

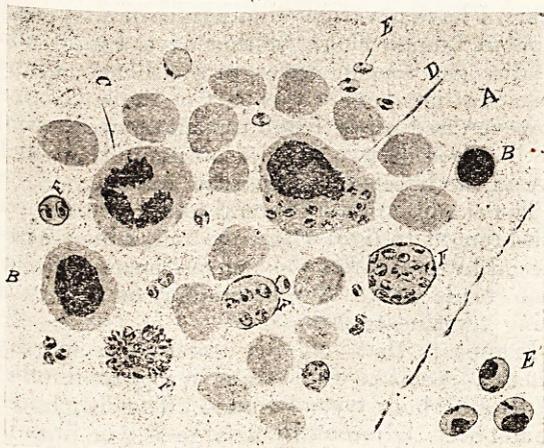
Original Articles.

A SHORT NOTE ON THE PARASITE OF KALA-AZAR.

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- A.—R. B. Corpuscles.
 B.—Large Lymphocytes.
 B'—Small ditto.
 C.—Polynuclear Leucocytes.
 D.—Large Mononuclear Leucocyte containing Parasite.
 E.—Free Parasites.
 F.—Bodies containing Parasite.



Splenic Blood Film from Kala-azar showing Parasitic bodies, magnified about 1,200 diameters.

Free Parasites magnified about 2,500 diameters.

In the accompanying drawing, I have endeavoured to give a fair idea of the appearance of the parasitic bodies which I have found in the spleen of all cases of *kala-azar* that I have been able to examine during the last few months.

In March 1903 I found small amoeboid bodies in the fresh spleen juice of a case of *kala-azar*, and subsequently in smears obtained *post-mortem* and stained, I found numerous small bodies which I now recognise as the same parasites as those described in this article.

Improved technique, and the use of films prepared from splenic blood drawn *inter vitam*, shows these bodies most distinctly to be parasitic organisms.

Last year an unexpected increase in my ordinary duties prevented me from pushing my investigations further, but recently, stimulated by the communications of Majors Leishman, Donovan and Ross, I have made a number of preparations, which show what I believe to be the parasite causing *kala-azar*, and which appear to prove that the chronic fevers with enlarged spleen and liver, the so-called "malarial cachexia" of Bengal and Madras, are identical with the famous *kala-azar* of Assam.

In May of last year Major Leishman described the bodies found by him as far back as 1900 in cases of Dum Dum fever, and more recently Major Donovan has shown that similar parasite

are to be demonstrated in blood drawn from the spleen of "chronic malarial (?)" cases in Madras. The finding of similar organisms in cases of *kala-azar* adds still more to the interest and importance of the discovery.

The parasite may be found either in spleen smears obtained *post-mortem*, or in films prepared from blood drawn from the spleen during life by means of a sterilized hypodermic syringe. I have obtained the best results by staining specimens with Grubler's modified Romanowski's stain. This stain, which is of the single-fluid type, is a solution in absolute alcohol, and the application of a drop of it serves to fix the specimen. The subsequent addition of a drop of ordinary water, and its admixture with the still liquid stain upon the film, causes a reaction, during which differential staining takes place. If the slides are washed after waiting for a minute or so, most beautiful specimens can be obtained, without the slightest precipitation of stain upon the films.

Stained in this way the parasite may be easily distinguished as a clearly defined oval body of a bluish mauve tint, containing a larger oval and a smaller rod-shaped mass of deeply crimson-stained chromatin. The smaller chromatin body stains the more deeply.

The parasite occurs free among the spleen cells, singly or in groups, but it may also be found in distinctly defined round cells varying in size between about 5 m/mm. to 10 or 12 m/mm. These cells stain a pale mauve colour, and contain from two to a dozen of the parasites. Many parasites may also be observed lying within the protoplasm of the large mono-nuclear and transitional leucocytes. Frequently large masses may be noted, composed of several hundred of the free parasites, but these should not be confused with collections of blood plates, which may often be observed in the same specimen.

Roughly speaking, the parasite may be said to measure 2 to 3 m/mm. in the long axis, and $1\frac{1}{2}$ to 2 m/mm. in breadth. The size, however, appears to vary with the thickness of the film. In thin films the bodies appear almost round, while in thicker films they assume an oval or even a fusiform shape.

So far I cannot say that I have recognized many intra-corporcular forms, unless the round cells mentioned above are altered blood cells. I have, however, sometimes found isolated endo-corporcular bodies in blood films from the peripheral circulation, and I have frequently observed what I believe may have been free forms. Their recognition is very difficult and uncertain however, and examination of the peripheral blood cannot be relied upon for purposes of diagnosis.

Laveran has already pronounced these bodies to be a species of pyrosoma, but the correctness of this statement has yet to be demonstrated.

One fact, however, which appears to give some support to this idea, is the frequent occurrence of outbreaks of cattle disease contemporaneously with epidemics of *kala-azar*.

Recently an intelligent native, who left his village in Mangaldai after losing many relations from *kala-azar*, assured me that cattle disease broke out at the same time as the epidemic attacked his village, and that he and many others had lost relations and cattle, year after year, until the survivors feared to remain in that part of the country.

When questioned as to the symptoms of the cattle disease, he volunteered the statement that bloody urine was passed by a number of the affected animals.

A new coolie from Midnapur district, who came from his country suffering from an enormously enlarged spleen, gave, when questioned, a similar story.

He stated that many people in his village were now suffering from spleen and fever, and that he had lost two brothers from this cause only last year. Cattle disease had broken out, some two or three years before, at the same time as the outbreak of "spleen fever" among the people.

When questioned as to the symptoms shown by the affected cattle, he at once referred to bloody urine as being of frequent occurrence. He said this without being asked leading questions, using the word for blood, and not merely stating that the urine was red.

These statements are of interest when taken in connection with the article on "Red Water in Cattle" by Stewart Stockman, Esq., C.V.D. (*I. M. G.*, Aug. 1903), and Laveran's pronouncement regarding the nature of the parasite found in cases of "spleen fever" by Major Donovan.

Should Laveran's theory prove correct, the spread of *kala-azar* and kindred diseases will probably be found to be due to the bite of some blood-sucking insect, such as a species of tick, or perhaps lice, fleas, or bugs.

There is also the possibility of the disease having been originally conveyed from cattle to man through the instrumentality of cattle ticks, for it is well-known that in many parts of India the people are accustomed to stable their cattle beneath the same roof or adjacent to their own houses, and enquiry will often elicitate the statement that people who live thus in close proximity to their domestic animals are frequently attacked by the ticks which fall from these beasts.

It will be seen at once that the discovery recorded in this article disposes once and for all of the Malta fever theory of the causation of *kala-azar*, although of course it does not necessarily negative the occurrence of this former disease in Assam.

It is hardly necessary to refer to the malarial theory of the etiology of *kala-azar*, because this has been abandoned as no longer tenable by all competent authorities.

I may, however, record the fact that the examination of considerably over twelve hundred blood films from cases of this disease has resulted in the finding of malarial parasites in less than fifty.

Among those showing malarial parasites, Quartan, Benign Tertian and Malignant Tertian in single and mixed infections, have been recorded in about equal proportions.

In spleen smears no malarial parasites have been seen, but old malarial pigment occurred in about half the specimens examined.

In regard to the suggestion that was thrown out at the last British Medical Association Annual Meeting, hinting at a species of trypanosome as the cause of *kala-azar*, I may state that little direct evidence can be brought forward in support of this idea. So far, although I have examined four or five thousand blood films from all kinds of fever cases during the past five years, I have never found any trace of a trypanosome in human blood, neither have I been able to discover trypanosomes in the blood of any species of mammal in this part of India. I have, however, frequently found trypanosomes present in the blood of two species of mud-fish, which live in the bheels of this part of Assam.

The examination of several hundred of these fish brought to light a strange fact, which has a special interest after the suggestion which has been made as to the possibility of *kala-azar* being trypanosomiasis.

It appears that mud-fish taken from marshy places adjacent to coolie lines in a great number of cases harbour trypanosomes. The fish taken from bheels adjacent to a large set of lines in which *kala-azar* had broken out, in nearly every instance were the hosts of this parasite.

Thirty odd fish of this particular species, taken from a bheel adjoining a village which had been attacked by *kala-azar*, showed 100 per cent with trypanosomes. Fish of this kind from other parts of the district, or from other parts of Assam (Gauhati), were entirely free from this parasitic invasion.

What the explanation of this fact may be I cannot suggest, but the existence of diseased fish apparently only in water subject to faecal contamination, and the occurrence of this disease specially among fish in bheels adjacent to *kala-azar*-infected villages and lines, is a fact which appears to merit further investigation.

ENLARGED PROSTATE.

BY W. J. WANLESS, M.D., *Miraj*.

With special reference to the disease in Indian subjects and the question of choice of operation. With report of six complete Suprapubic Prostatectomies.

(Continued from page 48.)

Case No. I.—Waman Rangnath, aged 55, Brahmin, residence Fulthan, 75 miles from Miraj, admitted 15th July 1902.

History and description.—Patient enjoys fair general health, is slightly anæmic, fairly well nourished, heart and lungs normal.

Present trouble began a year prior to admission with burning and frequent micturition,