

THE CAUSE OF RAT-BITE FEVER.

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PLATE 33.

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Four cases of rat-bite fever have recently come under our observation, and we have been able to make a systematic study of two of them.

The symptoms of the disease, which usually begin after an incubation period of from 10 to 27 days, consist of chills, fever, headache, and malaise. Inflammation is soon observed at the site of the apparently healed bites, with pains in the limbs on the affected side of the body, dark red skin eruptions, and swelling of the lymph glands. The attack with its local manifestations and high fever continues for from 3 to 7 days, the duration varying in individual cases. It alternates with an afebrile interval of 2 or 3 days. All the cases that came under our observation showed this picture, which may be considered typical of rat-bite fever.

Our investigations were conducted in the following manner. On August 9, 1915, when one of the patients was showing active symptoms, a sterile excision was made of a small piece of skin from the arm. This piece of skin showed the typical exanthem described above. The excised tissue was placed under dark-field illumination and examined microscopically, and in it were observed numerous actively moving spirochætæ. The skin tissue and also blood drawn from the patient were inoculated into monkeys, guinea pigs, and white rats. It was possible to infect all the animals inoculated in this manner, and to transmit the disease from them to other animals.

The study with the second patient was even more detailed. During the second attack a swollen lymph gland was punctured, and an India ink preparation made of the exudate, according to the

method of Burri. At the same time, a section of the excised lymph gland was impregnated with silver, according to Levaditi's method. The spirochætæ were identified in both preparations (Fig. 1).

The organism is somewhat larger than *Spirochæta pallida*, but smaller than *Spirochæta duttoni* and *obermeieri*.

One of the patients was treated with mercury, and the other with salvarsan. Both recovered. In treating these cases we recalled the fact that in recurrent fever, one of the spirochætal diseases which shows a temperature curve similar to that of rat-bite fever, salvarsan has proved effective. Syphilis, also, which resembles rat-bite fever in swelling of the lymph glands and skin eruptions, is improved or cured by salvarsan or mercury.

Hence, not only on the basis of the microscopic findings, but also by comparison with related diseases, we are led to the conclusion that the spirochæta discovered by us is in all probability the cause of rat-bite fever. Further investigations on the subject are in progress, and we reserve the privilege of making more definite statements in the future.

EXPLANATION OF PLATE 33.

FIG. 1. Section of a lymph gland impregnated with silver nitrate according to Levaditi's method. In the center is seen a mass of spirochætæ.

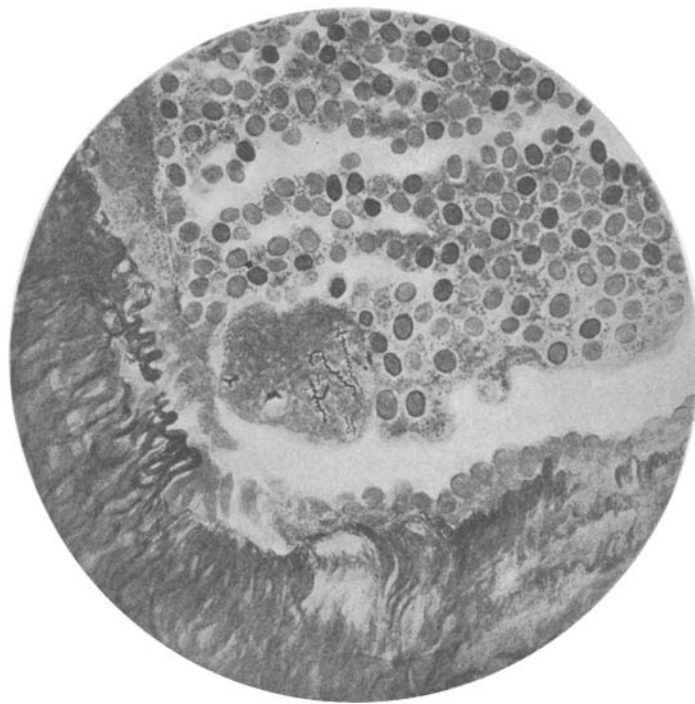


FIG. 1.

(Futaki, Takaki, Taniguchi, and Osumi: Cause of Rat-Bite Fever.)