possesses of giving life, as it were, to the four elements of matter) resolve air, earth, fire, and water into each other; and as magnetism is said to have the faculty of suspending gravitation, so they imagined (as nature delights in circles and ellipses) that there existed a quality which had the power of suspending the progress of events; and which, after a certain era, caused them to revert into their respective original channels: as water resolves into vapour by heat, and vapour resolves into water by cold. So that every accident and event was supposed to be bound perpetually to recur; the same number and description of plants, insects, birds, and animals again to ornament and adorn the earth; and the same beings, feeling their prior passions, again to exercise the same virtues and vices, and to be liable to the same calamities and disorders to which they were subject in their state of antecedence. (*Bucke's Beauties of Nature.*)

Dissection by Insects. — Mr. Carpenter having had many specimens of insects destroyed by the Térmes pulsatòrium, it occurred to him that their destructive powers might be turned to account, in making some delicate dissections for the microscope, and accordingly he placed a few of them in a pillbox, with the heads of three dead flies. On looking into the box some time after, to see how they had proceeded in their anatomical operations, he found they had completely cleared the interior of some of the eyes from all the blood-vessels, leaving the lenses in the corner most beautifully transparent; thus evidencing how useful they might be made in exceedingly fine dissections. (*Gill's Tech. Rep.*)

Bounties of Winter. — Sir, In my walks at this season of the year, when there has been little but snow and bare branches to look at, I have been frequently greeted by the fine glowing leaves of the oak, " tenacious of the stem," which show, amid the dark objects around them, like flames of fire; and this has put me upon thinking, why it is that the young trees retain their leaves so much longer than the older ones. I cannot answer this question to myself satisfactorily; perhaps some of your readers will answer it for me. That the old trees keep their lower leaves to the last, may very probably be owing to their being less exposed to the elements, but the younger are many of them golden to the very crown, though in situations not a whit more sheltered than their aged brethren. Talking of bare stems and branches, by the by, how very much people neglect the beauties of winter! What infinite grace there is in the leafless birch! what majesty in the oak! what rough, strong, mossy wealth in the walnut tree! It is very interesting to study their characters in this state, when you may discern the real disposition of a tree as clearly as if it had drunk wine; in which, they say, there is truth. I hope, however, it is not confined to wine; for, truly, I remain, Sir, &c. — *E. K. Feb.* 7. 1829.

Grew's Theory of Colours in Plants. — Grew, whose work on vegetable anatomy is well known, was a close observer of nature; and in noticing the

Melíssa officinàlis, or common balm, he says, it is observable that its green leaves, which yield a muscadine red to water, give a pure and perfect green to spirit of wine, which no other plant that he had tried would yield. He infused both the leaves and flowers of plants in various menstruums, for the purpose of discovering the true combination and attraction of the constituents of their colouring matter. He observed that oil received a green from plants by infusion, but not a perfect blue, neither would spirit of wine; but water received all colours except a perfect green.

The theory of Grew was built on the supposition, that there exists a set of vessels, or, as he terms them, lymphæducts, that abound in a compound of sulphur and acid, which is favourable to the production of blues, reds, and purples; whilst another set, which he terms air-vessels, contain a subalkaline salt, that mixes with the essential oil of the vegetable, and produces a green colour. The predominance of the lymphæducts, charged with their own compound in various proportions, or in various combinations with the air-vessels, gives, he argues, all the beautiful variety of colours exhibited in the vegetable creation.

The production of the different colours in vegetables by the predominance of acids or alkalies, we have found to be prettily shown by the following experiment: —

Make an infusion, by pouring hot water on the dried petals of red roses (*R*òsa centifòlia) usually kept by druggists; it will have but little colour till a small quantity of lìquor potássæ be added, when the infusion will become perfectly green; add sulphuric acid, and it will become red; and the colour may be alternately changed by the predominance of the acid or alkali. If the infusion be made of alcohol in lieu of water, it will at first be colourless, but the result will be the same. (*Maund's Botanic Garden*, vol. ii. part i. No. 146.)

Art. II. *Zoology.*

A South American Variety or Species of the Genus Hòmo. — If the education of the first animal, man, be a subject suited to a Magazine of Natural History, surely occasional notices of any new species or varieties of that extensive genus *H*òmo, would well comport with the design and execution of this work. Mr. Deville exhibited, a short time since, some skulls of a South American tribe of the human race, of which drawings would be desirable. It is said that this race is, or is supposed to be, extinct; but whatever tends to elucidate the natural history of ourselves, must be preeminently useful towards the completion of our knowledge, and the correction of our judgment. — *J. R.*

A Spotted Child. — There is now exhibiting in a travelling caravan, a fine healthy boy between two and three years old, who was born at Rochester, Kent, of healthy English parents. This child is in several parts of the body covered with considerable patches of brown hair of close texture, and soft and silky to the touch. The patches, in fact, are nothing more, so far as I could perceive by a cursory examination, than very large hairy moles or birth-marks, uncommon when occurring so large as in this instance, but otherwise by no means uncommon. Birth-marks, it may be observed, are sometimes dangerous as forming the beginnings of cancer, &c., but this does not occur, perhaps, so frequently with the hairy as with the livid sorts. — *J. R.*

Inferior Dexterity of the Left Hand. — M. Le Comte refers the inferior power of the left arm to the position of the fœtus during the last months of gestation, the left side being usually pressed against the bones of the pelvis, and consequently obstructing the circulation. This effect is farther increased by nurses carrying children on their right arm; and by the care taken to teach children not to use their left hands. (*Journal de Physiologie Exp.*)

Wolves and Foxes in Scotland. — In my antiquarian reading I have met with the following singular notice of Scottish wolves in *Bellenden's Translation of Boetius*, edit. Edin. 1541: — "The wolffis are right noisome to tame beastial in all parts of Scotland, except one part thereof named Glenmorris, in which the tame beastial gets little damage of wild beastial, especially of tods [foxes]; for each house nurses a young tod certain days, and mengis [mixes] the flesh thereof after it be slain with such meat [food] as they give to their fowls or other small beasts, and so many as eats of this meat are preserved two months after from any damage of tods; for tods will eat no flesh that gusts of their own kind." — *J. Rennie.*

Black Sheep. — According to Giraldus Cambrensis (who, though a retailer of fables, may be perhaps credited in this), the Irish in his time were chiefly clothed in black garments, because their sheep, from which the wool was furnished, were black. (Vide *Topograph.*, and also *Collectan. de Reb. Hibern.*, xi.) When this is compared with what Southey tells us, in his *Letters from Spain*, namely, that in the north of the Peninsula, the sheep are almost all of a black colour; we may, perhaps, justly conclude, that the black Irish sheep, mentioned by old Giraldus, had been originally imported from Spain at the period, it may be, of the Milesian emigration. Those who are extensively acquainted with Ireland may be able to say whether this breed of black sheep is now propagated there. — *J. R.*

Hands of the Whale. — The breast fins of the whale, instead of being composed of straight spines like those of fishes, conceal bones and muscle formed very like those of the fore legs of land animals; but so enveloped in dense skin, that the fingers have no separate motion, though the hand (if it may be called so) is flat, very pliant, large and strong, enabling the whale to sustain the young closely compressed to its body, as was remarked by Aristotle. The gradation of the hand, as it appears in apes, &c., may be traced in the otter, seal, walrus, manati, and dugong, into the whale. (*Dr. Harwood, Lect.*)

The King-fisher. — In the little work entitled *Ornithologia*, by Mr. Jennings, I find two statements respecting the common king-fisher (*A*lcèdo I'spida), which require modification. He says that it is "rarely, if ever, found near the habitations of man." (p. 172.) On the contrary, I am in the habit of seeing king-fishers very often on the banks of a brook, which runs past my garden, not a hundred yards from the house in which I write this paragraph. A nest was found with young, last summer, on the bank of the same brook, and within gun-shot of a whole row of houses. Mr. Jennings farther states that he saw a king-fisher on the Ravensbourne, in September 1827, insinuating thereby that the bird is rare; but the brook just alluded to is a branch of the Ravensbourne, on which they are far from uncommon. — *J. R.*

The King-fisher, Alcèdo I'spida (fig. 3. Vol. I. p. 23.) — About ten years ago, when living near St. Anstell, a small town in the west of Cornwall, I was told that a man in the neighbourhood had caught two curious birds, and that no one knew what they were; I accordingly, with all the eagerness of a boy and a naturalist, went to the man's house, and there saw two little birds *sitting* up like the auk (A'lca), rather than standing, on the floor of a small cage. They looked very melancholy, and stared about them in a very vacant manner. I quickly perceived that they were young king-fishers just able to fly. In reply to my enquiries the man told me that he had put a call bullfinch (Lóxia *P*yrrhùla) in a cage with limed twigs on a hedge near the river. This river is a rocky stream which flows at the bottom of the town, in winter it is sometimes very much swollen, but in the summer almost dry. On visiting the cage, he found a strange bird caught, which he carried home and placed the cage as before; in a few minutes he found, to his great surprise, *another* bird like the former entangled. He put them together in the cage in which I saw them, and fed them with worms, bread crumbs, and hempseed; they lived only a few days, and were then thrown away. The poor little birds, by a *mistake of instinct*, were probably attracted to the cage by the *call* or even the colours of the bullfinch, which, in some degree (the piping note especially), resembled that of their parent. What renders it more remarkable is, that the king-fisher is a bird very rarely, if ever, found in those parts. — *J. Lakes. Liskeard Vicarage, Cornwall, Dec.* 10. 1828.

Swallows remaining in this Country during the Winter. — If a fact which I observed will be of any service to confirm the hypothesis, not assumed, but rather revived, by your correspondent, the Rev. W. T. Bree, that some kinds of swallows remain dormant during the winter in this country, it is at your service. Walking about eight o'clock on the morning of the 15th of November, at Richmond, in Yorkshire, I was surprised to see the common swallow (*H*irúndo rústica) flitting about near the church in one direction and another with their usual alacrity in summer; the main body of swallows had taken their departure in the early part of October; the morning was misty, but genial and warmer than usual at that time of the year. It was my intention to have communicated this, previously to the present time, in the form of an essay on the arrival and departure of the *H*irúndines, along with some other observations and facts which I have collated, but your very learned correspondent, the Rev. W. T. Bree, has, I see, anticipated me. Yours, — *L. E. O. of Beadford*

Preservation of small Birds. — Remove the viscera, brain, eyes, and tongue with a hooked wire; fill all the cavities with antiseptic paste, or cotton saturated with it; bind the bill and wings with thread, hang it up by the legs, pour from one to two ounces of ardent spirits into the vent, and leave it to dry in an airy place. The paste is made with 8 parts of white arsenic, 4 parts of Spanish, and 1 part of soft soap, and 3 parts of camphor, with a few drops of alcohol. — *Id.*

New Species of British Snake. — Mr. T. M. Simmons has discovered, near Dumfries, in Scotland, a species of snake, which seems to be new to our naturalists, and which has been appropriately called Cóluber dumfrisiénsis (*fig.* 109.) It differs from the common snake (Cóluber *N*àtrix), in

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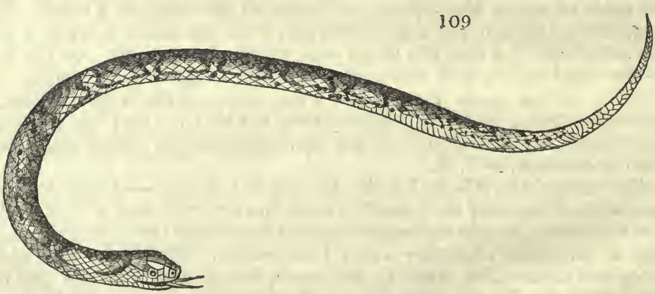

having no ridged line on the middle of its dorsal scales, which are extremely simple and smooth. The number of scales under the tail is about 80, and the plates on the belly 162. The only specimen hitherto found measured 5 in., was of a pale colour, with pairs of reddish-brown stripes from side to side over the back, somewhat zig-zag, with intervening spots on the sides

It comes nearest in character to a species of snake, *Cóluber austrìacus Linn.*, which is common in France and Germany, and which has smooth dorsal scales, like the Dumfries snake. The latter also, if the figure published by Sowerby be correct, has large scales on the head, which proves that it cannot be the young of the common viper, which, however, has also ridged scales. — *J. R.*

Hearing of Fish. — Independent of the story of Arion and the dolphin, we have the evidence both of modern experiment and dissection, to demonstrate the fact of the hearing of fish. The following verses, by the Bishop of Dunkeld, furnish a curious specimen of reasoning in opposition to this undoubted fact: —

> " Violent din the air brekis and dears, [1]
> Sine great motion of the water steirs, [2] —
> The water steirit, fishes for feardness flies,
> But out of doubt no fish in water hears,
> For, as we see, right few of them have ears;
> And eke, forsooth, but [3] if wise clerkis lies,
> There is no air in with waters nor seas,
> But [4] whilk [5] no thing might hear, as wise men lears, [6]
> Like as but [4] light there is nothing that sees."
>
> *Gawin Douglas, Palice of Honour*, i. 28.

Spiders live and grow without Food — Out of fifty spiders produced on the last day of August, and which were kept entirely without food, three lived to the 8th of February following, and even visibly increased in bulk. Was it from the effluvia arising from the dead bodies of their companions that they lived so long? Other spiders were kept in glass vessels without food from the 15th of July till the end of January. During that time they cast their skins more than once, as if they had been well fed. (*Redi, Generat. Insect.*, p. 160.)

I enclosed a packet of spiders' eggs in a pasteboard box, which were soon hatched but afterwards forgotten and neglected for about two months, when they were all found dead but two, which had cast their skins, and increased in size, but, though I fed them with flies and gnats, they soon died.— *J. R.*

Cìmex. — This extensive genus comprehends upwards of eight hundred species inhabiting plants as various as the shapes and hues of the insects themselves, some of which possess colours brilliant beyond description. In their larva state they are very active, and only differ from the perfect insect in wanting wings. They overrun the plants, grow, and change into chrysalides or pupæ, without appearing to undergo any material alteration. They have, indeed, only the rudiments of wings, which their last transformation unfolds, and the insect is then perfect. In their first two stages they are unable to propagate their species. In the perfect state, the fecundated female lays a great number of eggs, which are often found placed side by side upon plants. Many of these, when viewed through a magnifier, present singular varieties of conformation. Some are crowned with a row of small hairs, others have a circular fillet, and most of them have a cap, which the larva pushes off when it forces open the egg. Released from their prison, they overrun the plant, and feed on its juices. (*Carpenter* in *Gill's Tech. and Micr. Rep.*)

Swarming of Bees. — The ingenious President of the Horticultural Society, Mr. T. A. Knight, has been led from repeated observation to infer, that, in the swarming of bees, not a single labourer emigrates without previously

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[1] Injures. [2] Stirs. [3] Unless. [4] Without. [5] Which. [6] Learns.

inspecting its proposed future habitation, as well as the temporary stations of rest where their numbers collect soon after swarming. (*Philosophical Magazine.*)

The Death's-head Hawk Moth. (*fig.* 110). — As an instance of animals following the progress of cultivation, it may be mentioned that the Death's-

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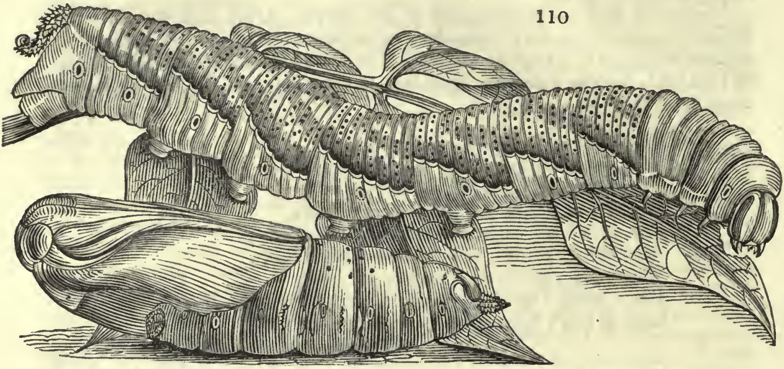

head hawk moth (Acheróntia A'tropos) has been found near Catrine, Ayrshire: the specimen was sent to the Hunterian Museum, Glasgow. It is very doubful whether this insect, whose larvæ feed on the jasmine, the potato, and other exotics, was produced in Britain before their introduction. — *J. R.*

The Vapourer Moth (*Bómbyx antìqua*). — Sir, The practice of "sembling," as it is called, i. e. exposing a female moth for the purpose of attracting the males, is well known to collectors of insects, and has often been adopted with success. In addition to the remarkable instances of the wonderful instinct by which the males are guided, recorded Vol. I. p. 352. of your Magazine, I beg to offer you the following, though by no means so interesting an example of the fact as those mentioned by your correspondent, J. H. Davies, Esq. A friend of mine once reared from the caterpillar a female specimen of *B*ómbyx antìqua (Vapourer Moth) (*fig.* 111. *a*), which sex of the insect, it is well known, is incapable of flying, possessing, as it does, only the bare rudiments of wings. Wishing to try the experiment of sembling, and thinking this apterous female a peculiarly fit subject for the purpose, he placed it on a card, and carried it into the garden, where a male moth (*b*) immediately came and settled on the card as he held it in his hand. The helpless female accidentally fell to the ground among herbage, so thick, that any attempt to recover the specimen would have been almost hopeless, had not the male led to the discovery by fluttering directly to the spot. A circumstance which serves to heighten the success of this experiment is, that the male thus introduced to my friend's notice, was the *only* specimen he saw during the autumn; *B*ómbyx antìqua, though a common insect in most seasons, being in others scarcely to be seen. — *W. T. Bree. Allesley Rectory, Nov.* 13. 1828.

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Death-Watches. — These little creatures, whose portentous click once made stout hearts quail, and still inflicts no small terror on many an ancient dame, even in these days of enlightenment, are thus described by Mr. Carpenter: — This singular noise proceeds from two different insects. One of these, the Anòbium tessellàtum, is coleopterous, of a dark colour, and about a quarter of an inch in length. It is chiefly in the latter end of spring it commences its noise, which may be considered analogous to the call of birds. This is caused by beating on hard substances, with the shield or fore-part of its head. The general number of successive distinct strokes is from seven to nine, or eleven. These are given in pretty quick succession, and are repeated at uncertain intervals. In old houses, where the insects are numerous, they may be heard, if the weather be warm, almost every hour in the day. In beating, the insect raises itself upon its hinder legs, and, with the body somewhat inclined, beats its head, with great force and agility, against the place on which it stands. This insect, which is the real death-watch of the vulgar, must not be confounded with a minuter insect, not much unlike a louse, which makes a ticking noise like a watch; but, instead of beating at intervals, it continues its noise for a considerable length of time without intermission. This latter insect, the Térmes pulsatòrium *Linn.*, belongs to a very different tribe (Neuróptera). It is usually found in old wood, decayed furniture, museums, and neglected books. The female lays her eggs, which are exceedingly small, in dry dusty places, where they are likely to meet with least disturbance. They are generally hatched about the beginning of March, a little sooner or later, according to the weather. After leaving the eggs, the insects are so small as scarcely to be discerned without the use of a glass. They remain in this larva state about two months, somewhat resembling in appearance the mites in cheese; after which they undergo their change into the perfect insect. They feed on dead flies and other insects; and often, from their numbers and voracity, very much deface cabinets of natural history. They subsist on various other substances, and may often be observed carefully hunting for nutritious particles amongst the dust in which they are found, turning it over with their heads, and searching about somewhat in the manner of swine. Many live through the winter, buried deep in the dust, to avoid the frost. (*Gill's Technological and Microscopical Repository.*)

British Pearls (*Mya margaritifera* Linn., *U'nio elongàta* Lam. (*fig.* 112.) —In the old and curious translation of *Hector Boetius*, by Bellenden (edit. Edinb. 1541), the following notice occurs of British pearls:—“ In the horse mussillis are generit perlis. Thir mussillis airlie in the morning (when the lift is cleir and temperate), openis thair mouthis a little aboue the watter, and maist gredelie swellis the dew of heaven, and eftir the measure of the dew thay swellie, they conceive and bredis the perle.”

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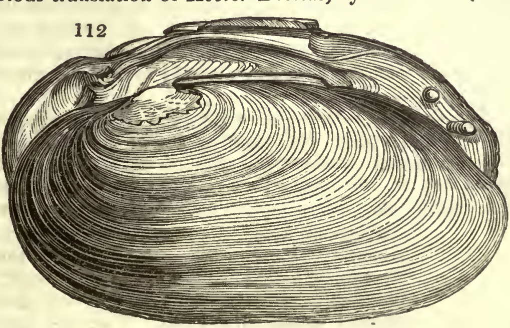

Suetonius gives, as one reason for Cæsar's expedition into Britain, the search for pearls, which Pliny (*Hist. Nat.*, ix. 35.) seems to confirm, saying that Julius Cæsar gave a breastplate covered with British pearls to Venus Genetrix, and hung it in her temple at Rome. Pliny adds, that they were small and ill-coloured; and Tacitus says, “ subfusca ac liventia.” The venerable Bede, again, in his *Ecclesiastical History*, says, the British pearls were excellent, and of all colours, — reddish, pale, violet, and green, which account is confirmed by Origen. Not many years ago, a patent was granted to fish for pearls in the river Jut, in Cumberland (*Gibson in Camden's Britannia*), but it does not appear to have been much acted upon. —*J. Rennie.*

Art. III. *Botany.*

Changes made in the Names of Plants. — I cannot help producing a few instances, from amongst a very large number, where the alterations appear to me to be decided improvements. I say nothing respecting generic terms, but have confined myself to the trivial or specific name: — Fritillària meleàgris of Linnæus, Mr. Salisbury proposes to change to F. tessellàta; *H*ippóphae *r*hamnöìdes to *H.* littoràlis; and Campánula Trachèlium to C. *u*rticifòlia, all certainly changes for the better. Who will not prefer, if he thinks for a moment, *Verónica* fontinàlis and bibarbàta (one expressing the place of growth, and the other alluding to the situation of the hairs on the stem) to the barbarously sounding words *Beccabúnga* and *C*hamæ`drys, to which few are able to attach any meaning? And is not Gerard's name of the common Scurvy-Grass, Cochleària rotundifòlia, expressive of the form of the leaf, better than C. officinàlis? I think it highly objectionable to continue the name officinàlis to so many plants merely because they *have been* used medicinally, and shall be glad to see some one take up the subject, and "reform it altogether." (See Gray's *Nat. Arrangement of Brit. Plants.*)— *D. S. Bungay.*

Preservation of Trees in Winter. — In iron founderies, such as the foundery for cannon at Munich, it is customary to stir the melted metal with a branch of green oak; and notwithstanding the great heat of the metal, the green wood is not affected deeper than about the twentieth part of an inch. This striking fact is explained from the non-conducting power of the sap; and upon the same principle it is that the bodies and branches of trees, not having the covering of snow which the roots have, are protected from the operation of cold by their sap increasing in spissitude, and, of course, in non-conducting capacity, as the winter approaches. On similar principles we may account for the preservation of various kinds of fruits. —*J. R.*

Sap of the Rose Tree.— From a plant of *R*ósa *r*ubiflòra, at Hammersmith, with a stem 5½ ft. high and 2¼ in. in diameter, when deprived of its branches and the head sawed off, 29th of July, 31 ounces of sap flowed in about a week, which, together with loss by evaporation, probably exceeded three pints. Chemical analysis gave the following ingredients: —

Oxalate of lime - - -	2·9 grains
Acetate of lime - - -	1·097
Acetate of potass - -	0·7
Gum and extractive - -	2·1
Sugar? soluble in alcohol - -	0·1
Loss - - - -	0·353
	7·25

R. Adams in *Brande's Journ.*

With respect to what Mr. Adams chooses to call extractive, I may be permitted to remark that the term ought to be exploded altogether from vegetable chemistry, since it does not, like the terms gum, acid, or alkali, convey any distinct meaning, nor apply to a definite class of substances. The recent brilliant discoveries in vegetable chemistry ought to put an end to this vague phraseology. — *J. R.*

Influence of Soil on Roots. — " If a cucumber," says Sir James Smith in his Lectures, of which MS. notes are now before me, " is planted; and after the branches shoot there is placed a stone in the way of either of them, the branch will turn off and avoid it without *touching* the stone, but describing a circle around it. When it has passed the stone, however, it will go on in a straight line." Sir James explains this by the well-known law of plants always approaching the light, the cucumber turning round to get out of the shadow of the stone.

Roots follow a very different law, always endeavouring to get away from the light; and, accordingly, so far from avoiding a stone or other obstacle, they often cling closely around it, and sometimes even mould their forms upon the hard substances with which they meet. This is well exemplified in the root of an alder tree (*A'*lnus glutinòsa, *B*étula *A'*lnus *Linn.*), which my little boy found in his searches after fresh-water shells for his collection. (See Vol. I. p. 413.) The root (*fig.* 113 *a*) was embedded among the gravel formed by the Ravensbourne river which passes the bottom of my garden; and it requires no details to point out how exactly it has moulded itself on every stone which it met with in its course. In the same manner roots are much influenced in their forms by the soils in which they grow. Of this I lately gave the following illustration in the *Athenæum*, from the familiar instance of fibrous and bulbous roots: — When plants with fibrous roots are placed in certain situations, they are apt to change their fibrous structure for a bulbous one, in the same way as the water crowfoot (*R*anúnculus aquátilis) has scolloped leaves above, and minutely winged leaves below, water. The change from fibrous to bulbous roots, and the contrary, is markedly exemplified in some of the grasses, particularly in Timothy grass (*P*hlèum) and fox-tail grass (*A*lopecùrus). Before this change of form was discovered, botanists frequently described the same grass under different names; a circumstance which occurred with regard to *A*lopecùrus geniculàtus (*b*) and *P*hlèum praténse (*c*). Leers seems to have been the first to discover that transplanting into a light rich soil tends to change the bulbous into the fibrous structure. — *J. Rennie.*

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Descent of the Radicles in the Germination of Seeds. — The unsatisfactory nature of several of the theories hitherto proposed on this subject has been ably shown by H. Johnson, Esq., in a paper read before the Medical Society of Edinburgh, and published in *Jamieson's Journal* for April. According to Dr. Darwin the radicle is stimulated by moisture, and elongates itself where it is most excited; according to Mr. Knight the radicle obeys the laws of gravitation. Mr. Johnson found that the radicle could be made to grow either downwards or upwards, according to the seed's being placed on the upper or the under surface of a mass of moistened earth, a result with which the experience of every gardener renders him familiar. Had Dr. Darwin, instead of the word moisture, used the term moist soil, his theory would have been unanswerable; as it stands, it is still by far the nearest to the truth. The fallacy of Mr. Knight's theory, which was adopted by Sir Humphry Davy in the earlier editions of his *Agricultural Chemistry*, is rendered sufficiently obvious by Mr. Johnson's experiments; but it had ceased to be in repute for a number of years Mr. Johnson agrees with Dr. Thompson and M. Aubert Du Petit-Thouars in ascribing this power of the vegetable to the vital principle. — *Cond.*

The Sun-Flower. — I was somewhat surprised to find the following passage in Drummond's *First Steps to Botany*, an excellent little work: — " Leaves always turn to the light, and some flowers regularly follow the sun, facing him when he rises, and also when he sets. It is strange that the sun-flower is so generally supposed to possess this property, since the slightest observation is sufficient to prove its fallacy. Gerarde detected the error so long ago as 1597." He then quotes the passage from Gerarde's *Herbal*, p. 614., in support of the above assertion, wherein Gerarde says, he could never observe the property, although he had endeavoured to find out the truth of it. Last year I had fifteen sun-flowers in my little garden, and it was a constant source of amusement to observe the flowers following so regularly as they did the course of the sun. In the evening when we retired they all looked towards the setting sun, but in the morning all were turned the contrary way, to be ready to meet the first beams of the great luminary of the day; and this continued daily until the flowers faded, and the work of fructification was over, when the sensibility to the light seemed to be lost, and the head remained fixed. The popular reason for the name of the flower is this very property, and it is rather unaccountable how it should have escaped the notice of Dr. Drummond.

Since I wrote the above I found the following passage in Smith's *Introduction to Botany*, p. 159. ed. 4.: — " Nor is the effect of light peculiar to leaves alone. Many flowers are equally sensible to it, especially the compound radiated ones, as the daisy, sun-flower, marigold, &c. The stately annual sun-flower, Heliánthus ánnuus, displays this phenomenon more conspicuously on account of its size, but many of the tribe have greater sensibility to light. Its stem is compressed, in some degree, to facilitate the movement of the flower, which, after following the sun all day, returns after sun-set to the east, by its natural elasticity to meet his beams in the morning. Dr. Hales thought the heat of the sun, by contracting the stem on one side, occasioned the flower to incline that way; but if so, it could scarcely return completely at night. There can be no doubt, from the observation of other similar flowers, that the impression is made on their radiated florets, which act as wings, and seem contrived chiefly for that purpose, being frequently destitute of any other use." How is this difference in the two authors to be accounted for? — *D. Stock. Bungay, July* 28. 1828.

Sloughing of Plants. — The power of sloughing has been denied to plants without good reason; for at a certain time of the year the leaves of a plant decay and fall off: so do ripe fruit. If a shrub, when in leaf, be planted, and any part of it die, the leaves formerly expanded will adhere to it, but those on the living branches will wither, fall off, and give place to others. — (*MS Lectures of Sir J. E. Smith.*)

Art. IV. *Geology.*

Mistatements in Ure's New System of Geology. — Sir, In common with every lover of natural history, I hailed the first appearance of your periodical with pleasure; and the gratification has been increased by every successive Number, so admirably is it calculated to promote the objects for which it was designed. I live in a remote part of the country, and can indulge my favourite pursuits but partially, not being within reach of any scientific library, and not having the means to purchase the works on science which I require. I am, therefore, obliged to economise, and be guided in my purchase by the opinions of the reviews in respectable journals. I know so little of geology, and yet feel so deeply interested in that science, from the novel and extraordinary facts which your Magazine and other works have from time to time noticed, that I had put by my little pittance to purchase an elementary work on the subject; and seeing in *Brande's Journal*, and other periodicals, a very high eulogium passed on Dr. Ure's "*New System of Geology*, in which the great Revolutions of the Earth and animated Nature are reconciled at once to Modern Science and Sacred History," I was induced to send my guinea to the bookseller, and procured the volume so much praised by those who must certainly have been capable of judging, and which was ushered into the world with such high pretensions. Now, Sir, I do not profess to be even a tyro in geology, but I am acquainted with a few facts, which (if I am not greatly mistaken) are sadly distorted and misrepresented in the work alluded to. I will but briefly notice a few instances of what appear to me to be errors, convinced that, if I am correct, you will think it your duty to guard your readers against a *system* which is likely to be the more injurious to the science of geology, since it emanates from so respectable a quarter, and has been praised by such high authority. You must indeed, Mr. Editor, allow me to remark, that it is as much your duty to guard your readers against erroneous publications, as it is to point out the most valuable ones to their notice. I have neither the time, inclination, nor ability to attempt a review of such a work as Dr. Ure's: I merely wish to notice some of its more glaring errors; and, if *my* remarks are incorrect, shall be most happy to be set right, and offer all due apology for my presumption. The first error (and it is an important one) that strikes me is in the Table of Equivalents (pp. 136, 137.), in which the lias is placed *above* the coral rag, cornbrash, Bath oolite, &c., and immediately beneath the "*green sand!*" The "green sand" comes next to the lias, and the craie inférieuse of the French is named as the equivalent. Where, then, should the Hastings' beds and the Purbeck be placed? for the chalk is next in order. In this instance, as in another hereafter noticed, Dr. Ure seems to have forgotten that the sands and clays, below the green sand of the chalk, form, together with the Purbeck, a well-characterised fresh-water formation, separating the chalk from the oolite.

At pp. 272, 273. the acknowledged imperfect account of the beds between the chalk and oolite, given in Messrs. Conybeare and Phillip's work, is inserted almost verbatim; Dr. Ure, as in the instance above quoted, losing sight of the discoveries which the researches of later geologists have brought to light. Accordingly, he enumerates the strata as, 1. Iron sand; 2. Interjacent clay, or Weald clay; 3. Green sand; 4. Chalk marl; and adds, "all these strata are probably of marine origin:" and, in noticing the "iron sand" (p. 274.), he remarks, "the organic remains of this bed have been imperfectly explored: they are not numerous; but the *N*aútilus, *B*elemnìtes, Ammon*ites*, *O*'streæ, Terrebrátulæ, and spines of an *E*chìnus cídaris have been found." Now, Sir, I would respectfully submit, that all this is palpably wrong; and how Dr. Ure, with Mr. Mantell's work on the fossils of the Hastings' bed before him (and which he repeatedly quotes in his account of the fossil reptiles), could have committed such a blunder is really inexplicable. The researches of Mr. Mantell have proved that the strata formerly called the iron sand abound with organic remains; all of which, or with but very few exceptions, are fresh-water or terrestrial: and the memoirs of Dr. Fitton and Mr. Webster, on the strata below the chalk, have long since established the true relations and characters of that interesting group of beds, now universally termed the Hastings' deposits. Surely so important a discovery ought not to have been unnoticed in a *New System of Geology.* But, Sir, were I only to point out the incorrect quotations, and the extracts from other works, put together without due consideration, and therefore leading to inferences which the writers never could have contemplated, I should occupy too great a portion of your valuable pages. I must content myself with merely noticing, in conclusion, that the plates of organic remains are shamefully incorrect. The Scaphìtes æquàlis (pl. 2.), a fossil peculiar to the lower beds of the chalk, is figured as a shell of the LIAS! *Mȳa* intermèdia, of the London clay (pl. 5.), is called a characteristic fossil of the *under oolite!* and, in plate 4., the shells figured as peculiar to the cornbrash and upper oolites are a medley of chalk and tertiary shells, with a few from the oolite: for instance, there are figured Turrilìtes costàtus and Vermiculària umbonàta, found in the grey chalk marl; Hamìtes gibbòsus, from the galt; Protellària macróptera and Turritélla conöídea, from the tertiary beds, &c.! These errors must have arisen from sheer inattention; but when a man like Dr. Ure, distinguished in the scientific world by his talents and admirable works, announces a "new system" of any science, have we not a right to expect that he will condescend to avoid such egregious errors? errors, too, which must so entirely mislead the uninitiated. No one can entertain a higher respect for Dr. Ure's talents as a chemist than myself, and I deeply regret he should have placed his so respectable name to the publication which has occasioned these remarks. I beg to repeat, Sir, that if any of my observations appear to you incorrect or too severe, you will suppress or alter them as you may think proper. If my strictures are correct, how, Sir, can we understand the unqualified praise bestowed on this work in *Brande's Journal* and other periodicals? We know what Lord Byron said of my "grandmother's review;" but the ones I allude to are above the reach of suspicion. — *H. August,* 1829.

Form and Aspect of Mountains. — Most of the principal mountains have one of their sides very steep, and the other gradually sloping. The Alps may be instanced as an example, having a much more abrupt descent on the side of Italy than on that of Switzerland; the Pyrenees again, are steeper towards the south than the north; while the chain of Asturias, which branches westward from the Pyrenees, is just the reverse. Mount Taurus, in the part where it approaches the Mediterranean and the Dardanelles, is abrupt on the south, but in Armenia it has a rapid descent northward. The mountains of Scandinavia are steeper towards the west and north-west than the east and south-east; and the Ghauts in Hindostan are, in like manner, precipitous on the west, and sloping in the opposite direction. In all these chains the steepest side is found to be that which is nearest the sea, and consequently their inclination is most gradual towards the interior of the country in which they are situated. — *J. R.*

Fossil Charcoal accounted for. — I was particularly struck with a phenomenon recorded by Dr. Richardson, the naturalist in Captain Franklin's expedition of discovery, respecting the shale on the coasts of the Arctic Sea. This shale composed precipitous banks, which, in many places, *were on fire.* "The shale," adds Dr. Richardson, "takes fire in consequence of its containing a considerable quantity of sulphur in a state of such minute division, that it very readily attracts oxygen from the atmosphere, and inflames." Nothing, I think, could explain in a more satisfactory manner the occurrence of charcoal in coal measures and other mineral strata. In the anthracite mines of North America, for example, wood charcoal occurs, with the ligneous structure as well marked as in charcoal recently prepared. — *J. R.*

Volcanoes. — It is remarkable that in the old continent the principal chains of mountains contain no volcanoes, and that islands and the extremities of peninsulas are alone the seats of these; while, in the new world, the immense range which runs along the shore of the Pacific Ocean possesses more volcanoes than are to be met with in the whole of the old continent and its adjacent islands. — *J. R.*

Trachyte. — What was formerly denominated Trap-porphyry is now called Trachyte, and is a granular fissured rock, formed of glassy felspar and hornblende, in which augite, mica, laminar felspar, and quartz, also occur. All the summits of volcanoes are composed of this rock, whether they be low hills, like those of Saxony, or rise, like the Andes, to 17,700 ft. high; the latter, probably, situated on a crevice traversing the whole continent, over an extent of 105 geographical leagues, from the Pacific to the Atlantic Oceans. (*Humboldt's Tabl. de la Nature.*)

Chemical Powers of Magnetism. — The following experiment is by the Abbé Rendu. If a bent glass tube be filled with the tincture of red cabbage, and two iron wires suspended to the poles of a magnet be immersed in the liquid in the two branches, the tincture will, in a quarter of an hour, become blue, or of a deep green in both branches of the tube, although the magnetism of the two wires must be of different kinds. The same result is produced, if well tempered and polished steel needles be used in place of the wires. If one wire be removed, the effect takes place only in the other branch of the tube where the wire remains. The same results occur if the wires are not in contact with a magnet; but being then cleaned, they are found to have become magnetic. Tincture of litmus undergoes similar changes, but far more slowly, and the colour becomes green only in the leg containing the north wire.

M. Biot considered that the oxidation of the wires might in these produce the ordinary effects of a voltaic current, but that as magnetism exerted its influence, notwithstanding the presence of interposed bodies, he advised M. Rendu to separate the wires from the tincture, by glass tubes closed at their lower extremities. In this case, even according to Rendu, the *same* phenomena were produced, but much more slowly. The tincture of red cabbage, however, became perfectly green in two days. *Mém. de Savoie. Bull. Univ.* A.x.196. (*Brande's Quart. Journal,* Oct.—Dec. 1828, p. 429.)

Scottish Gold. — It is a prevalent opinion amongst the peasantry in Scotland, that gold may be discovered by examining the sheep which feed on the pastures where it is subjacent. The following are the supposed effects of this sort of pasture, as given in Bellenden's translation of *Boetius's Cosmographe of Albion:*— "The sheep that gangis [pastures] on Dundore are yellow; their teeth are hued like gold; their flesh red, as it were littit [dyed] with saffron; their wool is on the same manner." Cordiner, in his *Picturesque Antiquities,* also mentions this hill, which is in the north of Scotland, and spells it Dun d'Or, "the hill of gold." The people, he adds, assert that the sheep have their teeth beautifully gilded. — *J. R.*

Lead Ore. — Miners, supposing blende to be changed into lead glance, talk of a mine's not being *ripe.* This is improbable; but a mine may be too ripe, as appears from an instance at Lead Hills in Scotland, where the vein which now contains the carbonates, sulphates, and phosphates, must once have been replete with the more valuable sulphuret of lead. (*Haidinger* in *Edin. Phil. Trans.,* xi. 73.)

Art. V. *Meteorology.*

Rules for the Weather. — A wet summer is always followed by a frosty winter, but it happens occasionally that the cold extends no farther. Two remarkable instances of this occurred in 1807–8 and 1813–14. With these exceptions, every frosty winter has been followed by a cold summer.

The true cause of cold, or rather the direct cause, is to be found in the winter excess of west wind, every winter with excess of west wind being followed by a cold summer; and if there is no cold before, or during a first excess, then a second excess of west wind in winter occasions a still colder summer than the first. It also appears, by repeated experience, that cold does not extend to more than two years at a time.

Again, if the winter excess of east wind be great, in the first instance, the winters will be mild, and followed by mild summers; while the summer excess of east wind is itself, in the first instance, always mild; but uniformly followed by cold winters and cold summers, which continue, more or less, for one or two years, according to circumstances. (*Mackenzie, Syst. of the Weather.*)

Electricity of the Winds. — In the Mediterranean Mr. Black ascertained, by numerous observations, that winds or currents of vapour of some continuance from an extent of sea, are *negatively* charged with electricity; while those from the land, especially from hilly countries, are relatively in a positive condition. When opposite winds, such as north and south, are differently charged with electricity and meet, a transfer of the electric matter is always the consequence. (*Journ. in Mediternan.*)

Air for Analysis. — To collect air for the purpose of analysis, instead of emptying a bottle filled with water, as is usually done, M. Gaultry de Claubry employs a saturated solution of sulphate of magnesia in the same way. (*Annales de Chimie*, vol. xxxvii. p. 380.)

Malaria the Cause of Sun-stroke. — Dr. M'Culloch is of opinion that the sun-stroke, or *coup-de-soleil*, as it is called, which proves so often fatal in hot climates, and is commonly attributed to the sun, is probably nothing more than the access of marsh fever, caused by exposure to malaria on the previous evening or morning. It is not, however, denied, that exposure to a burning vertical sun may not produce inflammation of the brain, and prove rapidly fatal. (*Brande's Journ.*, vii.)

Analysis of the South-west Wind. — This wind consists of air flowing from the south, and seeming occasionally absorbed at its arrival at the more northern latitudes. It has a real direction from the west, owing to its not having lost in its journey the greater velocity it had acquired from the earth's surface whence it came. — *J. R.*

Halo round the Sun. — The last time I was at Resley, I witnessed a colourless halo round the sun, precisely like those usually seen surrounding the moon, except that the diameter of the circle seemed larger than those of lunar haloes usually are. It continued for a quarter of an hour or so. I had never witnessed a solar halo before, and was in hopes I should have, for once, seen a parhelion, or mock sun; but no such phenomenon occurred, the halo gradually dying away. — *John Thompson. Hull, July* 20. 1829.

Rules for determining the Temperature of a Country. — The fact that a degree of latitude is equal to a degree of Fahrenheit, and that 400 ft. of elevation is equal, also, to a degree of Fahrenheit, is original and curious, and will go far to assist us in determining the clime of any country. (*Amer. Quart. Rev.*, March 1829, p. 174.)

PART IV.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Natural History in Foreign Countries.*

FRANCE.

Dr. Gall's Mode of studying the Characters of Animals. — After presenting my letters of introduction to him at seven o'clock in the morning, he showed me into a room, the walls of which were covered with birdcages, and the floor with dogs and cats, &c. Observing that I was surprised at the number of his companions, he observed, " All you Englishmen take me for a birdcatcher. I am sure you feel surprised that I am not somewhat differently made to any of you, and that I should employ my time talking to birds. Birds, Sir, differ in their dispositions, like men; and if they were but of more consequence, the peculiarity of their characters would have been as well delineated. Do you think," said he, turning his eyes to two beautiful dogs at his feet, which were endeavouring to gain his attention, " do you think that these little pets possess pride and vanity like man? " — " Yes," I said, " I have remarked their vanity frequently." — " We will call both feelings into action," said he. He then caressed the whelp, and took it into his arms. " Mark his mother's offended pride," said he, as she walked quietly across the chamber to her mat. " Do you think she will come if I call her? " — " O yes," I answered. — " No, not at all." He made the attempt, but she heeded not the hand she had so earnestly endeavoured to lick but an instant before. " She will not speak to me to-day," said the Doctor.

He then described to me the peculiarities of many of his birds, and I was astonished to find that he seemed familiar also with their dispositions (if I may be allowed the word). " Do you think a man's time would be wasted thus in England? You are a wealthy and powerful nation; and, as long as the equilibrium exists between the two, so shall you remain: but this never has existed, nor can, beyond a certain period. Such is your industry, stimulated by the love of gain, that your whole life is spun out before you are aware the wheel is turning; and so highly do you value commerce, that it stands in the place of self-knowledge and an acquaintance with Nature and her immense laboratory." (*E. A. T.* in *Med. and Phys. Jour.*, Nov.)

The Chameleon's Antipathy to Black. — Whatever may be the cause, the fact seems to be certain, that the chameleon has an antipathy to things of a black colour. One, which Forbes kept, uniformly avoided a black board which was hung up in the chamber; and, what is most remarkable, when it was forcibly brought before the black board, it trembled violently, and assumed a black colour. (*Oriental Mem.*, i. 350.)

It may be something of the same kind which makes bulls and turkey-cocks dislike the colour of scarlet, a fact of which there can be no doubt. — *J. R.*

Young of the Fresh-water Muscle. — M. Raspail, on observing the fresh-water muscle microscopically, perceived it eject a granular parcel, which, when torn, gave out a number of small bivalves, very lively, one third of a millimetre in length, and furnished with umbilical cords. The shell was formed of phosphate of lime and scarcely a trace of the carbonate of lime could be discovered. This, it may be remarked, invalidates M. Blainville's account of eggs expelled by the animal; and M. Jacobson's, of the little shells being parasites. (*Bulletin des Sciences*, tom. xiv.)

Earthworm oviparous. — M. Léon Dufour appears to have determined that the earthworm (*L*umbrìcus terréstris) is an oviparous and not a viviparous animal. The eggs are of a very peculiar structure, being long, tapering, and terminated at each end by a pencil of fringed membranaceous substance. They have more the appearance, indeed, of a chrysalis or a cocoon, than of an egg; but their pulp, &c., prove them to be true eggs. The worms when hatched are very agile, and when disturbed will sometimes retreat for safety within the shell which they have just quitted, or instinctively dig into the clay. (*Ann. Sc. Nat.*, Juin, 1828. See also v. 17.)

Vegetable Remains in Coal. — From a comparison of the vegetable remains which accompany the deposits of anthracite in the Alps, with those which characterise the coal formations, it appears that a complete identity of genera and (where the specimens are perfect enough) of species exists in each; but no relation can be traced between those and the remains found in the lias and oolitic formations. Botany, therefore, in this case, leads to a conclusion almost directly opposite to that which has been deduced from observations purely geological, and the study of fossil animals. The identity, if not the close analogy, of plants found in coal-measures (du terrain houiller), in all parts of the globe where coal-fields have been examined, leads us naturally to suppose that the same kind of vegetation existed over the globe at the epoch of the coal formations. Though this is probable, it is not certain, as we still want data for determining the vegetable productions of this period, between the tropics and in the polar regions. Even admitting it in its full extent, we must not thence infer that this uniformity continued during the formation of lias, oolite, chalk, and the strata of the Paris basin.

M. Brongniart is of opinion that, at the period of the formation of the lias, there were two great zones of terrene vegetation, the tropical and the temperate; the former being that which had constituted the only vegetation when the coal-measures were deposited. That the remains of plants belonging to the tropical zone are now found in Alpine anthracite, he explains by referring to their transportation, by means of water, from the tropics; an explanation rendered probable from the remains being always in scattered fragments, never in quantity, nor in a position to indicate that they have grown where they are now found.

GERMANY.

Distant Sight. — Ross, in his *Voyage to Baffin's Bay*, proved that a man, under favourable circumstances, could see over the surface of the ocean to the extent of 150 English miles. It is not probable that any animal exceeds this power of vision, though birds, perhaps, excel men and most quadrupeds in sharpness of sight. Schmidt threw at a considerable distance from a thrush (*T*úrdus mùsicus) a few small beetles of a pale grey colour, which the unassisted human eye could not discover, yet the thrush observed them immediately and devoured them. The long-tailed titmouse (Pàrus caudàtus) flits with great quickness among the branches of trees, and finds on the very smooth bark its particular food, where nothing is perceptible to the naked eye, though insects can be detected there by the microscope. A very tame red-breast (Sýlvia Rubécula) discovered flies from the height of the branch where it usually sat, at the distance of 18 ft. from the ground, the instant they were thrown down; and this, by bending its head to one side, and using, of course, only one eye. At the same distance a quail discovered with one eye some poppy seeds, which are very small and inconspicuous. (*Schmid, Bliken en den Haushalt der Natur*, p. 26. edit. 1826.)

Of the Sight of Arachnìdæ, Scorpionìdæ, *and Stemmatous Insects.* — The smooth eyes of these animals are very analogous in their construction to those of fishes; only the anterior chamber of the eye is totally wanting, and the iris is nothing more than a band of pigmentum bordering the anterior surface of the glassy substance. The crystalline is not enchased in the glassy substance; the corresponding surfaces of these two bodies are convex, and scarcely touch each other except in one point. The small space which the crystalline leaves between it, the cornea, and the glassy substance, is, probably, filled up with a liquid in the living animal. In every case refraction should be considerable in the stémmata, for it takes place, 1. by the convexity of the cornea; 2. by that of the crystalline, which is denser than the cornea; 3. by the posterior convexity of the crystalline to the passage of light in the space occupied, probably, by a liquid; 4. and lastly, by the glassy substance. In consequence of this disposition, the eyes, which are here treated of, must necessarily be purblind. Thus spiders only see at very short distances. The position of these eyes, in a great number of insects, and the fact that larvæ have, in general, only stémmata, since they have nothing to see afar off, tends to confirm this opinion. The field of sight in smooth eyes can be only very small: to this condition their immobility and the diverging of their axis unite, to prevent, in spite of their plurality, the different visual fields from covering themselves again, and the double or multiple sight from taking place.

In the *S*olpùga the large eyes diverge under an angle of 90°, the field of vision cannot surpass that extent; and in other *A*rachnìdæ in which the diverging is less, there is even some visual scope. The small pediculate eyes of the *S*olpùga are situated anteriorly upon the same plane, and their fields of vision should cover themselves; in other *A*rachnìdæ, the eyes are always placed upon an arc of the external integuments, sometimes united by pairs, but always with diverging axes. The large eyes of the *S*olpùga, and of other scorpions, are probably less myopic than the small, less developed, and less diverging stémmata of other *A*rachnìdæ. (*Müller, zur Vergleichen Phys. des Gesicht.*)

Rock Blocks. — M. Hausmann, whose profound knowledge of geology is well known, has published an excellent memoir in Latin, under the title of *De Origine Saxorum per Germaniæ Septentrionalis Regiones arenosas dispersorum.* He describes the dispersion and gradual wearing down of the innumerable erratic blocks found in the sandy plains of Northern Germany; though, as M. Brongniart justly remarks, they are by no means confined to this district, but extend east and west, as well as along the course of the Danube.

All their phenomena indicate a violent catastrophe which the northern portion of the globe must have sustained at the period of its last general change. M. Hausmann mentions the several theories devised to account for these. Some geologists are of opinion that the blocks in question have been formed in the localities which they now occupy, being the remains of mountains which anciently occupied those plains. This opinion has been defended by Beroldinger, and lately revived by Muncke; but, though at first sight it appears simple, it is disproved by the great diversity of the species of rocks found indiscriminately together, though varying very far in the dates of their formation. Some, for example, are enveloped in sand, in clay, and in marl; whilst others, entirely naked and isolated, rest upon a posterior alluvion. The blocks, moreover, are not surrounded with stones in such a manner as to support this opinion; and their smooth surface, whether it be plain or rounded, proves that they must have long been exposed to the influence of water. Other geologists suppose them to have been thrown out from volcanoes, or to have fallen from the firmament; opinions which it requires little expense of argument to disprove. The prevailing hypothesis is, that the rock blocks have been detached from mountains, more or less distant from their present position; some referring to the mountains in a northerly, and others to the mountains in a southerly, direction. M. Hausmann himself is of opinion that the rock blocks in question have been rolled in a direction from north-east to south-west, and supports the theory by referring to Braunschweig, Hanover, the valley of the Weser, &c., where are found the porphyry of Elfdal and other stones which abound in Dalecarlia, as well as in the neighbouring mountain chains. In Mecklenburg, also, and Pomerania, are found the debris of the rocks of Gottland and Oeland; and the dispersion of these blocks extends even through Denmark and into the interior of Sweden, as has been more fully explained by M. Brongniart in a paper of which we have elsewhere taken notice. (*Bulletin des Sciences.*)

HOLLAND AND THE NETHERLANDS.

*Libéllulæ distinguished from Æ'*shnæ. — Monsieur M. I. Van der Hoeven, professor of natural history at Leyden, has given the following distinctions of Libéllulæ and *Æ'shnæ:* —

1. In the anterior wings of Libéllulæ, and near their base, is a humeral or discoidal cellula, presenting the figure of a reversed rectangular triangle, terminating in a point in the base. In *Æ'shnæ,* on the contrary, instead of this triangle, there is found a cellula of greater size, and horizontally shaped, while there is no difference between their anterior and posterior wings.

2. *Æ'shnæ* which have their eyes widely separated (such as the *Æ'shna* forcipàta of Fabricius, *Æ.* unguiculàta), and forming the second division of this genus in the system of M. Vander Linden (*Æ'shna* bononiénsis) in 4to, 1820, have a triangular cellula, like that of Libéllulæ, but shorter and more broad. In other respects, their anterior and posterior wings resemble those of other *Æ'shnæ,* which never occurs among Libéllulæ. Agrions may, perhaps, be distinguished by the feebleness of their brachial nervures, and the narrowness of their wings. (*Annales des Sciences Naturèlles,* December.)

SWEDEN.

The cartilaginous envelope of the brain in the *M*yxìne glutinòsa, which forms the cranium, has for a base a thin cartilage of a brown tint, and of a structure peculiar to this subdivision of chondropterygian fishes, the Cyclostómmata. This supporting cartilage nearly resembles in form the lyre of Apollo, consisting of an arch, of which the two sides are symmetrical. Behind, this arch is supported by the anterior part of the vertebral column and by the labyrinth; and, before, it enlarges and terminates by two recurrent branches in form of an S reversed. (*Retzius, Act. Acad. Sauv. Stockholm.*)

DENMARK.

Flòra Dánica. — Professor Hornemann lately read to the Society of Copenhagen, a report upon a recent number of the *Flòra Dánica.* It contains 50 species of cotyledonous plants, of which 18 have been added to the Danish Flora. There are two, the Pýrola grœnlándica and *P*ediculàris lanàta, both from Greenland, which the Professor considers as new species. Among 38 acotyledonous plants, the Alcyonídium attenuàtum, from Greenland, is also unedited. It may likewise be considered, that there are 22 new species of this family, which have been discovered by Professor Schumacher, and which have not before been figured in any botanical work. Besides the descriptions of new or rare plants, the author has given details respecting their uses and cultivation. (*Oversigt over det Danske videnskab. Selskabs forhandl.*)

ASIA.

Vision of Birds of Prey. — It always appeared to us most extraordinary, indeed unaccountable, that birds of prey could scent carcasses at such immense distances as they are said to do. We were led to scepticism on this subject, some twenty years ago, while observing the concourse of birds of prey, from every point of the horizon, to a corpse floating down the river Ganges, and that during the north-east monsoon, when the wind blew steadily from one point of the compass for months in succession. It was extremely difficult to imagine, that the effluvia from a putrefying body in the water could emanate in direct opposition to the current of air, and impinge on the olfactories of birds many miles distant. Such, however, were the *dicta* of natural history, and we could only submit to the general opinion. We have no doubt, now that we know the general opinion to be sometimes wrong, that it was by means of the optic, rather than the olfactory, nerves, " that the said birds smelled out their suit."

The toucan is a bird which ranks next to the vulture, in discerning, whether by smell or by sight, the carrion on which it feeds. The immense size of its bill, which is many times larger than its head, was supposed to present, in its honeycomb texture, an extensive prolongation of the olfactory nerve, and thus to account for its power of smelling at great distances. But, on accurate examination, the texture above mentioned in the bill is found to be mere diploe to give the bill strength. Now the eye of this bird is somewhat larger than the whole brain, and it has been ascertained, by direct experiments, that where very putrid carrion was enclosed in a basket, from which effluvia could freely emanate, but which concealed the offal from sight, it attracted no attention from vultures and other birds of prey, till it was exposed to their view, when they immediately recognised their object, and others came rapidly from different quarters of the horizon, where they were invisible a few minutes before.

This sudden appearance of birds of prey from immense distances, and in every direction, however the wind may blow, is accounted for by their soaring to an altitude far beyond our sight. In this situation, their prey on the ground is seen by them, however minute it may be, and therefore their appearance in our sight is merely their descent from high regions of the atmosphere to within the scope of our optics. The toucan, in India, generally arrives a little in the rear of the vulture, and remains till the larger bird is glutted, while smaller birds of prey, at a still more retired distance, pay similar homage to the toucan. (*Dr. James Johnson,* in *Medico-Chirurg. Review.*)

Art. II. *Natural History in the English Counties.*

Middlesex.

The Chiff-chaff arrives among the first of our summer birds, about the latter end of April, and may be seen moving briskly from right to left in the top branches of some tall tree, calling the peculiar note from which it receives its name. I send you one for inspection which was lately shot in this neighbourhood. — *A Constant Reader. Sept.* 15. 1829.

We have sent the specimen, for which we return our best thanks, to Mr. Sowerby's museum; Mr. Sowerby says it is the Lesser White Throat (*Motacílla* Sylviélla *Lin.*, *C*urrùca Sylviélla *Flem.*). — *Cond.*

Yorkshire.

Scarborough Museum. — Amongst the numerous interesting objects with which Scarborough abounds, the new museum now stands most prominent and attractive. It is situate to the south of the bridge, on an ascending piece of ground, and is seen from the sands rising majestically above that beautiful erection.

The museum is a rotunda of the Roman Doric order, 37 ft. 6 in. in external diameter, and 50 ft. high. The basement contains, *pro tempore*, the library, keeper's room, and laboratory. When sufficient funds are obtained, it is proposed to place these accessories in wings radiating from the central building, which will then be entirely used as a museum. The principal room is 35 ft. high, and is lighted by a central eye or opening. The beautiful Hackness stone, the munificent gift of Sir John B. Johnstone, Bart., has been employed in this building. The fossils, which are very numerous, are arranged on sloping shelves, in the order of their strata, showing at one view, the whole series of the kingdom. A horizontal shelf below sustains the generic arrangement of fossil shells. Amongst the collection of fossils, which is one of the most perfect in England, are two admirable assemblages of local fossils, one purchased of Mr. Williamson, and the other presented to the Society by Mr. Duesbury, being the valuable collection of the late Mr. Hinderwell. The birds and animals are placed above the geological arrangement; so that every part of the museum can be seen at once. The whole expense of the building, fitting up, &c., will be about 1400*l.*, of which 1100*l.* has been raised. The remainder, if not contributed by the liberality of the friends of science, must be raised by loan, on interest. A donation of 25*l.* constitutes a proprietor's share, which is transferable at all times by will or sale, and confers a perpetual right of admission on the family of the owner. A donation of 5*l.* confers the same perpetual right on the families of strangers. The terms of admission to casual visitors are reasonable; and the receipts from this source go to pay the keeper, Mr. Williams, who is always there to explain the geology of the district.

The building has been erected from designs by Mr. R. H. Sharp, architect, of this city, on whom it reflects much credit.

At a public dinner on the opening of this museum, on the 31st of August, an interesting history of its rise and progress was given. It appears that Mr. Dunn, the secretary, convened a meeting at his own house in 1820, which consisted, he states, " of Mr. Hinderwell, the possessor, at that time, of the best collection in the town, and which has since been liberally presented to the museum by Mr. Duesbury; Mr. Travis, whose botanical researches are acknowledged by some of the best writers of the day; Mr. Bean, who was then aspiring to the meridian of glory which he has since attained; and Mr. Smith, the father of English geology, whose connection with any institution would form one of the brightest gems in its diadem. After maturely considering whether a society could be formed at Scarborough or not, Mr. Hinderwell informed us he had promised his own collection to his nephew, and from his age and declining health could not take an active part in its formation. We consequently postponed the accomplishment of our wishes till a more favourable period; hoping, that when Sir John Johnstone resided in our neighbourhood he would patronise our undertaking. In this we have not been deceived, and before Sir John made his tour to Italy, he offered to call a meeting together; but the intellectual atmosphere of Scarborough had not yet acquired that temperature which would be congenial to the growth of so tender a plant. I cannot but lament the circumstance, because if we had been ripe enough we might have formed the first link of that splendid chain of philosophical institutions which has since adorned this country. But if we had not the courage to dare to *lead*, we deserve to *follow*. As to the objects of the institution, allow me to say, that to give energy, concentration, and effect to native talents; to examine the great laboratory of the earth; to establish the locality of natural objects; to trace analogies with distant parts of the earth; to explore worlds of organised beings till lately unheard of, and to make acquaintance with others now in existence, of which we were before ignorant; to collect, and to arrange in a simple, harmonious, and intelligible form, the various objects of natural science; and, in fact, to trace the finger of the Almighty in his multiplied and magnificent operations, are some of the sublime objects of this Society; and if by some they may be considered futile, because they do not seem immediately to produce their return in pounds, shillings, and pence, it is because a certain preparation of mind is necessary beyond the limited calculations of commercial views, to appreciate these objects. But, Sir, when the handicraft of Naples discovered the application of the magnet, who could have foreseen it would have led to the navigation of the world? When Galileo found that, by the adjustment of a few convex glasses, distant objects could be approximated, who could have believed that it would have led to such an intimate acquaintance with the heavenly regions? And when the Marquess of Worcester published his *History of Inventions*, or still more lately, Dr. Black, his *History of Latent Heat*, could any man have foretold that it would be followed by so gigantic an application of the power of steam as we have lived to see? And if such results are the consequences of man's labours, what may we not expect from closely attending to those of Omnipotence? Mr. William Vernon has strikingly observed, in a small work well worthy your attention, 'That to a mind educated in the school of natural history, mankind are indebted for the most extensively beneficial of all the discoveries of the present age.' The same process of thought which led to the observations of the habits of the swallow or the cuckoo, when applied to the diseases of the cow, enabled the immortal Jenner to make the discovery of vaccination, which, with few exceptions, has preserved mankind from one of the greatest of human afflictions. But the mind as well as the body must be fed with milk before it can bear strong meats. The uses of such societies as ours are to adapt their aliment to all classes. The philosopher of many years' standing will have abundant opportunities of enlarging his knowledge: and whether he takes the comprehensive views of the geologist, or descends to particulars with the naturalist; whether he examines the formations of a world, or the elegant arrangements of the petals of a rose; the mountains of the Himalaya, or the wings of a butterfly; the plains of a Pampas, or the convolution of a turbo; the variegated carpet of nature, or the no less varied coat of a caterpillar; — he will be insensibly led by his sublime contemplations 'from nature up to nature's God.' The child, whose time has been hitherto spent in the study of the dead languages, the practical application of which is confined to two or three professions, will have his eyes opened to new objects, from which his father's have long been closed, and his mind directed to a language more ancient than that of Homer, the language of nature, a book which he can never lay aside with an unholy thought. If the human mind, even in the humblest form, cannot be as agreeably entertained in such a sanctuary, as in the purlieus of a pothouse; if, when oppressed with disappointment and sorrow, it cannot here find diversion which will both chasten and enlarge, elevate and refine it from the foul dross of worldly anxieties, then deem this institution unworthy of your patronage, and denounce its secretary as an impostor. Gentlemen, I beg to conclude in the language of the best of our modern historians, Mr. Sharon Turner: 'To be intelligent is now even more necessary than to be affluent, because mind is become the invisible sovereign of the world; and they who cultivate its progress, being diffused every where in society, are the tutors of the human race; they dictate the opinions, they fashion the conduct of men. To be illiterate, or to be imbecile, in this illumed day, is to be despised and trodden down in the tumultuous struggle for wealth, power, and reputation, in which every individual is too eagerly conflicting.'"

Sir J. V. B. Johnstone, in explaining his connection with the museum, adverted to the circumstance of Hull, Whitby, Leeds, and other secondary towns of Yorkshire, having been long conspicuous for their museums, and to the richness of the district in which they lived in botany and conchology and other treasures suitable for a museum. He did not profess to be a philosopher himself, but, says he, "As a landed proprietor, I assure you, honestly, I intend to derive some advantage from this institution. An accurate knowledge of the strata upon my estate, which will enable me at once to lay my hand upon gravel, marl, lime, building and walling stone, surely is not to be despised; and as plants are peculiar to certain soils, a delineation of the strata, whilst it assists the studies of the botanist, will also afford to agriculture a surer basis for improvement. One certain result will certainly follow the knowledge of geology: for the future, the chalk on Sherburn Wold will not be vainly bored for coal, or the Hackness Moors for lead; both which operations have taken place, of course, with dead loss to the proprietors and the community."

Sir George Cayley, after several mirth-creating observations of a local character, said, "You have the advantage of possessing two naturalists in Scarborough, whose names are, perhaps, as well or better known on the Continent than at home, for few men are esteemed prophets in their own provinces. Many there are amongst you who have, amidst other pursuits, given a fair share of attention to scientific objects, and especially to natural history; but Mr. Bean and Mr. Williamson are naturalists by profession, the have dedicated their lives to it, and have made discoveries which have extended the bounds of human knowledge. Such men shed a great lustre over your undertaking. Touching upon this subject, I cannot but express my regret, that Mr. Bean's fair title to the original discovery of certain new fossil vegetables has been superseded on the Continent by Mr. Williamson, who, without any unfair intentions, having given them publicity, as I find in M. Brongniart's late invaluable work on fossil vegetables, they are named after him. With regard to most of these discoveries, I conceive that Mr. Bean stands in the same relationship as Columbus with respect to America, and, on a minor scale, with nearly a parallel result. I do not wish to detract from Mr. Williamson's just merits; he has been indefatigable in his researches on localities discovered by Mr. Bean. I wish that some gentlemen, qualified by local information, would give to the public a proper line of demarcation between two most valuable men; all I wish is, that each should have his due share of public applause; a man's fair fame ought to be as much his own as his estate. I have named the circumstance to my friend, the Baron de Ferussac, who has some years ago acknowledged Mr. Bean's communications in his splendid work on conchology, and I make no doubt some notice will be taken of it in the next number of his *Bulletin Universel.* I must not quit the subject of fossil plants without adverting to the lucid and satisfactory essay of M. Brongniart, who has proved, I believe, to the satisfaction of the most eminent naturalists, that we have five distinct epochs in the previous vegetation of our planet: this will furnish us with such marked and distinct guides, when examining the stratifications of the earth, that men will soon be talking of these matters, as of what occurred at the first, second, or fifth milestones on their journeys. By the classes of plants at these different epochs, we seem to be acquiring a knowledge of the past temperatures of our climate; and in the discovery of certain inflammable and highly expansive fluids, enclosed in crystals, by Dr. Brewster, which, probably, during a long series of aggregation at the same temperature, have been imprisoned in cells which then fitted their contents, but which fluids have, in our present temperature, shrunk so as to leave a partial vacuum, though readily made to fill them again, as may be seen under a microscope, by the application of a heat considerably greater than that of the human body; thus seeming to furnish a sort of register thermometer of the early temperature of our globe. At least such facts lead us to hope that a much more clear developement of our previous planetary history will be attained to, than at one time the nature of the subject seemed to admit." (*Yorkshire Gazette*, Sept. 5).

It would thus appear that an Englishman, when he chooses, can, in a dinner speech, distinguish himself as well in matters of natural history and philosophy, as in politics. Nothing can be more gratifying than to see the power to do this joined with the inclination. It will be no small advantage to this institution to have such a man for their secretary as Mr. Dunn, whose mind is evidently thoroughly imbued with science and universal benevolence. — *Cond.*

P*hysèter catòdon.* — You mention your regret at not being able to obtain a good drawing of the *P*hysèter catòdon; I have, therefore, sent you two

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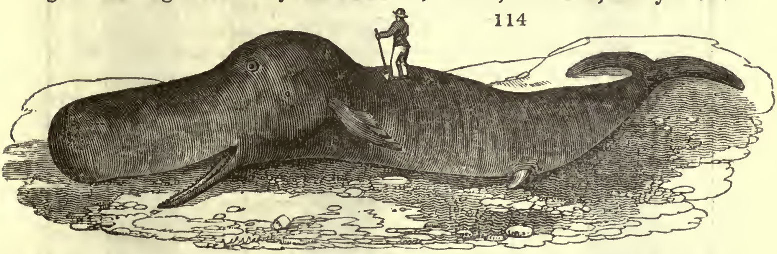

plates of one cast on the Holderness coast, in 1825; the larger plate was from a copy drawn by a land-surveyor, and, though accurate as to admeasurement, is by no means so good a resemblance as the smaller one (*fig.* 114.), which is a very fair representation of the animal, as laid upon the shore. Mr. Davies, the bookseller here, is in possession of an original drawing, by Mr. Dikes, which is said to be the best likeness taken of it.

The whale was claimed by Mr. Constable, as the Lord of Holderness, and the skeleton is now at Burton Constable, the seat of Sir Clifford Constable. It was, however, about two years ago, in a very neglected condition, being laid in an irregular heap, in the middle of a field, as I have been told. Whether it has since been put together and taken care of, I have not heard. Yours, &c. — *Thomas Thompson. Hull, May* 28.

DORSETSHIRE.

Flowers varying in Colour. — During the last month I have found Scabiòsa arvénsis and Erythræ'a *C*entaúrium with white flowers, and *Prunélla* vulgàris with flowers of a rose colour. — *A Constant Reader. Winburne, Sept.*

ART. III. *Calendar of Nature.*

SCOTLAND.

DIAGRAM, showing the Motion of the Mercury in the Barometer and Thermometer, and the Temperature at which Dew is deposited, or the mean of each for every ten days in June and July; also the Depth of Rain in the Pluviometer, and the Quantity of Moisture evaporated from the Evaporating Gauge for the same period; as extracted from the Register kept at Annat Gardens, Perthshire, N. lat. 56° 23½′, above the level of the sea 172 ft., and 15 miles from the coast, by the mean of daily observations at 0 o'clock morning and 10 o'clock evening. (The explanation of the Diagram will be seen at p. 284. supra.)

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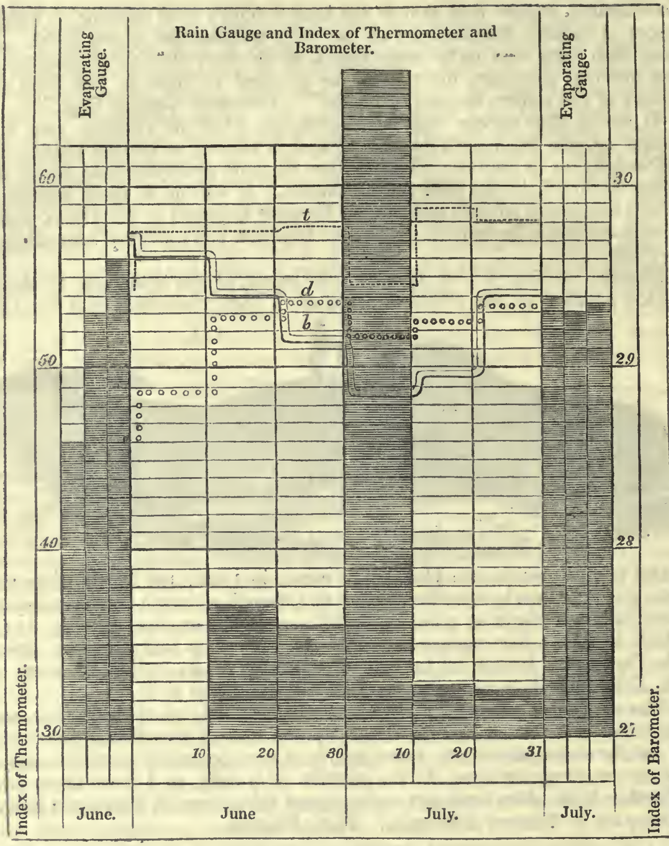


The mean temperature for June this year is 56·7°, which is half a degree lower than on an average of the past seven years for that month. The fall of rain 1·3 in. or within ·2 of an inch of the ordinary average. The mean temperature for July is 57·1°; the ordinary mean for that month, on an average of seven years, is 60·7°. The average fall of rain in July is 2·43 in. This year the fall measures in the rain-gauge 4·35 in. The coldest day in June was on the 5th: mean temperature of that day 50°; extreme cold 40°; wind N.W. Warmest day on the 8th: mean temperature of that day 60°; extreme heat 70·5°; wind S.E. The coldest day in July was on the 3d: mean temperature of that day 50·5°; wind N.W.; extreme cold 46°. Warmest day the 22d: extreme heat 72°; wind W. The mercury in the barometer rose to 29·9° on the 10th of June; wind S.E.: it fell to 28·9° on the 16th; wind N.W. The mercury was lowest on the 2d of July, when it stood at 28·5°; wind S.W.: and highest on the 31st, height 29·55°. There were loud gales of wind from the N.W. on the 3d, 15th, and 16th of June, and on the 22d of July.

At the beginning of June vegetation was about as forward as at the same period last season. The weather continued dry till the 13th of that month; and want of moisture at the root produced a disposition to run rather prematurely to seed in the growing crops; and although the average temperature in June was nearly 2° lower than in the corresponding month last year, yet, for the above reason, vegetation appeared to continue in as forward a state as last season, till near the end of the month. For the sake of more ample reference in future, we shall make more extended remarks respecting the progress of vegetation than we did in our report for June and July last year. The laburnum came in flower on the 4th, and the mulberry was in leaf on the 5th, the same as in 1828; the Prímula scótica and farinòsa (bird's-eye primrose) on the 6th; the *G*erànium sanguíneum on the 7th, and the double-flowered butter-cup (*R*anúnculus àcris) on the 9th. The web caterpillar that infests apple trees appeared on the 11th, a week earlier than last year. The gooseberry caterpillar did not appear at all. Bees began to swarm on the 10th. The Tradescánt*ia* díscolor (spiderwort) was in flower on the 15th, the Búddle*a* globòsa on the 16th, the *A*'ster alpìna on the 18th. Clover that was sown on the 13th brairded on the 19th (6 days); mean temperature of that period 55 5°. Wheat came in the ear on the 22d. The destruction to wheat in this quarter last year, by the maggot, excited early attention to its mode of propagation; and numerous small yellow flies were observed, on that side of the ear which had burst the sheath, busily employed laying eggs through a semitransparent fine tube, which entered within the glume. Though this fly had caused the evil last year, it was not noticed. Strawberries were gathered on the 24th, the same day as last season. Although the clover hay was ready for the scythe at that time, the moist weather prevented the operation of cutting till the first week in July. Field peas, that gave a braird on the 31st of March (see p. 205.) came in flower on the 24th, a period of 85 days; mean temperature of that period 50·3°. The web caterpillar became torpid on the 28th; 4 days later than last season. The wind was from the W. and N.W. 13 days, and from the E. and S.E. 17 days; there were 8 days of brilliant, and 6 of partial, sunshine, and 16 days in which the atmosphere was clouded. There was thunder, accompanied with showers, on the 13th, 14th, 15th, 17th, and 22d.

On the 1st of July a heavy rain fell, amounting to ·8 of an inch; and, in the short space of thirty-eight hours, not less than three inches fell on the 4th and 5th. The subsequent evaporation cooled the air near the earth's surface, and considerably retarded the vegetative process. The atmosphere was often cloudy, and the temperature often fell to 48° during the night at 5 ft. above the earth's surface; and a thermometer lying on the grass frequently indicated 8° lower. The sudden and copious supply of moisture promoted an elongation of plant; but as the ear of many of the *G*ramíneæ, and the flowers of other plants, had been nearly developed during the long and severe drought, vegetation did not for some time seem so backward as might have been inferred from the low temperature, under ordinary circumstances.

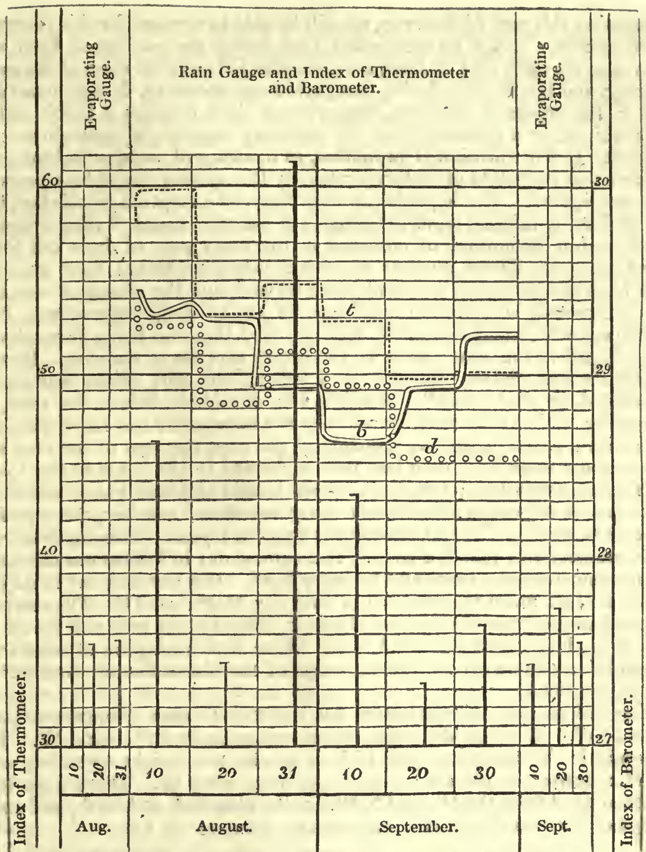
The *A*ntirrhìnum píctum and màjus (snapdragon) came in flower on the 2d of July, and the eggs which had been laid on the 22d of June were formed into small yellow caterpillars in the space of 10 days; mean temperature of that period 55·5°. The single white campanula (Campánula *p*ersicifòlia) came in flower on the 6th; and at that time the white cabbage-butterflies were first observed. It was the 7th before clover hay-cutting could commence by reason of the rains. The *S*enècio *a*brotanifòlius was in flower on the 8th. Oats at Annat Park, that brairded on the 28th of April (see p. 285.), came in ear on the 11th, a period of 74 days; mean temperature of that period 54·3°. The *L*ýchnis chalcedónica was in full flower on the 11th; quite as early as last year.

On the 12th the wheat ears were covered with small black flies, the same as we *erroneously* supposed last year to have been produced by the maggot (see p. 96.). This fly has a round head, but as far as we could discern has no eyes; two antennæ proceed from the lower part of the forehead; it has six small and brownish-coloured legs; its body is covered with a strong beetle-like coat, which renders it very difficult to kill; it is three-jointed, and the wings are something longer than the body: when viewed through a powerful microscope, they appear beautifully reticulated with a plain border fringed with hairs. This fly lodges in the ear, but seldom penetrates within the glume; but when that is opened by the finger where the moths are, these little black flies, which are scarcely a tenth of an inch in length, and small in proportion, attracted by the smell with which they seem to have been long tantalised, come forward, feeling their way with their antennæ, and often pass the caterpillar without seeming to observe it, though within a hair's breadth of touching it; but the moment they do touch the maggot with their forehead they immediately become bent, and fix the anus on any part of the maggot with which they come in contact. The maggot begins to turn itself, and the fly extends her wings to balance herself, and remains about a quarter of a minute, when it moves off, but sometimes returns to repeat the operation two or three times. The fly often dies within two or three days after her eggs are laid, but hitherto we have observed no difference between those maggots that have come in contact with the fly, and those that have been secure from their touch. The ear of wheat becomes parched on the infected side; the caterpillar escapes and falls to the ground, where it does not remain many minutes before it works itself under cover nearly half an inch deep. Those that have lain a fortnight still move when brought to light. The interest excited here by the ravages of this maggot will excuse the apparent digression.

Barley which brairded on the 10th of May (p. 285.) came in the ear on the 18th (69 days); mean temperature of that period 55°. The dry weather in May and June caused the barley to spindle, and the ear appeared in the same space of time it did last season, though there were ·8° less temperature. (p. 96.) Privet came in flower on the 14th; the Bùtomus umbellàtus on the 15th; the *L*ílium cándidum came in flower on the 24th, and gooseberries were ripe on the 29th, about a week later than last season: but a week in the end of July is equal to two weeks in the end of September in promoting the ripening process. There were 13 days of partial, and 5 days of clear, sunshine: in July, 13 days were cloudy, and there were 10 days on which rain fell. The wind blew from the W., S.W., and N.W. 19 days, and from the E. and N.E. 12 days. The air was exceedingly dry before the rains in June, as may be observed by the unusual difference between the mean temperature and point of deposition in the Diagram; and tender foliage of trees was in consequence much shrivelled. Since the 10th of June the air has been unusually moist, often at saturation, and foliage has a fresh and healthy appearance. The dew point is often some degrees higher than the minimum temperature. On the last night of July it was 52°; minimum temperature 46°: of course the moisture deposited in the shape of dew was considerable.

Errata. — In my last Calendar, p. 284., in the sixth line below the Diagram, write the word "under" after "more than 3°;" in the fourth line from the bottom, p. 285., "*N*arcíssus on the 36th," should be on the "30th." Those who have the Numbers will be kind enough to make these corrections with the pen. — *A. G.*

Diagram, showing the Motion of the Mercury in the Barometer and Thermometer, and the Dew Point, or the mean of each, for each ten days in August and September; also the Depth of Rain in the Pluviometer, and Quantity of Moisture evaporated from the Evaporating Gauge for the same period; as extracted from the Register kept at Annat Gardens, Perthshire, N. lat. 56° 23½′, above the level of the sea 172 ft., and 15 miles from the coast, by the mean of daily observations at 10 o'clock morning and 10 o'clock evening.



In place of shading the columns, as in former Diagrams, dark lines are substituted to facilitate the engraving, and represent the depth in inches and tenths of the moisture evaporated in the evaporating gauge, and of rain that fell in the rain-gauge each ten days of the respective months. The dotted line shows the mean temperature; the line marked *d* shows the mean point of deposition, or dew-point (see p. 284.); the double line *b* shows the mean height of the mercurial column in the barometer for each ten days in the two months. The mean temperature for July this year was 57·1°, for August 55·5°, and for September 50·5°. By turning back to p. 94. it will be observed that the temperature in July last year was 4°, in August 3·6°, and in September 6·1° higher than in the corresponding months this year. The rain which fell this year in the months of July and August, and which might be supposed to affect the ripening of the crops, was 9·6 in.: the depth that fell in the two corresponding months of last year was only 4·6 in. This comparatively low temperature and excessive moisture in the soil might have led to the inference that the ripening of the crops would have been proportionally later; and this holds true with regard to the leguminous part of the crop, the ripening of fruits, and the progress of vegetation in general, except the cerealia, which comprehend what is generally termed the "white crop:" but when we take into consideration the structure of the plants composing this part of the crop, we will be able to account for this apparent phenomenon. It will be recollected, that during the months of April and May, and the early part of June, the rains that fell were far short of the usual average, and evaporation during that period was excessive. It is an invariable law in the vegetable kingdom, that when a plant receives a check, either by a wound, or a diminution of the ordinary supplies of nourishment, a tendency to fructification is promoted, as if, aware of its approaching end, it hasted to that state of maturity whereby the species might be preserved and propagated. The leguminous crops form no exception to this law, but are differently affected from the cerealia at different stages of their growth: for though a diminution of moisture in the early part of June did force them soon into flower, an after additional supply promoted their growth; new blossoms appeared, new pods were formed, and the season of maturity was protracted, according to the degree of the existing temperature. Not so the cerealia, which form only one ear; and that ear being formed was not affected to the same extent by the future supplies of moisture. Hence, because wheat, barley, and oats had formed the ear, which was either developed, or what is locally termed in the shot-blade, before the rains, at an earlier period than would have been the case under the same temperature with a greater supply of moisture at the root, this part of the crop was not above a week later than last year in coming to the sickle in the lower districts of Perthshire; but in the more humid highland glens, where the same causes did not operate in the early months of summer, the ripening process is later by three to four weeks than last year. The depth of rain in September this year is 2·25 in. The coldest day in August was the 25th: mean temperature of that day 51°; wind N.W. The warmest day in August was the 31st: mean temperature of that day 61·5°; wind E. The mercury in the barometer was highest on the 31st, height 29·62 in.; and lowest on the 27th, height 28·4 in., wind N.E. There were brisk gales of wind from the N.W. on the 24th and 25th; range of the thermometer from 42° to 72° in the shade.

The coldest day in September was the 28th: mean temperature 46°; wind N.W. Warmest day 26th: mean temperature 57°; wind W. The mercury in the barometer was highest on the 1st; height 29·54 in., wind N.W.: lowest on the 6th; height 28·65 in., wind W. There were loud gales of wind from the W. and N.W. on the 21st, 22d, 23d, 28th, and 29th; range of the mercury in the thermometer from 38° to 65°.

Calendar of Nature for the Carse of Gowrie, Perthshire.

On the 4th of August, very heavy rain, which continued for twenty-seven hours without intermission, was accompanied at its commencement with vivid flashes of forked lightning and loud and long-continued peals of thunder, and violent wind from the N.E., with the temperature as low as 46°; the rain that fell amounted to 1·40 in. On the 27th, during twenty-four hours, about 2·25 in. of rain fell, with the wind from the same quarter. The general characteristic of the weather throughout the month was moist with a clouded atmosphere; there being 17 days cloudy, 7 days of partial sunshine, and only 7 days in the month of clear sunshine; the wind blew from the N. and E. 13 days, and from the N. and W. 18 days. The Digitàlis ferrugínea came in flower on the 1st, the Scabiòsa succìsa on the 8th, the Coreópsis verticillàta on the 10th, the *A*'ster *A*méllus on the 11th. Barley that came in the ear on the 26th of June was ripe on the 21st, a period of 56 days, mean temperature of that period 56·6°; under a temperature of 59·4°, last year, barley ripened from the time of earing in 49 days; difference of time 7 days, and of heat 2·6°. (p. 96.) The flowers of the *C*ólchicum autumnàle appeared above ground on the 24th, nearly two weeks later than last year; cabbage plants brairded on the 26th that had been sown on the 17th, 9 days: mean temperature of that period 54·6. The Boccòn*ia q*uercifòlia was in flower on the 29th; and wheat that came in the ear on the 22d of June was cut ripe on the last day of the month, a period of 70 days: mean temperature of that period 56·6°.

The weather continued moist during the first 10 days of September, and the atmosphere mostly cloudy; from that period the atmosphere was clearer, and brisk gales of wind were frequent, and much of the crops were got in, in good condition; with the exception of beans, the ground was clear by the 28th in the Low Carse. In September there were 15 days of brilliant sunshine, 7 days of partial sunshine, and 8 days cloudy. The tiger lily came in flower on the 1st; ripe figs were pulled on the 2d; Spanish broom flowered on the 4th; Moorpark apricots ripening only on one side. Green-gage plums were ripe on the 17th, white Beurré pears on the 29th. Elruge nectarines not yet ripe. The sportsmen find the game scarce. Few young partridges have been hatched, and the skeletons of several dams have been found in the nest by the reapers. Hares are not so plenty as usual; the young are still feeble. Swallows have disappeared, and the sea-mews appear in myriads on ploughed fields. Few wildgeese have as yet reached their winter quarters in the Low Carse. — *Sept.* 30.

Art. IV. *Retrospective Criticism.*

Errata. — Page 302. line 15. for "Capucaila" read "Capercaile," the common name of the mountain cock. Retrospective critics should be free from errors, and (to use a common proverb) "ought to sweep before their own doors." — *B. C.*

Page 275. line 27. for "A'lca *A*'lce" read "A'lca A'lle;" and after "species" add "of Petrel."

The Water-Shrew. — Sir, The description given by Mr. Dovaston of the water-shrew (p. 219.), will, I think, lead to some interesting facts in the natural history of British shrews. I am inclined to think that the animal there described differs from the *S*òrex fòdiens, given by Stark as a synonyme of the *S*òrex Daubentòn*ii* of Geoffroy, and what the author supposes it to be. The characters of the former are black above, and *cinereous* or *ash c*olour beneath, ears and eyes very small, its length is nearly 6 in., snout long and small, it burrows near water, and, according to Berkenhout (*Synopsis of the Nat. Hist. of Great Britain*, 1789), inhabits Lincolnshire. Now I have seen (though I have not yet been able to procure a specimen) a water-shrew that very nearly answered this description, in the *moors* of Lanarkshire, which correspond very nearly, in physical characters, with the fens of Lincolnshire. But the *S*òrex Daubentòn*ii*, *Le Greber* (digger) of Pallas and of Vicq d'Azyr, besides the character of its ear being provided with three small valves, capable of shutting it entirely, which would have presented to the eye of Mr. Dovaston the appearance of being buried in the fur, has the toes of the feet bordered with stiff hairs, the tail square-shaped, a little shorter than the body, the fur blackish above and white below; it sleeps during the day, and hunts in the evening and morning; its length is only 3 in. The animal seen by Mr. Dovaston answers this description; according to this gentleman, the belly and throat were of the purest silver white, distinguishing it from the *S. C*ollùrio, the ears were almost buried in fur, length about 3 in., tail shorter, being not quite 2 in., the claws fringed with very fine bristles; it was never seen till near sunset, once only at noon. Pennant describes the *S.* fòdiens, which, in its length, and in the presence of a dusky spot near the tail, would approximate to this species. The error will be traced, I suspect, to the fact of two distinct species having been confounded; and if this were the case, this little animal would be the representative of the true *musaraigne d'eau* of the French writers, first noticed by Pallas, and since admitted into systems by the name of *S*òrex Daubentòn*ii*, with which the *S*òrex fòdiens would not be connected as synonymous, but left apart, as a well-marked and distinct British species. Yours, &c. — *William Ainsworth.* 11. *Gardener's Crescent, Edinburgh, Sept.* 1829.

Art. V. *Queries and Answers.*

A Pair of Butcher Birds (*Lànius Collùrio, m. et f.?*). — About three years ago, a pair of butcher birds were observed building in this neighbourhood, and were watched till their eggs were on the point of hatching and then snared. These birds have since come into my possession, and on comparing them with the plates and descriptions in Bewick's sixth edition of *Land Birds*, I find the male agrees precisely with that of the red-backed shrike, p. 73., and the female with the one at p. 75., which is there called the woodchat; but in the appendix, p. 377., where another figure of the woodchat is given from a specimen in the collection of Mr. Leadbeater, is the following paragraph in allusion to this figure: — "At page 75. is given a figure of a shrike, which, judging from that of Buffon, appears to be the female of the woodchat; hence it may be concluded, that if the female is found in this country, so in all probability is the male also." Now as this appears to be the only reason Mr. Bewick had for stating this bird to be the female woodchat (Lànius rùfus), I suppose that he is in error, and that the figures at p. 73. and 75. are the male and female red-backed shrike (Lànius Collùrio). I have never seen a specimen of the woodchat known to have been killed in Britain; but, perhaps, some of your readers will be able to throw a little light upon both these points. — *W. Farrar, M.D. Barnsley, Aug.* 1. 1829.

Peculiar Smell of the Greater Shrike. — Sir, Can any of your correspondents account for the peculiar smell which proceeds from the greater shrike (L. excùbitor) after death, and which is not unlike the smell which arises from the explosion of gunpowder? I have noticed the same peculiarity in the nuthatch (Sítta europæ`a), but in a much less degree. Yours, &c. — *A. N. July* 21. 1829.

The Storks in Germany. — Sir, In Lower Germany there is a singular belief concerning the storks (*abus*, as the Low Germans call them), which build on the ridges of the thatched houses in the flat and marshy parts of Germany. It is, that they pay the master of the house for leave to build their nests on his roof; the *first* year they pay a *quill feather*, some say cut into a pen; the *second*, an *egg;* and the *third* year a *young one;* the *fourth* year they begin with the *feather again*, and so on as long as the same pair continue to build on the house. These payments they lay on the dunghill, which stands before what the Germans call the long door, like our barn door; the barn and dwelling-house are under the same roof, the door for the family is at the side.

This I was assured was the fact by several, but I could find none who had seen it, they only knew somebody who had a nest and had been paid. They think it a sign of good luck to have a nest, and, therefore, as soon as they see a pair of storks flying about, they collect straw, &c., for them to make their nest with. Perhaps some of your numerous correspondents can speak to the truth or falsity of the fact. — *G. H. Clapton, Aug.* 28. 1829.

Softening the Skins of Birds. — Sir, I should feel greatly obliged to any of your correspondents, if they would inform me, through the medium of your Magazine, how to soften the skins of birds which have become dry and hard, without injuring the feathers. Having received specimens in this state from friends, who have been able to skin the bird, but not to mount it afterwards; I am at a loss how to restore suppleness, and am rather surprised that in all the treatises which I have read on taxidermy, I have not found any instructions upon a point so necessary to be known by preservers of subjects of natural history. I am, Sir, &c. — *J. A. H.*

Acìlius pumilèonis. — What are the habits of this insect, which is said to prove ruinous to the wheat crops in particular situations? — *P. S. Berwickshire, August,* 1829.

The Zimb. — I have lately read that the effects produced by this insect, both on man and beast, are of a dreadful nature. Bruce, in his *Travels in Africa*, says, " As soon as this winged assassin appears, and his buzzing is heard, the cattle forsake their food, and run wildly about the plain till they are worn out with fatigue, fright, and pain." I shall feel obliged if any of your correspondents can inform me to what order this terrible insect belongs, with a description of its habits, and the method of producing the fatal effects ascribed to it. Is it not the *fly* mentioned by the prophet Isaiah, ch. vii. v. 18. and 19.? — *W. H. White. Bedford, June* 9. 1829.

Spinning Slugs. (p. 69. and 303.)—Sir, Careful observers of natural phenomena may doubtless find many opportunities of observing slugs spin. I, without pretending to be more than a casual observer, and having but few opportunities, have witnessed it more than once; and I can state from actual observation, that slugs do climb up trees at this time of the year (July), and particularly in warm damp weather, and suspend themselves by a slimy cord from a branch; but that it is not done for any purpose implied in, or that could be inferred from, your correspondent's article; it is for the purpose of copulation, and I believe all our indigenous slugs procreate in the same manner. I have never seen snails shooting love shafts at each other; I should be glad I did, being rather sceptical on that head. Perhaps some of your correspondents could give some information as to what time of year and in what situations they might be observed. I am, Sir, &c. — *J. B. Liverpool, July* 10. 1829.

Flòra Virgiliàna. — Sir, Your correspondent W. (p. 401.) expresses a desire that you should furnish us with a *complete* Flòra Virgiliàna. " I should like," he says, " to see all the weeds included;" a desire in which every botanist, as well as scholar, will be ready to join. It were, indeed, devoutly to be wished; for we should then, with W., " recur with a new pleasure to our old acquaintance,"—

> " Lappæque tribulique; interque nitentia culta
> Infelix lolium," &c.

Till something of the kind be effected, schoolboys are under the necessity of rendering these words, not by their real appropriate names, but by those of some analogous weeds of their own country, and their masters are unable to teach them better. My schoolmaster, Mr. Editor, was a botanist as well as a scholar; and as I had early imbibed a love for natural history, the georgic lesson was always a pleasure to me, — I believe I may say, to both of us. Still, however, even with the help of Martyn's edition, which he always had before him on the occasion, and kindly allowed me to consult, we were sometimes at a fault; the Roman plants seemed often to defy us to identify them, and Virgil and Linnæus were not easily to be reconciled.

Your correspondent having dismissed the *weeds*, goes on to say, " In the mean time, until difficulties be cleared away, let us rejoice in the"

> —— " biferique rosaria Pæsti:
> Et virides apio ripæ, tortusque per herbam
> . . . . cucumis; nec *sera comantem*
> *Narcissum*, aut *flexi* . . . *vimen acanthi*," &c.

From the manner in which these lines are introduced, I am almost inclined to think that your correspondent sees no difficulties here, and is satisfied as to the species of all the plants enumerated in this passage. But does it not present us with some obscurities as great as those in which the weeds before mentioned are involved? What species, for instance, is meant by " sera comantem narcissum?" Most, if not all the *Narcíssi*, are, with us at least, early spring flowers. I almost fancy I have somewhere read (or else the idea itself has occurred to my mind), that no species of narcissus or daffodil was intended, but rather Amarýllis lùtea, the yellow autumnal lily. Be this as it may, however, at least " flexi vimen acanthi " was always a great puzzler, and has afforded much matter for discussion among the learned. On referring to Martyn's *Georgics,* I see it suggested, from the impossibility of finding any one plant with which all the characters ascribed to acanthus will agree, that the poet in all probability speaks in different passages of two distinct plants under that name, the one a tree, and the other an herb. From the well-known anecdote about the origin of the Corinthian capital, we might be led, reasonably enough, to identify the acanthus of the ancients with the Linnean genus of the same name. On the other hand, Sir J. Smith, if I remember right (for I cannot immediately refer to the passage), strenuously contends that the acanthus of Virgil is no other than the common holly (*I*'lex *A*quifòlium). Possibly this great botanist, when he broached such an opinion, might not have sufficiently attended to the various passages of Virgil in which the acanthus is mentioned, and the apparently discordant accounts given of it. For, as Professor Martyn observes, in one place Virgil speaks of it as a tree that bears berries, and is always green :

—— " baccas semper frondentis acanthi." (*Georg.* ii. 119.)

Again, in *Georg.* iv. 123. already quoted, he seems to speak of it as a twining plant, and a little afterwards he mentions it as a garden plant :

" Ille comam mollis jam tum tondebat acanthi."

The epithet *mollis* is surely quite inapplicable to the holly, and except by way of contrast (as Linnæus employs it in naming one species), almost equally so to the modern genus *A*cánthus. It is a remark, perhaps too obvious to mention, that much allowance must be made for the heightening of poetical diction, and that the same accuracy of botanical description must not be looked for in the beautiful lines of the Mantuan bard, as we may fairly expect in the *Spècies Plantàrum* of the great Swede. On these and similar knotty points, Mr. Editor, I should be glad of further information, through the pages of your Magazine. Yours, &c. — *B. Coventry, Sept.* 8.

The Specimen of the Shrub from Claremont, sent by Miss C. Watson, in order to ascertain its name, is the Grevíll*ea* (in commemoration of the Right Hon. Charles Greville) punícea, Prote*àceæ* (*fig.* 117.), an elegant shrub introduced a few years ago from New South Wales, and usually kept in the green-house. If gathered in the open shrubbery, as our correspondent says it was, it must have been turned out there for the summer season, or by way of experiment. — *Cond.*

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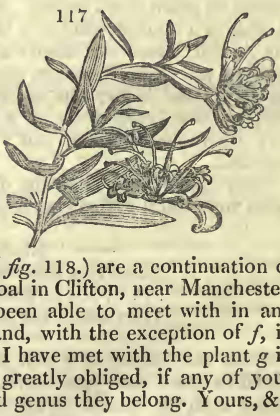

Fossil Plants. — The enclosed drawings (*fig.* 118.) are a continuation of the fossil plants found in the Little Mine Coal in Clifton, near Manchester. The figures *a*, *b*, *c*, *d*, *e*, and *f*, I have not been able to meet with in any other mine; they are drawn the full size, and, with the exception of *f*, in nearly the same situation as when found. I have met with the plant *g* in most mines in Lancashire. I should feel greatly obliged, if any of your readers would inform me to what order and genus they belong. Yours, &c. — *B. St. Helen's, June* 4. 1829.

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The Dadley's Spring. — Sir, The corn spring in this parish, which I gave a short notice of, p. 297. of your Magazine, I visited on the 21st of August, and found that it had entirely ceased to flow. The exact period of its cessation I am unable to state; but I know that it was flowing about the middle of June or later, though with a somewhat diminished stream. From the appearance which the channel presented on the 21st of August, I should suppose the spring must have ceased to flow for at least a fortnight or more. Is it not fair to infer that its operations may have been stopped by the long continued drought in the early part of the summer? The late heavy rains have probably not yet had time to produce a counter effect. Allow me to remark, that your printer has committed a slight mistake in the orthography of the name of the above-mentioned spring: it should be *Dadley's* spring, not *Dudley's*, as printed at p. 297. Yours, &c. — *W. T. Bree. Allesley Rectory, August* 26. 1829.

The Corn Spring (p. 297. 408). — May not this be accounted for on the principle of the intermitting springs explained in the *Library of Useful Knowledge*, under Hydrostatics? — *John Mearns. Shobden Court, near Leominster, Sept.* 27. 1829.

Muphatamet's Optical Phenomenon (p. 108.) is perfectly easy of solution, without having recourse to any supposition about the effect of refraction. No shadows can be visible unless produced by bodies obstructing the rays or stream of light, whether from the body or from the reflected image of the sun. The first and darkest shadow was that of the passenger on the wall, produced in the ordinary way (*fig.* 119. *a*). The second was the shadow of

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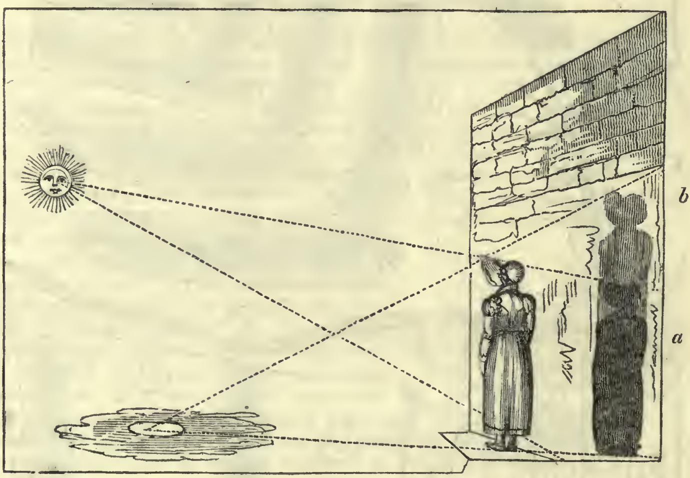

the same passenger (*b*), produced by the obstruction of the stream of reflected light from the sun's image presented on the watery surface of the street, as shown in the diagram annexed. As proof of this, let any one stand between a wall and a piece of water (or looking-glass laid on the ground in the line of the sun), so as the spectator can see both the sun and the sun's image at the same time; he will have a double shadow on the walls quite visible to himself or others. This effect is often seen, or may be seen, in well-lighted rooms where there are plate looking-glasses or mirrors. — *J. M.*

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