

area affected by the disease (localised tetanus); (d) diminished severity in the manifestations of the disease (modified tetanus).

Clinical and also experimental evidence support the contention that each and all of these results have been attained. During the later periods of the war, when prophylactic treatment has been almost universally resorted to amongst the wounded in the Western front, the fall in the incidence of tetanus has been very remarkable. There is also evidence to show that wounds, in the discharges of which bacilli resembling *B. tetani* were found, and which were subsequently treated by antitetanic serum, have not been followed by tetanus.

The proportion of cases of tetanus with long incubation stage has largely increased since this mode of prophylactic treatment has become general. The comparative increase in the number of cases of limited or localised tetanus is abundantly shown by more recent reports. That the severity of the disease has been greatly mitigated by the prophylactic use of antitoxin is clearly shown by the marked decline in the mortality of the disease during recent years, both in this country and in America.

From considerations such as these the conclusion seems warrantable that the preventive treatment of tetanus by means of its antitoxin is a sound and beneficent measure which ought to be followed up to the fullest limits which experience dictates to be safe.

The curative treatment of tetanus by this same agent stands on a somewhat different footing, but the increasing number of recoveries recorded in cases where it has been energetically employed encourages the hope that here also we possess a remedy of unquestionable value. I can recall a case which I treated some four years ago by the combined intrathecal and intramuscular injection of antitoxin. This was a severe and rapidly developing form of the disease, exhibiting general tetanic convulsions with opisthotonos. No prophylactic had been employed in this case, yet, contrary to my expectation, recovery took place. In the case of Lance-Corporal —, above recorded, the disease had secured a firm hold, and was rapidly increasing in severity up to the time of the first intrathecal injection. From that time the virulence of the attack appeared to be arrested, and no extension of the area involved was afterwards noted. The frequency of the paroxysms also seemed to be diminished in consequence of the treatment.

Referring further to the lance-corporal's case, there are one or two points of pathological interest. The unhealthy appearance of the wounds on patient's admission ten days after their infliction, and their resistance to careful treatment for a fortnight longer, suggested the presence in the tissues of something more than the mere fragment of metal. I have in several cases noted this unaccountable delay in healing in wounds subsequently followed by tetanus. It may be that tetanus spores lodged in a wound have the effect of maintaining an unhealthy septic condition; and this delay in healing, in the absence of any other obvious cause, may put the surgeon on his guard as to the possibility of impending tetanus in any case which obstinately resists ordinary methods of treatment. It may even lead to a diligent search being made in the discharges for the spores or bacilli of tetanus. A very notable circumstance in this case was the rapid improvement in the wounds which set in immediately after the first injection of antitoxin. The discharge ceased within two days and the wounds rapidly cicatrised.

The localisation and limitation of the disease in the above case also deserve attention. From beginning to end the attack may be described as strictly *unilateral*. At no period was any portion of the left side involved in spasm, with the exception of the abdominal wall and other parts where the muscles of the two sides act in association. Even in these the contractions were more marked on the right side. The anatomical continuity of the muscles of the two sides of the abdomen would account for the apparent spasm of the whole abdominal wall. It was also observed that throughout the attack the right hand and foot were entirely unaffected by spasm, voluntary movement and sensibility also being normal in both.

These observations are corroborative of the theories (a) that the morbid condition in tetanus is primarily confined to the nerves, spinal cord, and subcortical centres in direct connexion with the seat of infection, but that it may sub-

sequently, in consequence of the intensity of the infection or in the absence of any counteracting influence, such as antitoxin, extend to the nerve centres generally, and thence involve the entire muscular system; and (b) that the channel of transmission of the tetanus toxin is principally the nerves leading from the point of infection, and not the blood current or the general lymphatic system.

With reference to the rigid condition of the arm and shoulder after the tetanic symptoms had passed off, the question arises, Was the stiffening, which persisted for many weeks, a result of (a) a fibrosis of the muscles mainly involved in the prolonged spasm, or (b) a peri-arthritis due to continued irritation of the metal which still was in close relation to the shoulder-joint, or (c) a nerve implication due to proximity of the metal to the sheaths of the brachial plexus? Probably all of these conditions participated in preventing for a long period the restoration of the arm to its full measure of utility.

In contemplating the removal of the piece of metal still *in situ* it will have to be borne in mind that such an operation is fraught with considerable risk of re-exciting the disease, and that special precautions, including a preliminary injection of tetanus antitoxin, will have to be observed.

Yet another remarkable feature of the case was the occurrence of thrombosis with phlebitis of the iliac and femoral veins as a sequel to the tetanus attack. I can find no record that this association has ever hitherto been observed.

A CONTRIBUTION TO THE STUDY OF
DYSENTERY.
BY A. C. INMAN, M.A., M.B. OXON.,
SUPERINTENDENT OF LABORATORIES, BROMPTON HOSPITAL, LONDON
TEMPORARY HONORARY CAPTAIN, R.A.M.C.;
AND
D. G. LILLIE, M.A. CANTAB.,
LATE BIOLOGIST TO THE BRITISH ANTARCTIC EXPEDITION, 1910.
(An Interim Report to the Medical Research Committee from
the Laboratory, Mont Dore Military Hospital,
Bournemouth.)

EARLY in October, 1916, it was ascertained by one of us (D. G. L.) that carriers of *Entamoeba histolytica* cysts were to be found among the dysentery convalescents invalided from France and Flanders. It was therefore decided to search each convoy arriving from France for amoebic carriers as thoroughly as time allowed. Between Nov. 3rd, 1916, and Jan. 4th, 1917, 159 dysentery convalescents were admitted to the hospital direct from France. The incidence of carriers of *Entamoeba histolytica* cysts among these 159 cases is indicated in Table I.

Number of cases admitted.			Number of amoebic carriers discovered.		
British.	Australian.	Other Colonial troops.	British.	Australian.	Other Colonial troops.
134	21	4	13	5	0

So that nearly 10 per cent. of the British cases and 24 per cent. of the Australian cases were carrying *Entamoeba histolytica* cysts.

Now examination of the blood of these amoebic carriers revealed the fact that in 7 out of the 18 cases the blood-serum agglutinated the *B. dysenteriae* Flexner or the *B. dysenteriae* Shiga in a dilution sufficiently high to warrant the diagnosis of a recent infection by one or other of these bacilli.¹

This coincident finding of *Entamoeba histolytica* cysts in the stools and specific agglutinating substances in the blood seemed sufficiently suggestive to warrant further observations

¹ The agglutination test was carried out by Dreyer's method with Standard Cultures prepared in the Department of Pathology, University of Oxford, on behalf of the Medical Research Committee. In this report the test will merely be referred to as being positive or negative for the test, and its diagnostic value will be fully dealt with in a separate report.

on the point. To date we have had access to 97 carriers of *Entamoeba histolytica* cysts invalided from France or Flanders as dysentery convalescents. The results obtained by examination of the blood are shown in Table II:—

TABLE II.—*Agglutination Tests in the Case of Amœbic Carriers from France.*

Number of cases ... 97	
Number of cases in which the blood agglutinated	
B. Flexner	26
Number of cases in which the blood agglutinated	
B. Shiga	7
Number of cases in which the blood failed to agglutinate either B. Flexner or B. Shiga... ..	64

Of these 97 cases, 66 had never been with any other than the B.E.F., nor had they at any time previous to the war visited a country in which amœbic dysentery is known to be endemic. They must, then, have become carriers in France. In 38 of these 66 cases a history of contact with likely sources of infection was obtainable.

For sake of comparison it was decided to examine in a similar manner carriers of *Entamoeba histolytica* cysts invalided from the Mediterranean area, with a few exceptions from Salonika. The results obtained are set forth in Table III:—

TABLE III.—*Agglutination Tests in the Case of Amœbic Carriers from the Mediterranean.*

Number of cases ... 98	
Number of cases in which the blood agglutinated	
B. Flexner	5
Number of cases in which the blood agglutinated	
B. Shiga	28
Number of cases in which the blood failed to agglutinate either B. Flexner or B. Shiga	65

It will be noticed that the percentage of positive and negative agglutination tests is identical with that obtained in the cases invalided from France. When, however, the cases with positive agglutination tests are considered it is found that some 78 per cent. of the French cases are accounted for by the B. Flexner, whilst conversely over 80 per cent. of Mediterranean cases are accounted for by B. Shiga. Finally, amœbic carriers admitted to the hospital from the Forces in India, Mesopotamia, and Egypt have been similarly examined. The results are exposed in Table IV:—

TABLE IV.—*Agglutination Tests in the Case of Amœbic Carriers from India, Mesopotamia, or Egypt.*

Number of cases ... 35	
Number of cases in which the blood agglutinated B. Flexner	1
Number of cases in which the blood agglutinated B. Shiga	3
Number of cases in which the blood failed to agglutinate either B. Flexner or B. Shiga... ..	31 (88·5%)

The experiments referred to above are, in our opinion, suggestive from several points of view. For the reason, however, that they only form the beginning of a series of researches we do not propose, for the present, to go more deeply into matters than we have already done.

One conclusion of practical import may, however, be emphasised. It is highly important that careful protozoological as well as bacteriological and serological examinations be made in every case of dysentery coming under investigation. A positive bacteriological or serological finding, for example, does not preclude the necessity for a careful protozoological examination.

In conclusion, it is a pleasant duty to acknowledge our indebtedness to Lieutenant-Colonel T. H. F. Clarkson, R.A.M.C., officer commanding Mont Dore Military Hospital, Bournemouth, for permission to publish this note and for whole-hearted support and encouragement.

LITERARY INTELLIGENCE.—The fourth edition of Mr. Comyns Berkeley's "Handbook of Midwifery" is announced for early publication by the house of Cassell. It has been considerably expanded to meet the additional requirements of the Central Midwives Board and to render it suitable for obstetric dressers.

TRAUMATIC DISLOCATION OF THE KNEE-JOINT:

A REPORT OF TWO CASES.

By HARRY PLATT, M.S. LOND., F.R.C.S. ENG.,
HONORARY SURGEON AND SURGEON IN CHARGE, ORTHOPÆDIC DEPARTMENT, ANCOATS HOSPITAL, MANCHESTER; CAPTAIN.
R.A.M.C. (T.), 2ND WESTERN GENERAL HOSPITAL.

(From the Orthopædic Department, Ancoats Hospital.)

COMPLETE traumatic dislocation of the knee-joint is a condition seen so infrequently that it is well worth while recording all cases of this type. During the last 18 months two individuals with this rare injury have been admitted to the Ancoats Hospital, Manchester, under my care and I have had an opportunity of controlling the treatment in both cases and of observing the functional result obtained.

CASE 1.—L. S., a female aged 20, whilst crossing a field in the dark, slipped, caught her left foot in a hole, and fell over backwards on to her left side. She was brought to hospital on Sept. 17th, 1915, within an hour of the accident, a tentative diagnosis of fractured femur having been made by an outside doctor. On examination the left knee-joint revealed an obvious complete dislocation, the femur being displaced backwards, the upper end of the tibia being abnormally prominent, with a deep hollow above. The amount of effusion in and around the joint was strikingly small, and there were no signs of any circulatory obstruction in the limb. A radiogram (Fig. 1) was taken before reduction was attempted, this latter manoeuvre being accomplished with ease by Dr. W. S. Booth, the senior house surgeon to the hospital. The limb was then put up on a back-splint, and after ten days' stay in hospital the patient was sent home to Wolverhampton, a plaster cast having been applied extending from the toes to the groin. Five months later the patient was readmitted to hospital and the cast removed. The injured joint was now absolutely stiff in the position of full extension; no motion could be elicited even though considerable force was exerted. A radiogram showed atrophy of the cancellous tissue of the bone ends, but there was a clear cartilage line on both bones. The girl began to walk on the limb, wearing a calliper splint for the first two months. Her present condition (15 months after the accident) is as follows: The knee-joint is firmly ankylosed, the patella being adherent to the anterior surface of the femur. The patient walks well without pain and is following her occupation.

FIG. 1.



L. S., dislocation of knee-joint. Backward displacement of femur; no lateral displacement.

CASE 2.—J. E., a man aged 47, fell from the top of a ladder to the ground a distance of 12 feet, his left knee striking a plank, the point of impact being localised to the inner side of the joint. He was admitted to hospital on April 1st, 1916, some 20 minutes after the accident. The left knee showed all the signs of a complete dislocation, with the femur displaced backwards and slightly outwards. There was a moderate effusion into the joint, but no evidence of vascular obstruction. A skiagram (Fig. 2) was taken before reduction by the senior house surgeon, Dr. H. M. von Mengershausen. Reduction, as in the first case, presented no difficulties. At the end of a week the man left hospital with his leg in a plaster cast. This fixation was maintained for four months. On removal of the plaster the joint allowed five degrees of