(e) Similar drugs may be used for the eye symptoms. In educated people, who can be trusted not to use the drugs to excess, the instillation of a few drops of cocaine (4 grains) and adrenaline (3 drachms to the ounce) will not only help the eyes, but, by passing down the lacrimal duct, will also allay the trouble in the nose. Used in an atomizer these may be sprayed up the nose and also into the eyes. In prescribing these drugs some estimate must be made of how often the patient will use them and, more particularly still, the kind of spray he will use them in, likewise the viscosity of the ingredients of the solution used.

(f) A search should be made for any microbic invaders which are adding to the patient's discomfort.

(g) Considerable comfort is experienced by dipping the whole face into a basin of cool water at bedtime. If sufficient salt is added the eyes may be opened and washed in this. Keeping the lips and glottis closed some patients manage, by expanding the buccal cavity, to draw the solution into the nose and wash that at the same time. Such a washing often allows the patient to fall asleep with ease and comfort.

By these various methods much more can be done for the unfortunate sufferer from hay fever than was possible formerly.

RECTAL INJECTION OF ETHER IN WHOOPING-COUGH.

BY

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MANY methods are used in the treatment of whooping-cough; among the many drugs belladonna, opium, and quinine seem to be the favourites. Recently x-ray treatment has been suggested in America¹ and in England.² Vaccine treatment has also been tried on many cases.³ Ether was first suggested in 1914 by Audrain, whose results were published in 1920.⁴ He used 1 to 2 c.cm. injected intramuscularly three times a day. Since then several other workers have published their results; Panayotatou stated that the duration of the disease could be reduced to twelve days after starting treatment by a dose of 1.5 to 3 c.cm. of ether given intraglutely on alternate days.⁵ Mason in America, who treated 26 cases in the same way,⁶ had 60 per cent. cured and 24 per cent. definitely improved. He also tried ether by the rectum on four cases, using 6 c.cm. of a 40 per cent. solution of ether in olive oil. Half of these were successful and half failures.

Smith⁷ has recently reviewed all the literature published since the war on the treatment of whooping-cough, but does not mention the rectal method of administering ether. It would seem that this is the first time that a large number of cases so treated has been put on record.

MODE OF ADMINISTRATION OF ETHER.

It has been the custom to administer the ether by subcutaneous or intramuscular injection. This is undoubtedly the most rapid method, but it is very unsatisfactory for children between the ages of 2 and 12. An enema by the rectum is much more suitable. The enema is painless—only two cases in this series complained of abdominal pain, rapidly passing off, and the majority of children raise no objection to the repetition of the treatment. The only difficulty lies in getting a certain number of cases to retain it.

When ether was given by injection I always used the intraglutely route. The dose was 5 to 10 minims of the ordinary anaesthetic ether. For the administration of an enema I used a full-sized male rubber catheter, attached by a small glass tube to a larger-bored rubber tube with a funnel at the other end. The ether was mixed with an equal amount of olive oil, the dose given being 1 drachm of the mixture for every year of age. If anything an excess was given, and if the symptoms were severe and the enema well retained 1 or even 2 extra drachms were given. Before

administering the enema the skin round the anus was well smeared with vaseline and the catheter then passed up 3 to 6 inches. The ether mixture was passed into the funnel and allowed to flow into the rectum by its own weight. The rate of flow can be watched through the glass tube connecting the catheter to the tube. This also serves as a gauge to see whether there is anything left in the tube. When all the enema has been run in, the catheter is rapidly withdrawn and usually none leaks out. Ether appears in the breath about five minutes after the enema has been given and can be detected during the next twenty-four hours. It has never in this series caused any digestive upset or pulmonary trouble. In many cases it did not begin to have any beneficial effect till after the second administration, and in severe cases actually aggravated the symptoms at first.

I treated the first 25 cases with ether alone without drugs and the next 25 with ether and drugs; the latter improved so much more rapidly than those treated with ether alone that the remainder of the cases were always treated with both. Of drugs I tried phenazone, bromides, belladonna, iodine, and opium in various combinations. I met with successful results with all these drugs, but belladonna was the most generally successful. In the cases summarized in this article only four enemas or injections were given—in some cases one each day and in others on alternate days. There would seem to be no advantage in resting for forty-eight hours nor any need to limit the treatment to four doses.

RESULTS.

After December 1st, 1924, all cases of whooping-cough coming to the casualty department were treated by ether. In this way the results of 86 consecutive cases can be recorded. Of these, 28 were treated by injection and 58 by enema. Of the former, 11 gave up the treatment before the course was completed, but, with the exception of 3, the results as far as they went were satisfactory. Three cases must be classed as failures, and the remaining 14 were successful.

Of those treated by enema 14 gave up the treatment owing to the parents' objections or because the child would not allow the administration of the enema. Of the remainder, 13 were failures and 31 successful. Of the children successfully treated, the earliest had been coughing for four days and the longest for more than four weeks. This case was a girl of 6 who had been coughing for about a month when first seen. She was having about forty attacks during the twenty-four hours, and vomited in nearly half of them. The appetite was very poor, and there were frequent attacks of epistaxis. The first two enemas contained 3 drachms of ether each, and the second two 3½ drachms. The breathing improved after the second, and the whooping completely stopped after the fourth. One week later the vomiting also stopped and the appetite improved. The child was putting on weight at the rate of an ounce a week, and reported satisfactory progress at every subsequent visit. No more epistaxis occurred after treatment was started.

In addition to these cases of pertussis treated in the casualty department, an outbreak among the in-patients enabled me to try the ether treatment on a number of cases under constant observation. Of these, 12 were treated by enemas and 5 by injections. Nine of the former were successful; the paroxysms were at once considerably diminished in number and violence, and ceased within a few days. Three were failures. Two of these patients were already under treatment for bronchopneumonia and the third for anterior poliomyelitis. The observations of the nursing staff bear out what the mothers reported to me in the out-patient department. Of those treated by injection 4 were successful and 1 a failure, though benefited.

I have had no success with ether as a prophylactic, though probably, if given when a suspicious cough commences, the disease will be aborted or rendered very mild. It is perhaps worth noting that the only cases in the ward which remained unaffected and were not given any prophylactic treatment were two cases of coeliac disease. They were in the ward when the original case was admitted, and at the time of writing, three months after the first "whoop" was heard, have no signs of the disease.

The total number of cases treated by me with ether may be tabulated thus:

Method.	No. of Cases.	No Result.	Successful.		Failures.	
			No.	Per Cent.	No.	Per Cent.
Intramuscular ...	33	11	18	55.5	4	12.1
By the rectum ...	70	14	40	55.5	16	22.8
Total ...	103	25	58	55.5	20	19.4

In holding a case to be successful I have laid stress on the following points: (1) the number of attacks of paroxysmal coughing; (2) the violence of the coughing; (3) the number of times that vomiting is caused; (4) absence of complications, or, if any, with only mild symptoms.

I have to thank Dr. Beatty, physician to out-patients, for permission to publish these notes.

SUMMARY.

1. Drugs still hold their place in the treatment of whooping-cough. Of these belladonna seems to be the most useful.
2. Ether will check the disease completely in 25 per cent., fail completely in 25 per cent., and be followed by considerable improvement in 50 per cent.
3. Ether neither causes nor prevents complicating bronchitis; bronchitis already present is not a contraindication to its use.
4. The method of administration seems to be of no importance provided the dose is large enough.

REFERENCES.

- ¹ BRITISH MEDICAL JOURNAL, November 29th, 1924, *Epitome*, para. 424.
² *Ibid.*, December 20th, 1924, *Epitome*, para. 491. ³ *Ibid.*, para. 492. ⁴ *Bull. et Mém. Soc. Méd. des Hôp. de Paris*, June 11th, 1920. ⁵ *Brit. Journ. Child. Dis.*, vol. xx, 1923. ⁶ *Journ. Amer. Med. Assoc.*, December 22nd, 1923. ⁷ *Amer. Journ. Dis. Child.*, November, 1924.

HAEMOGLOBINURIA FOLLOWING MALARIAL TREATMENT OF QUATERNARY SYPHILIS.

BY

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SCHILLING and Jossman¹ have reported an instance in which haemoglobinuria occurred following malarial treatment with *Plasmodium vivax*. The temperature rose seven days after it had returned to normal; quinine (8 grains) was given, and almost immediately red, followed by black, urine was passed. The following day the urine was clear, but the patient was jaundiced. The temperature then fell gradually to normal during a period of about ten days. The authors were not able definitely to exclude paroxysmal haemoglobinuria, but believed that the case was one of blackwater fever. The following case is described as another example of haemoglobinuria following malarial treatment.

A man, aged 56, was given a subcutaneous injection of defibrinated blood infected with *P. vivax* on October 25th, 1923. Twelve days later febrile paroxysms occurred and the patient was allowed to undergo nine. The last rigor took place on November 22nd. A course of quinine bisulphate was commenced the following day. Two doses of 10 grains were given on each of the first three days and one dose of the same quantity on each of the following fourteen days, making a total of 200 grains. In addition, the following course of neokharsivan was given: one dose of 0.3 gram, one of 0.45 gram, and four of 0.6 gram. The last injection was given on December 30th, 1923. The temperature was recorded every four hours for fifty-eight days after the cessation of the malarial paroxysms. On only seven days was it above normal; the highest temperature recorded (100.4° F.) followed an injection of neokharsivan. The temperature was then observed twice daily for twenty-eight days and no record above normal was noted. On the twenty-ninth day (February 18th, 1924), eighty-eight days after the last malarial paroxysm and seventy-one days after the last dose of quinine, the morning temperature was 98.8° F.; it was then recorded every hour. At 2 p.m. it had risen to 101.8° F., and at 3 p.m. to 103.6° F.; it then began to drop in a staircase manner, reaching 99° F. at 2 a.m. on February 19th, and normal at 10 a.m.

on that date. A rise to 99° F. occurred at 2 p.m. on the same day, but thereafter the temperature was normal or subnormal, the records being made every four hours for twenty-one days, and then twice a day for forty-seven days.

On the morning of February 18th, the day upon which the highest fever occurred, the patient was cyanosed and complained of feeling cold, but no definite rigor occurred. At 3 p.m. profuse perspiration appeared. The pulse rose to 100, and the respirations to 20. On this day dark, very nearly black, urine was passed; the urine passed on the following day was red, and the colour gradually became normal. Red cells were present in the urine on February 22nd. There was bacilluria on this date, but no tubercle bacilli were found. There was no vomiting, hiccup, or jaundice, but abdominal pain was marked.

A blood film taken on February 18th showed a large number of anaemic or pale red cells but no shadow cells. Spherocytes were never observed, nor was punctate basophilia or polychromasia detected in daily films from February 18th to 26th. Malarial parasites were not found.

The attack from which this patient suffered might have been due to blackwater fever or to paroxysmal haemoglobinuria. Both diseases can be brought on by cold. The daily minimum temperatures of the outside air showed a marked fall shortly before the onset of the attack. From the fifteenth to the sixth day before the attack the minimum temperature averaged 33.6° F., the lowest record being 31° F., and the highest 37° F. From the fifth to the day previous to the attack the minimum temperature averaged 22.6° F., the lowest being 19° F., and the highest 26° F. There was a pronounced fall of the indoor temperature on the night of February 16th-17th, the temperature of the ward in which the patient slept being 48° F. at midnight and at 2 a.m. on February 17th. The ward temperatures are recorded at 2 a.m., 7 a.m., noon, 7 p.m., and midnight, and 48° F. was the lowest temperature that occurred during the days immediately previous to the attack, 52° F. being the next lowest. The fall of the temperature to 48° F. was very sudden, there being a drop of eleven degrees in five hours. The rise after was gradual. The low temperature occurred about thirty hours before the onset of the attack of haemoglobinuria.

The fact that no quinine had been given for several weeks before the onset of the haemoglobinuria is of no assistance in diagnosis, for, although large numbers of attacks of blackwater fever are precipitated by this drug, many are not. Thomson² describes cases which had had no quinine for several months before the onset of blackwater fever.

Turning now to the facts in favour of the diagnosis of blackwater fever, the number of attacks which occurred is important. If the patient suffered from paroxysmal haemoglobinuria it was possible that several attacks might occur over a prolonged period. The attack was, however, the only one during a total observation period of 679 days in Claybury and West Park Mental Hospitals. The patient was under observation for 317 days before the attack.

The presence of red cells is against the diagnosis of paroxysmal haemoglobinuria but not of blackwater fever. J. G. Thomson³ has reported its occurrence in ten cases, and states that other writers have also observed it.

By the courtesy of Dr. N. Roberts, medical superintendent of West Park Mental Hospital, I have been enabled to perform the Eason-Donath-Landsteiner test for the autolysin of paroxysmal haemoglobinuria in the blood of this patient. In this disease haemolysis of the red cells occurs if a mixture of red cells and serum is cooled to 0° C. for five minutes and then placed at 37° C. for one hour. In this case haemolysis did not take place. This is against the diagnosis of paroxysmal haemoglobinuria, although it should be added that the test was not performed until March 4th, 1925.

The following facts suggest the diagnosis of paroxysmal haemoglobinuria. Jaundice is a very prominent symptom of blackwater fever, but it was absent in this case. J. G. Thomson² believes, from the study of the disease in Rhodesia and from the literature, that blackwater fever is due to a previous infection with *P. falciparum*. He states, however, that the disease may occur in persons after a relapse of benign tertian malaria, but he believes that in those cases there has been a previous infection with *P. falciparum*. This species is exterminated by quinine, and *P. vivax* causes the relapse. In the patient whose case is here recorded there was no history of previous malaria or