that this is seldom needed. The change from trench life to a comfortable bed is usually sufficient to induce sleep, and I hold there is strong reason to avoid the administration of soporifics in these cases. Much more important than drugs at this stage is psychic treatment. The patient finds himself in a ward where the "atmosphere" of cure is strong. He sees other men rapidly recovering from conditions similar to his own. His medical officer visits and talks to him daily, and tries to obtain his intelligent co-operation. I have found that the least hysterical type of patient is able voluntarily to relax his muscles more or less completely. He is told to let himself go as "though he were dead"; and if this is done with any success it is then demonstrated to him that his limbs can be "flopped" about and that at the same time his tremor practically disappears. This mild exhibition of suggestion I have found of great value. On the fourth or fifth day he is got out of bed and enters on a course of mild graduated physical exercises under a special instructor.

(b) Once the typical uncontrollable tremor has been thoroughly established, rigid intensive treatment will alone give good results. Psychic treatment again plays the greater part, and in its name most of what follows is used.

Each case is placed in a cubicle, the lines of treatment explained to him, and his co-operation enlisted. He is kept lying down in as relaxed a position as he can assume, although, as a rule, he does not succeed too well in this. He is seen daily and his efforts commended. The diet is light and given at stated intervals. A mixture containing valerian is given night and morning, or, where indicated, iron and arsenic. Active local treatment of the muscles involved is given twice daily and consists in five minutes' rubbing, followed by five minutes' exercises. Odorous liniments are more successful than the inodorous. The rubbing is done by a professional rubber who used to train men for athletics, and whose methods accordingly are singularly applicable to this type of case. The exercises to follow this are valueless unless the "fixed attitude" of the patient is forcibly corrected while they are being carried out. For instance, where the shoulders are habitually kept raised (that is, in the shrugged position) the patient should be seated near two handles by grasping which he is able to pull his shoulders well down. If necessary, an assistant can aid him by pressing down on his shoulders at the same time. In this position the patient is instructed to perform strong head turning, bending, and rolling movements in regular sequence.

Suitable exercises and suitable positions in which they are to be done must be devised for the individual case. If the shoulders are carried forward, as in marked pectoral tremor, a long stick under the arms will serve to restore their position. If there is a wrong position of the head, this can be counteracted by an assistant pulling the head in a diametrically opposite direction. The resistance experienced in counteracting these attitudes will be found to diminish with each occasion the patient is treated.

As an adjunct in aiding a patient to correct his "fixed attitude," a mirror may be placed in front of him. By this means visual reinforcement is supplied to the voluntary effort, which, as is well known, is deficient in these cases. A looking-glass, too, will be found essential for the performance of the facial exercises in face tremor.

Finally, patients must never be allowed to lose heart during their treatment. A slight modification in routine may be found to suit the mental kink of a particular patient, and this short road to recovery should always be kept in mind.

I have had no failure amongst my cases with the exception of the one case with a pre-war history. If treated from the commencement little trouble is to be anticipated. The average time in the cubicle has been ten to fourteen days. In one or two instances, where the desire for recovery has not been the most prominent point in the case (*les malades invétérés* of the French), treatment has had to be extended up to three weeks and then suddenly the malady has vanished. Here there must be no misplaced sympathy: their treatment should consist, in the aphorism of Sir George Savage in a recent article, of "sympathetic but judicious neglect."

At the annual meeting of the American Surgical Association held at Cincinnati in June (6th to 8th) Dr. Lewis S. Pilcher was elected president for the ensuing year.

PRELIMINARY NOTE

ON

THE COMPLEMENT DEVIATION IN CASES OF MALARIA:

A NEW AID TO DIAGNOSIS.

BY

J. GORDON THOMSON, CAPTAIN R.A.M.C.(T.C.).

This preliminary note is published in advance of the full paper being prepared on the subject, because the details as to technique which it contains may enable other workers to make collateral studies on an aid to diagnosis in malaria which may prove important. It is especially required to find if possible a test sufficiently delicate to indicate complete or nearly complete recovery from infection.

War Office,
28th November, 1918.

RONALD ROSS, Colonel,
Consultant in Malaria.

THIS research work was undertaken under the direction of Colonel Sir Ronald Ross, K.C.B., K.C.M.G., F.R.S. The difficulty of definitely diagnosing chronic cases of malaria in which parasites cannot be found in the peripheral blood has always been a serious one; and considerable doubt is often held whether a patient has ever had malaria or not.

The effect of treatment by quinine after the disappearance of the parasites from the peripheral blood is gauged by the continued improvement of the patient's health; but there is really no accurate means of determining a permanent cure.

The fixation of complement depends on the presence of antigen and antibody; if either of these is absent the complement remains untouched. Until the present research was undertaken investigators were unable to obtain a satisfactory specific antigen for malaria, without which it was impossible to examine serums by these methods.

After a large number of experiments a specific antigen for malaria has been prepared in the following manner: Make a culture of malaria parasites from as heavily infected a case as possible according to the method described by J. G. and D. Thomson (1913).¹ After twenty-four to forty-eight hours' incubation, pipette off the supernatant serum, and add an excess of distilled water to the remaining corpuscles. Shake up and centrifuge, removing the supernatant fluid each time. This process can be repeated until the fluid is quite free from haemoglobin. The sediment at the bottom of the centrifuge tube consists of the bodies of malarial parasites, the washed envelopes of red cells, and leucocytes. Dissolve this sediment in as small a quantity of decinormal sodium hydrate as possible, and a straw coloured viscid fluid is obtained. Neutralize this by adding normal hydrochloric acid solution drop by drop. The more numerous the malarial parasites and the less fluid used in dissolving them, the stronger the antigen will be. Dilute this solution ten times with normal saline and test its anticomplementary action by titration with varying dilutions of guinea-pig's serum. Carry out further dilutions until an antigen is obtained which does not of itself prevent the action of complement.

The best antigen obtained in these experiments acted well diluted 1 in 30 with normal saline. Experience has shown us that the anticomplementary powers of this antigen varies enormously, and it has been found necessary sometimes to dilute our original antigen one hundred times before it could be used. The higher the dilution of course the weaker the antigen becomes, and it should be the aim of the experimenter to obtain as strong an antigen as possible which is not too anticomplementary. Recently we have used an antigen composed of ten different strains of benign tertian malarial parasites with satisfactory results, and this gives a positive reaction with known cases of benign or malignant tertian malaria.

The antigen must be titrated before use to estimate the minimum dose of complement we require to use in the test. The patient's serum is diluted 1 in 10 with normal saline. Put up for each serum four tubes, three of which contain antigen, the fourth being the serum control.

Into the three tubes containing antigen we introduce two and a half, three, and three and a half doses of complement, and two and a half doses are added to the serum control. An antigen control is put up with each series. Each batch of malaria serums tested has introduced into the series at least two known negative serums and two known positive serums. The method used is long fixation in the cold, the tests being kept overnight in the ice chest. In the morning the sensitized red cells are introduced, and the results read after fifteen minutes in the water bath at 37° C. The reading of the results must be carefully done and taken immediately after the negative controls; serum and antigen controls show complete haemolysis.

By using antigen prepared as above described I have performed tests on the serums of 200 known cases of benign and malignant tertian malaria, with or without parasites in the peripheral blood, and at all stages of treatment by quinine.

After short courses of treatment the blood serum gives positive results, and in many cases we have obtained positive results after a considerable amount of treatment; but the reaction tends usually to become weaker. After very prolonged treatment and in cases where there has been no attack of malaria for many months the blood serum usually gives a negative result.

As the doses of complement used are small and the reaction often weak, it is obvious that the tests have to be carried out with great care, and serum, antigen, negative and positive controls introduced into every series of tests done. The serum should in every case be drawn with aseptic precautions into sterile tubes, and it should be used as soon as possible after being taken from the patient, or fallacious results will be obtained.

It is interesting to note that the serums of syphilitic patients give a positive result with this antigen, and it is necessary to exclude this disease.

How far this test will be of use in the future for the diagnosis of chronic cases of malaria liable to relapse we are unable to state, as experiments have not been in progress long enough, but there can be no doubt that with an improved specific antigen a more definite reaction not so liable to error will be obtained, and thus a new and useful test added to the clinical pathology of malaria.

I wish to thank Sir Ronald Ross for all his kind help and encouragement, and Captain David Thomson and Sergeant Denny, without whose aid I could not have made such progress in these observations. Captain Gardner and Dr. Jamieson gave me great assistance in every way during the investigation.

REFERENCE.

¹The Growth and Sporulation of the Benign and Malignant Tertian Parasites in the Culture Tube and the Human Host, *Proc. Roy. Soc., B.* vol. lxxxvii, 1913, and *Ann. Trop. Med. and Parasit.*, vol. vii, No. 4, 1913.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

THE SUPRARENAL GLANDS IN INFLUENZA.

With reference to the report on the influenza epidemic in the British armies in France, 1918 (November 9th, p. 505), it would be of general interest to know if the suprarenal glands showed any abnormality.

In view of the marked decrease of blood pressure in the majority of the cases of fatal bronchopneumonia, the suprarenals were specially examined at the 4th Northern General Hospital in three typical cases. Besides the morbid changes, which are noted in the report, the suprarenals were found to be very disintegrated by haemorrhages, which were most marked at the cortical medullary junction. Sections showed extensive haemorrhages throughout the three layers of the cortex, most marked at the cortical medullary junction, and extending to a slighter extent into the medulla; the cells showed marked cloudy swelling, and many cells of the cortex showed a fatty change, as shown by staining with scarlet red.

E. S. WINTER, Captain R.A.M.C.(T.F.),
In charge Pathological Department, 4th Northern
General Hospital, Lincoln.

LIGHT CHLOROFORM NARCOSIS FOR TRANSPORT.

THE administration of chloroform in the firing line is often clearly indicated. If it is not more often performed it is, I think, because many medical officers do not realize how easily it can be done. A man in severe pain may be put under chloroform more easily than a woman in childbirth. Above all, there is, in my experience, no active excitation period with singing or shouting which might draw the enemy's fire if the wounded man happens to be lying in the open at night.

A few drops of chloroform are put on a handkerchief which is held to the patient's face. He takes three or four slow breaths, finds that the pain is diminishing, and then breathes rapidly and deeply, simply drinking in the chloroform. In little more than thirty seconds the conjunctival reflex disappears.

The injured man may then perhaps be got free from the wreckage of a dug-out, or broken bones fixed in a favourable position, without pain and consequently without increasing the severity of the original wound shock. He is then lifted on to a stretcher and carried back to the regimental aid post, usually remaining in a semi-conscious condition for the whole journey. On arriving at the aid post he may be given tea, hot soup, or, if advisable, a little solid food. The anaesthetic given as described does not induce vomiting. In the warmth of the aid post the patient again soon becomes drowsy, and he finally departs for the casualty clearing station showing very little signs of shock and in as good a condition as one could hope for.

H. M. STEPHENSON, M.C.,
Temporary Captain R.A.M.C.

HERNIA OF OVARY AND TUBE.

A CHILD, aged 12 weeks, was brought to the Tynemouth Jubilee Infirmary, North Shields, on account of a painful swelling in the right groin which it was stated, had been present since birth, and increased considerably in size on coughing or other exertion. A small elastic swelling about the size of a pigeon's egg was noted in the right inguinal region; it was dull on percussion, expansile and reducible. A diagnosis of hydrocele of the canal of Nuck was made.

A small incision, parallel to Poupart's ligament, was made, and the sac, which was firmly adherent to the round ligament near its fundus, opened. It contained a small quantity of pale straw-coloured fluid; the right tube and ovary were adherent just beyond the neck. There were several small petechial haemorrhages. The adhesions were separated by gauze dissection and the ovary and tube replaced. The sac was ligatured with catgut and removed, and the wound closed in the usual manner. The child was allowed to go home with its mother after the operation, a collodion dressing being applied. Recovery was uninterrupted.

CYRIL H. CUFF, M.B., B.S. Dunelm.,
Lieutenant R.A.M.C.

ABDOMINAL OR BILOCULAR HYDROCELE.

THE following case is a comparatively rare condition. A previous case in this hospital was operated on by the P.M.O., Mr. F. O. Lasbrey, in 1916, and reported by him in the *BRITISH MEDICAL JOURNAL* of August 26th, 1916. This case differs from that in the remarkable size attained.

The patient was an Egyptian peasant, aged about 45, who was admitted to the C.M.S. Hospital, Old Cairo, on August 20th, 1918, complaining of a swelling of the abdomen and scrotum. He attributed the condition to a blow in the groin with a pole some years previously, as after that the scrotum became distended, and later the abdomen also. At the time of admission the abdomen was enormously distended with fluid right up to the costal margin, the lower ribs on either side being widely separated from the middle line. The right side of the scrotum was also very large. On percussion a flat note was obtained over the whole of the front of the abdomen, right up to the ribs, with resonance in the flanks. Communication of fluid between the scrotal sac and that in the abdomen was quite free. A fluctuation impulse could be obtained between the two swellings, and pressure on either increased the tension in the other. The appearance and physical signs of the abdomen were very similar to those in a woman with a very large ovarian cyst.