*Eighteen Fatal Cases of Poisoning by the Phalloides Group of Amanitae.*

| No. | Name of Reporter. | Date. | Sex. | Age. | First Symptom Appeared. | Death. | Treatment, etc. | *Bulletin Société Mycologique de France.* |
|---|---|---|---|---|---|---|---|---|
| | | | | | Hours. | Hours. | | |
| 1 | Drs. V. and X. Gillot | 1900, Sept. 17 | F. | 12 | 11 | 72 | Emetics, purgatives, belladonna | 1902, vol. xviii, p. 34. |
| 2 | ,, ,, | ,, ,, | F. | 9 | 11 | 48 | ,, ,, ,, | |
| 3 | ,, ,, | ,, ,, | F. | 3 | 11 | 28 | ,, ,, ,, | |
| 4 | ,, ,, | 1901, Sept. 30 | F. | 41 | 10 | 45 | | ,, ,, p. 41. |
| 5 | ,, ,, | ,, ,, | M. | 79 | 11 | 63 | | |
| 6 | ,, ,, | ,, ,, | F. | 20 | 10 | 106 | | |
| 7 | L. Rolland | 1902, Oct. 20 | M. | 37 | 10 | 54 | Atropine and morphine hypodermically | ,, ,, p. 418. |
| 8 | ,, | ,, ,, | M. | 32 | 10 | 53 | ,, ,, ,, | |
| 9 | ,, | ,, ,, | M. | 22 | 10 | 78 | ,, ,, ,, | |
| 10 | B. Souché | 1903, Aug. 13 | F. | 50 | 4 | 48 (?) | Atropine hypodermically | 1904, vol xx, p. 40. |
| 11 | ,, | | M. | 45 | 18 | 48 | ,, ,, | |
| 12 | ,, | | F. | 11 | 18 | 96 | ,, ,, | |
| 13 | ,, | | F. | 3 | 18 | 96 | | |
| 14 | ,, | ,, Sept. 1 | F. | 10 | 10 | 104 | | ,, ,, p. 45. |
| 15 | ,, | | F. | 7 | 10 | 112 | | |
| 16 | ,, | | M. | 4 | 10 | 105 | | |
| 17 | Dr. X. Gillot | 1904, Oct. 16 | F. | 34 | 9 | 48 | | 1905, vol. xxi, p. 58. |
| 18 | V. Harlay | ,, Aug. 31 | M. | 2½ | 17 | 72 | | ,, ,, p. 107. |

The above table shows (1) the long period which usually elapses between the ingestion of the fungus and the appearance of the first symptom, averaging between ten and twelve hours; (2) the average period in which it proved fatal—72 hours; (3) the 6 cases treated by atropine proved fatal, as did the 3 others in which belladonna was given; (4) half the cases were under 20, and a third under 10 years of age.

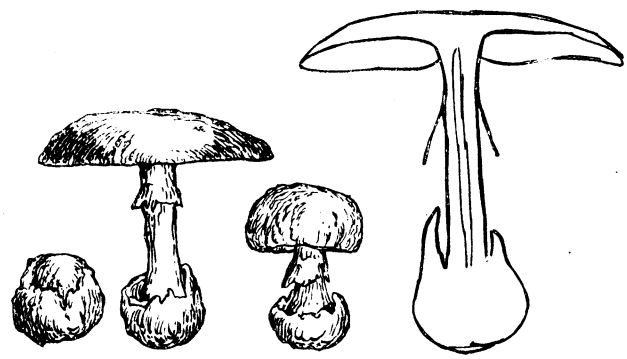
We owe most of our knowledge of phallin to Kobert.[2] He found it to be a toxalbumin, very similar to the toxalbumin ricin contained in the seeds but not in the oil of the castor-oil plant, and abrin in the scarlet and black beans of *Abrus precatorius*—jequirity.

The most commonly observed symptoms in a case of phallin poisoning are, vomiting not occurring for several hours (10 to 12) after eating the fungus, diarrhoea, pain in the abdomen, cramps of the stomach and diaphragm, intense thirst, cold sweats, collapse, sometimes headache, delirium, suppression, more or less complete, of urine, slight but distinct jaundice in the latter stages of severe cases, subnormal temperature, sometimes cramps in the limbs.

*Post-mortem Signs.*—Absence of *post-mortem* rigidity, marked hypostatic discoloration, inflammation of the gastro-intestinal mucous membrane, localized ecchymoses of the liver, alimentary canal, pleura and lungs, enlarged solitary glands, fatty degeneration of the liver, fluidity of the blood, hyperaemia of the meninges.

*Treatment.*—The orthodox rule of emptying the stomach and intestines of course applies only to those cases seen in the early stage; usually the patient has been vomiting and purging long before he is seen—of course a dose of castor oil may be required. To relieve the great suffering morphine is almost sure to be required. To decompose any phallin left in the stomach, permanganate of potash, as has been suggested, should be tried. The subcutaneous administration of normal saline solution (sodii chlor. ʒj, aquae Oj) has been used with success.

Dr. Ramond treated five cases of poisoning by *A. phalloides* with hypodermic injections of atropin gr. $\frac{1}{60}$, morphine gr. $\frac{1}{8}$. Three of these died after fifty-four, fifty-eight, and seventy-eight hours' suffering. To the other two he gave injections of 300 c.cm. of artificial serum, and they recovered.[3]



Three specimens of *Amanita phalloides* Fr. in various stages of development. Section of a full-grown specimen showing the volva or poison cup. From Nature (reduced).

The recognition of *A. phalloides* and its immediate allies is not difficult. Although it sometimes resembles the common mushroom, *A. phalloides* is never anything else but white beneath the cap, where everybody knows the mushroom is pink, purplish-brown, or almost black. On the top *phalloides* is frequently nearly white, but one can almost always see traces of yellowish-green, especially about the margin. The stem of the mushroom is nearly cylindrical—that is, nearly as thick above as it is below—but the stem of *phalloides* is always bulbous, and springs out of a cup made by the upper part of the bulb, as shown in the figure, the so-called "poison-cup."

The cup-like base of the stem, the permanently white gills, its shining pale greenish or yellowish-white top, and the fact that it never grows far away from trees, especially oak trees, should enable any one to recognize this most virulent fungus. There is one point more to be remembered about *phalloides*, namely, that it will "peel" almost as well as the common mushroom.

REFERENCES.

[1] For a full account of this case see *Lancet*, vol. ii, 1879. [2] Kobert, R., *St. Petersburger Medicin. Wochenschrift*, Nos. 51 and 52, 1891, where a full account of the symptoms and *post-mortem* appearances is given. [3] *Bulletin Soc. Mycol. de France*, 1902, vol. xvii, p. 420.

## CLINICAL EFFECTS OF ETHER ANAESTHESIA ON RENAL ACTIVITY.

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THE following investigation was undertaken with the object of determining clinically the influence of ether anaesthesia on the secretion of urine, both as regards its quantity and its nitrogenous content. The investigation arose from a discussion we had in Mercer's Hospital regarding the relative advantages of chloroform and ether as a routine anaesthetic for operations, more especially in cases with renal disease. The idea for the investigation was suggested to us by a paper read last session at the Dublin University Biological Association by Professor Thompson, giving the results of his experiments on dogs; the method and the periods of collecting the urine employed by us, however, differ from his.

The method we adopted was to take periods before, during, and after anaesthesia, as follows:

Period I. Twenty-four hours, ending at 9 a.m. on morning of operation.

Period II. From 9 a.m. on the morning of operation till immediately preceding the administration of the anaesthetic.

Period III. During the induction of anaesthesia, ending with the abolition of corneal reflex.

Period IV. First half-hour of complete anaesthesia.

Period V. Second ,, ,, ,,

Period VI. Third ,, ,, ,,

Period VII. Six hours following anaesthesia.

Period VIII. Twenty-four hours following Period VII.

The bladder was emptied by catheter at the end of each period.

The total nitrogen was estimated by Kjeldahl's method.

The following tables give the results obtained in ten consecutive cases. All our cases were drawn from among the female surgical patients in Mercer's Hospital. We purposely selected cases involving various operations on limbs, head and neck, and abdomen, so as to obviate as far as possible any special influence of the operation:

The cases were operated on by Mr. Maunsell and Mr. Pringle, and were as follows:

| Case. | Age. | Operation. |
|---|---|---|
| A | 45 | Myomectomy and ventrifixation. |
| B | 42 | Ovariotomy for small adherent cyst of ovary. |
| C | 25 | Curetting. |
| D | 20 | Removing tuberculous glands of neck. |
| E | 24 | Appendicectomy, hysteropexy, and rectopexy. |
| F | 21 | Removal of glands of neck. |
| G | 23 | Removal of glands of neck. |
| H | 50 | Appendicectomy. |
| I | 18 | Removing internal semilunar cartilage of knee. |
| J | 28 | Excision of varicose veins. |

All these cases ran an aseptic course. In each case the urine was tested before the operation and found normal.

TABLE I.—*Amount of Urine, showing Rate of Secretion in c.cm. per Half-hour.*

| Case. | Period I. | Period II. | Period III. | Period IV. | Period V. | Period VI. | Period VII. | Period VIII. |
|---|---|---|---|---|---|---|---|---|
| A | 21 20 | 52.5 | 121.50 | 3.50 | 1.70 | — | 9.30 | 8.80 |
| B | 13.00 | 24 3 | 20.00 | 1 20 | 0.90 | 0 5 | 11.80 | 8 80 |
| C | 37.80 | 48.7 | 20.30 | 4 00 | — | — | 11.80 | 10.60 |
| D | 14.20 | Lost | 9.40 | 5 co | — | — | 9.50 | 7 co |
| E | 20.20 | 48.7 | 58.90 | 3.80 | 0.71 | 0 7 | 14 60 | 11.20 |
| F | 12.50 | 33.0 | 15.70 | 2.50 | 1 60 | — | 11.40 | 8.30 |
| G | 12 50 | 37 5 | 85.co | 4 10 | 7 00 | — | 10 90 | 7 70 |
| H | 21.70 | 27.1 | 12.20 | 3.50 | 3 60 | — | 12.70 | 7.70 |
| I | 57.40 | 107.5 | 123.70 | 19 00 | 5.10 | — | 46.20 | Lost |
| J | 32.30 | 10 4 | 20.60 | 9 00 | — | — | 13 00 | 9 30 |
| General Average | 24.28 | 42.2 | 58.73 | 5.56 | 2.95 | 0 6 | 15.12 | 8.82 |

Referring to the above table, we take Period I as giving the normal rate of secretion, being the rate for the twenty-four hours ending at 9 a.m. on the morning of operation.

Period II shows an increase in every case except J, the increase being accounted for by the nervous condition of the patient preceding operation.

In Period III—the period of induction—the rate of secretion shows in some cases an increase and in others a decrease compared with Periods I and II. These figures correspond with the varying results obtained by other observers, on dogs, where the depth of anaesthesia was not uniform.

In Period IV the effect of full anaesthesia becomes apparent, every case showing a great decrease, the average rate of secretion being only 23 per cent. of normal.

In Period V we get a further decrease, the average being only 55 per cent. of Period IV, or 13 per cent. of Period I; and if we except Case G in which the anaesthesia was incomplete during part of this period, the average is only 41 per cent. of Period IV, or 9.3 per cent. of Period I.

In each of the two cases in which the anaesthetic was continued for Period VI, the rate shows a further decrease.

In Period VII, that is, the six hours following anaesthesia, the rate of secretion again rises, but in no case does it reach normal as indicated in Period I.

Period VIII shows a slight decrease in the rate of secretion in every case. In the majority of cases this decrease seemed to have no definite relation to either the amount of fluid taken or the amount vomited during the thirty hours following operation; but three cases, namely, C, D, and H, seem to suggest that these factors may have an influence. In C and D the decrease was small, these cases were given the largest amount of fluid, and did not suffer from post-operative vomiting. In H the decrease was largest, this case received the smallest quantity of fluid and vomited the most frequently. No note was taken of the amount of sweating.

TABLE II.—*Total Nitrogen, showing Rate of Excretion in Grams per Half-hour.*

| Case. | Period I. | Period II. | Period III. | Period IV. | Period V. | Period VI. | Period VII. | Period VIII. |
|---|---|---|---|---|---|---|---|---|
| A | 0 190 | 0.230 | 0.530 | 0.020 | 0.015 | — | 0.100 | 0.160 |
| B | 0 220 | 0.250 | 0.110 | 0 0c7 | 0.006 | 0 c05 | 0 c90 | 0.170 |
| C | 0 260 | 0.260 | 0.250 | 0 050 | — | — | 0.160 | 0.230 |
| D | 0.200 | Lost | 0.090 | 0 050 | — | — | 0.130 | 0.140 |
| E | 0.250 | 0 410 | 0.360 | 0.023 | 0.005 | 0.005 | 0.170 | 0.200 |
| F | 0.190 | 0.280 | 0.130 | 0 022 | 0.013 | — | 0.072 | 0.140 |
| G | 0.190 | 0.250 | 0.650 | 0 033 | 0.048 | — | 0.105 | 0.140 |
| H | 0.130 | 0.250 | 0.130 | 0 036 | 0.036 | — | 0 106 | 0.150 |
| I | 0.270 | 0 350 | 0.410 | 0.101 | 0.034 | — | 0.230 | Lost |
| J | 0.180 | 0.120 | 0.210 | 0.110 | — | — | 0.160 | 0.170 |
| General Average | 0 2c6 | 0 271 | 0.287 | 0.045 | 0.022 | 0.005 | 0.132 | 0.166 |

Referring to the above table, we see that Period II shows an increase in the ratio of excretion of nitrogen in all cases except J, corresponding with the increase in the amount of urine as shown in Table I.

In Period III there is in some cases an increase and in others a decrease, the average, however, being a considerable increase.

Period IV shows a marked decrease in every case, the average rate of excretion of nitrogen being only 22 per cent. of normal, as indicated by Period I. This corresponds closely with the decrease which we saw took place in the amount of urine during the first half-hour of full anaesthesia.

During Period V we find a continued decrease in every case except one, the average rate being 65 per cent. of that in Period IV, or 11 per cent. of Period I. In the one case—namely, G, in which there was an increase—the anaesthetic was unsatisfactory, as mentioned above.

In the two cases which were continued into Period VI there is a slight further diminution, the average rate being only 2.2 per cent. of normal, thus amounting to practical suppression.

In Period VII the rate of secretion of nitrogen again rises in every case, but does not reach normal, the average being 64 per cent.

In Period VIII the rate rises in each case considerably higher than that of Period VII, the average being 37 per cent. increase.

TABLE III.*—*Showing Rates of Secretion of Urine and of Excretion of Nitrogen in Percentage of Period I (Normal).*

| | Period I. | Period II. | Period III. | Period IV. | Period V. | Period VI. | Period VII. | Period VIII. |
|---|---|---|---|---|---|---|---|---|
| Amount of urine ... ... | 100 | 164 | 242 | 23 | 13 | 3 6 | 62 | 43 |
| Total nitrogen ... ... | 100 | 131 | 139 | 22 | 11 | 2.2 | 64 | 84 |

* In comparing the averages in any two Periods it is only those cases whose record appears in both columns which are used—not the general average of the Period.

In reviewing the foregoing results, which correspond to those obtained by W. H. Thompson from dogs,[1] we see that during the time of full anaesthesia not only is the amount of the urine reduced—in some cases as low as 3.6 per cent. of normal—but the excretion of the nitrogenous constituents is diminished to such an extent (2.2 per cent. of normal in Period VI) as to amount to practical suppression. And this condition of inactivity of the renal epithelium appears to increase the longer the anaesthetic is continued. We cannot but think that in cases of prolonged ether anaesthesia this inhibition of renal activity must exercise a most injurious effect on the general metabolism and condition of the patient.

In comparing Periods VII and VIII, we see that whereas the amount of urine is greater in Period VII, the N-excretion is greater in Period VIII, which appears to indicate that the kidney substance recovers its power of secretion of water after the removal of the anaesthetic more rapidly than it regains its power of nitrogenous excretion.

In conclusion, we desire to thank Professor W. H. Thompson for his kindness in giving suggestions and facilities in the carrying out of the work.

[1] BRITISH MEDICAL JOURNAL, March 25th, 1905.