Paratyphoid Fever in Malta

A NEW PORTABLE MOSQUITO NET SUPPORT.

By LIEUTENANT-COLONEL C. E. NICHOL, D.S.O.
Royal Army Medical Corps.

I SHOULD like to bring to the notice of officers serving abroad a portable mosquito net support which has just been invented and patented by a lady who has resided for a considerable time in the Tropics, and which is a great advance on anything of the kind I have yet come across. The accompanying diagrams explain the device.

Fig. 1 shows the support erected ready for fixing on a bed, together with the mosquito net and extension rod for adapting to a chair and a table.

Fig. 2 shows the support erected on a camp bed, with net suspended over sleeper, also the carrying valise and extension rod.

Fig. 3 shows the support (with extension rod) erected over a chair and table.

Fig. 4 illustrates the compactness of the apparatus, showing the netting, support, extension rod and valise, the whole weighing about 4 lb. and measuring less than 30 inches.

The price is £2 2s. and it can be obtained, without net if required, from "Corries Patent, 25, Great Winchester Street, London, E.C."

Lecture.

PARATYPHOID FEVER IN MALTA.¹

By SURGEON-CAPTAIN ROBERT SAMUT.
1st King’s Own Malta Regiment (Militia).

In presenting to the medical profession an account of that type of infectious disease which latterly has figured so largely both at the hospital and in our private practice, namely, paratyphoid fever, and in detailing the circumstances connected with the origin and progress of this disease, which in its course has already claimed victims, I have implicitly adhered to clinical facts collected from my own cases and from those of other practitioners, and to the careful study of the micro-organisms connected with the disease at the Pathological Laboratory of the Central Hospital.

As to the object of this paper, it is scientific inasmuch as it is intended to bring before you those facts connected with this group of bacilli which are conspicuous by their absence from the ordinary text-books; to demonstrate these facts by means of bacteriological preparations which, in most

¹ Lecture delivered in the University Hall on July 16th, 1909.
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cases, will speak for themselves; and to show that the clinical picture of paratyphoid may so closely resemble that of Mediterranean fever as to be identical with it in some cases. I cannot help feeling that many cases in which the diagnosis was not based on the Widal test have gone to swell that dark list of our statistical returns, the list of Malta fever, which would otherwise have been classified under their proper heading, namely, that of paratyphoid fever. Finally, our considerations on the infectivity of the disease, and of the ways and means by which the infecting bacilli are spread, cannot help leading us to a few practical conclusions with regard to prophylaxis, which might spell "prevention is better than cure."

The word paratyphoid was first adopted by Achard and Bensaude in 1896 to differentiate those cases of typhoid fever which, being typical of this disease in respect to their symptomatology, presented such constant anomalies to the Grüber-Widal test as to be classified under a special heading. Once recognised, the typhoid anomaly was described under the name of paratyphoid or paracolon fever by Widal and Nobecourt, and later by Gwyn, Brill, Mournier and Cushing.

In 1901 Schütz defined the nature of a bacillus which he succeeded in recovering from the blood of a patient who was suffering from fever, clinically identical with enteric fever, but whose blood did not yield the Grüber-Widal reaction with the Eberth bacillus.

Burch, Brion, Kayser, Kurth, Johnston, Hume and others have subsequently added considerably to our knowledge of the disease, while the bacteriology of the group has been enriched in no small measure by the researches of Colonels Birt and Firth, and Majors Statham and McNaught, R.A.M.C.

Unlike true typhoid fever which owns for its origin infection by one and only one micro-organism, the bacillus of Eberth and Gaffky, paratyphoid is a group disease for which a number of organisms are responsible, the chief varieties being:

- Bacillus paratyphosus A.
- Bacillus paratyphosus B.
- Bacillus coli communis.

Subvarieties of the Para. B group exist, however, which owe their names either to their discoverer or to the place where epidemics of the disease have been known: thus Gaertner, Moorceilli, Günther, Rumfelt, Brugge, Gent, Hanstadt, Aertyck, Calmphont and Meirelbeck, are examples of names to which others are being added daily. These forms differ slightly in detail, but may be looked upon as members of the Para. B family.

Yet other forms exist which produce typhoid symptoms and which therefore belong strictly to the paratyphoid group of micro-organisms, these being:

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Bacillus faecalis alcaligenes.
Bacillus mortificans bovis.
Bacillus typhi murium.
Bacillus psittacosis.

Taking the characters common to all the members of this large group of organisms we find that they are as closely allied bacteriologically as they are clinically. They are all short, mobile rods, which do not liquefy gelatine and do not retain Gram’s stain. They grow on media usually unfavourable for the growth of other organisms, and have the power of fermenting sugars and some alcohols. That their action is not limited solely to the production of typhoid symptoms, and that they may give rise to inflammation with or without the production of pus, has been definitely proved; thus hepatitis, nephritis, adenitis, cerebral abscess, and suppurative tonsilitis, have all been produced by them.

Of the media usually employed for their isolation I will do no more than mention their names, their preparation being a long and tedious process. Conradi-Drigalski, Endo, Proskauer-Copaldi, and McConkey’s bile salt agar, are the principal of those media which inhibit the growth of saprophytes, but favour at the same time the growth of the paratyphoid bacilli. Others, like Gaectgen’s caffeine, Klein’s malachite green, Conradi’s picric acid and Fawcus’s modification of the latter are still more selective, since they favour the growth of one or more forms to the exclusion of all others. Sanatogen media are also useful.

We now come to the all important action of these bacilli on sugars. Advantage is taken of their property of fermenting sugars not only to distinguish them from other organisms, but also to classify the various species of the group; since in this, more than in any other respect, the members of the paratyphoid family differ somewhat. Glucose, lactose, and maltose are the chief sugars employed, while mannite and dulcite, which are alcohols and not sugars, serve as further means of diagnosis. Now, whereas B. typhosus fails to produce gas in each and all of these sugars, the paratyphoid bacilli A and B stand out in their character of producing gas in one sugar, a monosaccharide, viz., glucose. B. coli communis, on the other hand, ferments not only glucose, but also lactose, maltose, mannite and dulcite, producing gas in each case.

The production of acid in these media, the action on litmus milk and on glucose neutral-red and the formation of indol, are other points extremely important in diagnosis, and I would ask you to look carefully at the specimens, which require no further description.

One word with reference to the test on which the diagnosis of cases is principally based is indispensable. We must distinguish between the words “group” and “specific” agglutination. All members of the paratyphoid group are agglutinated by sera of animals suffering from or immunised against diseases produced by them; for this to take place, however, a low dilution is essential; this constitutes “group” agglutina-
tion. "Specific" agglutination, on the other hand, consists of clumping of one form of bacillus by the serum of an animal suffering from or immunised against the disease produced by that bacillus, in dilutions considerably higher than those producing the group agglutination.

And now I will ask you to note the chief characteristics of the different members of this interesting group of bacteria, and to begin with the B. paratyphosus A. We find that infection with this organism is rare in man. The bacillus is possibly a South African variety, and has rarely been isolated from the blood of patients. Major Statham has been fortunate in isolating the micro-organism from the blood of four patients, and Lieutenant-Colonel Birt from that of two more. It is not so mobile as the B. typhosus, having but two flagella at each extremity.

B. paratyphosus B may be looked upon as a name indicative of a number of bacilli rather than one specialised form. The species includes the meat-poisoning bacteria and of these some deserve closer observation. Thus Gaertner's B. enteritidis is responsible for most of those typhoid-like epidemics which follow the eating of unsound meat. Such cases were usually put down to poisoning by chemical substances produced by putrefaction, and passed under the heading of meat or ptomaine poisoning. Closer investigation, however, revealed the presence of a bacillus which has all the group characters of the paratyphoid bacilli. Loeffler's B. typhi murium, Smith's B. cholerae suis, B. psittacosis, and B. gwyn, are other prominent members of the group, while others have been described by Durham, Bowes, Boseman, Fisher, Cotta, Delepine, and others.

We now come to the B. coli communis, or the bacillus of Eserich, the commonest type of the intestinal flora, of which five varieties at least are known to exist. It is present in the intestine shortly after birth. It is less mobile than the other paratyphoid bacilli, showing, as a rule, a rotatory slow movement, though very active forms have been described.

I would merely mention the B. facalis alcaligenes for the sake of completing the bacteriology, and because it is an interesting entity, since Doebert considers that by successive passages in guinea-pigs it is possible to convert it into the B. typhosus, a conclusion which remains to be definitely proved. McNaught's bacillus isolated in 1907 closely resembles B. facalis alcaligenes producing no clotting in milk, but marked alkalinity in less than four days.

So much for the bacteriological study of this important and interesting family of bacilli. The different strains which I have worked with, and which I now show you, have been derived from the following sources. One strain was presented to me by Major D. Lawson, R.A.M.C., another was obtained from Naples University, while two strains of B. paratyphosus B were isolated by me at the central hospital from the blood of

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patients suffering from paratyphoid fever by Castellani's method in one case, and by Kayser and Conradi's ox-bile method in the other. The cultures are all pure and respond typically to each of the tests already enumerated.

I must refrain from going deeper into bacteriology, as most of you here are not specialists in this subject, and I do not wish to overtax your attention further. I will, therefore, take up the symptoms of paratyphoid fevers without further delay.

The symptoms of this disease have a wide range, and might for convenience be classified under four types:

1. In the mildest form the patient may pass through the disease with no more than a feeling of indisposition for a few days with symptoms of gastric derangement and malaise. Constipation is often well pronounced.

2. The second type is that which reproduces the clinical picture of enteric fever. In this form of the disease we generally meet with the usual premonitory signs, malaise, depression, headache, and, above all, loss of appetite and even nausea, the tongue being usually white and glossy. The patient may go about and struggle to do his work, but soon he feels too weak and realizes that he is seriously ill. A high temperature develops which runs an enteric-like course. Rose spots make their appearance on the abdomen. Diarrhoea may be present, but constipation seems commoner. Enlargement of the spleen and sometimes of the liver with jaundice are met with. Epistaxis is extremely common. The urine is highly concentrated with an increase of urea and uric acid, but a diminution of sodium chloride; albumin may be present and a positive diazo reaction is not unusual. Complications are not so common in paratyphoid as compared with true enteric, yet haemorrhage from the bowel is, according to Klemperer, met with in 3 per cent. of cases; pulmonary complications such as congestion and pneumonia are among the commonest.

3. The next form is one which is characterized by those symptoms usually met with in Malta fever. Now, while the close resemblance between paratyphoid fever and true enterica is firmly established, it is not usually accepted that paratyphoid may simulate Malta fever so closely as to be identical with it in all its clinical manifestations. Yet many cases have come to my notice, and during the present epidemic of the disease in Malta a large number have been returned to hospital in which symptomatology was as far removed from the usual picture of infections by the paratyphoid group as it was closely related to that of Malta fever and which on careful bacteriological examination yielded undeniable proof of paratyphoid infection. I attach particular interest to these cases.

4. The last form is paratyphoid fever as a complicating infection during the course of other fevers, notably Malta fever. That such a
mixed infection exists was proved by me in the September number of the Journal of the Royal Army Medical Corps, and by other cases since. What I consider most conclusive, however, is the fact that some years ago, before the paratyphoid bacilli were well understood and cultivated, haemorrhage from the bowel had been met with in several cases of Mediterranean fever in which the blood had given absolutely negative results to the Grüber-Widal test with \textit{B. typhosus}. Hence ulceration of the intestine was considered to be one of the complications of Mediterranean fever, while the fact was apparently proved beyond doubt in the \textit{post-mortem} room, when the ulcerated Peyer's patches were held up for demonstration as proof conclusive of the destructive changes of the bowel brought about by the \textit{Micrococcus melitensis}. Bruce describes such a case in the \textit{Practitioner} of April, 1888. Bousfield's case,\footnote{Journal of the Royal Army Medical Corps, vol. vii., August, 1906.} reported under the title of "A Case of Malta Fever with Ulceration of the Small Intestine," is so important in this connection, and presents points which coincide so accurately with the changes witnessed by me, and no doubt by others performing \textit{post-mortem} examinations on similar cases, that I must ask to be pardoned if I summarise them in a few brief notes:

Bousfield states that several cases had come under his observation having more or less profuse haemorrhage from the bowel, cases which were clinically \textit{not} typhoid, whose sera did not react to enteric, though they did to Malta fever. One case whose blood had given undoubted reaction to the \textit{M. melitensis}, but failed to react to \textit{B. typhosus}, was examined \textit{post mortem}; "eight definite ulcers situated between 18 and 36 inches from the ileo-ccecal valve were observed. Some appeared to correspond to Peyer's patches, others to the distribution of the blood-vessels. Their edges were sinuous and shelving. There was no sign of lymph deposit or of tubercles." The ulcers presented characters so much like those seen in enteric fever that Bousfield concludes by saying that "he believes the most skilful pathologist would have been unable to state that they were not those of typhoid fever." In conclusion, I may say that in our experience in the \textit{post-mortem} room such ulcerations have never been found in cases of pure Malta fever, while their constant occurrence in cases of mixed infection with the paratyphoid bacilli is, in my opinion, very significant.

Such are the facts connected with this important group of micro-organisms. In the light of our present knowledge it becomes a duty, which falls upon each and all of us equally, to endeavour to combat by means of prophylactic measures, outside and inside the sick-room, a disease which threatens to take root among us. Such a campaign should be conducted on a thoroughly organised system which should, in my opinion, include the following considerations:
Tosari: The Hill Sanatorium of the Netherlands India

(1) The proper disposal of faecal material removed from cesspits under the supervision of sanitary inspectors. Such material, diluted with water, is obviously a source of extreme danger when used to water vegetables.

(2) The emptying of wells which may have become contaminated with sewage, and which are used for watering vegetables, &c.

(3) The examination of all suspicious fevers by the Grüber-Widal test.

(4) The system of reporting all cases of paratyphoid fevers to the sanitary authorities, leading to investigation of the proximate cause of the disease.

(5) The isolation of cases so far as it may be possible.

Much can be done by the medical attendant, who should not be content with only warning members of the household of the danger of contact with the patient's excreta. He should invariably see that a basin containing disinfectant, such as lysol or cresol or any other favourite antiseptic, is provided, and give the necessary instructions for its use.

(6) Lastly, I would point out the all-important question of the "bacillenträger," or "carriers." These should be warned of the danger they are to others by being centres of infection. By voiding bacteria in all their virulence, in their urine and faces, they are the means of disseminating disease, and no pains should therefore be spared in instructing them in the measures to be adopted to minimise the danger of those who are nearest and dearest to them.

Travel.

TOSARI: THE HILL SANATORIUM OF THE NETHERLANDS INDIA.

BY CAPTAIN MAYNARD CRAWFORD.
Royal Army Medical Corps.

Within a moderate distance of Singapore there are only two places available which have "cold climates" and at which invalids can obtain a complete change from the damp heat of the Straits. They are Newara-Eliya in Ceylon, and Tosari in Java, the latter being the nearer and also the less known.

The following notes of a visit to Tosari may interest readers of the Journal, especially those stationed in the Straits Settlements.

Tosari, which has been described in the Straits Times as the Mussoorie of the Netherlands India, is a sanatorium placed on the north-west spurs of the Tengger Mountain in East Java. It can be reached in four days and a half, the last two of which must be