One Twenty fourth of the Lethal.

A single dose of this proportion may exceptionally have no effect whatever upon temperature, but usually it originates an oscillation totalling about 0 25° C. This may be of the nature of a rise, having its maximum in 30 to 40 minutes, after which a gradual return to, but seldom below, normality ensues, or else a slight reduction occurs without antecedent rise. On repetition of dosage there may be a slight additional effect (Fig. 11), followed by a reversion to normality and hypernormality. After such a proportion there is usually more oscillation above than below normality, whether the dose is repeated or otherwise.

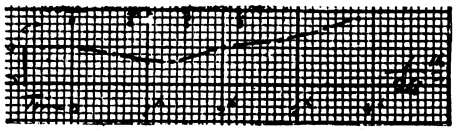

Fig. 11.—Four doses of one twenty-fourth lethal, interval 45'.

Whilst the results discussed in this paper appear to be generally applicable to the large group of aconitines in so far as these have been investigated, it cannot be assumed that they are necessarily strictly applicable to other bodies which would find their place in the same class as indaconitine.

Divergent potentiality for absorption and excretion might obviously cause variation in the advent of maximum intensity of effect, and consequently of the probability of summation by subsequent doses.

CONCLUSIONS.

1. Objective toxicity is produced by indaconitine hydrobromide when administered hypodermically in doses which are not less than $\frac{1}{4}$ of the lethal proportion. The characteristic symptom of obvious salivation is produced by $\frac{1}{3}$, rarely by $\frac{1}{4}$ of the lethal. Perceptible toxic effect is therefore restricted to a very limited range of dosage.

2. The temperature-reducing activity caused by single doses of the salt, which decrease in geometrical progression, does not show a parallel diminution, but is more gradual, excepting for doses of $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$, which are approximately proportionate in effect.

3. Some modification of the internal (rectal) temperature of the normal animal is observed as the result of hypodermic medication after doses bearing a proportion down to the $\frac{1}{24}$ of the lethal, which may, therefore, be regarded as the "minimal effective dose" for temperature. Smaller proportions may occasion a slight effect within the area of physiological variation. At or near the $\frac{1}{25}$ of the lethal is to be located the "maximal ineffective dose."

4. Although the total reduction of temperature becomes very small as the reduction of dosage proceeds, there is by no means a commensurate abbreviation in duration of effect.

Repetition of Dose.

5. A second dose causes a summation of temperature reduction for practically all fractions of the lethal down to the $\frac{1}{25}$ (provided the interval before readministration is not more than forty-five minutes), but the extent of this summation declines very rapidly after the dose falls below the proportion of $\frac{1}{4}$ to the lethal, and is quite inconspicuous when below $\frac{1}{12}$.

6. When there is an interval of sixty minutes before readministration there is still summation of effect of the second dose, though to a lesser degree than after a forty-five minutes' interval. When ninety minutes elapse it is still recognizable for doses which bear a larger proportion than $\frac{1}{16}$ to the lethal unit.

7. When the interval is of 105 minutes, summation, though greatly reduced in extent, follows doses of $\frac{1}{2}$ and $\frac{1}{3}$ of the lethal proportion, but for $\frac{1}{4}$ and smaller proportions there is no summation, the greatest reduction of temperature falling after the primary administration. After intervals of 120 and 240 minutes there is no summation, successive doses causing a diminished effect, which is more or less in direct proportion to the increase in time interval.

8. It has already been shown that a slight degree of tolerance is established towards the action of the aconitines when administered daily or every second day, but this is inconspicuous compared with the decline in temperature-reducing activity of all proportions from $\frac{1}{2}$ of the lethal downwards when given at intervals of 120 and 240 minutes.

9. Hypernormality of temperature may occur as a transitory condition after administration of indaconitine in large proportions. The larger the dose and the sooner this phase is superseded by a fall to subnormality. When the proportion is reduced to $\frac{1}{8}$ or less, hypernormality may endure for 45', and under these circumstances there is a relative delay in the time of occurrence of subnormality by a second administration. As the limit of active dosage is approached in the descending scale, the result is often of the character of an oscillation of temperature around the normal, in which hypernormality is conspicuous.

It is observed that as the effect of practically all doses which are sublethal passes over, there is a tendency to a condition of hypernormality after the original temperature has been regained.

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Remarks

ON

THE INTERNAL USE OF THE OIL OF TURPENTINE.

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AMONGST old remedies which in these days are fast falling into disuse oil of turpentine stands out as a prominent example of undeserved neglect. In experienced hands the oil is often capable of bringing relief in cases where more modern and fashionable remedies have been given with very inadequate and unsatisfactory results. In the matter of haemorrhages, for instance, so many newer specifics have been placed upon the market that the value of turpentine in arresting the effusion of blood is now comparatively seldom referred to.

This modern avoidance of a most serviceable drug may be due in some measure to vague apprehensions as to possible irritation of the kidneys by the use of the oil, and perhaps to some natural repugnance to the taste of the remedy. With regard to the latter point, the oil can be given made up into capsules, but if comparatively small doses are required, it acts more efficiently and is fairly well disguised if it be rubbed up with the mistura amygdalae of the *British Pharmacopœia*, well sweetened, and flavoured with oil of cloves. As to irritation of the kidneys, small doses such as 5 or 10 minims have little tendency to produce this result, and in large aperient doses (2 drachms to ½ oz. and upwards) the action of the drug is upon the bowels, and little of the oil gets absorbed into the circulation to pass through the kidneys and give rise to irritation. Either small doses or very large ones, then, may be given without misgiving. It is only the moderate dose of 30 to 60 drops which is to be used with caution, and its effect upon the kidneys heedfully observed.

Any one who wishes to test the value of turpentine as a haemostatic should note its curative influence upon a case of haemorrhagic purpura. For years I have been in the habit of treating cases of purpura—when the complaint occurs, as it does so often, in well-nourished, full-blooded children—with purgatives, and look upon oil of turpentine given in conjunction with castor oil as the best form in which the aperient can be administered. Now it is only in large doses that turpentine has any appreciable aperient effect, and therefore to give it value in a case of purpura we must see that enough is taken to produce the result we desire. I have found that for

a child of five or six years of age a dose of less than 2 drachms of the remedy combined with an equal quantity of castor oil has no aperient action upon the bowels nor any visible influence in checking the effusion of blood. If the dose first given is insufficient, the quantity may be increased without fear of doing harm; and for children of ten or twelve years I have prescribed as much as ½ oz. each of the two oils, given every morning or every other morning, not only without any ill consequences but with great benefit to the patient. In one case in my recollection there was some haemorrhage from the kidney, but whether this symptom was to be ascribed to the general haemorrhagic tendency or to the special action of the remedy I cannot say. I think the former; at any rate, it ceased with the other haemorrhages after the turpentine had been discontinued. Turpentine is not a violent aperient, as any one can judge for himself if he will make trial of it in a suitable case. After using it for many years I can confidently assert that, given as an aperient in the manner recommended, the drug is as harmless as colocynth and far less drastic in its action. The best time for its administration is an hour after food, and the patient should be enjoined to remain quiet for another half-hour after the dose has been taken. I must again insist upon the importance of prescribing the oil in ample purgative measure in a case of purpura if we wish to secure its full action as a haemostatic. I have given small doses of 5 or 10 minims in the same class of case, and repeated them every four hours or so, but cannot report favourably upon the result, for the haemorrhagic tendency appeared to be in no way lessened by this method of using the remedy. In the larger quantity, however, oil of turpentine given as recommended in conjunction with castor oil may justly be regarded as a specific, for a long experience has proved to me that a dose of 2 to 4 drachms given once in the day, either morning or evening, for a week or so will in the large majority of cases quickly put an end to the disorder. In cases where it does not succeed—and one meets with these from time to time—I have noticed that the aperient effect of the drug is uncertain and ineffectual. In other words, the dose has been insufficient and should be increased; for it is only in cases such as these, where the quantity taken has been too small to induce a copious action of the bowels, that the oil is apt to get absorbed into the circulation in sufficient amount to irritate the kidneys and cause haematuria. But even if this symptom should occur, there is no reason for alarm, for the haemorrhage ceases quickly when the drug is discontinued. I may repeat that this form of treatment is only adapted to the sturdy, well-nourished patients in whom the disease breaks out suddenly upon a state of health. The weakly, wasted infants, who are also apt to suffer from the complaint, require very different medication.

Besides purpura, other forms of haemorrhage may be arrested by the free internal use of turpentine. In haemophilia a brisk terebinthinate aperient will sometimes bring about a cessation of the bleeding after local styptics have been used in vain. If necessary the dose may be repeated in six or eight hours. Great pallor and apparent weakness in the patient furnish no objection to this method of treatment.

I have often noticed, and not without amusement, a look of surprise and almost of alarm when I have recommended the administration of oil of turpentine in aperient dose for a child, as if the suggestion were a novel and daring device of my own invention. But the internal use of turpentine in substantial dose is no new thing. As a remedy for purpura, it was first introduced many years ago by Dr. Neligan, who gave 2 fluid drachms night and morning to a child 5 years of age. Sir Thomas Watson recommended its employment in chorea. As an anthelmintic, its value has long been established; and in cases of tapeworm, Dr. Mason Good used to advise 1 oz. to be given in a single dose to a child of 10. Many of the old writers extol the virtues of large doses of the remedy in various forms of illness. Dr. Graves recommends it in doses of 6 drachms every six hours in cases of continued fever, and also in "considerable doses" for the nervous headaches of hysterical girls. Other authorities advocate its use, always in large doses, in puerperal fever (Brennan, Copland, etc.), epilepsy (Cheyne), flatulent colic and ileus (Copland), and in bronchitis associated with emphysema (Corrigan, Waters). The above authorities give no hint that early life is any bar to the use of the remedy; indeed, in some cases they definitely recommend its employment for children of tender years.

Local bleedings, such as haemoptysis and the melaena of typhoid fever, may be judiciously treated by the same remedy, but in smaller doses. I have seen arrest of the haemorrhage to occur in both of these complaints under the use of the drug in doses of 10 or 15 minims three times a day; but its effect when thus administered is much more uncertain than in the case of the aperient doses recommended for purpura.

In addition to haemorrhages, other complaints are found to be benefited by turpentine in more moderate but still substantial dose. For iritis in the adult patient, both the syphilitic and rheumatic forms, oil of turpentine in drachm doses, given three times a day, was at one time a remedy held in high esteem. It was introduced as such by Carmichael in the year 1829, and recommended especially for cases in which mercury was unsuitable. Its value for this purpose was confirmed by Arnott and others; and I am told by Dr. Dawson Williams that he has himself seen the oil used in this manner by the late Mr. Wharton Jones with conspicuous success. Copland and Hockin found it useful in cases of amaurosis; and night-blindness has also been cured by this means. The oil should be given in the dose and with the frequency recommended above. If strangury be produced, the use of the drug must be suspended, and the patient be made to drink freely of linseed-tea, as originally advised by Mr. Carmichael.

One of the most valuable uses of turpentine is its internal administration in small doses as an antiseptic and sedative in cases of flatulent colic and unhealthy states of the intestinal mucous membrane. In the abdominal cramps to which some children are subject, 3 or 4 minims of the rectified oil of turpentine, with or without double the quantity of castor oil, may be given three times a day rubbed up with a spoonful of mistura amygdalae. If the attacks are severe, a small quantity of codeine may be added. In cases of tuberculous peritonitis I have found great benefit from this combination. Thus, for a child of 7 or 8 years, we may order 4 minims of oil of turpentine and 20 of the spirits of nitrous ether, with ⅛ grain of codeina, to be made into an emulsion with the almond mixture and taken three times a day. The addition of some extract of liquorice still further disguises the strong taste of the turpentine. If there be much tympanitis the external application of turpentine on hot flannel may be used in addition. Codeine is a better sedative than morphine or chlorodyne in cases of abdominal discomfort, on account of its small tendency to constipate the bowels.

Young children who are brought up by hand, and sometimes even breast-fed infants, are apt to suffer from an aggravated form of flatulence and colic which may even give rise to convulsions. Such cases are often greatly relieved by turpentine in minute dose given with a few drops of castor oil. The remedy acts upon the kidneys, and sometimes also upon the bowels as well. For an eight months child we may order 1 minim of the rectified oil to be rubbed up with 3 minims of castor-oil and 2 grains of gum tragacanth. This must be made up to a teaspoonful with water. For such young patients it may be successfully disguised by adding to each ounce 1 drachm of the liquid extract of liquorice, 5 drops of the oil of cloves, and 20 drops of spirits of chloroform. It should be given every four hours and will do much to prevent the distressing accumulation of wind. If the paroxysms of colic are severe, $\frac{1}{30}$ grain of codeine may be added to each dose of the mixture.

In cases of hiccough 10 drops or so of turpentine given with 30 drops of spirits of nitrous ether in an aromatic water have a striking effect in putting a stop to a symptom which in a weakly patient is apt to be not only intractable but harassing and even dangerous. I may say, however, that of all remedies for obstinate hiccough there is none to be compared for a moment in rapid and successful action with an aperient dose of the old-fashioned rhubarb and magnesia. Some years ago I saw in consultation an elderly gentleman who was suffering from kidney disease and dropsy, with much digestive disturbance. For a whole week previous to my visit the patient had been worried by a persistent hiccough, both night and day,

which took him every few minutes, and so completely prevented any refreshing sleep that his weakness had begun to be alarming. He had been treated for this symptom with a variety of sedative and antispasmodic remedies old and new, but the attacks had resisted every effort to suppress them. Finding the tongue excessively foul and the stomach considerably dilated, I advised a good aperient dose of rhubarb and heavy carbonate of magnesia, made up into a draught with tincture of cardamoms, spirits of chloroform and peppermint water, to be given without loss of time. This was done, and I heard later that the hiccough had ceased immediately that the draught had been taken, and that the patient had eventually made a good recovery—in fact, he lived for some years afterwards. I have used the same treatment in many cases of a similar kind for patients of all ages and cannot remember a single instance in which it has failed to relieve.

The action of turpentine upon the mucous membranes is utilized in the treatment of hepatic concretions. A dose of 10 or 15 drops given two or three times a day after food I have found not only to relieve the catarrh of the bile ducts but also to have a solvent action upon the gall stones—if I am correct in drawing that conclusion from the long period of relief which I have known to follow a course of the remedy. Again, in pyelitis arising from the irritation of retained gravel in the pelvis of the kidney, turpentine given in the same dose is very useful in checking the inflammation, although it has no solvent action upon the concretions. In these doses it is most conveniently prescribed in capsule.

The curative value of turpentine when given by the mouth may often be supplemented and enforced by its internal use in enema. In cases of threadworms the vermicidal action of the remedy is strikingly manifested, and it has also a salutary influence upon the mucous irritation which is a constant accompaniment of ascarides if these be numerous. For a child of 7 or 8 years of age ½ oz. of the terebinthinate oil may be used for the injection at bedtime diluted with 10 oz. of barley water. The late Dr. Elliotson used to treat obstinate cases of amenorrhoea in young women with the same injection repeated once or twice a day, and maintained that its action was attended with almost invariable success. It has been employed, too, in cases of catalepsy. One ounce of the oil well mixed with a pint of thin gruel and thrown slowly into the bowel acts as an energetic stimulant to the torpid nervous system; and the injection, if followed by vigorous frictions along the spine with a strong irritating liniment, is said to be attended with very satisfactory results. In flatulent colic a terebinthinate enema, if given hot, is a welcome addition to the use of remedies by the mouth and will often bring a severe attack to an immediate close. In the seizures of this kind which have been before referred to as common in infants the derangement is a cause of so much suffering that nothing which tends to shorten the attack should be neglected; and the injection of a drachm of the oil in 5 or 6 oz. of hot barley water thrown slowly into the bowel will often put an end to the distress and send the child into a quiet sleep. Employed in this manner the remedy is a diffusible stimulant of extreme excellence, and in taking stock of the various curative expedients at our command in such a case to omit it from the list would be voluntarily to abandon one of the most trustworthy of our resources.

THE French Medical Congress will be held this year at Geneva on September 3rd, 4th, and 5th, under the presidency of Professor Ad. d'Espine, of Geneva. The subjects proposed for discussion are: (1) The clinical forms of arterio-sclerosis, to be introduced by Dr. Huchard, of Paris, and Professor Jacquet, of Bâle. (2) The pathogeny of neurasthenic states, to be introduced by Professor Dubois, of Berne, and Dr. Jean Lépine, of Lyons. (3) The treatment of biliary lithiasis, to be introduced by Professor Gilbert and Dr. Carnot, of Paris, and Dr. Mongour, of Bordeaux. On September 6th there will be an excursion to Evian at the invitation of the Société des Bains of that town. A circular tour through Switzerland is also being organized. Doctors of any nationality can enrol themselves as members of the congress, but French is the only language in which communications will be received or discussions allowed. The General Secretary of the Congress is Professor A. Mayor, 6, Rue Adhémar-Fabri, Geneva.

An Address

ON

PUERPERAL ECLAMPSIA, WITH SPECIAL REFERENCE TO ITS TREATMENT WITH NITRO-GLYCERINE.

BY JUSTIN M. McCARTHY, M.D.,

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PERHAPS there is no more trying—indeed, one might almost say, no more terrible—way of spending a night than in a struggle with death for the life of a patient in the throes of puerperal eclampsia.

Having been brought into contact with 15 such cases, it seemed that the classification and tabulation of the notes relating to them, considered in the light of information gained from the writings of those who have made a special study of this subject in recent years, would well form the subject of a paper, which might possibly be of benefit to others who may yet have to go through a similar ordeal, be of some service in the mitigation of suffering, if not in saving life, and at the same time call forth a fruitful discussion.

CASES.

Apology is offered for the incompleteness of the records, the reason being that the cases occurred in country practice, with a minimum of help, so that one's time was almost entirely taken up in rendering the necessary attendance.

In Table A we have a list of these cases with their leading characteristics, 15 of them being puerperal eclampsia, 2 epileptic, and 1 due to tuberculous meningitis during which labour took place—these last 3 being convulsions during labour, and so puerperal eclampsia, but still not of the type that presents itself to one's mind when thinking of true puerperal eclampsia. One of these, No. 18, was having a fair labour, having previously been confined of twins; the head was on the perineum, when she had a most violent epileptic fit. Her face became livid, there was much frothing at the mouth, and the breathing was stertorous. Only a partially-trained midwife was present, so that the difficulty of applying forceps, which step seemed absolutely necessary, was very great. This, however, was fortunately accomplished without injury and the patient delivered of a living boy, who, with his mother, eventually did well. This patient had had true epileptic fits on many occasions. Another point in connexion with the case was the marked post-epileptic stupor which followed and lasted some hours. Such a condition might have an important medico-legal bearing on cases of infanticide.

Coming to the true puerperal eclampsia, they are Nos. 1 to 15 in Table A. They occurred at different times from February, 1878, to December, 1906. One interesting item is that the two cases, Nos. 3 and 4, both of which were fatal, occurred within twenty-four hours. This is possibly a unique experience in the obstetric woes of a general practitioner. The 13 are taken out of some 2,800 cases attended in my part of the practice from 1875 to the present time—a proportion of 1 in 215.4. This is admittedly an excessive proportion, Galabin giving the general proportion for Europe as about 1 in 500 deliveries. It should be further noted that, of the 15 cases in question, only 8 occurred among those for whom attendance had been arranged, and that with regard to the other 7 medical aid was in the first instance summoned for convulsions. The periods of occurrence are shown in Table B.

These are so erratic that it would be quite possible for a practitioner with a small obstetric practice to have a large average of such cases, whilst another with an extensive practice might have none.

There was no possibility of infection in the two cases occurring within twenty-four hours. One sent for help in the evening, but the child was born before the arrival of the doctor. The third stage was attended to, and the patient comfortably settled for the night, when the second patient sent for help because of convulsions. Next morning No. 1 patient sent for help, as a convulsion had taken place. This came on about twelve hours after labour, and the patient had not been seen since visiting No. 2.