NOTES ON AN EPIDEMIC OF ENTERIC FEVER.

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The following are some notes on an epidemic of enteric fever in the "Carabineers," at Mhow, during the months of February, March, April and May, 1907.

The barracks have been occupied by the present regiment since the middle of October, 1906. Previous to that they were occupied by the 10th Hussars, and this regiment suffered severely from enteric fever in the years 1903, 1904, 1905 and 1906 (see Table I.). Table II. shows the incidence in individual bungalows for the past four years; the extraordinary preponderance of cases in Barrack No. IV. and the almost entire escape of Barrack No. III. should be noted. The exemption of Barrack No. III. is difficult to explain; it was occupied mainly by the band of the 10th Hussars, and since their arrival the band of the "Carabiniers" have occupied it; other parts are occupied by signallers and some seven or eight nursing orderlies, most of them nursing enteric fever cases. The accompanying map of the Cavalry Barracks also shows that the band cook-house has a latrine in front of it and a urinal behind it, the back of the cook-house building itself being a wash-house. No. IV. Barrack comes into near relation with two latrines, but otherwise its surroundings are as sanitary as any other barrack.

There appears to be no sanitary defect which would explain why enteric fever has been so prevalent in No. IV. in the past, or why it should be responsible for nine cases out of fifteen this year. We must look, therefore, for some other explanation for the "B" Squadron epidemic, and one naturally turns to the features of the epidemic, which I will briefly describe.

A glance at the Cavalry Barrack map will show the chronological order of the cases and the bungalows in which they occurred. The index of the map shows the date of admission, but what is infinitely more important, the approximate date of onset of each case. In most cases the patient gives a very definite date on which he first fell ill, began to suffer from headache, diarrhoea, or other symptoms. The latrines and urinals each bear the letter of the squadron to which they belong. The cook-houses are suitably labelled.

No. 1 Case was admitted on February 7th; he was sent in from
field manoeuvres, which started six days before. He stated that he first fell ill one or two days before starting on manoeuvres, and had therefore been a possible source of infection to his comrades in barracks for two days. He had been in the habit of using both "A" and "B" Squadron latrines. The map shows that these latrines are almost equally handy to the occupants of No. IV Barrack. The source of infection in this case remains a mystery; the only cases of enteric fever in the station at the time were in the infantry barracks 1 1/2 miles away. He was a steady man and did not eat or drink in the bazaar.

No. 2 Case was admitted on February 14th. He did not accompany his squadron on manoeuvres. He stated that he had been ill, suffering from diarrhoea—six or seven stools a day—since February 7th. He also stated that he invariably used "A" Squadron latrine, but this is difficult to entirely credit, as it will be seen from the dot map that he lived slightly nearer "B" Squadron latrine. However, as a possible spreader of infection, either by latrine or other intermediate contact, the importance of this case can scarcely be over-estimated.

Case No. 3 was admitted on February 21st. First ill on February 15th. He stated he used both "A" and "B" Squadron latrines, and as he occupied Room 9, either would be handy. The source of infection was possibly latrine contact with Case No. 2.

Case No. 4 was admitted on March 2nd; first ill on February 27th. He was employed many hours daily in the riding school, with the result that he was often late for meals. He volunteered the statement that he frequently found his food had been left uncovered in the barrack-room, and it was covered with flies. His room (see dot map) was on the ground-floor, and flies from both latrines more than probably settled on his food. These latrines could undoubtedly have been infected by Cases Nos. 2 and 3, up to February 14th and 21st respectively, fourteen and eight days before this man first fell ill.

Case No. 5 was admitted on March 5th; first fell ill on February 27th. On February 14th Case No. 2 was admitted from the same room. This man developed the disease fourteen days later. What more suggestive of latrine or other contact infection, when one remembers the features of Case No. 2?

Case No. 6 was admitted on March 7th; first ill on March 3rd. Living on the lower floor nearly opposite a latrine.

Case No. 7 was admitted on March 9th; first ill on March 3rd. Living in the same room as Case No. 2, and developed the disease seventeen days after Case 2 left for hospital.
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Case No. 8 was admitted March 10th; first ill on March 6th. Belonging to Barrack No. V. There are two possible sources of infection: (a) 'A' Squadron latrine, infected by Case No. 2, at the last possible date, twenty days before; and (b) association with Case No. 9, who was employed with this man in the forge, and used the same latrine.

Case No. 9 was admitted March 10th; first ill on March 7th. Lived in same room as Case No. 6.

Case No. 10 was admitted on March 20th; first ill, probably, about March 13th. An ambulatory case. Died of perforation seven days after admission. Room No. 16.

TABLE I.—ENTERIC FEVER CASES IN 10TH HUSSARS.

<table>
<thead>
<tr>
<th>Year</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
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<td>3</td>
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<td>1</td>
<td>3</td>
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<td>0</td>
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<tr>
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<td>4</td>
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<td>1</td>
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<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
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<tr>
<td>1906</td>
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<td>0</td>
<td>4</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td>10</td>
<td>5</td>
<td>0</td>
<td>3</td>
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TABLE II.—ENTERIC FEVER AS IT OCCURRED IN BARRACK BLOCKS.

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<tr>
<th>Year</th>
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<th>III.</th>
<th>IV.</th>
<th>V.</th>
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<td>5</td>
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<td>15</td>
<td>9</td>
<td>35</td>
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<td>21</td>
<td>1</td>
<td>37</td>
<td>29</td>
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Case No. 11. A doubtful case. Cause not traced.

Case No. 12 was admitted April 5th; first ill April 3rd. Case occurred in Bungalow No. 1. He was semi-comatose for twelve days after admission and no information could be got from him. Source not traced.

Case No. 13 was admitted on April 17th; first ill April 11th. Last in contact with Case No. 8, twenty-three days before.

Case No. 14 more than probably was infected in hospital. Admitted on April 17th; first ill on April 15th. Blood, on admission, contained malarial parasites. On April 24th, after giving quinine, temperature was normal, then began to rise gradually. On May 2nd had typical typhoid stools.

Case No. 15. A sporadic case. Source not traced. He stated he was in the habit of eating raw tomatoes and onions.

Case No. 16. Source not traced.
This epidemic presents many features like other company epidemics described from time to time in the Journal. I think it may be claimed that latrine or other intermediate contact infection most satisfactorily accounts for its spread in "B" Squadron. It presents none of the features of a water-borne epidemic, though a bacillus giving nearly all the cultural characteristics of *Bacillus coli* was isolated from the drinking-water tank at the commencement of the epidemic.

On February 16th No. 4 Troop was given a separate latrine, and completely new *gumlahs* were provided for the squadron latrine.
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On March 21st the whole squadron went into camp, provided with separate cooking, washing and latrine arrangements. No case occurred in "B" Squadron after they moved to camp. However, the epidemic appears to have ceased spontaneously about this time, otherwise one would have expected previously-infected cases to still come in for a short time.

"B" Squadron, or No. IV. Barrack Room Dot Map.

Most of the attacks were severe. Many cases complained of very severe sore throat during the first week. Another feature was the occurrence, in many cases, of broncho-pneumonia towards the end of the second week, giving rise to prolonged irregular fever.

Case No. 4 developed a localised empyema which was opened and drained. The pus contained staphylococci, but an attempt to cultivate B. coli and B. typhosus failed.

All the cases were fed on whey and white of egg; in the earlier
cases cream was added, but the cream was found to contain a
certain quantity of milk, and, a good deal of faeces residue occurring
during its use, it was abandoned. Sanatogen was tried in one case
from the commencement, and in five cases in which convalescence
was slow and emaciation extreme. I think it will be found to pro­
vide a very useful and necessary proteid element to add to the whey
and albaminous diet. Two drachms, thrice daily, were administered.

Many cases developed a scorbutic taint, which was combated by
giving fresh lime juice. In many cases treated on whey diet there
seemed to be a rather undue tendency to intestinal hæmorrhage. I
should like to hear of any similar experience.

In collecting information about this epidemic I was much struck
by the difficulty in obtaining reliable evidence. The sick report is
a document too often carelessly prepared. In some cases the man's
barrack number was wrongly stated; seldom was his room number
given. Men specially employed, such as orderly room staff, sign­
nallers, &c., often do not live with their companies or squadrons.
Men may be transferred from one squadron to another whilst incu­
bating the disease, or during the early stages, in which case the
date of onset of the disease is of much importance. Men, as in
this epidemic, may be using several latrines besides their company
one. All these points appear pretty obvious to anyone, but let such
an one endeavour to work out the causes of an epidemic and he
will find how very easily sources of error creep in and falsify his
deductions.