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

blackwater fever. The blood inoculated could not have carried a double infection of *P. vivax* and *P. falciparum*, for the strain had been passed through four persons before the case under review was inoculated. Since then sixty-eight inoculations have been performed with the same strain of parasite at Claybury Mental Hospital, and it has been used by other mental hospitals. Colonel S. P. James has also used the strain for mosquito inoculations. No malignant parasites have been found. The strain must therefore be a pure strain of *P. vivax*.

Yamakami³ has found that about 25 per cent. of tertiary and congenital syphilitics have the cold haemolysin in their blood. It is therefore probable that it might be present in a case of quaternary syphilis. Although the Eason-Donath-Landsteiner test was negative, it must be remembered that the test was performed a long time after the attack of haemoglobinuria.

The diagnosis of this case is therefore difficult, but on consideration of the detailed report of J. G. Thomson on blackwater fever it would appear that it is probably a case of paroxysmal haemoglobinuria.

In conclusion, I wish to thank Dr. J. S. Harris of West Park Mental Hospital for his assistance. For permission to publish records from Claybury Mental Hospital my thanks are due to Dr. G. F. Barham, medical superintendent.

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X RAYS IN THE DIAGNOSIS OF ORGANIC DISEASES OF THE COLON.*

BY

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In estimating the value of radiology in the diagnosis of organic diseases of the colon, it is necessary to compare it with the other available methods of confirming, or otherwise, suspicions aroused by a consideration of the patient's history. Apart from the ordinary physical examination of the abdomen and digital examination of the rectum, the only direct means of investigating intestinal diseases are the x rays, investigation of the stools, and sigmoidoscopy.

For the purpose of this communication my colleague, Dr. J. F. Venables, has analysed all the cases of the kind which have come under our observation at New Lodge Clinic during the last four years. In each an x-ray examination has been carried out by Dr. P. J. Briggs, the stools have been investigated by Dr. J. H. Ryffel and Dr. J. F. Venables, and I have inspected the rectum and pelvic colon with the aid of the sigmoidoscope. The relative value of these different methods can thus be estimated, but it is at once clear that all are valuable and should be systematically used, as it is generally impossible to tell beforehand which will give the most important information in a given case, whilst in many the final diagnosis is only reached by a consideration of the symptoms and the results of the physical examination in the light of the information obtained—whether of a positive or negative character—with the x rays, the investigation of the stools, and sigmoidoscopy.

The series of cases includes 13 of carcinoma of the colon, excluding growths of the rectum which could be felt on digital examination, 5 localized adhesions of the colon, 5 cases of diverticulitis, 3 strictures following ulcerative colitis, 1 case of tuberculosis of the caecum, and 1 of tuberculosis of the last three inches of the ileum.

1. The X Rays.

(a) An x-ray examination after an opaque meal never reveals an obstruction of the colon which cannot be recognized with an opaque enema, but it is useful in the diagnosis of obstruction of the small intestines, especially near the end

of the ileum. In only 2 out of 12 cases of cancer of the colon was anything abnormal seen after an opaque meal.

(b) As I first demonstrated in April, 1908, an opaque enema shows the presence of obstruction at a comparatively early stage, often long before localizing symptoms develop. But a negative result does not exclude a growth of the colon; in 1 of the 9 cases in which an opaque enema was given and in 3 earlier cases a growth was found, though an opaque enema had failed to show the slightest abnormality.

An opaque enema is the only certain clinical means of recognizing diverticula of the colon. This is of great importance, as it may be impossible, even during an exploratory operation, to distinguish between a growth and an inflammatory mass secondary to diverticulitis. In one case in which we had found that symptoms of obstruction were due to diverticulitis, a recurrence of symptoms two years after the mass had been removed was shown by an opaque enema to be due to carcinoma developing in connexion with a diverticulum of the iliac colon, which had apparently escaped notice at the original operation.

Until recently I believed that ulcerative colitis never led to stricture on healing. I have, however, now seen 4 cases out of a series of 17, in which delayed recovery was due to narrowing of the colon, which was discovered with the x rays; in two of these the whole pelvic colon was shortened and narrowed, but complete recovery ultimately occurred without surgery. In the third case a long stricture was found in the transverse colon and a short one in the descending colon, and in the fourth a long stricture of the transverse colon and a kink of the pelvic colon; in neither were any symptoms pointing to obstruction present, but the x rays showed the necessity of short-circuiting operations, without which recovery would have been impossible. Delayed recovery in cases of ulcerative colitis, whether an appendicostomy has been performed or not, is thus an additional indication for x-ray examination.

2. The Stools.

Microscopical examination may show the presence of blood corpuscles and pus in stools which look normal to the naked eye. Much more frequently blood can only be recognized by chemical means and by the discovery of haematoporphyrin or acid haematin with the spectroscope. In 4 out of 12 cases of growth of the colon the blood was obvious; in all of the others occult blood was found in every stool. For some unknown reason it appears to be present with equal constancy when obstruction is caused by adhesions; thus obvious blood was present in 1 and occult blood in the remaining 4 of our cases of this kind; occult blood was also found in the cases of ileal and caecal tuberculosis. In 3 cases suspicious symptoms and the presence of occult blood induced us to advise operation, though the x rays had shown nothing abnormal; in 2 of these the symptoms were referred to the stomach and achlorhydria was present, and we diagnosed carcinoma of the stomach, so that an opaque enema, which might have led to a correct diagnosis before operation, was not given.

3. The Sigmoidoscope.

The sigmoidoscope is so invaluable in diagnosis that every practitioner and physician should learn to use it himself in cases of supposed colitis or unexplained disturbance in the functions of the bowels. With its aid a growth of the upper part of the rectum or lower part of the pelvic colon can be recognized before it can be felt—often before a barium enema shows any definite abnormality. By means of the sigmoidoscope I have twice been able to diagnose early malignant degeneration of a polypus before the wall of the bowel itself had become involved.

I hope that one result of this discussion may be to induce surgeons to avail themselves more frequently of the assistance given by a thorough investigation before embarking on an exploratory laparotomy. I have had the disappointment of learning that a patient, in whom we had diagnosed a growth of the splenic flexure, had had his appendix removed by a distinguished surgeon, whom he consulted without telling his own doctor, to whom we had sent our report; eighteen months later he was operated upon a second time for acute obstruction caused by an inoperable growth of the splenic flexure.

* Contributed to a discussion in the Subsection of Proctology of the Royal Society of Medicine, May 13th, 1925.