On a Schizotrypanum from a Bat of Brazil (*)

by

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(With plates XXIX—XXX).

During our recent stay in Lassance (State of Minas Geraes), we examined the blood of several mammalia, in search of trypanosomes. We met with the following animals infected under natural conditions: two dogs, four armadillos and five bats. The parasite from the armadillos and the dogs was identified as being Schizotrypanum cruzi, by means of inoculations and histological examinations; it was not the first time we isolated the parasite from these animals in the same place.

The bats we examined belong to only one species, the determination of which is being made (Phyllostomidae); the abode of almost all of them was the ceiling of the house we inhabited. Out of twenty two bats examined we found five infected with trypanosomes, or 22.7%. Only in one individual were the parasites numerous, whilst in the others the blood infection was very slight.

The flagellated form of the parasite morphologically resembles that of S. cruzi, as already noted by some authors in the case of haemoflagellates in Cheiroptera of other countries. Measuring about 20 micra in length, it has a large blepharoplast near the posterior extremity and an oval nucleus, situated medially or nearer the anterior extremity. In peripheric blood we saw no trypanosoma in course of division; on examination of fresh blood, some forms show more rapid movements than others.

We made the histological examination of several organs (heart, spleen, liver, lung, kidney, intestine, brain, striated muscle) of three infected bats; in two of them, which presented rare trypanosomes in blood, we saw no form of multiplication in the tissues. In one specimen, very infected (No 3), we found in sections of the lung and small intestine two cells with numerous parasites under the form of leishmania, more or less oblong.

The cells are relatively large with a single, central, spheric nucleus

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and a cellular membrane of slight thickness. In the lung, the parasited cell is located in the very parenchyma of the organ and in the intestine, in the muscular layer, in both organs near the capillaries, without any evidence of inflammatory reaction. These cells measure 43 by 27 μ (lung) and 72 by 50 μ (intestine); according to M. Torres, who examined our preparations, they resemble cystic gigantocytes described by him in tatusiae infected by *S. cruzi*.

With the blood of a bat slightly infected we made inoculations into two guinea-pigs: one died on the next day and the other 15 days afterwards, with negative examinations of blood in the fresh state.

Two guinea-pigs were inoculated on the 10-IV-33 with blood from a bat fairly infected (No. 3), in the organs of which we had found the parasited cells:

Guinea-pig No. 1: examined almost daily during more than 50 days, it never presented trypanosomes in peripheric blood. The complement fixation test, Machado's reaction, performed by Dr. E. Villela on the 9th and 25th of may was negative.

Guinea-pig No. 2: the examinations of fresh blood, repeatedly made during 30 days, were also negative. After inoculation on the 9-V-33 with *S. cruzi* (a sample freshly isolated from a dog) it acquired the infection in a normal lapse of time. On the same day, prior to the inoculation, we made a passage of 3 to 4 cm. of its blood into a guinea pig, which died on the 30-V-33 presenting neither trypanosomes in blood nor parasitic forms in the heart muscle. Machado's reaction was negative on the 9-V-33 and slightly positive on the 26-V-33 (E. Villela) in the serum from guinea-pig No. 2.

Guinea-pigs Nos. 1 and 2 continue under observation.

The experiments we have just reported above, on account of their small number, are not sufficient to convey a definite conclusion regarding the systematics of the trypanosoma we met with in bats at Lassance. They, however, lend support to the hypothesis that we are dealing with a non-pathogenic parasite, possibly *Trypanosoma vespertilionis* Battaglia 1904, the first trypanosoma described in Chiroptera. The forms of multiplication of this flagellate, which does not divide itself in blood, were unknown until Chatton's and Courrier's works (1921), who encountered them in several organs and included their species in the genus *Schizotrypanum* Chagas 1909, under the name *Schizotrypanum pipistrelli* nowadays regarded as synonymous with that of Battaglia.

Chatton and Courrier described large cysts surrounding a thin membrane, at times with nuclear remainders which conveyed the suppo-
sition of their initially intracellular location. Containing numerous cri-thidiomorphic parasites these cysts evolve in the connective tissue of several organs, such as: stomach, intestine (mucosa and submucosa), gall bladder, kidney, bladder, spleen, ovary, womb, epididymis. At times attaining 200 micra in diameter. These authors found no cysts either in lung or in the muscular tunica of the intestine.

The trials of transmission of *S. vespertilionis* to laboratory animals have been negative, except those of Battaglia (1914) who succeeded in infecting rabbits; no other experiments confirming those of this author have yet been reported.

Recent studies in a focus of American trypanosomiasis in Panama, made by H. C. Clark and L. H. Dunn (1932), have shown the possibility of finding Cheiroptera infected by *S. cruzi* in natural conditions. These authors verified a trypanosoma infection in thirty bats of various genera, in a total of 161 individuals examined (18.6%), having succeeded in transmitting the infection to a white rat (No. 2) by means of inoculation of blood from three young bats *Artibeus jamaicensis jamaicensis*. After an incubation of 15 days, rat No. 2 presented trypanosomes in blood; from this rat the infection was transmitted to another and, later on, to a guinea pig and other animals (white mice and dogs). Although the trypanosomes were at times very numerous in the peripheral blood, the authors found no parasitic forms in the tissues of bats infected in natural conditions. Those investigators also succeeded in infecting bats with *S. cruzi* taken from man and dog.

The fact that Clark and Dunn performed these investigations in a region having cases of Chagas' disease, apart form armadillos, oppossums, dog, squirrel, and numerous *Triatoma geniculata* infected with *S. cruzi*, induces the belief that the Cheiroptera of that region may also present themselves infected by this parasite in natural conditions; it however does not exclude the possible existence of *S. vespertilionis* in bats of Panama.

In our case, in a zone of endemic trypanosomiasis we also verified a high percentage of Cheiroptera infected by a *Schizotrypanum*. The experiments performed up to now would rather demonstrate that this flagellate is not transmissible to guinea-pigs by inoculation of contaminated blood, the same not being the case in regard to the samples of *S. cruzi* obtained from dogs and armadillos of the same region. The possible coexistence of both parasites, so closely related to one another, — *Schizotrypanum cruzi* Chagas, 1909 and *Schizotrypanum vespertilionis* (Battaglia, 1904), — as seems to be the case at Lassance and very likely in other regions, points to the importance and the necessity of deeper studies on the biology of trypanosomes from bats.
EXPLANATION OF THE PLATES XXIX—XXX

PLATE XXIX

Fig. 1—Cell of the lung from bat Nº 3, with numerous parasites. Zenker, Haematoxyline-eosine. Enlargement: 950 times.

Fig. 2—Parasited cell of the intestine from bat Nº 3. Zenker, Haematoxyline-eosine. Enlargement: 440 times.

PLATE XXX

Fig. 3—The same cell as in Fig. 2. Enlargement: 950 times.

(Photomicrographs by J. Pinto).
Dr. Emmanuel Dias: Sobre um *Schizotrypanum* de um morcego do Brasil.
On a *Schizotrypanum* from a Bat of Brazil.