accident observed by colleagues who have inoculated in Serbia more than 120,000 men with the tetravaccine. We have never observed any really serious reactions, either local or general, the inoculated persons being as a rule able to attend to their duties in from twenty-four to forty-eight hours after injection.

3. The inoculated persons develop protective substances for the four germs: typhoid, paratyphoid A, paratyphoid B, and cholera. The amount of agglutinins present for each of the four germs is practically the same as in control individuals inoculated with typhoid, paratyphoid A, paratyphoid B, and cholera monovaccines.

4. We are of the opinion, as stated in previous publications, that the tetravaccine should be used as a matter of routine to inoculate the troops taking part in the present war, greatly exposed as they are to the four diseases, typhoid, paratyphoid A, paratyphoid B, and cholera. Its use renders it possible to give a contemporaneous protection for the four maladies by a simple and rapid procedure.

As we have already received numerous requests and inquiries from many quarters, and as the time at our disposal makes it impossible for us to supply the vaccine to all who ask for it, it may be mentioned that the tetravaccine is now prepared on a large scale by Mulford and Co., of Philadelphia, and can be obtained from them.

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PARATYPHOID "A" FEVER.

BY

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ALTHOUGH paratyphoid fever has been recognized for several years, and during the last three or four years has become of considerable importance in India, especially as affecting the British troops, it appears seldom to be recognized by civilian practitioners, and not much attention been paid to it outside the army. This is no doubt due to the fact that few textbooks give more than a brief sketch of the disease.

The following notes are based on over a hundred cases which I have personally observed and in which the *Bacillus paratyphosus* A was isolated in each instance, either from the blood, urine, or faeces.

Definition.—A septicaemia caused by the presence of the *Bacillus paratyphosus* A, causing a remittent type of fever of about twelve days' duration.

Incubation.—From ten to fifteen days.

Chart to illustrate a severe case of paratyphoid A fever followed by a relapse. B. Blood culture positive.

Immunity.

In India race seems to bear no relation to immunity, for although the organism has been more frequently isolated from Europeans than from Indians this is due chiefly to failure in taking the necessary steps for its isolation among the latter. From five blood cultures from Indians I have isolated *B. paratyphosus* A on two occasions and *B. typhosus*

once. It appears to be more common among men than women, but no definite statement on this can be made at

Chart to illustrate a typical case of paratyphoid A fever. B. Blood culture positive.

present owing to the excess of male over female population in the army in India. One attack protects against a second. I have never seen or heard of a second attack. As might be expected, antityphoid inoculation gives no protection against paratyphoid.

Bacteriology.

A Gram-negative motile bacillus is present which agglutinates with high titre paratyphoid A serum, and by the absorption test can remove the agglutinins.

Reactions.

	24 Hours.	48 Hours.	10 Days.
Glucose ...	Acid + gas +	Acid + gas +	The same as after 48 hours' incubation.
Lactose ...	No change	No change	
Cane sugar	No change	No change	
Mannite ...	Acid + gas +	Acid + gas +	
Dulcitol ...	No change	Acid + gas +	
Inulin ...	No change	No change	
Neutral red agar	Gas + fluorescence -	Gas + fluorescence -	
Litmus milk	Acid + clot -	Acid + clot -	
Indol ...	Nil	Nil	

Symptoms.

The onset is as a rule insidious, there being a general feeling of lassitude and loss of appetite. There is complaint of headache (frontal and occipital), pain in the back and limbs, and chills. A rigor seldom occurs. The headache becomes very severe and the patient suffers from insomnia for the first few nights, but when once the headache is relieved sleep returns. There is constipation and the tongue is coated with a yellowish-brown fur except the tips and edges, which are clean. The temperature varies considerably with the severity of the case, but is generally 101° to 102°, or even higher at nights, and 99° to 101° in the morning. There is generally defervescence, the fever lasting about twelve days.

The pulse-rate is slow in comparison with the temperature. This is a very diagnostic sign, and often gives one a clue to the real nature of the disease during the first few days. The pulse-rate is often described as being rapid in this disease, but careful observation of my own cases and a study of a large number of charts from various stations in India entirely disproves this.¹

In a few cases there is initial bronchitis or tonsillitis, and epistaxis sometimes occurs.

A rash may be present during the first few days, but

I have seen so many varieties and also so many cases in which no rash appeared that I do not consider the presence or absence of a rash any aid to diagnosis.

Tenderness or even pain over the gall bladder is a common symptom. There is often an initial enlargement of the spleen but seldom of the liver.

By the end of the first week the headache is relieved and there is marked improvement in the general condition of the patient; this is in marked contrast to the case of true typhoid. Although the fever continues a few days the patient feels quite well, and is anxious for an increase of diet or even to be allowed to get up.

Complications and Sequelae.

A relapse is fairly common, and usually begins within seven to ten days after the cessation of the initial attack, but seldom runs the full course, lasting five to seven days. Haemorrhage is rare, but blood-tinged mucus is sometimes passed. Perforation is extremely rare, but has been recorded. Phlebitis and cholecystitis appear to be the most common complications, the former occurring more often than in typhoid.

The mortality is very low, and is generally placed at 1 per cent., but even this figure is, I think, too high.

Convalescence is slow; considering the comparatively short duration of the fever there is marked debility and anaemia.

Treatment.

The case should be isolated and treated on general lines, as a case of typhoid.

Beyond relieving the headache and constipation little can be done except careful nursing. For the relief of the headache small doses of aspirin are useful, and for the first night or two hypnotics may be used. An initial dose of castor oil should be administered if the case is seen early; if not enemata should be given. The pain over the gall bladder is seldom excessive, and can generally be relieved by hot fomentations.

The diet should consist entirely of milk or milk- whey during the fever and be very gradually increased. Too early feeding is, in my opinion, the cause of most cases of relapse.

Diagnosis.

Little reliance can be placed on Widal's reaction as an aid to diagnosis, as the agglutinins are very feeble—seldom higher than in a dilution of 1 to 40 during the disease, and are frequently entirely absent.² They appear to be highest at about the twenty-second day of the disease, by which time the patient is convalescent. The most rapid and satisfactory method of arriving at a diagnosis is by blood culture, but it is essential that the blood should be drawn within the first five or six days of the disease. I have recovered the bacillus from the blood as late as the ninth day, but this is uncommon. A bottle containing 20 c.cm. of sterile ox bile should be inoculated with 5 c.cm. of blood from the vein. This is best done with an all-glass syringe which has been sterilized by dry heat or hot oil at a temperature of 140°C. The syringe should not be sterilized with antiseptics. The further stages in the isolation of the organism must be carried out by an experienced bacteriologist. Failing isolation from the blood, the urine and faeces should be daily examined. The disease varies considerably in intensity from the ambulatory type, which is fairly common, to the typhoid type. The fever in this type lasts three or four weeks, but even in this severe type the "typhoid state" is seldom, if ever, seen.

An intermittent type of temperature sometimes occurs.

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¹Grattan and Wood, *Journal of the Royal Army Medical Corps*, August, 1911; Bainbridge, *Lancet*, March 16th, 1912. ²Grattan and Harvey, *Journal of the Royal Army Medical Corps*, January, 1911.

THE Pan-American Medical Congress, at its seventh meeting, held in San Francisco in June, passed a resolution requesting the president to organize a Pan-American Committee on Medical Education to include one representative from each American country. The committee is to investigate the status of medical education and medical practice in the different countries; and to consider the feasibility of a system of exchange professorships between American universities. Its report is to be communicated to the national medical organizations of the countries represented, and a final report is to be submitted to the eighth Pan-American Medical Congress.

THE TREATMENT OF AMOEBIC DYSENTERY.

BY

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RECENTLY many cases of dysentery have been coming home to England from Gallipoli and other places abroad, and as a result people who have little or no experience of this symptom-complex of disease are called upon suddenly to treat them. Naturally the results in many instances are not very satisfactory, and, in the hopes that some information on the subject may help any practitioners so situated in the future, I propose to give a brief account of the up-to-date treatment of one of the commonest forms of this disease. Since Rogers proposed the use of emetine for amoebic dysentery I have treated many cases, both in private and in the Seamen's Hospital, by this drug, and the method of administration now given is therefore based on actual experience and is one that will be found useful and efficacious in actual practice. Other ways of giving the drug I have no doubt may prove equally successful—at any rate, in the hands of experts—but there are certain points that must be carefully followed if success is to be obtained.

Space will not permit of a dissertation on all the varieties of dysentery met with. It is sufficient to say here that there are bacillary forms of the disease, protozoal forms, and helminthic. Of these the one termed amoebic comes under the protozoal group, and is caused by a parasite termed the *Entamoeba histolytica*. The cases of dysentery that have recently reached England from the Dardanelles have, at least in the vast majority of cases, been bacillary or of some undetermined type, and certainly have not been amoebic.

The administration of emetine to such is useless, as this drug is only specific for the form of dysentery caused by the *Entamoeba histolytica* just mentioned, and by its improper use in cases not due to such parasites negative results are obtained, and the drug is brought into disrepute. The first thing to do in dealing with a case of dysentery is to determine its type, and for this purpose the faeces must be carefully examined for protozoal and other parasites. To detect pathogenic amoebae is not difficult, at least to the expert, but there are pitfalls the unwary may easily fall into, especially if one has not had sufficient practice in examining stools. *Lambia* cysts, *Blastocystis*, vegetable cells, and desquamated cells from the bowel are easily mistaken, and such mistakes are serious, as they may condemn a patient to a long course of emetine for no purpose whatsoever. Still more difficult, at least in the vegetative stages of the parasites, is the distinction between *Entamoeba coli*, a harmless amoeba, and the *E. histolytica*, the harmful one. In the tropics and abroad generally the former is very common, and there is no reason why mixed infections with both should not occur. The distinction between the two lies in the hands of the expert, but the broad rule generally adopted now is, if a patient is passing blood and mucus—that is, has signs of definite dysentery and has amoebae present—the case may be looked upon as an amoebic one and treated accordingly. Later on, when the case becomes chronic or passes into the stage of the true carrier, cysts appear, and these can be differentiated from each other by their size and the number of their nuclei.

Having then diagnosed the case properly—a most important thing—the next thing is to treat it, and this is done by emetine hydrochloride in varying doses and amounts. The drug may be administered in one of three ways: (1) Intravenously; (2) subcutaneously or intramuscularly; or (3) by the mouth.

As regards intravenous injections, I have had no occasion to use them, but there is no reason why they should not be employed in fulminating or in moribund cases where time is precious. The most usual method of administering emetine is subcutaneously or intramuscularly. Subcutaneous injections often give rise to a considerable amount of pain and stiffness, and to avoid this some give them deep into the muscles similarly to quinine. There seems to be an idiosyncrasy in some individuals, a man I lately treated having considerable trouble—pain and stiffness—after his injections, whether