A CASE OF TUBERCULOSIS IN A RAT[1].

By G. E. BODKIN, B.A., Dipl. Agric. (Camb.), F.Z.S., F.E.S.,
Government Economic Biologist, British Guiana.

In April, 1917, while examining some rats (probably *M. decumanus*) in company with Mr L. D. Cleare, Jnr., my assistant, for external and internal parasites, the lungs of a male specimen were observed to be in a highly diseased condition.

This particular rat whilst under ether was observed to die some time before the others. On commencing to open the thoracic cavity the condition of the lungs was at once observed to be abnormal; on further examination the whole of the left lung was found to have almost completely decomposed into a thick yellowish-green pus.

The right lung was not so badly affected but was of a dull greyish-yellow colour with red blotches. No other lesions were observed in the specimen. The skin and fur were normal though infested with mites and a number of the well-known plague flea (*Xenopsylla cheopis* Roth.). The intestines contained specimens of the Cestode *Hymenolepis diminuta* Rudolphi, a common parasite of rats in this country.

Smears of this pus were made and submitted to Dr F. G. Rose, the Government Bacteriologist. He kindly examined the slides and his report appears beneath.

I may add that these rats were captured in a house inhabited by an individual well known to be tubercular.

Government Bacteriological Dept.
22nd October 1917. Georgetown, Demerara.

In April, 1917, Mr G. E. Bodkin, Government Entomologist, brought me some smears taken from the lungs of a rat. These smears contained many pus-cells, broken-down lung-tissue and slender rod-shaped bacilli, some showing 'beading,' Gram-positive and acid-fast, in fact, morphologically identical with tubercle bacillus.

[1] Published by permission of the Director of Science and Agriculture, British Guiana.

Dean (1905, *Journ. of Hygiene*, v. 99) has described a leprosy-like disease in rats, but the clinical appearances as described by Mr Bodkin are quite unlike those of 'Rat-leprosy,' while the grouping and number of the bacilli did not in the least resemble those of the lepra bacillus.

There is therefore very little doubt in my mind that the bacilli were tubercle bacilli.

F. G. Rose, B.A., M.B. (Cantab.)
Government Bacteriologist,
British Guiana.

NOTE ON BODKIN'S PAPER, ON TUBERCULOSIS IN A RAT[1]

By Louis Cobbett, M.D.

This may have been an instance of avian tuberculosis in the rat, of which cases have been recorded by Max Koch and Rabinowitsch, though, so far as I am aware, destructive lesions in the lungs of this animal have not hitherto been described.

M. Koch and Rabinowitsch (1907)[2] examined fifty wild "grey" (? brown) rats, caught in poultry yards and pheasant preserves, and found six of them tuberculous. The lesions consisted of enlargement of the lymphatic glands, especially the mesenteric, and isolated nodules scattered in various organs. From two of these cultures tubercle bacilli were obtained and proved, on adequate investigation, to belong to the avian type. From this it has been concluded that the rat, like the mouse, sometimes contracts avian tuberculosis and may perhaps play a part in the transmission of the disease from one poultry yard to another.

On the other hand numerous experiments made on the tame "white" rat by the late Royal Commission on Tuberculosis showed this animal to be highly resistant to infection with all three types of tubercle bacilli. Even daily feeding for many months on the bodies of tuberculous guinea-pigs and tuberculous milk failed to produce any serious infection. Intraperitoneal injection alone proved fatal and that too only when enormous quantities of tubercle bacilli (10 to 50 m.g., enough to kill a calf) were introduced. Under these circumstances the rats developed a disease which progressed very slowly, and eventually died—it might be a year or more later. On macroscopic inspection lesions were very

[1] Kindly written at the request of the Editors.—G. H. F. N.

[2] M. Koch and L. Rabinowitsch (1907), Die Tuberkulose der Vögel. *Virchow's Archiv*, Beiheft 2, Vol. cxl, 246 [see p. 368].

https://doi.org/10.1017/S0022172400007038 Published online by Cambridge University Press

inconspicuous, and nothing like cavitation was ever seen in the lungs, but on microscopic examination of crushed pieces of organ it is hardly too much to say that the tissues of the principal organs appeared to have been replaced by bacilli. Doses of 1·0 m.g. did not produce progressive disease[1].

The resistance of the white rat to artificial infection with tuberculosis, especially by feeding, was thus shown to be high, and it is difficult to understand how this animal can become infected naturally. That the brown species (*M. decumanus*) does so we have seen already, but there are no recorded instances known to me of natural tuberculosis in the wild black rat (*M. rattus*) or its near relative the tame "white" rat, nor is anything known about the capacity for resistance to artificial infection of the brown rat. If we may trust certain early experiments of Robert Koch[2] with various species of mice the field mouse is much more susceptible to infection with (mammalian) tubercle bacilli than the white mouse, and it is not unreasonable to suspect that there may be a similar difference of susceptibility in the brown and white rat. But about this we have no information, and even Koch's experiments need to be confirmed under more modern conditions.

[1] L. Cobbett, *The Causes of Tuberculosis*, p. 443.

[2] R. Koch, *Die Aetiologie der Tuberkulose*. Eng. trans. in *Microparasites in Disease*, New Syd. Soc. pp. 164 *et seq.*