ENTERIC FEVER: IS IT INVARIABLY A WATER-BORNE DISEASE?

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My attention has recently been drawn to a paper by Major Norman Faichnie, R.A.M.C., entitled "Enteric Fever: a Water-Borne Disease," which appeared in the May number of our Journal. I have read with attention Major Faichnie’s paper and note with regret that its arguments are based on the assumption that, given a good water supply, we may snap our fingers at any danger to be apprehended from the occurrence of enteric fever.

There is much in Major Faichnie’s article which is tempting to criticism, but on this occasion I confine myself to replying to that portion of it which refers to a paper I wrote on "Air-borne Typhoid," in the Army Medical Department Report for 1900.

My paper contained an account of a very serious epidemic of enteric fever which occurred among the Boer prisoners of war incarcerated in Ceylon in 1900, and which, in a small degree, extended to the military guard which surrounded the Boer camp.

Sir Allan Perry, the Principal Civil Medical Officer in Ceylon, who was entirely responsible for the admirable medical arrangements made for the preservation of the prisoners’ health, investigated, with the utmost care, the causation of the epidemic of enteric fever which commenced in the Boer camp on September 21st, 1900, and satisfied himself beyond all reasonable doubt that the fever, in the first instance, was imported from South Africa, subsequently spreading through the medium of the air, mainly, I should say, at the latrines, for at first it was almost impossible to induce the prisoners to report sick, and as a consequence, the latrines common to the camp became infected.

Sir Allan Perry further satisfied himself that connection of any kind between the water supply and the outbreak of fever might be confidently excluded, an opinion I also held, and which I consistently pressed when some weeks later the fever showed itself among the military guard, the safeguarding of whose health was my care.

Major Faichnie finds himself quite unable to agree with the conclusions arrived at by Sir Allan Perry and myself, so im-
pressed is he with the theory that infected water, and that alone, is responsible for outbreaks of enteric fever.

I will first deal with Major Faichnie's grave doubts as to the fever having been imported to Diyatalawa Camp from South Africa.

The transports bringing Boer prisoners of war to Ceylon arrived at Colombo in rapid succession, as will be evident from the following table:

<table>
<thead>
<tr>
<th>Arrival of Transport Date</th>
<th>Name of Transport</th>
<th>Number of Prisoners</th>
<th>Date of arriving in Diyatalawa Camp</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 8, 1900</td>
<td>Mohawk</td>
<td>243</td>
<td>August 9, 1900</td>
</tr>
<tr>
<td>September 1, 1900</td>
<td>Ranee</td>
<td>598</td>
<td>September 8, 1900</td>
</tr>
<tr>
<td>September 5, 1900</td>
<td>Bavarian</td>
<td>1,290</td>
<td>September 10, 1900</td>
</tr>
<tr>
<td>September 9, 1900</td>
<td>Dilwara</td>
<td>988</td>
<td>November 8, 1900</td>
</tr>
<tr>
<td>November 8, 1900</td>
<td>Mongolian</td>
<td>724</td>
<td>December 25, 1900</td>
</tr>
<tr>
<td>November 8, 1900</td>
<td>City of Vienna</td>
<td>361</td>
<td></td>
</tr>
<tr>
<td>January 9, 1901</td>
<td>Ranee</td>
<td>241</td>
<td>January 10, 1901</td>
</tr>
<tr>
<td></td>
<td>Catalonia</td>
<td>631</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>5,028</td>
<td></td>
</tr>
</tbody>
</table>

The first transport, the "Mohawk," brought no sick.

The second transport, the "Orient," brought practically no prisoners, its accommodation being taken up by the 2nd King's Royal Rifles, which, on arrival from South Africa, were to act as the military guard at Diyatalawa Camp.

The third transport, the "Ranee," introduced measles into the camp, a disease which rapidly spread in epidemic form, and did not cease until November 25th, by which date no less than 251 cases had occurred, with seven deaths.

It was not until the arrival of the fourth transport, the "Bavarian," on September 5th, that fever of the enteric type began to appear. There had been much sickness on board the "Bavarian" during her voyage from South Africa to Ceylon. On Colombo being reached, twenty-three cases of serious illness had to be transferred to the civil hospital at that port; of those cases nine were examples of enteric fever, all being of a severe type. From this infected transport, 1,290 prisoners reached Diyatalawa Camp, and among them, it cannot be doubted, were many who brought with them enteric infection. Ten days after this "Bavarian" batch reached the camp, one of them reported sick, and was found to be suffering from unmistakable enteric fever. On cross-examination the man acknowledged that he had felt very ill for ten or twelve days previously, but, hoping daily to feel better,
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had neglected applying for medical aid. For those ten days the man had been using the camp latrine, as well as sleeping in infected clothes among a crowd of prisoners, and had thus freely spread infection. It is more than likely that there were many similar cases.

The fever being thus, as I maintain, introduced into the camp from an infected transport, the virus found highly receptive hosts among the depressed, debilitated prisoners of war, and a formidable epidemic of fever was soon started.

It appears to me that the chain of evidence connecting the epidemic of enteric fever at Diyatalawa Camp with South Africa is reasonably complete, but Major Faichnie refuses to admit such a contention. He is so enamoured with his "universal water infection theory" that he will admit no possible origin for enteric fever other than impurity of the water supply.

Was the water supply conveyed to the camps at Diyatalawa a pure or impure supply? That is the question I now propose discussing.

(1) The source of the water supply was what appeared to be a spring on the mountain side, some three and a half miles from the camp. This intake was extremely isolated and most difficult of access, as was brought home to me when, in company with Sir Allan Perry, I climbed the mountain side in the course of our search for a pure water supply. I can safely state that the source we selected was entirely removed from danger of pollution by wayfarers of any description, and as to the tea estates alluded to by Major Faichnie in his paper, the nearest was several miles distant. Between those estates and our spring was a dense jungle. So far as my recollection serves me I have fairly described the location of our water source.

(2) From the intake, which was surrounded with barbed wire, a large iron pipe conveyed the water to the two camps, i.e., the larger one set apart for the prisoners of war and the smaller one for the military guard.

In the case of the prisoners' camp the water, on reaching it, was received into two large iron reservoirs, and from thence distributed by stand-pipes, conveniently disposed throughout the camp.

In the case of the military guard camp small iron pipes attached to the main conveyed the water directly into four large Pasteur tank filters, and from thence by stand-pipes in suitable positions throughout the camp. As a further precaution, Pasteur
or Berkefeld filters were placed in each barrack hut and subjected daily to careful examination. Thus all water in the military camp before distribution passed through a reliable filtering medium.

(3) The water in the large iron storage tanks located in the prisoners' camp was subjected to a weekly chemical examination, as well as to frequent bacteriological and microscopical examinations. The result invariably declared the water to be of great purity.

(4) No alteration of any kind was made in the water supply or filtering arrangements during the time the camp was in occupation (over two years); yet no case of enteric fever occurred among the troops, or I believe among the prisoners, subsequent to the cessation of the imported (?) epidemic in December, 1900.

I commend that fact to Major Faichnie, and would further remind him that the periodical rains continued in their due season, and that the tea estates remained under cultivation.

(5) No fresh milk except for hospital use was allowed within the camp precincts.

(6) All aerated waters were manufactured at Newera Eliya, the sanatorium of Ceylon, where no enteric fever existed.

(7) No native drinks of any kind were permitted.

(8) All soldiers leaving camp on duty or recreation were obliged to take with them a water bottle filled with filtered water, the use of which was impressed upon them.

The foregoing considerations and precautions in my judgment completely "put out of court" a water-borne origin for the epidemic of enteric fever which attacked, in the camp at Diyatalawa, the prisoners of war and their military guard, and justifies my emphatic denial of Major Faichnie's suggestion, viz., that the water supply was impure, and that such impurity was the real cause of the epidemic of enteric fever I have been considering.

No sanitarian denies the far-reaching importance of specifically infected water as an avenue for the introduction of enteric fever among a community; but I am glad to think that there are very few who are at one with Major Faichnie in believing that specifically infected water is the only factor which merits consideration when attempting to trace an outbreak of enteric fever.