

## Draft of Remarks on the African Fever on the Lower Zambezi, [July 1859]

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ORIGINAL COMMUNICATIONS.

REMARKS ON THE AFRICAN FEVER

ON THE RIVER ZAMBEZI. (a)

By DAVID LIVINGSTONE AND JOHN KIRK, M.D.

While employed in trying to open up Africa to the influences of civilisation and commerce, the first thing that naturally attracted our attention as Medical men was the fever, which hitherto has proved one of the great barriers to the advances of Christian nations into the interior of the continent.

We have enjoyed considerable facilities for observing the disease during the last twelve months, not only among those of the expedition, but likewise among the Portuguese and natives; and our experience having been very different from that of others, we deem it desirable to lay the results before our Medical brethren.

Our observations are far from being so full as might be desired, but when travelling in this country, where the grass towers over head and almost hides the narrow path, it is of the utmost importance to possess correct views at the beginning. Our remarks may thus prove serviceable in preventing others from making a wrong commencement.

About a month was spent by the Expedition in endeavouring to find an opening through the Delta, from the sea to the main river.

This part may be described as abounding in mangrove swamps and damp plains covered with gigantic grasses. The mangrove swamps emitted a most offensive smell, and gave us the impression that they were most fitly named, "the hot-beds of fever."

Above the the Delta the river is remarkable for the quantity of fine sand which it carries in its waters, and deposits everywhere in banks which during about half the year are exposed to the sun; there is comparatively little mud, and in this respect as well as in the greater height of its banks which are also of sand, it differs greatly from the rivers of the west coast.

The mountains of Meramhalla, 4000 feet high appears to the east of Senna, and a range of hills on the north bank of the river stretches from that village up to Lupata, above which the country is hilly, and the banks of the river rocky.

Warned by the fate of the "Great Niger Expedition," it was resolved that no unnecessary delay should take place in the the Delta and that the prophylactic use of quinine should be tried.

The season chosen for entering the river was the winter (from May to August), the most healthy time for Europeans, though not the most favourable for navigation, and during the stay of the Expedition among the mangroves not a single case of fever occurred among the members, or among the officers and men of the *Pearl*, and H.M.S. *Hermes*, who accompanied it.

Quinine was taken regularly by all the Europeans, with a single exception, to the amount of two grains in sherry wine daily; and we were quite disposed to attribute our immunity to the prophylactic so much praised for its efficacy on the Niger; although the former experience of one of us suggested its total inefficiency to ward off an attack.

Three of our number became affected with incipient cinchonism; in their case the dose was lessened. We seemed always to be on the verge of cinchonism, as an additional dose could produce deafness and ringing in the ears to an intense degree in the course of a few hours.

The following is the number of those who escaped without a single case of sickness, although exposed to hard work in the sun, and frequently sleeping in the boats in the lower part of the the Delta: - 16 officers, 37 seamen, 12 Krumen, and 2 boys from Sierra Leone.

This interesting paper has been forwarded to us with the following note by Sir James Clark: -

SIR, - I receive the accompanying paper from Drs. Livingstone and Kirk, through the Foreign Office, a few days ago. If you agree with me that it is of sufficient importance to be communicated to the Profession, I shall feel obliged by its insertion in the *Medical Times and Gazette* 22 B, Brook-st., Grosvenor sq., NOV. 5, 1859. I am, &c. J. Clark.

Three of our number were left in charge of goods on an island about twenty miles above the mangrove swamps, but probably not beyond their influence. The soil was of stratified sand, with an alluvial layer on the surface, covered with grasses. The neighbouring country presented the same aspect as the island, and was similarly constituted. Previous to this there had been hard work and constant excitement. Those left on the island, although less exposed, had a comparatively inactive life. They had not been many days alone when two of their number became sick.

Mr. B - was seized with slight rigors, severe headache, delirium, with contracted pupils. These symptoms were sudden, and followed a imprudent course of exposure to the sun. Although removed in a few hours, they speedily returned after renewed exposure; but this time more severe, the full bounding pulse, dry tongue, and hot skin showing the intensity of the fever.. Vomiting, which now commenced,

proved the most troublesome symptom, and became an obstacle to all treatment, as remedies were not retained beyond a few seconds. Although the other symptoms abated after twelve hours, vomiting continued, and soon the disease returned in a more severe form, running on to muttering delirium, with involuntary picking of the bedclothes.

When on the verge of coma remedies began to be retained, and the action of a large dose of calomel with jalap resin relieved the cerebral disorder, and, by reducing the irritability of the stomach, allowed quinine to be given. Convalescence was very rapid; in a few days all trace of the disease had gone.

A fortnight afterwards Mr.B – was again seized with the same symptoms, vomiting again being the great obstacle, and, from its continuance after the others had been subdued, rendering the convalescence slow. Loss of memory and muscular weakness continued for some time after this attack. While Mr.B – was sick, Mr C.L – had fever also, but in a very different form, and we did not then recognise the two as being the same disease. In him the symptoms were those of a cold, such as we see in Europe, – at first frontal headache, pain in the back and limbs, lassitude and indifference to what went on around; this state was followed by one in which he lay without speaking, headache had gone, the pulse was small and thready; the skin at one time burning hot, at others coated with a clammy perspiration. In this case slight diarrhoea had continued from the beginning. Quinine was tolerated; but although the constitutional action was evident, yet the fever, did not abate until a mercurial purgative had been given.

These were the first cases of fever among us, nor did we see more for some time afterwards.

In the month of August all the goods had been conveyed as far as Shupanga. Two officers were left there in charge, while the steam-vessel proceeded to Tette, taking with her those who had suffered when at the island.

At the time the Portuguese were engaged in war against a party of rebels, and the army being destitute of Medical appliances of every description, an opportunity was offered of observing the fever and other diseases in their worst forms among those exposed without proper shelter or food, and in subjects frequently worn out by constitutional disease.

The commanding officer was the first case we were requested to see: he had obstinately refused all remedies, but being then in a state of coma, and unable longer to refuse, an active purge was given, followed by thirty-grain doses of quinine, which soon restored health. In him there had been no other symptom beyond those of severe constitutional fever running on rapidly to coma. This is the type most frequent in the lower parts of the the Delta, especially at Quillimane. In the vicinity of Tette it is seldom fatal. The limited experience

we here had seems to indicate that the type once established has a constant tendency to recur. Should further observation confirm this, it would become of importance to send all Europeans on their arrival to higher lands; so that, should they be subject to fever, they might have it in its milder form first, and carry that with them to the more unhealthy localities.

While the party at Shupanga enjoyed good health, notwithstanding the partial discontinuance of quinine, several cases happened on board the steam-vessel. We may mention that the accomodation on board was both very scanty and very uncomfortable. Water running into the cabin while the vessel was under steam, so as to keep the beds constantly wet

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beneath; fortunately the weather was dry, or the rain would have poured in from above also, as we subsequently experienced.

Mr.R –, the engineer, had taken quinine with unvarying regularity, had an excellent appetite, and seemed to enjoy the climate; in working the engine he was obliged to see the fire lighted at 2 1/2 a.m., in order to have steam by 7 a.m.

An officer had shifted his bed through the night, so as to prevent Mr. R – getting his clothes, and he proceeded to light the fire in his shirt; the consequence was pains all over the body and limbs, the bones being especially sore, the face flushed, eyes suffused, headache, and quick pulse. The bowels had been regular, and the tongue clean. A pill composed of resin of jalap, calomel, rhubarb, and quinine, which had formerly been found efficient in fever, was given, more as a precautionary measure, than from a belief that this was a case of the complaint. It seemed more a common cold than the African fever. As soon as the remedy had operated, the symptoms abated. Quinine was given, and one dose of ten grains produced severe cinchonism, from which, when he recovered, he was quite well without loss of strength.

Towards the end of the rainy season the members of the Expedition were divided, those who had previously suffered from fever remained at Tette, while we went down the Zambezi to the sea, and explored the River Shine, both very unhealthy districts. While one of us was exposed to sun and rain navigating the vessel, and ashore superintending the wooding, the other was engaged botanising among grass jungles and mangrove swamps. Yet both of us escaped entirely. The use of quinine had been completely abandoned, and we are inclined to attribute our good health to the regular and active exercise which both these occupations imply. In this respect our experience corresponds with that of the Portuguese residents, who assert that while actively employed they enjoy good health.

While we explored the high lands around Lake Shirwa the

steam-vessel was left in the River Shine, under the care of Quartermaster Walker. We were absent twenty-four days, Walker was seized with fever the day we left: it commenced suddenly, though he taken quinine regularly. On our return we found that he had been delirious most of the time. and the fever had shown no signs of abating; but the action of purgatives, followed by quinine, soon restored health, and in subsequent attacks, when at the sea-coast, among the mangroves, no difficulty was experienced in cutting short the attacks at the beginning.

Our own experience in the high lands between the Shine and Lake Shirwa during twenty-four days, when we were exposed in the early hours to the dew from the long grass, continuing the march without interruption throughout the remainder of the day over rough country under the tropical sun, and then sleeping in the open air, and yet enjoying perfect health, as did also the natives who were with us, shows clearly that there exists within a short distance of the coast a healthy region well suited for the residence of Europeans.

This region is elevated above the sea from 3000 to 4000 feet, and shut off from the coast lands by the range of high mountains to the east of Lake Shirwa. It is of easy access by the Shine, which flows to the foot of the hills, and is navigable the whole distance. To the north, the southern extremity of a chain of lakes, which extend far into the interior of the continent, reach within thirty miles of the River Shine. This elevated region may be looked on as the entrance, by means of these inland seas, to a great part of Central Africa, cut off hitherto from communication with European nations by the unhealthy lands which bound the coasts.

The result of our experience has been to discontinue the daily use of quinine. It had been persevered in long after the conviction of the members had been against its prophylactic power. It is our conviction that we owe our escape from the disease far more to the good diet provided for us by H.M. Government than to the use of quinine. We have been as fully exposed to the malarious influence as any party is likely to be. The vessel in which we have to navigate is one which takes in so much water that our beds are constantly damp, and often rotten beneath, with a quantity of water in the bilge of the ship. Yet we have found the fever quite amenable to treatment when taken early, and attention paid to any local congestions which may manifest themselves. Let it not be thought that we undervalue quinine, to it we trust for the removal of the disease when given after purgatives; in all forms of the fever we have found it of the greatest value, and three does have always proved sufficient to induce the constitutional action even in those who have not been taking it previously.

We have found the fever assuming a formidable type only

when permitted to go on unchecked for some time in those exposed to great fatigue, damp, and poor diet, or when the irritable state of the stomach prevented the administration of quinine.

In regard to the complications most frequently seen, among ourselves vomiting has been the most troublesome, and blistering over the stomach has seemed the best means of stopping it. We have fortunately escaped without more serious inflammatory lesions of the internal organs; but among the Portuguese two cases have been observed with pneumonia; both proved fatal - the tartarate of antimony seemed to have no effect, while stimulants were equally powerless when once sinking had commenced. Enlargements of the spleen, when of recent date, have yielded quickly to the use of the sulphate of iron and quinine.

The ship's company, consisting of Krumen, have showed no greater immunity than the Europeans. The experiment of quinine was made with them, but its prophylactic action proved equally feeble as in our own case.

In future Expeditions of a similar nature, we beg to suggest that the work of the contracting ship-builders be more scrupulously tested than it had been in our case, when the defects once observed completely baffled all attempts at remedy.

Zambesi, July 1859