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THE NATURE OF ZAMBESI FEVER.

BY

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Although my area of observation has not extended beyond two small patches of the valley of this river, where I have been stationed in the course of my employment, and the small amount of evidence collected renders confident statements rather presumptuous, I venture to make this preliminary report in the hope of directing the attention of newly arrived medical men to this important subject, and of persuading laymen here that fever and malaria are not synonymous terms.

There is a danger of residents here hastily condemning antimalarial measures and quinine prophylaxis as useless, because they find that nearly all except seasoned residents suffer from attacks of fever in spite of these precautions, and they have unfortunately been taught by the doctors to consider all fever as malaria.

Now my opinion is that—at any rate on these sugar estates, where most of the quarters are more or less mosquito-proof, where anophelines are scarce, and quinine is taken daily by almost every white man—none of it is malaria.

In nearly two years I have hardly seen a single case that I should diagnose malaria on the clinical appearances—and I practised some years on the Gold Coast and neighbouring colonies; and I have never seen a parasite nor a pigmented leucocyte, although I make a practice of examining the blood of all white men with fever, and, during six months of last year among the Kaffirs, examined over a hundred smears while looking for spirilla, with the idea that the disease was relapsing fever.

It is curious that the idea that all the fever here must be malaria has been kept up so consistently, because as long ago as 1865 LIVINGSTONE, who has always been recognised as a careful observer, stated as his deliberate opinion that quinine was useless as a preventive of Zambesi fever, and mentioned that his party had abandoned its use for that purpose in the early part of their three years' stay without noting any ill effect.

One of my predecessors, I am told, came to the conclusion that the drugs of a certain well-known firm were not to be trusted because their quinine appeared to have so little effect on the fever, and yet he never thought of the possibility of the fever being non-malarial, or left no record of that idea.

My view is that the fever from which all newcomers, white or black, suffer some time in the first year or two, from which old residents are not entirely exempt, and which attacks twenty-five per cent. of up-country natives serving a year here, is all, or nearly all, Mediterranean fever; but I am still in the dark as to whether malaria is naturally uncommon in the whole Zambesi valley, or only kept under in the places in which I have been stationed; and whether it occurs here but is obscured by the other fever, which evidently remains latent for an indefinite period, and would quite likely be made active by an attack of malaria.

On this particular point I am hoping that the members of the Society who have been in the neighbourhood of the Zambesi, Shiré, or Lake Nyassa will be able to help me. I should like to ask if anyone has seen malaria parasites in the blood of patients who have come here direct from home and not previously lived in a malarial country, and in what proportion of fever cases, where the blood was examined, were parasites or pigment observed.

Personally, I must confess to a strong suspicion that this part of

Africa is not what is ordinarily called a malarial country, and I feel justified in trying to force this suspicion into the minds of my colleagues, because this is not merely a question of academic interest, but one gravely affecting European colonisation and the progress of commercial development, and so long as the local fever is calmly assumed to be malaria no steps will be taken to ascertain the method of its transmission.

I should also like to point out that, in the light of what I have seen here, I am now of opinion that Mediterranean fever is not uncommon in West Africa, where it is called malaria, and that it is one of the causes, both there and here, of hæmoglobinuria, which raises the question whether it is not always the cause of blackwater fever in conjunction with a predisposition to hæmolysis produced by malaria or some other condition.

The possibility seems greater when one thinks of the distribution of blackwater fever—Greece, Sicily, Sardinia, not the Roman Campagna, India, and the central parts of the two Americas—and one may even hazard a guess that it was never reported from India before 1885, because Mediterranean fever did not reach there until after the opening of the Suez Canal.

But, to return to the original subject, I will briefly summarise some of the grounds on which I came to the conclusion that our local fever is the same fever that has been so effectually dealt with in Malta.

In May, 1909, I took over medical charge of a sugar estate and factory with a staff of fifteen to twenty white people, one or two Goanese Eurasians, about a dozen Demarara negroes of various degrees of colour, a few Bombay banyans, and a number of Kaffir field-workers from parts of the British and Portuguese highlands, varying from 400 to 2000, but usually nearer the latter figure. I do not mention the local people, who seldom visit the doctor except for surgical treatment, but if sick go home and send a substitute, so that I have very little idea of how far they suffer from fever.

During the first half of last year I was stationed at, and on various occasions have visited, an allied estate near the junction of the Shiré, where the whole staff is about half as much again as here, and found that the conditions of sickness appeared to be much the same.

What was bound to impress anyone with previous experience of African native labourers was the extraordinary amount of sickness, the small death-rate, the obscurity and variety of the symptoms and the tendency to recurrence; all of which would suggest first the idea of malingering, especially as patients so commonly complained of pain in the back, though they were able to stoop without difficulty, and of headache with a clean tongue and normal pulse.

Even the fact that housemates showed a tendency to go sick one after another in a group, although it might throw light on the method of transmission, also admits of the explanation that they were perhaps telling one another that it was easy to get a day off by going to the new doctor who was easily convinced.

However, time cleared up that source of error, and I have been surprised to find such an absence of malingering among the up-country Kaffirs. One or two whom I suspected of exaggerating their symptoms demonstrated my error by becoming obviously very ill and dying.

Owing to their coming and going and the similarity of Kaffir faces I could not remember patients; but as they were each indicated by a number, at the cost of some trouble I traced selected individuals through my book, and found that in nearly every case those who complained of some form of neuralgia without showing physical signs of disease had suffered a little while before with fever, or else developed signs of fever as the week went on, and that they had a subnormal temperature as a rule; and when I could get hold of them in the afternoon, sometimes an evening rise, so that I was soon convinced that I was dealing with a febrile disease that attacked nearly everyone and manifested itself in a great variety of different symptoms.

Another observation, throwing light on the question of the nature of the sickness and malingering, was that a man who had been working most regularly for a month or two would come to the surgery and then begin to constantly lose days at the work; while after some months, if he had long enough to serve, he would again become regular in his attendance. It was these cases who frequently came to me complaining of night-blindness, a not uncommon condition here, and one which is mentioned by LIVINGSTONE as troubling one of his boatmen.

The dry season being the healthy one for Europeans, and the Kaffirs predominating by fully fifty to one, my early cases were practically

confined to the latter ; but as time went on I found that the same forms of sickness were occurring among the West Indians and banyans, and that Europeans when attacked with fever commonly showed one or more of the symptoms that I had learnt to expect in the Kaffirs, such as stomatitis, tender neck-glands, neuralgia along the teeth or in one limb, severe pain under the sternum, in the loin or flank not increased much by movement, or sudden vomiting with a clean tongue.

One of the office staff suffered from this curious form of vomiting, without nausea, and generally in the afternoon, that puzzled him and puzzled me until later, when I had learned to recognise the prevailing fever and remembered that, shortly after my arrival, he had been laid up with fever and arthritis, which he called rheumatism, in which diagnosis I was unable to concur.

As I was away when our stock of thermometers arrived, and there was no one to teach the hospital attendant to chart, nothing was done here in that way until more than a year after I came, but before leaving I had noticed the tendency to relapse, and had been examining blood films for spirilla.

I suppose I examined at that time from 100 to 150, and noted the absence of any protozoal parasites. I examined a few wet films for pigment, but was not surprised that I did not see any.

During my *locum tenens* duty at the other estate I was able to start charting,* and then found that what I had previously considered relapses were often exacerbations, a slight intermittent fever continuing during the interval. At that time we had too many in hospital to take all temperatures, and I found so many with dilated hearts, pulsating vessels, oedema of feet, loss of knee jerks and paresis of legs, or sometimes arms, larynx or abdominal muscles, that I thought I was dealing with beri-beri, until later I satisfied myself that these conditions followed prolonged recurring illness for which many had never reported sick.

I tried the effect of quinine bisulphate—ten grains in solution night and morning—in many of the more severe forms of fever, and some cases appeared to improve rapidly with it, but others I found improved in the same way without and many continued unaffected.

* At the beginning of the TRANSACTIONS will be found four specimen charts, which have been selected from a number supplied by Dr. BRUCE, illustrating the form of fever described in his paper. Most of the other charts seem to show a similar type of fever.

I found fevers of various sorts, some with bronchitis and patches of lung congestion, some with diarrhoea, some with nothing but pyrexia. Some lasted a few days; some lasted many weeks.

There was a noticeable absence of rigors and very little sweating. One case of intermittent fever with pain in the hip joint, suggested tuberculosis, but cleared up in about three weeks. Most of the prolonged cases showed an undulant tendency and left a sub-normal temperature for a long time; but there were some of prolonged remittent fever with a little bronchial catarrh, but without other symptoms of enteric, which resisted all treatment, and several of them proved fatal, simply from pyrexia after about four weeks, while the others gradually subsided into mild intermittent fever, and eventually ended in slow recovery.

Many of these suffered from relapses after they had left the estate, in the rainy season especially, and caused grave scandals.

When their time expired men they were detained until fit to travel, and then allowed to go if they insisted, although they were advised to stay longer. Of course after a long fever they were thin, and those who brought on a relapse, by exposure and over-exertion, continued to hurry on, so getting worse and generally developing dysentery, and ending by collapsing on the road.

One government medical officer got the idea that these people were carelessly discharged in that condition and illustrated his protest to the governor, with some curious photographs, with the result that the already abused sugar estates were held up to public execration in the local press.

This illustrates one important form of mischief brought about by the disease. A large expedition may have hundreds of people, to all appearances well so long as they remain doing light duty in camp, who would break down under long marches, especially if exposed to wet or shortage of food, and, as many of them would not be believed when they claimed to be sick, be the occasion of much unintentional cruelty and of prejudice against similar expeditions afterwards.

Having to nurse a European for some two months, and to examine and vaccinate hundreds of people coming and going, as well as to act as my own dispenser and sanitary inspector, I found no time to make notes or copy charts, but I have since managed to get a few copies from the originals, which were very badly written and mixed up by the Kaffir dresser. They are enclosed with some taken here since.

Since returning I have examined the sputum of a good many of the pulmonary cases without finding anything that could be the pneumococcus nor any protozoal parasite, and a good many of the dysenteric motions without finding amœbæ, although I have seen *Balantidium coli* in some cases. It is interesting to note here that there does not ever appear to have been a case of liver abscess detected. I have procured a cheap microscope for the use of the hospital attendant, whom I hope to teach to examine stools systematically, and I think it will be found that the so-called dysentery is a enterocolitis, due to the fever and the Kaffir's rough food, sometimes aggravated by balantidium, and not amœbic dysentery.

The man whom I mentioned as being nursed was attacked about two weeks after his arrival with a form of dysentery characterised by little tenesmus, but a good deal of colicky pain and copious stools. Along with this, which lasted about a week, he developed an irregular remittent fever, which continued after all diarrhœa had ceased. I have seen enteric begin in that way in Nubia, and known cases called dysentery at first; so although there were no definite symptoms of any particular disease I thought that this was enteric until about the fifth week, when the temperature was still irregular, sometimes subnormal and sometimes rising to 99° or 100°, and the patient gradually getting weaker, although not so bad as one would expect if the diagnosis had been correct.

This state of affairs went on until after six or seven weeks he was so drowsy that although he could sit up and had a fairly good appetite he could not eat unless I sat on the bed and kept him awake.

I began to fear trypanosomiasis, but found no evidence of it, and fortunately just then he began to improve and was sent home. I heard that he landed with fever and was three weeks in a nursing home, but eventually became quite well.

I had at the same time a Demararo suffering from prolonged low fever with bronchitis and arthritis, lasting more than two months, who was sent home and completely recovered.

On my return here I found a coloured sugar boiler suffering from neurasthenia so severe that he used to lie in bed with the room darkened for days, and if worried with questions would bury his face in the pillow and sob. I could not make out what had led up to this condition except

that he had been vaguely unwell, his most prominent symptom being intense constipation, but I can now surmise the cause.

Since then I have had occasion to treat one European with fever without specific symptoms, lasting on the first occasion two weeks and afterwards relapsing at intervals to three months, in spite of large doses of quinine, some intramuscular, as well as several other fever cases that one could not positively diagnose.

In addition to these there have been among the Demararos many cases of intermitting fever relapsing at most uncertain intervals, not always preventing them from working and mostly associated with neuralgic pains in various parts of the body, loss of appetite and constipation. These are men who were brought up in a malarial country and say they do not suffer from fever at home. One has been suffering now for over a year.

I think, on the evidence of the observations I have made—but the picture of which I have perhaps failed to convey in my description above—one is justified in calling the local fever Mediterranean fever, pending serum tests, although I admit that it is wise to be on the safe side by administering quinine in doses small enough to avoid adding to the patients' discomfort.

I am now trying to obtain dead cultures of *micrococcus melitensis*, and hope by next year to have some records of serum tests, together with notes of the corresponding cases, including results of blood counts.

Assuming this disease to be Mediterranean fever, I have no opinion as to the method of transmission. The Europeans drink cows' milk—which is boiled before use—and the Demararos keep goats and drink the milk, but most Kaffirs look upon milk drinking as rather disgusting, and our employees are only visitors and do not keep domestic animals.

Culicine mosquitoes swarm here, and moubata ticks are not uncommon in the older houses, and one sees on Kaffirs a small red tick called the dog-tick, often mistaken for a bug.

The occurrence of batches of new cases in the same house group might be accounted for by the Kaffir's habit of sucking his fingers and dipping them in the common dish.

I should be grateful for any suggestion as to a line of investigation.

Dr. C. W. DANIELS: So far as I know I am the only Fellow present who has been on the sugar estate referred to in the paper. I was there in 1900, and only stopped three days on my way down the river. I am since told by the manager of the estate that conditions have improved very much, but as they were then there are several points on which I have to differ completely from the writer of this paper. In the first place, in making systematic investigation, I wanted to see the malarial parasite, and I had no difficulty in finding it. Anophelines were not scarce. In the irrigation trenches—which, although not exactly dirty, were badly supplied with water—anophelines were very plentiful, as they were also in some of the houses.

As regards the few cases I found in hospital, these were treated with tabloids of quinine administered by breaking up the tabloids and dissolving in water, when they yielded as ordinary cases of malarial fever. At the time I was on the estate there was plenty of fever and numerous fever carriers, and in the cases I saw the fevers yielded to quinine. Some cases resembling beri-beri had been reported, and there had previously been outbreaks which looked like beri-beri. There was, however, no definite case of this disease during my visit. With regard to the Zambesi river generally, as regards malaria, districts differ, dependent on how far they are from the sea-coast. There was very little malaria at Chinde at the mouth of the Zambesi. These sugar estates are something like a day's journey from the coast, and there certainly was a fair amount of malaria. At the Shiré river you are probably in one of the most malarial districts in the world. Practically, all native children under three or four years of age have enlarged spleen, but here you can find malarial parasites in the great majority of children, and, if you accept the statements of patients, the infantile mortality is far in excess of anything that occurs in most native populations. I think there is no doubt about the presence of malaria all up the Zambesi river, and undoubtedly in 1900 there was a considerable amount of malaria existing on the sugar estates.

At the time of my visit blackwater fever had occurred, but had not been common on this particular sugar estate. Generally speaking, the higher up the river the more blackwater fever you get, and the greater is the endemic index as regards malaria.

I personally saw no cases which resembled Malta fever on the Zambesi or in Nyasaland.

My experience of typhoid fever in this district is confined to one case of a native of Zanzibar, who became ill and was carried an eight days' journey up the river, where he developed definite typhoid fever, and there was a slight epidemic amongst the inhabitants. I am now informed, however, that typhoid fever is fairly common.

On looking at the charts accompanying this paper, I quite admit that they are not in the least like ordinary malarial charts, or like any type of fever I saw on the Zambesi.