

ENLARGEMENT OF THE SPLEEN IN LOWER BENGAL.

BY LIEUTENANT J. MCKENZIE.
Royal Army Medical Corps.

To one who is new to India there is, perhaps, nothing so puzzling as the condition of splenic enlargement.

Until Leishman's epoch-making discovery, enlargement of the spleen was thought to be due to malaria and to that alone. I speak from personal knowledge of Lower Bengal only, but in that region at least a short experience suffices to raise grave doubts on this point, and the more one sees of malaria and splenic enlargement, the less one feels inclined to associate the two as a matter of course in every case. Out of a mass of cases (chiefly natives) with high fevers and low fevers, large spleens and small spleens, temperatures without spleens and spleens without temperatures, it becomes possible to extricate two important classes:—

- (a) Those who have had several attacks of typical malaria, with definite rigor, high temperature and the malarial parasite in the blood, but who have very little or no enlargement of the spleen.
(b) Those who have had a few mild attacks of "fever," but have been "seedy" for some time and are found to have very great enlargement of the spleen.

In (a) the malarial parasite is found without difficulty, especially if search is made during a period of fever. In (b) the malarial parasite can rarely be found, and continual search may be made without discovering any parasite in the peripheral blood. But if the spleen be sufficiently large to allow of a splenic puncture being made during a period of fever (usually of a low type, and often showing a double rise in the twenty-four hours), Leishman bodies are found in a large proportion of the cases. It has been demonstrated that this same organism is found in kala-azar, and the high mortality of kala-azar shows that in places where that disease abounds the parasite is present in much greater numbers or in a more virulent form—suggesting the comparison of plague and pestis minor.

Talking of Calcutta district in particular, the more one sees of splenic enlargement, the more does the malarial parasite retire to the background, and the stronger becomes the conviction that it has been a much maligned organism in the past, and has got the credit, or discredit, of a great deal more mischief than it was really responsible for.

With regard to the organism described by Leishman, the problem

at present facing us is a three-fold one : (1) What is the nature and classification of the parasite? (2) What is its source in Nature? (3) By what means does it gain entrance to the human body?

(1) *With regard to its Nature.*—It has been differently described as a trypanosome and as a piroplasma, and as being neither of these but a new parasite altogether. Some observers thought that they had seen it inside red corpuscles; others maintain that it is never found inside the red blood cells. From study of the parasite and the mass of evidence, it seems pretty certain that the parasite is carried free in the blood plasma, that it is never found inside the red cells, and that it is not a piroplasma. Arguing from analogy, it would seem that the forms seen up to the present are asexual phases in the history of a yet unknown parasite.

(2) *With regard to its Source in Nature.*—The malarial index in Calcutta is practically *nil*, and it is true that the percentage of children with enlarged spleen is also very small. But in the country immediately surrounding Calcutta it is found that although the malarial index is still very low, rarely above 10, the percentage of children who have enlarged spleens is enormous. This fact of itself would seem to suggest the separation of malaria and splenic enlargement. On examining a large number of native children in Dum-Dum, I found the percentage of enlarged spleens to be 76. In many of the cases examined the spleens were of enormous size, extending down to the pelvis; and though nearly all gave a history of fever of a low type, yet none of these cases gave a history of typical malarial attacks, and in none of them was the malarial parasite found. But in one group of twenty-three children, belonging to the native followers employed at the Station Hospital, the fact was noted that only seven had enlarged spleens, and that in most of these enlargement was slight, the spleen extending only one or two inches below the costal margin. This gave a percentage of 30 with slight enlargement as against the 76 per cent. with great enlargement in former observations.

On comparing the conditions of life of these followers' children (*x*) with those of the children coming from the surrounding villages (*y*), the only difference discoverable lay in the fact that group (*x*), living in Government quarters on the Jessore Road, and at some distance from any tanks (though close to mosquito-breeding marshes), made use of the Cantonment water supply for cooking and drinking purposes, while group (*y*) made use of tank water for these purposes. This Cantonment water supply, like that of Calcutta, is drawn from the river Hoogli, above Barrackpore, passed

through filter beds and brought down in pipes. Standpipes are placed at intervals along the roads in the Cantonment and from these the *bhisties* fill their "mushuks" and distribute the water.

Having noted this difference in the source of the drinking water, in future examinations the children using tank water were put on one side and those using Cantonment water on the other. It now at once became apparent that the tank water group (*y*) claimed nearly all the cases of enlarged spleen, leaving in the Cantonment water group (*x*) a small number of only slightly enlarged spleens.

It is impossible to draw a hard and fast line between the two groups, as families may have moved from one place to another, and children who have been drinking tank water until a few months ago may be included in the Cantonment water group; again, children who ordinarily use Cantonment water may at odd times drink from any inviting tank. It is also noticed that among native children living within the Cantonment, or on its borders, and regularly using the Cantonment water, cases of enlarged spleen are not nearly so numerous, and these children are much healthier than those in the villages around. It seems reasonable, then, to connect this condition of low fever and enlargement of the spleen with the drinking of tank water, and to suppose that the organism which is its cause lives and flourishes in the tanks.

(3) *The Mode of Entrance into the Human Body.*—At the first blush one sees in the tanks of India only a merciful provision for one of the most urgent necessities of life, and doubtless without a substitute it would be in many places all but impossible to do without them; but when one looks more closely into the matter and reflects on the uses to which a tank is put by the natives, it ceases any longer to present itself as a pool of limpid water for the refreshment of man, but appears rather as a masquerading cesspool, hiding beneath the water lilies that grace its surface death-dealing germs of every kind. Let us watch by a tank when the day is young. Not singly, but in dozens or scores, the manhood of India descends into the tank, stirs up the mud at the bottom, relieves Nature in any way that seems good to him, washes without soap his oily, odoriferous skin, and at the same time his loin cloth, makes an effort to cleanse his teeth—using a forefinger by way of tooth-brush, and tank water in default of Odol—quenches his thirst by gulping down a few handfuls, and being thus refreshed carries off his "surahi" full of water with which to cook his food. In the evening the females have their turn, and the proceedings of the morning are repeated. And this polluting process goes on incessantly, day after day, year after year, generation after generation.

If we now consider the distribution of the parasite in the body, we find that its presence has been demonstrated in ulcers of the intestinal wall, in the mesenteric glands, in the portal vein, in the liver, in the spleen, and in the bone-marrow. A reasonable view to take is that the parasite gains entrance through the wall of the intestine (where it causes ulceration), reaches the liver by the portal vein, and the mesenteric glands by the lymphatics. That it now reaches the general circulation is proved by its presence in the spleen and bone-marrow, and if it were intracorpuseular it could scarcely fail to be found at some time or other in the peripheral blood. We might compare it with the case of carmine particles or bacilli injected into the circulation and suppose that it is now attacked in the spleen and bone-marrow by the leucocytes, which seem to find there a suitable battle-ground.

The fact that it has been found in sores of the skin and not in the internal organs in the same cases seems to be in favour of the theory of its entry by the alimentary canal. If its usual mode of entry were injection into the blood by a biting insect, one would not expect to find it in an ulcer of the skin, or having found it there would hope to find it in the internal organs as well.

SUMMARY.

(1) In Lower Bengal malaria is comparatively rare in places where splenic enlargement is all but universal.

(2) Natives who drink filtered river water do not suffer to any great extent from enlargement of the spleen, while those who drink tank water suffer to the extent of about 80 per cent.

(3) In cases of splenic enlargement examined during a pyrexial period the *Leishman* body is found.

(4) Of the organs in which the parasite is found most are associated with the digestive system, while the remaining ones are those in which the leucocytes are known to wage war on organisms and foreign particles that are circulating free in the blood plasma.

CONCLUSIONS.

(1) That the low fever and enlarged spleen of Lower Bengal is caused by the *Leishman* body.

(2) That this organism flourishes in the tanks.

(3) That it gains entrance to the human body through the alimentary canal.

NOTE.—Since the above was written, Captain Leonard Rogers, I.M.S., has announced that *Leishman* bodies, cultivated under certain conditions, yield trypanosomes.