

A NOTE ON THE NATURAL OCCURRENCE OF PIROPLAS- MOSIS IN THE MONKEY (CERCOPITHECUS).

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DURING the months of May and June last three batches of monkeys (*Cercopithecus*), making fourteen in all, were sent to me for experimental purposes. The first lot of four monkeys arrived on May 15th, and on taking their temperatures the following evening it was found that they all had fever varying from 103·8° to 106·4° F. Blood films were taken and examined the following day, but nothing was then found save a rather marked degree of polychromatophilia. That evening, May 17th, the temperature of one of the monkeys was found to be 110·4°, the animal was moribund, and died within two hours. An autopsy was made next morning, but nothing abnormal could be found. That afternoon, in examining a fresh blood preparation, a non-pigmented pear-shaped endocorpuscular body was found. This body was single, pear-shaped when first seen, and gradually changed its shape, becoming first oval and then again pear-shaped but with the thin end now at the opposite extremity. No protrusion of pseudopodia was observed.

This discovery led to the prolonged re-examination both of the films already stained and of fresh ones. In every case, including that of the dead monkey, piroplasmic bodies were found to be present in very small numbers, usually not more than two or three being found in a large blood film. Stained by Leishman's method the commonest form seen was a round or ovoid endocorpuscular blue body with a red dot of chromatin situated nearer to the periphery than to the centre of the body. In a few cases corpuscles were found containing two of these bodies situated close together.

On June 19th six monkeys, and on June 29th four more were

received. All their temperatures were found to be high, and in every case examination of the blood showed the presence of piroplasma.

Since the discovery of the parasite very many blood examinations have been made, and it has been found that the round form of parasite is the commonest, but that distinctly pear-shaped forms also occur. The double forms are exceedingly rare, and the two parasites in this case are always almost circular. Only once again has the parasite been seen in fresh blood; the appearance and change of shape were then exactly as described above. A few extracorporeal forms have been seen, in all respects resembling the intracorporeal forms.

The parasites vary in size. The more common round form has a diameter usually of 1.5μ . The pear-shaped forms are as a rule larger— 2.5μ by 1.5μ —the largest one measured was 3μ by 2μ .

The only occasion on which the parasites were found in any number was on a day when a blood film was taken in the morning from a monkey with a normal temperature. Parasites were found to be much more numerous than usual, and it was remarked that the same evening the temperature of this monkey rose to 106.8° . But for this one occasion there has been little variation in the number of parasites found, the number remaining about the same whether the temperature be high or normal. But it must be said that this was the only time on which a blood film was obtained just before such a marked rise of temperature.

Course of the disease. Of the fourteen monkeys six have died. Two of these latter had been injected with *Trypanosoma* and need not be noticed; one of the other four died of hyperpyrexia, one of septicaemia following injury, and in two nothing could be found except signs of obstinate constipation. One of these two last monkeys had had faecal vomiting, and the actual cause of death was inhalation of vomit and suffocation, but in neither case could any cause for the constipation be found. Smear preparations from the organs were made in all cases except in the one showing hyperpyrexia, where the monkey died before a diagnosis had been made and before the disease was even suspected. In no case could it be said that the parasites were present in greater numbers in the smears than in the heart's blood.

The course of the disease in the three of the eight monkeys still alive is shown in the accompanying charts. Chart 1 is of a monkey of the first series, chart 2 of one of the second, and chart 3 is of one of the third series. Charts 1 and 2 show the course of the disease until the monkeys were used for other experiments, chart 3 is brought up

to date as the monkey has not so far been used for anything else. Each chart is typical of the disease in the corresponding series of monkeys. It will be seen that at first there were occasional marked rises of temperature, followed by a gradual fall extending sometimes over several days. Later on there are still sudden rises, but the fall is much more prompt. Gradually these exacerbations ceased and the temperatures became nearly normal; but slight rises to about 103° still occur and the parasite can nearly always be found in the blood. The animals' general condition has always been good, they show no loss of appetite and do not appear at all sick.

Source of the disease. All the monkeys were caught by four men in the same district (Kikuyu). After capture they were kept for a couple of days in a native village, and were then brought in to the district officer, who kept them in a cage in his compound until there were enough collected to be forwarded by train. Infection might therefore have taken place either before capture, in the native village, or at the district officer's quarters. At first I was inclined to think that the disease must have been contracted at one of the two last places, but on comparing all the charts it is seen that the temperatures of the monkeys of the third series were much lower on arrival here than were those of the second. Also, taking the charts of the third series, it is seen that they correspond closely with those of the first and second series at the same dates. It seems likely, then, that all the monkeys contracted the disease at about the same time, and this could only have been before capture.

No ticks were found on any of the monkeys nor in the crevices of the box in which the first four arrived.

The only other animals available for experimental inoculation with the blood of these monkeys were dogs. Two were injected subcutaneously with blood. The first dog, an aged pariah, showed neither rise of temperature nor parasites in the blood. The second, a mongrel terrier puppy, showed a slight rise of temperature to 103° on the nineteenth day after inoculation, but no parasites could be found in the blood, the temperature returned to normal and the dog remains in good condition.

NOTE. In the charts the sign + signifies a moderate number of parasites, + · parasites scanty, + · · very scanty, - signifies no parasites found.

CHART I. *Piroplasmosis in Monkeys.*

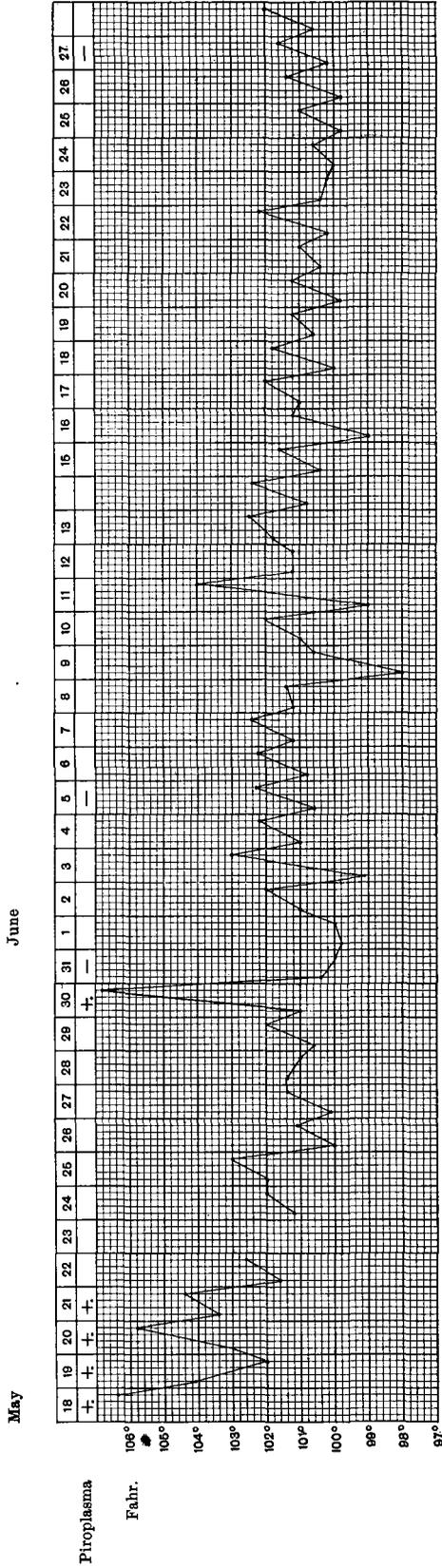


CHART II. *Piroplasmosis in Monkeys.*

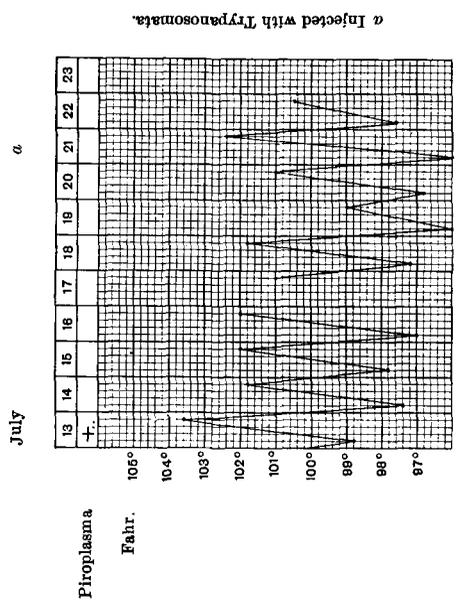
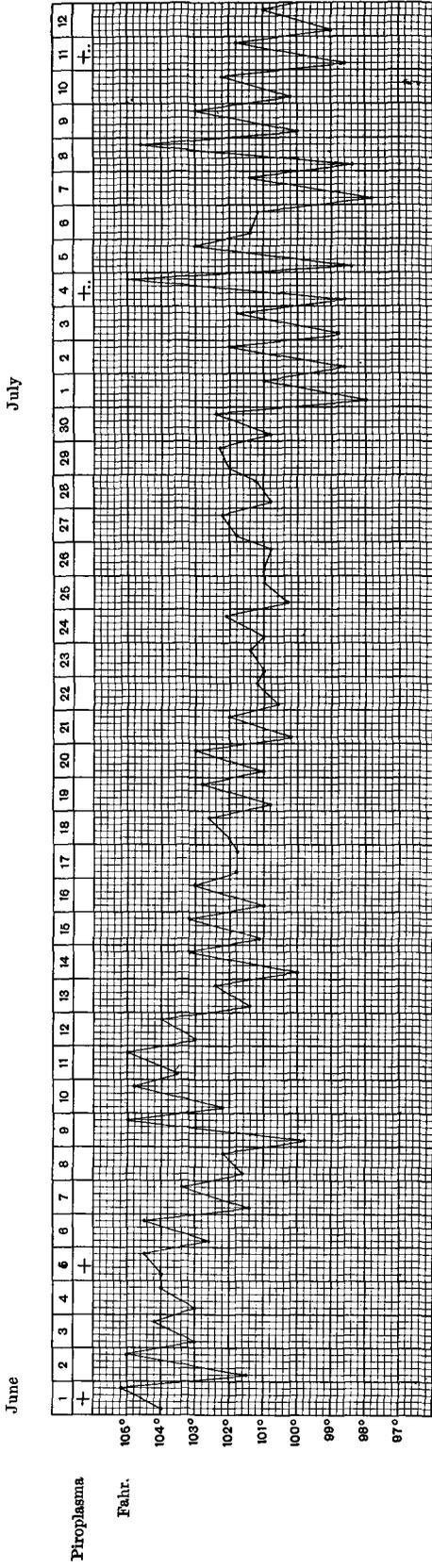


CHART III. *Piroplasmosis in Monkeys.*

