TABLE XLIII.—*Showing the Effects of Theine on the Temperature of the Ear of a Rabbit.—Normal Temperature of Rabbit,* 33.8 C.

Temperature after Injection of Theine.

2.	33.2 per ¼ minute, at	2.0 P.M.	10.	33.5 per ¼ minute, at	2.33 P.M.
3.	34.2 ,,	2.5 ,,	11.	33.4 ,,	2.40 ,,
4.	34.1 ,,	2.8 ,,	12.	33.4 ,,	2.45 ,,
5.	34.9 ,,	2.10 ,,	13.	33.5 ,,	2.50 ,,
6.	35.5 ,,	1.15 ,,	14.	32.8 ,,	2.55 ,,
7.	34.6 ,,	2.18 ,,	15.	33.9 ,,	2.58 ,,
8.	34.9 ,,	2.22 ,,	16.	33.5 ,,	3.0 ,,
9.	35.1 ,,	2.25 ,,	17.	33.9 ,,	3.4 ,,

TABLE XLIV.—*Showing the Effects of Caffeine on the Respiratory Movements of a Rabbit.*

Natural Respirations taken at intervals.

1.	34 per ¼ minute, at	1.10 P.M.	4.	33 per ¼ minute, at	1.13 P.M.
2.	32 ,,	1.11 ,,	5.	,,	1.14 ,,
3.	28 ,,	1.12 ,,	6.	,,	1.15 ,,

Respiration after Injection of Caffeine.

7.	42 per ¼ minute, at	1.17 P.M.	13.	40 per ¼ minute, at	1.35 P.M.
8.	44 ,,	1.19 ,,	14.	46 ,,	1.37 ,,
9.	42 ,,	1.21 ,,	15.	30 ,,	1.40 ,,
10.	46 ,,	1.24 ,,	16.	30 ,,	1.42 ,,
11.	46 ,,	1.29 ,,	17.	34 ,,	1.45 ,,
12.	40 ,,	1.33 ,,	18.	36 ,,	1.48 ,,

TABLE XLV.—*Showing the Effects of Caffeine on the Cardiac Pulsations of a Rabbit.*

Normal Pulsations of the Heart taken at intervals.

1.	Per ¼ minute, 86	3.	Per ¼ minute, 82	5.	Per ¼ minute, 78
2.	,, 80	4.	,, 76	6.	,, 82

Pulsations after Injection of Caffeine.

7.	90 per ¼ minute, at	1.16 P.M.	11.	82 per ¼ minute, at	1.30 P.M.
8.	86 ,,	1.18 ,,	12.	74 ,,	1.35 ,,
9.	84 ,,	1.22 ,,	13.	48 ,,	1.45 ,,
10.	80 ,,	1.25 ,,	14.	40 ,,	1.48 ,,

Immediately after death, heart beats 12 per ¼ minute.

TABLE XLVI.—*Showing the Effects of Caffeine on the Temperature of the Ear of a Rabbit.—Normal Temperature of the Ear,* 33.9 C.

Temperature after Injection of Caffeine.

1.	35.6 c. per ¼ minute, at	1.20 P.M.	3.	36.6 c. per ¼ minute, at	1.35 P.M.
2.	35 c. ,,	1.27 ,,	4.	34.9 c. ,,	1.45 ,,

TABLE XLVII.—*Showing the Effects of Guaranine on the Respiratory Movements of a Rabbit.*

Normal Respirations taken at intervals.

1.	Per ¼ minute, 41	3.	Per ¼ minute, 34	5.	Per ¼ minute, 32
2.	,, 36	4.	,, 30	6.	,, 30

Respirations after Injection of Guaranine.

7.	48 per ¼ minute, at	4.20 P.M.	19.	36 per ¼ minute, at	4.50 P.M.	
8.	34 ,,	4.22 ,,	20.	36 ,,	4.55 ,,	
9.	44 ,,	4.26 ,,	21.	28 ,,	5.0 ,,	
10.	50 ,,	4.31 ,,	22.	28 ,,	5.2 ,,	
11.	64 ,,	4.32 ,,	23.	30 ,,	5.5 ,,	
12.	52 ,,	4.33 ,,	24.	28 ,,	5.8 ,,	
13.	38 ,,	4.35 ,,	25.	20 ,,	5.12 ,,	
14.	38 ,,	4.38 ,,	26.	34 ,,	5.15 ,,	
15.	40 ,,	4.40 ,,	27.	18 ,,	12.20	
16.	42 ,,	4.43 ,,	28.	20 ,,	12.22	Next
17.	42 ,,	4.45 ,,	29.	22 ,,	12.34	morning
18.	31 ,,	4.48 ,,	30.	22 ,,	12.26	

TABLE XLVIII.—*Showing the Effects of Guaranine on the Cardiac Pulsations of a Rabbit.*

Normal Pulsations of Heart taken at intervals.

1.	Per ¼ minute, 66	3.	Per ¼ minute, 78	5.	Per ¼ minute, 72
2.	,, 72	4.	,, 72	6.	,, 68

Pulsations of Heart after Injection of Guaranine.

7.	78 per ¼ minute, at	4.21 P.M.	19.	78 per ¼ minute, at	4.50 P.M.	
8.	80 ,,	4.23 ,,	20.	60 ,,	4.55 ,,	
9.	70 ,,	4.25 ,,	21.	74 ,,	5.1 ,,	
10.	74 ,,	4.30 ,,	22.	76 ,,	5.3 ,,	
11.	74 ,,	4.33 ,,	23.	86 ,,	5.7 ,,	
12.	74 ,,	4.34 ,,	24.	80 ,,	5.8 ,,	
13.	86 ,,	4.35 ,,	25.	80 ,,	5.12 ,,	
14.	86 ,,	4.37 ,,	26.	80 ,,	5.18 ,,	
15.	90 ,,	4.38 ,,	27.	88 ,,	1.21	
16.	90 ,,	4.43 ,,	28.	86 ,,	12.23	Next
17.	90 ,,	4.46 ,,	29.	78 ,,	12.25	morn-
18.	78 ,,	4.49 ,,	30.	86 ,,	12.27	ing.

TABLE XLIX.—*Showing the Effects of Guaranine on the Temperature of the Ear of a Rabbit.—Normal Temperature of Ear,* 32.3 C.

1.	29.8 per ¼ minute, at	4.14 P.M.	7.	33.5 per ¼ minute, at	4.48 P.M.
2.	33.5 ,,	4.25 ,,	8.	35.0 ,,	4.50 ,,
3.	34.6 ,,	4.30 ,,	9.	33.4 ,,	5.5 ,,
4.	35.1 ,,	4.32 ,,	10.	33.3 ,,	5.12 ,,
5.	34.6 ,,	4.35 ,,	11.	34.3 ,,	12.30 ,, next
6.	34.0 ,,	4.43 ,,		morning.	

[*To be continued.*]

ATROPIA AS AN ANTIDOTE TO POISONOUS MUSHROOMS.

By T. LAUDER BRUNTON, M.D., F.R.S.,
Casualty Physician and Lecturer on Materia Medica and Therapeutics at St. Bartholomew's Hospital.

IT is, perhaps, not very generally known that one of the most perfect instances of antagonism with which we are acquainted is the power of atropia to counteract the poisonous principle of mushrooms. This principle seems to be the same, or nearly the same, in different species of mushroom, for they all seem to have similar actions. The *Agaricus muscarius, A. phalloides, A. pantherinus, Boletus Satanas,* and *Russula fœtens,* all resemble one another in action; but the effects produced by the same sort of fungus may vary in different individuals. They all act more or less on the intestinal canal and heart, and apparently also on the brain. The usual symptoms are uneasiness in the stomach, vomiting, purging, a feeling of constriction in the neck, want of breath, giddiness, fainting, prostration, and stupor. Sometimes the intestinal symptoms are most prominent; at other times, the cerebral ones. The most extraordinary action of poisonous mushrooms is upon the heart. The active principle of the *Agaricus muscarius,* or *Amanita muscaria,* was separated by my friend Professor Schmiedeberg of Strasburg, and named by him muscarin. The merest trace of this alkaloid will arrest the pulsations of the frog's heart almost instantaneously, and prevent it from ever beating again unless its effect be counteracted. But if a minute quantity of atropia be brought into contact with the organ, it will begin to pulsate again, and will go on beating for a long time. I have stopped the motions of a frog's heart by dropping a little dilute muscarin upon it, and have again made it pulsate after it had remained perfectly motionless for no less than four hours. Muscarin does not stop the heart of mammals so readily as that of the frog, but it renders the pulse slower, and intermissions are sometimes noticed in cases of poisoning by mushrooms. A little atropia at once counteracts the effect of muscarin on the heart in mammals just as it does in the frog.

But, besides this remarkable effect of muscarin on the heart discovered by Professor Schmiedeberg, it possesses one no less extraordinary upon the pulmonary vessels. This I discovered some time ago, when experimenting with a specimen of muscarin given to me by my friend. He had noticed that intense dyspnœa was one of the most marked symptoms produced by the poison. He had not, however, attempted to explain it. He had observed that during the dyspnœa the arteries contained very little blood, and when cut across hardly bled at all. On considering the matter, it appeared to me that this emptiness of the arteries and the dyspnœa might be due to a common cause, viz., contraction of the pulmonary vessels. If these vessels contract spasmodically, the blood will be prevented from passing through them, and will accumulate in the right side of the heart. The right heart and veins will consequently become gorged with blood, while none will reach the left side, so that both it and the arteries will remain empty or nearly so (see fig. 1). As the blood cannot reach the lungs to become aërated, dyspnœa occurs; for this may be produced as well by preventing the blood from reaching the air as by compressing the windpipe, and thus preventing the air from reaching the blood. This supposition of mine appeared to explain the symptoms perfectly; but it was only a supposition, and required to be tested by experiment before it could be regarded as having any value. I accordingly tested it in the following way.

Having thoroughly narcotised a rabbit with hydrate of chloral, I commenced artificial respiration, and opened the thorax, so that I could see the lungs and the heart perfectly. It is well known that with due precautions animals can be kept in this condition, for an hour or two at least, without any change occurring in either heart or lungs. The animal is so deeply narcotised that it lies as if dead, but the heart goes on pulsating as regularly as if everything were in its normal condition. Both sides of the heart are equally filled, the vena cava is only moderately distended, and the lungs are rosy. While this state of things continued, I injected a little muscarin into the jugular vein. At once everything changed. The lungs became blanched, the left side of the heart became small, the right side swelled up, and the vena cava became greatly distended. (See fig. 1.) After a short time, I injected a little atropia into the jugular vein, and instantly everything returned to its normal condition. The left side of the heart regained its former size, the right side diminished, the distension of the veins disappeared, and the blanched lungs again assumed a rosy hue (see fig. 2). This was exactly what I expected, and consequently I was all the more distrustful of my own personal observations. A little prejudice might have led me to exaggerate the blanching of the lungs, although the condition of the

heart and veins was so obvious as to preclude the possibility of error. I accordingly got two observers who knew nothing about the experiment, and repeated it before them, noting down *their* observations. These agreed exactly with my own, and I thus became sure of my facts.

As dyspnœa is observed after poisoning by mushrooms, both in animals and men, we may, I think, safely extend the results we have obtained by experiments on the lower animals to men, and say that in

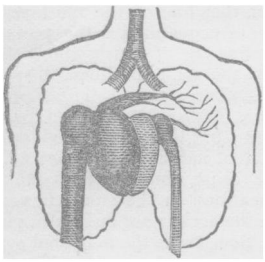

Fig. 1.

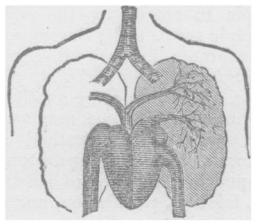

Fig. 2.

them also the dyspnœa is due to spasmodic contraction of the pulmonary vessels. The dyspnœa, as well as the other symptoms of muscarin poisoning, disappear in animals almost immediately after the injection of atropia, and, indeed, Schmiedeberg and Koppe describe an experiment in which the use of this antidote during the death-struggle completely restored a dog which had been poisoned by muscarin. They, therefore, recommend that in cases of poisoning by mushrooms the stomach should be emptied, and then atropia injected subcutaneously. It is a curious circumstance that, in poisoning by mushrooms, tickling the fauces seems to prove much more efficacious in producing vomiting than the administration of tartar emetic. The antidote may be given by the mouth, either in the form of tincture of belladonna or liquor atropiæ; but Schmiedeberg and Koppe prefer subcutaneous injection, on account of the more rapid absorption and speedy action of the drug, as well as the more accurate adjustment of the dose. The dose for subcutaneous injection should be about one-hundredth of a grain or about one minim of the liquor atropiæ sulphatis (*B. P.*) repeated if necessary until the dyspnœa is relieved.

ON A RARE MODIFICATION OF ALBUMEN IN THE URINE.

By GEORGE JOHNSON, M.D., F.R.S.,
Professor of Medicine in King's College; Physician to King's College Hospital.

On October 31st, I saw for the first time, at the Charing Cross Hotel, a fine muscular gentleman about thirty-five years of age, who had some febrile symptoms with muscular pains, which I at first thought might be a slight return of a Roman malarious fever from which he had suffered two years ago. The temperature was 101.5; pulse 80. After two days, his throat became sore, and there was much congestion of the uvula, tonsils, and fauces. The congestion extended to the mucous membrane of the larynx, which was red and swollen; and his voice was husky. The throat presented appearances which I have sometimes seen as a result of exposure to sewer-gas, but there was no evidence that he had been thus exposed.

I gave him three-grain doses of quinine three times a day, and a chlorate of potash gargle. The symptoms rapidly passed away, and on November 5th he was so well that I took my leave of him.

At my first visit, I took away a sample of his urine, which I found to present remarkable reactions with heat and nitric acid. I then handed it over to my son, who has recently published an elaborate paper on Certain Compounds of Albumen with the Acids (*Journal of the Chemical Society*, August 1874). I subjoin his report on the specimen. I have only to add that, on the day after I obtained the first specimen, and each day afterwards, the urine of this patient was found not to contain the peculiar substance here described.

Report on a Specimen of Urine, by George Stillingfleet Johnson, Daniell Scholar of King's College, London.—The urine was high coloured, feebly acid, and became slightly turbid on boiling. This slight turbidity was at once cleared up by the addition of nitric acid (phosphates). A few drops of nitric acid produced in the cold urine a copious white precipitate, which was at once dissolved on heating or on the addition of more nitric acid. This precipitate did not reappear on cooling, nor on neutralising the acid with potash. A solution of corrosive sublimate gave a copious white flaky precipitate, not dissolved by heat, and resembling ordinary coagulated albumen. Solution of ferrocyanide of potassium gave no precipitate either in the cold or on heating; and, after the addition of this salt to the cold urine, nitric acid failed to produce any precipitate.

The urine was placed on a dialyser of parchment-paper, which was floated on some distilled water. After twenty-four hours, the liquid on the dialyser was found to be neutral; and its behaviour with reagents was much altered, though no odour of decomposition was perceptible. Nitric acid now produced a transparent gelatinous precipitate, dissolved by heat. The application of heat alone produced no alteration, nor did solutions of potassium-ferrocyanide, and ammonium-chloride. Solutions of corrosive sublimate, silver-nitrate, and plumbic acetate, produced gelatinous precipitates not dissolved by heat.

The precipitate produced by corrosive sublimate in the original urine, and the viscosity of the liquid, would lead one to suspect the presence of ordinary albumen; but the absence of coagulation by heat, and the resolution of the coagulum produced by nitric acid on adding excess of the acid or on heating, together with the very curious change produced by dialysis, would seem to indicate a perfectly distinct modification of albumen.

Dr. Beale has published a case (*Kidney-Diseases, Urinary Deposits, and Calculous Disorders*, p. 227), reported by Dr. Leared, in which the urine gave exactly the same reactions with heat and acid as the sample above described.

THERAPEUTIC MEMORANDA.

TWO CASES OF ALOPECIA SUCCESSFULLY TREATED BY LOCAL STIMULANTS.

Case I was that of a married man, aged 54, with a large family of perfectly healthy children. He had always enjoyed good health until about a year previously, when he experienced a sudden and severe nervous shock. Shortly afterwards, he first noticed symptoms of baldness, his hair becoming thinner and falling off, particularly over the head; so much so, that in a few weeks his scalp presented a perfectly white and shiny appearance, with no vestige of hair left, rendering the use of a wig necessary. The disease continued gradually to spread, until the whole of his body was more or less implicated. When he applied to me, he stated that he had been under treatment for some months, but with no benefit; and, to use his own words, "had been discharged as incurable". On making a careful examinaton of his body, I found a condition of almost general alopecia to exist, the skin having an uniform white, smooth, and shiny appearance. I put him under a strictly nutritious and digestible dietary, and prescribed tonics to improve his general health. Locally to the scalp I painted on some blistering fluid, repeating the application once a fortnight, and ordered the following lotion; carbonate of ammonia one drachm, tincture of capsicum one drachm, rectified spirit one ounce, glycerine one ounce, and rose-water to eight ounces, to be applied freely over the body night and morning. For two months I could distinguish no appreciable improvement in his condition; but, after that period, new hair, very silky and quite white, began slowly to grow, and became thicker and stronger until the body and head assumed all the appearance of health, being well covered with hair over the different regions, although the colour of that hair, originally dark brown, was now permanently quite white. In this condition he was discharged as cured after seven months' treatment. About three months afterwards I met him, and he stated that he had experienced no return of the disease in any way. I may here observe that, in this man's case, there was no history of acquired or congenital syphilis, or, in fact, any apparent cause for the disease beyond the shock he mentioned.

Case II was that of a married woman, aged 32, with five children, who applied to me with alopecia circumscripta of two years' standing. Her husband and children appeared quite healthy, and she stated that she had never known a day's illness, and that the disease seemed in no way to affect her general health. I could obtain no information as to the origin of the disease, and there was no evidence of any constitutional disturbance that could have caused it. The scalp, upon examination, presented a series of white, smooth, ivory-like patches, bounded irregularly by healthy hair. This case was treated upon the same principle as the former, the blistering fluid being applied at intervals of three weeks, although not with the same speedy effect, as, from the soreness of the scalp, the treatment had to be stayed from time to time. The disease also appeared to be more intractable, it being upwards of seventeen months before she was discharged thoroughly recovered.